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Wisconsin State Horticultural Society

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D. E. Bingham, Sturgeon Bay.
President State Horticultural Society.

ANNUAL REPORT

OF THE

Wisconsin State Horticultural Society

For the Year 1911

VOL. XLI

PART I:

(Part I, containing Constitution, By-Laws, Business Transactions, etc., distributed to members only.)

F. CRANEFIELD, Editor

MADISON, WIS.



MADISON

DEMOCRAT PRINTING COMPANY, STATE PRINTER
1911

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LETTER OF TRANSMITTAL

MADISON, WIS., May 1, 1911.

To His Excellency, FRANCIS E. MCGOVERN,

Governor of Wisconsin.

DEAR SIR:—I have the honor to transmit to you herewith the
Forty-first Annual Report of the Wisconsin State Horticultural
Society.

Respectfully,

FREDERIC CRANEFIELD,

Secretary.

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OFFICERS AND COMMITTEES, 1911.

OFFICERS.

D. E. Bingham, President.....	Sturgeon Bay
C. L. Richardson, Vice-President.....	Stanley
L. G. Kellogg, Treasurer.....	Ripon
F. Cranefield, Secretary.....	Madison

EXECUTIVE COMMITTEE.

D. E. Bingham, Chairman.....	<i>Ex-Officio</i>
C. L. Richardson.....	<i>Ex-Officio</i>
L. G. Kellogg.....	<i>Ex-Officio</i>
F. Cranefield	<i>Ex-Officio</i>
1st Dist., Wm. Longland	Lake Geneva
2nd Dist., G. W. Reigle.....	Madison
3rd Dist., Wm. Toole	Baraboo
4th Dist., F. W. Harland	Milwaukee
5th Dist., H. C. Melcher.....	Oconomowoc
6th Dist., E. Genzenbach	Sheboygan
7th Dist., E. A. Richardson.....	Sparta
8th Dist., N. A. Rasmussen.....	Oshkosh
9th Dist., A. W. Lawrence, Jr.....	Sturgeon Bay
10th Dist., Irving Smith.....	Ashland
11th Dist., O. Flanders	Bayfield

BOARD OF MANAGERS.

D. E. Bingham

L. G. Kellogg

F. Cranefield

COMMITTEE ON TRIAL ORCHARDS.

A. W. Lawrence, term expires.....	Jan. 1914
J. S. Palmer, term expires.....	Jan. 1913
R. J. Coe, term expires.....	Jan. 1912

LOCATION OF TRIAL AND DEMONSTRATION ORCHARDS.

Wausau, Marathon County, 10 acres.....	Established 1897
Medford, Taylor County, 3 acres.....	Established 1903
Poplar, Douglas County, 7 acres.....	Established 1904
Maple, Douglas County, 3 acres.....	Established 1906
Barron, Barron County, 5 acres.....	Established 1906
Manitowoc, Manitowoc County, 5 acres.....	Established 1907
Gays Mills, Crawford County, 6 acres, (1 A. Grapes) ..	Established 1907
Sturgeon Bay, Door County, 5 acres.....	Established 1908
Whitehall, Trempealeau County, 5 acres.....	Established 1908
Lake Geneva, Walworth County, 5 acres.....	Established 1908
Sparta, Monroe County, 1 acre (Grape Station).....	Established 1908

The Improvement of Rural School Grounds. (See p. 143.)

Dist. No. 6. Town of Baraboo, Sauk Co.

Dist. No. 5. Town of South Lancaster, Grant Co.

Dist. No. 10. Town of Manitowoc Rapids, Manitowoc Co.

Dist. No. 3. Town of Sevastopol, Door Co.

Dist. No. 2. Town of Fond du Lac, Fond du Lac Co.

Dist. No. 1. Town of Genesee, Waukesha Co.

LIST OF FRUITS RECOMMENDED FOR CULTURE IN WISCONSIN.

The behavior of varieties of fruits is influenced very largely by environment. The conditions of soil, exposure and latitude over such an extensive area as the state of Wisconsin vary greatly and no list can be given that will prove satisfactory in all localities. The following provisional lists were prepared by the Trial Orchard Committee. Hardiness of plant and fruit bud has been the leading thought in the selection of varieties.

APPLES (General List).

Alexander, Astrachan (Red), Autumn Strawberry, Dudley,
Fall Orange, Fameuse (Snow), Golden Russett, Hibernial,
Lowland Raspberry, Longfield, Lubsk Queen, McIntosh,
Malinda, McMahan, Newell, Northwestern Greening, Oldenburg (Duchess), Patten Greening, Perry Russett, Plumb Cider, Scott, Tetofski, Talman (Sweet), Utter, Wealthy, Westfield (Seek-no-Further), Windsor, Wolf River, Yellow Transparent.

APPLES (Lake Shore List).

In addition to the above many other varieties including the following may be successfully grown in the extreme southern part of the state and in the counties bordering on Lake Michigan. Baldwin, Eureka, Fallwater, Gano, King, Northern Spy, Pe-waukee, Willow Twigg, York Imperial, Bellflower.

APPLES (Commercial Orchard List).

It is generally conceded that a commercial orchard should consist of but few varieties; the following are suggested: Dudley, Fameuse, Longfield, McMahan, McIntosh, Northwestern Greening, Oldenburg, Scott, Utter, Wealthy. Yellow Transparent.

APPLES (Five Varieties for Farm Orchard).

Northwestern Greening, Oldenburg (Duchess), Talman (Sweet),
Wealthy, Yellow Transparent.

APPLES (For Trial).

These are all promising varieties but have not been extensively
grown in any part of the state: Gem City, Hanko, Lily, Wen-
dorff, Zettle Bellflower.

CRABS.

Brier Sweet, Hyslop, Lyman, Martha, Sweet Russett,
Transcendent, Whitney.

PLUMS.

Of the classes commonly cultivated, viz.: European, Japanese
and Native or American, the last named is the most reliable.

NATIVE PLUMS.

De Soto, Forest Garden, Hammer, Hawkeye, Ocheeda,
Quaker, Rockford, Surprise, Wyant.

EUROPEAN PLUMS.

(Not recommended except along Lake Shore). Lombard, Green
Gage, Moore's Arctic.

JAPAN PLUMS.

(Not recommended except along Lake Shore). Abundance, Bur-
bank.

CHERRIES.

Early Richmond. Montmorency.

GRAPES.

Brighton, Campbell's Early, Concord, Delaware Diamond,
Green Mountain, Moore's Early, Niagara, Worden.

BLACKBERRIES.

Briton (Ancient), Eldorado, Snyder.

STRAWBERRIES.

Varieties starred have imperfect flowers and must not be planted alone.

Bederwood, *Crescent, Clyde, Dunlap, Enhance, Gandy,
Glen Mary, *Haverland, Lovett, *Sample, Splendid, *War-
field.

TWO VARIETIES STRAWBERRIES FOR FARM GARDEN.

Dunlap, *Warfield.

RASPBERRIES.

Black: Conrath, Cumberland, Gregg, Older.
Red: Cuthbert, Loudon, Marlboro.
Purple: Columbian.

CURRANTS.

Red: Red Cross, Red Dutch, Long Bunch Holland, Victoria.
Perfection.

White: White Grape.

Black: Lee's Prolific, Naples.

GOOSEBERRIES.

Downing.

PEARS.

On account of the prevalence of blight and winter killing, pears are not generally recommended for Wisconsin. Good crops are occasionally produced under favorable conditions, especially in the southeastern part of the state. The following list includes both early and late varieties.

Anjou, Bartlett, Clairgeau, Clapp Favorite, Early Berga-
mot, Flemish Beauty, Idaho, Kieffer, Laurence, Louise,
Seckel, Sheldon, Vermont Beauty.

TREES AND SHRUBS RECOMMENDED.

EVERGREENS.

For screens and windbreaks—Norway Spruce, White Spruce, White Pine, Austrian Pine, Scotch Pine.

For hedges and screens for shearing—Norway Spruce, American Arbor Vitae, Red Cedar.

For lawns—Norway Spruce for backgrounds. For groups—American Arbor Vitae, Red Cedar, White Spruce, Colorado Blue Spruce, Austrian Pine, Scotch Pine.

For small lawns—Arbor Vitae, Savin Juniper, Mugho Pine.

DECIDUOUS TREES.

The more desirable ones are starred, and a further selection of five is indicated by double stars.

**American Elm, Box Elder, Black Cherry, Carolina Poplar, **Green Ash, *Hackberry, Honey Locust, Larch, **Linden, **Norway Maple, *Scarlet Maple, **Silver Maple, *Sugar Maple, Scarlet Oak, *White Oak, White Ash.

DECIDUOUS ORNAMENTAL TREES.

This class includes smaller deciduous trees of more value for ornament than for shade or defense.

Crab (native), also Bechtel's double flowering crab, Cut-leaved Weeping Birch, Tartarian Maple, Ginnala Maple, Kentucky Coffee Tree, Mountain Ash, Weeping Willow, Russian Mulberry.

LIST OF SHRUBS RECOMMENDED.*

Scientific Name.	Common Name.
<i>Berberis Thunbergii</i>	Thunberg's Barberry
<i>Berberis vulgaris</i>	Common Barberry
<i>Berberis vulgaris</i> var. <i>atropurpurea</i>	Purple-leaved Barberry
<i>Corylus maxima</i> var. <i>purpurea</i>	Purple Filbert
<i>Diervilla florida</i>	Weigela (rose)
<i>Diervilla candida</i>	Weigela (white)
<i>Diervilla hybrida</i>	Weigela (Eva Rathke)
<i>Diervilla hybrida</i> var. <i>Desboisii</i>	Desbois Weigela
<i>Eleagnus argenta</i>	Silver Berry
<i>Euonymus Europaeus</i>	Strawberry Tree
<i>Hibiscus Syriacus</i>	Althea
<i>Hippophae rhamnoides</i>	Sea Buckthorn
<i>Hydrangea paniculata</i> gr.....	Garden Hydrangea
<i>Lonicera Ruprechtiana</i>	Ruprecht's Honeysuckle
<i>Lonicera Tartarica</i>	Tartarian Honeysuckle
<i>Morus Alba</i> var.....	Tea's Weeping Mulberry
<i>Philadelphus coronarius</i>	Mock Orange
<i>Philadelphus coronarius</i> var. <i>aurea</i>	Golden Mock Orange
<i>Philadelphus inodorus</i>	Mock Orange, large fl.
<i>Pontentilla fruticosa</i>	Shrubby Cinque Foil
<i>Prunus nana</i>	Russian Almond
<i>Rhodotypos kerrioides</i>	Rhodotypos
<i>Rhus Cotinus</i>	Smoke Bush
<i>Ribes aureum</i>	Missouri Flowering Currant
<i>Robinia hispida</i>	Rose Acacia
<i>Rosa rugosa</i>	Japanese Rose
<i>Sambucus nigra</i> var. <i>aurea</i>	Golden Elder
<i>Shepherdia argentea</i>	Buffalo Berry
<i>Spiraea Bumalda</i>	Bumalda Spiraea
<i>Spiraea Bumalda</i> var.....	Anthony Waterer Spiraea
<i>Spiraea Billardii</i>	Billard's Spiraea
<i>Spiraea Douglassii</i>	Douglas' Spiraea
<i>Spiraea Japonica</i>	Japanese Spiraea
<i>Spiraea salicifolia</i>	Meadow Sweet Spiraea
<i>Spiraea Van Houtte</i>	Van Houten's Spiraea
<i>Syringa Persica</i>	Persian Lilac
<i>Syringa villosa</i>	Chinese Lilac
<i>Syringa vulgaris</i>	Common Lilac
<i>Tamarix Pallassi</i> Desv. (<i>Tamarix Amurense</i> Hort.)....	Amur. Tamarix
<i>Viburnum Opulus</i> vr. <i>sterile</i>	Snowball

* From bulletin 108, Wisconsin Experiment Station, by F. Cranefield.

ROSES.

Hardy garden—Harrison Yellow, Persian Yellow, Madame Plantier.

Twelve varieties hybrid perpetual—Paul Neyron, Mrs. J. H. Laing, Gen. Jacqueminot, Dinsmore, Marshall P. Wilder, Coquettes des Blanches, Earl of Dufferin, Jules de Margottin, Vick's Caprice, Magna Charta, Prince Camille de Rohan, General Washington.

Moss roses—Perpetual White, Salet, Paul Fontine, Henry Martin.

Climbers—Prairie Queen, Russell's Cottage, Seven Sisters, Gem of the Prairies, Crimson Rambler.

Five hybrid perpetual roses for the garden: Gen. Jacqueminot, Magna Charta, Margaret Dixon, Mrs. John Laing, Paul Neyron.

COMPARATIVE HEIGHT AT MATURITY OF DIFFERENT SHRUBS.

The height at maturity of the different species must be considered when planting in groups or borders. This will depend so much upon their environment that it is difficult to give the height in feet that any species may be expected to attain. When different kinds are planted under like conditions it may be assumed that relative heights will be maintained. The following may serve as a partial guide in planting:

Tall—10 to 15 Feet.

Barberry (Common)
 Lilac, Common
 Lilac, Japanese
 Golden Elder
 Lilac Jossika's
 Honeysuckle, Fly
 Mock Orange
 Honeysuckle, Slender
 Sea Buckthorn
 Honeysuckle, Tartarian
 Siberian pea tree (tall)
 Honeysuckle, Tartarian white

Medium—6 to 10 Feet.

Barberry, purple
 Crandall Currant
 Silver Berry
 Honeysuckle, Blue

Strawberry Tree
 Japanese Rose
 Spiraea, Billard's
 Lilac, Chinese
 Lilac, Persian
 spiraea, Douglas
 Purple Filbert
 Spiraea, Three-lobed
 Rose Acacia
 Spiraea, Van Houten's
 Russian Almond
 Weeping Mulberry
 Siberian Pea tree (dwarf)
 Wiegela

Dwarf—2 to 6 Feet.

Althea
 Spiraea, Anthony Waterer
 Barberry, Thunberg's
 Spiraea, Ash-leaved (Sorbaria)
 Cinque Foil
 Spiraea, Bumalda
 Honeysuckle, Albert's
 Spiraea, Japanese
 Hydrangea
 Spiraea, Meadow Sweet
 Rhodotypos
 Spiraea, Plum-leaved

A LIST OF NATIVE SHRUBS DESIRABLE FOR PLANTING ON HOME GROUNDS.

Scientific Name.	Common Name.
Arctostaphylos Uva-ursi.....	Bearberry
Ceanothus Americanus.....	New Jersey Tea
Cephalanthus occidentalis.....	Button Bush
Cimaphila umbellata.....	Prince's Pine
Comptonia aspleniflora.....	Round-leaved Dogwood
Cornus stolonifera.....	Red Osier Dogwood
Dirca palustris.....	Leatherwood (Wickopy)
Epigaea repens.....	Trailing Arbutus
Euonymus atropurpureus.....	Wahoo
Hypericum pyramidatum.....	St. John's Wort

<i>Ilex verticillata</i>	Winterberry (Holly)
<i>Juniperus procumbens</i>	Trailing Juniper
<i>Myrica Gale</i>	Sweet Gale
<i>Physocarpus opulifolia</i>	Ninebark
<i>Rhamnus catharticus</i>	Buckthorn
<i>Rhus Typhina</i>	Staghorn Sumac
<i>Rhus Glabra</i>	Smooth Sumac
<i>Rhus copallina</i>	Dwarf Sumac
<i>Ribes rubrum</i>	Wild Rose Currant
<i>Ribes floridum</i>	Wild Black Currant
<i>Rosa lucida</i>	Wild Rose (tall)
<i>Rosa blanda</i>	Wild Rose (dwarf)
<i>Rubus odoratus</i>	Purple-flowered Raspberry
<i>Rubus Nutkanus</i>	White-Flowered Raspberry
<i>Sambucus Canadensis</i>	Common Elder
<i>Sambucus pubens</i>	Scarlet Elder
<i>Symphoricarpus racemosus</i>	Snowberry
<i>Symphoricarpus vulgaris</i>	Coral Berry
<i>Taxus baccata</i>	Ground Hemlock
<i>Viburnum lentago</i>	Sheepberry
<i>Viburnum dentatum</i>	Black Haw
<i>Viburnum acerifolium</i>	_____
<i>Viburnum opulus</i>	Bush Cranberry
<i>Zantoxylum Americanum</i>	Prickly Ash

SIX SHRUBS FOR HOME GROUNDS.

The following are all reliably hardy in any part of the State:

Common Lilac, Tartarian Honeysuckle, Rosa Rugosa, Mock Orange
or Syringa, Van Houten's Spiraea, Common Barberry.

THREE HARDY PERENNIAL VINES.

Ampelopsis or American Ivy (native in southern Wisconsin). Wild
Grape, Trumpet Honeysuckle.

BLACK LIST.

A LIST OF SHRUBS ALL OF WHICH HAVE BEEN TESTED ON
THE GROUNDS OF THE EXPERIMENT STATION AT MADI-
SON AND FOUND UNSATISFACTORY.

Scientific Name.	Common Name.
<i>Azalea arborescens</i>	Rhododendron
<i>Azalea viscosa</i>	Rhododendron
<i>Azalea nudiflora</i>	Azalea
<i>Azalea mollis</i>	Azalea
<i>Calycanthus floridus</i>	Sweet-scented shrub
<i>Caryopteris Mastacanthus</i>	Blue Spiraea
<i>Chionanthus Virginica</i>	White Fringe
<i>Clethra alnifolia</i>	Sweet Pepperbush
<i>Colutea arborescens</i>	Bladder Senna
<i>Cornus florida</i>	Flowering Dogwood
<i>Cydonia Japonica</i>	Japanese Quince
<i>Daphne Cneorum</i>	Daphne
<i>Daphne Mezereum</i>	Daphne
<i>Deutzia gracilis</i>	Slender Deutzia
<i>Eleagnus longipes</i>	Goumi
<i>Exochorda grandiflora</i>	Pearl Bush
<i>Forsythia suspensa</i>	Golden Bell
<i>Halesia tetraptera</i>	Snowdrop tree
<i>Itea Virginica</i>	Virginia Willow
<i>Kerria Japonica</i>	Kerria
<i>Ligustrum vulgare</i>	Common privet
<i>Paulownia imperialis</i>	Paulownia
<i>Prunus cerasifera</i> var. (<i>Prunus pissardi</i> Hort.)....	Purple leaved Plum
<i>Prunus Japonica</i>	Flowering Almond
<i>Prunus triloba</i>	Flowering plum (double)
<i>Spiraea Arguta</i>	Arguta Spiraea
<i>Spiraea Thunbergii</i>	Thunberg's Spiraea

The plants of certain of the above named varieties made a good growth each year but have not blossomed unless given thorough
B.

winter protection. In this class are Bladder Senna, Flowering Almond, Flowering Plum and Golden Bell.

The Japanese Quince is hardy of bush but has not borne flowers except when given winter protection. The Goumi will only bear fruit when protected in winter. The double-flowered Almond will blossom freely if given thorough winter protection, otherwise it will kill back severely. The double-flowered Plum grows well and after a mild winter will bear flowers in advance of the leaves; unreliable, however, four years out of five if unprotected.

The others of this list have either died outright or else barely survived.

POISONS USED TO DESTROY INSECTS IN ORCHARDS AND GARDENS.

PARIS GREEN.

A well known poison used to destroy biting insects, as the apple worm, tent caterpillar, potato beetle, etc.

Formula.

Paris Green.....	1 to 2 lbs.
Fresh (unslaked) lime.....	1 lb.
Water	200 gals.

One-half pound of pure Paris Green to 50 gallons of water is sufficient to destroy codling moth and other insects in the orchard and fruit plantation if properly applied.

Add $\frac{1}{2}$ lb. Paris Green to every barrel of Bordeaux mixture and make a complete spray.

ARSENATE OF LEAD.

(A Poison for Biting Insects.)

This poison is better than Paris Green for the following reasons:

- (1) It remains longer in suspension.
- (2) It adheres better to the foliage; one thorough application being sufficient for the entire season.
- (3) It may be used in any reasonable quantity without danger of injury to the foliage.

Use at the rate of 2 to 3 lbs. to 50 gals. of water or Bordeaux.

Add $2\frac{1}{2}$ lbs. of Arsenate of Lead to every barrel of Bordeaux mixture and make a complete spray.

WHITE HELLEBORE.

(For Biting Insects.)

Used to destroy currant and cabbage worms and on fruits and vegetables where more poisonous substances cannot be used with safety.

Formula.

Powdered white hellebore.....	1 oz.
Water	2 to 3 gals.

It may also be used in the powder form mixed with flour, gypsum, soot, etc.

BORDEAUX MIXTURE.

The Universal Fungicide. Not a cure but a preventive of fungous diseases.

Formula.

Copper Sulfate	4 lbs.
Fresh (unslaked) lime.....	5 lbs.
Water	50 gals.

Dissolve the copper sulfate in 25 gals. of water in one barrel or cask. Slake the lime so as to make a paste which dilute to 25 gals. in another barrel.

The lime water should be strained to remove coarse particles which clog the nozzles in spraying.

Pour these two solutions together into a third barrel and the resultant mixture is Bordeaux.

Add 2 to 3 lbs. of Arsenate of Lead to every barrel and make a complete spray.

Caution: Use only wood, copper, earthenware or glass vessels in making Bordeaux.

Stock Solution for Bordeaux.

The above formula and directions may be followed when only small quantities are used. When ten barrels or more are used at one application always employ stock solutions.

For example: Dissolve 400 lbs. sulfate in 50 gals. water.

Slake 100 lbs. of lime and dilute to 50 gals.

Then use the following formula:

Water	(approximately) 45 gals.
Sulfate Solution.....	2 gals.
Lime Solution.....	2½ gals.

LIME SULPHUR COMPOUND.

Home Made.

(From Bulletin 16, W. S. H. S.)

Formula.

Fresh (unslaked) lime.....	15 lbs.
Flowers of Sulphur.....	15 lbs.
Water	50 gallons.

Directions for preparation. In a kettle of at least forty gallons capacity heat twelve gallons of water. In a separate vessel mix fifteen pounds of sulphur with water enough to make a thin paste. Pour the paste into the heated water and when the mixture is near the boiling point add fifteen pounds of lime. After the lime has com-

pletely slaked, boil for one hour, stirring to prevent caking on the sides of the kettle. Then strain into the spray tank (or barrel) and add sufficient water to make fifty gallons of the mixture.

Lime-sulphur wash diluted as above is used only on dormant plants. Where large quantities are used a steam cooking plant is almost a necessity.

SELF-BOILED LIME AND SULPHUR.

(Bulletin 213, N. J. Agr. Exp. Sta., Sept., 1908).

"In this combination only the heat of the slaking lime is relied upon to unite it with the sulphur, and the formula is:

Lime, best quality.....	40 pounds.
Sulphur—flowers	20 pounds.
Water	50 gallons.

Place the lime in a barrel and dust in the sulphur with it, so that the two may be well mingled. Add boiling water enough to start a brisk slaking, and cover with a heavy blanket to confine the heat. Add hot water as needed to keep up the slaking and stir occasionally to aid the combination. Keep this up until the lime is fully reduced and mixed with the sulphur. Then let the combination stand covered for an hour to maintain its heat; afterward dilute with warm water to the desired strength and spray at once.

It should be remembered, in making all these mixtures, that enough heat is needed to melt the sulphur and bring it into combination with the slaking lime. It matters little whether the heat comes from a fire or from slaking lime or from caustic soda. For the mixtures made without fire, the water used in slaking should be boiling hot. If cold water is used the heat of the slaking lime is used up in heating the water, and not enough remains to combine the sulphur. It is only the sulphur in combination with the lime that acts as a scale-killer. The uncombined sulphur helps nothing and the surplus lime is a positive drawback, since it makes the wash too thick to penetrate well." (See also p. 129.)

COMMERCIAL LIME SULPHUR.

Concentrated Lime Sulphur compound is offered by several different firms.

The commercial product is a clear reddish liquid and is used by diluting with cold water.

SPRAY:

WHAT?	WHY?	HOW?	WHEN?			REMARKS
			1ST SPRAYING	2D SPRAYING	3D SPRAYING	
Apple	Scab	Bordeaux Mixture	Just before Blossoms Open	Just after Blossoms Drop	10 days after 2d Spraying.	
	Codling Moth	Arsenate of Lead combined with Bordeaux	Just after Blossoms Drop	10 days later	Last week of July or 1st week of August for 2d brood	1st and 2d Spraying same as 2d and 3d for scab; merely add arsenate of lead to Bordeaux
	Oyster Shell Scale	Lime-Sulphur	March or early April but before growth starts			Do not use Lime-sulphur on growing plants
Cherry and Plum	Mildew and Shot-hole fungus	Bordeaux Mixture 3-4-50	When leaves are about 1/2 grown	10 to 12 days later	10 to 12 days later	
Currant and Gooseberry.	Mildew, blight and Currant worm	Bordeaux and Arsenate of Lead	When leaves are fully developed	2 to 3 weeks later		
Grapes	Mildew and Anthracnose	Bordeaux	Before leaf buds open	2 to 3 weeks later	3rd, 4th and 5th applications at intervals of 2 weeks, if required	
Strawberry	Leaf-spot or blight and leaf eating insects	Bordeaux and Arsenate of Lead	When first leaves appear	After blossoms fall		
Raspberry and Blackberry	Anthracnose and fungous diseases	Bordeaux	As above	2 weeks later		Spray new growth after fruit harvest

AN OUTLINE OF THE WORK OF THE WISCONSIN STATE HORTICULTURAL SOCIETY.

The Wisconsin State Horticultural Society conducts field work at sixteen different points as indicated on the map.

The work was begun in 1897 at Wausau for the purpose of testing the hardiness and adaptability of the different varieties of tree fruits in the northern or "cut-over" regions of the state.

These orchards comprise 55 acres and 5445 trees in addition to two acres of grapes.

The orchards at Wausau, Medford, Barron, Poplar and Maple are "Trial" Orchards, being for the purpose above indicated; the Sparta vineyard is also in this class.

The remaining orchards are located in sections where tree fruits are known to thrive and are designed as "Model" or demonstration orchards to show the best methods of culture, best varieties for market, etc.

An account is opened with each of the "Model" orchards with the confident expectation that a decided margin of profit will be shown at the end of 10 or 12 years. The orchards should then yield profitable crops for 20 years longer with but moderate expense for maintenance.

In these two ways the Society hopes to demonstrate the possibilities of fruit growing in Wisconsin.

The Society has recently undertaken the task of improving the grounds of the 7,000 rural schools of the state. (See 1911 Arbor Day Annual.) A comprehensive plan has been adopted and the first steps taken.

ADDITIONAL AIMS AND PURPOSES OF THE WISCONSIN STATE HORTICULTURAL SOCIETY.

Organized in 1865, being the legitimate successor of the Western Fruit Growers' Association, which was organized in 1853.

Chartered by the State of Wisconsin in 1871.

Purely an educational institution.

Its purpose the advancement of every branch of horticulture throughout the state.

Aims to accomplish this through publications, individual help and Conventions (two yearly).

Issues an annual report (250 pages) containing articles by experts on orchard culture, small fruit and vegetable gardening and the decoration of home grounds. Sent free to members.

Issues a monthly magazine Wisconsin Horticulture which is sent free to members.

WE ANSWER QUESTIONS.

Individual help is furnished through the Secretary, who obtains from reliable sources information on any horticultural topic. No charges for such services.

Receives an annual appropriation from the state for the support of the field work and other activities.

Extends an urgent invitation, a promise of help and the hand of fellowship to all who want to learn about the growing of fruit, flowers or vegetables; to all who love the beautiful in nature a hearty welcome is assured.

Cordially invites every person in Wisconsin who knows something about fruit, flowers or vegetables to become a member, as such persons are needed to help along the splendid work in which the Society is engaged.

D. E. BINGHAM,

President W. S. H. S.,

Sturgeon Bay.

FREDERIC CRANFIELD,

Secretary W. S. H. S.,

Madison.

TRANSACTIONS
OF THE
Wisconsin State Horticultural Society

ANNUAL SUMMER MEETING

Oconomowoc, August 17, 1910.

The meeting was called to order at 10 o'clock a. m., in the City Hall, by President William Toole.

The Invocation was offered by Rev. Mr. Hanks, of Oconomowoc.

ADDRESS OF WELCOME,

By MR. D. C. EDGERTON, Mayor.

Mr. President, Ladies and Gentlemen of the State Horticultural Society. In the two or three years that I have been the chief executive of this little city it has been my very great pleasure oftentimes to welcome gatherings to the city, and I do not know of any duty which falls upon the mayor which is more pleasant. I do not know of anything that is nicer for any of us to have in our own home than to have people come to see us, and the more they come and the better we get acquainted, the more we like it. A friend said to me some years ago when I was down at a bankers' convention that he thought he would stop going to conventions because he was getting the convention habit. I think I am getting the convention habit and I am getting it now because I have the pleasure

so often to welcome conventions to Oconomowoc. But it is a mighty good habit and I am not going to break it up. I never attended a convention yet of any kind that I did not learn something whether it was a convention of those that were interested in the same business in which I made my living or some other business but I always learned something. There seems to be something which pervades the atmosphere when men draw together with a common impulse to develop some idea which is in all their minds that is absorbed by everybody, that establishes a common sympathy, and for that reason I say that I do not want to get over the convention habit, and I hope that in your deliberations in our town you will find the surroundings and the country atmosphere in which you are going to live for two or three days so prolific of good ideas that you will be able, still better than in the past, to make two blades of grass grow where one grew, or more apples to grow on a stem than ever grew on a stem before.

I cannot think of anything this year which we could welcome so much as a convention that would show us that the earth does still produce things to eat. When we figure on the prices of things to eat and find that a bunch of beets costs quite a little more than it used to, we cannot help but be cheered up with such an exhibition as we have here today. We are constantly reminded while we are in this room that there is corn in Egypt. We are going to need it, and for that reason, among very many others which I shall not take the time to enumerate, we are glad to have you here. Our Business League, which is our "boom club" you might call it, takes charge of the entertainment and the needs of such conventions as this, and I believe that they have outlined a program for you which they will through their own representatives carry out, and once more I hope, while you are with us, you will feel so well satisfied with Oconomowoc that you will not only knit those friendships which should be knitted by constantly coming together year after year among yourselves, but that it will instill into your hearts a lasting friendship for our little city. Again I thank you,

RESPONSE

By President WILLIAM TOOLE.

Members of the Horticultural Society and friends of Oconomowoc,—It was with great pleasure that the executive committee of this society first received the invitation from our brother Melcher to hold our meeting here in Oconomowoc. You are all aware that each year we receive several invitations, it is for the committee to consider where we had better go so that the most good will be derived from that meeting, and I will say that we are moved to some extent by the pleasure we expect to derive from it as well. Some of us have knowledge of Oconomowoc, we have heard of its pleasant surroundings, and all of us were impressed with the idea that Oconomowoc was a good place to come to, Oconomowoc people good people to get acquainted with, and those impressions have been strengthened greatly during this short part of our stay here, and I am quite sure with all that there is in store for us, that we will go away feeling that we will be glad to come again.

In the meantime I wish that I could impress you with the idea that our society is bringing something to you. Perhaps we may not in to-day's papers bring out a great deal of wisdom, and it will depend upon the audience whether there will be brought out in the discussion much of value, but we hope that we may impress you with the idea that it will be of value to you to become members and look up our past volumes and come to know the history of our society. While we who represent our society here are quite young in years, yet we have a society that is old in its work, which has done a great deal for the state of Wisconsin. We are quite satisfied, with a membership scattered over all the state, with horticultural ideas that have been broadened as we have been able to observe, that our Horticultural Society has done a great deal to help boom Wisconsin, to help enhance the value of real estate in different parts of the state. Looking into details, I am quite sure that we could prove with figures that are correct, and we want more of this good work. We want not only to benefit

you, but we want you to benefit people in other parts of the state, so that I hope it will be here as with other places, that when we go away we will have strengthened you through a membership in our society, and that you will strengthen our society through your membership.

THE CONSERVATION OF THE CITY DWELLER AND THE GARDEN

C. B. WHITNALL, Milwaukee.

The value of the garden is too seldom appreciated excepting as it may be measured by money. Such a measure indicates its importance to mankind but partially.

The money value of flowers is based on the strength of our natural yearning for them. When so situated that we cannot help ourselves to them. Where some one has been delegated by Mammon to stand between us and our instinctive desire to exact compensation and tribute for such natural influences. This is too true of all large cities, there is not enough there to go around, and many of us go short.

The reason we like flowers is that they are the ecstasy of the regeneration of vegetable life on which we are dependent. It is the same love we have for our mother—one brings us to life, the other sustains us. Our creator and our sustainer appears to be one and the same power.

When we examine into the lower stages of life, it is found difficult at times to tell whether the structure is animal or vegetable. Following upwards there is a separation and it becomes quite easy to tell which is which, but we find that both continue to be as interdependent as when all functions were contained in the one structure. And when animal is deprived of functioning with vegetation disease is the natural consequence.

Vegetative influences, not only of diet, but for environmental effects, are as necessary as the blood in our veins—in fact our blood could not be cleansed but for vegetation—influence on the atmosphere.

Although many of us do not stop to reason nature's clever arrangements to the desired understanding of them, it takes a small amount of serious reflection to convince us that vegetable life is virtually a part of our life.

Man, having grown together with flowers and fruits, (which are simply further developed flowers), for so many generations, we have come to see and feel their influence instinctively—nature's incessant care of us, made reasoning unnecessary. We have crowded into cities, denying ourselves or ignoring these vegetative influences, for the most part unconscious until we wake up to realize that we have been sacrificing health for dollars.

It is the unsatisfied love that has brought into service the Wisconsin Horticultural Society. It is the business of this society to gratify mankind's love—love for flowers and fruit which is not essentially different from our love for each other—when you come to dissect love. You may be excused for not being able to distinguish love or draw a definite line between love and selfishness. This may sound queer to some of you. You may dispute it, but you will have a job on your hands to prove the assertion entirely wrong.

You will all agree to this,—we do love flowers and fruit, and you must admit that we cannot live a natural life without them.

Our Indian didn't have a Horticultural Society. He didn't need one. He obeyed the dictates of nature, and nature makes horticulture a business.

The so-called progress of civilization appears to have been actuated by the desire to get something for nothing. This has forced a division of labor with its consequent development—an occasional sacrifice of first one attribute to our well being, then another, until now we have one-third of our population crowded into large cities, where deterioration is universal, where the third generation of city born are more or less degenerate, where the race would become extinct were it not for new blood injected from fruit laden and floral decorated environments. This is a fact borne out by statistics. A thorough study of the matter requires its consideration from three aspects—the physical, the sociological and the economic. It will be in order today to consider the physical only. The more beautiful the land-

scape, as measured by our initiative sense of beauty—with flowers and fruits in more or less perfection,—the better will the atmosphere be for animal life—we cannot have pure water or utilize sun-light without them.

Atmosphere, water and light are the three God given forces which, if withheld, or diverted from universal use, cause pestilence.

It is the crippling of vegetative functions of which the tree is the dominant factor—that is leaving our city dwellers in distress. Although we have much to say about good or poor land, let us not overlook the fact that our vegetation absorbs about 90 per cent of its material from atmosphere, chiefly noxious gases, which if left in the atmosphere, as is common within the confines of our large cities, we slowly starve, just as we do by insufficient or adulterated food for our stomach. On the other hand, if vegetation does not have this impure atmosphere to cleanse for us, it also takes on a sorry look. We do most of our talking about the elements that are visible, when we take elements from soil without returning it. We see the results and say the land is exhausted and call it poor. These chemicals have been measured and given a commercial rating. I am told that in Germany it has been agreed that the elementary land value in sewage is \$2 a year per adult. According to this Milwaukee is dumping \$500,000 in its pond of drinking water annually. Yet some of our business men declare that if the Socialists undertake to stop this waste, we will bankrupt the city. Surely there are no members of this Horticultural Society that does not know that Wisconsin's rate of productivity is being lessened.

But do they all realize that a corresponding depletion of humanity is taking place? The waste of one causes the waste of the other—like the positive and negative poles of electric forces, there is an endless circuit or vibration of the elements between the animal and vegetable forces which, if interrupted, causes deterioration, we call disease.

We are civilized in Milwaukee as well as other large cities. That means we have assented to rules of the game regardless of results in physique and morality. In spite of this we have agreed that cleanliness is necessary for safety.

But what is cleanliness? Many of us do not know. But we

have learned what it looks like, and we have undertaken to deceive the laws of nature by keeping up appearances. We put our filth out of sight—run sewers underground—into rivers—kept receptacles in back yards and alleys. Yet we arrest a man for carrying a concealed weapon, and allow him to live in a room without sunlight. We cannot break natural laws and escape. To keep clean means to feed to or return to vegetation promptly all animal waste. There is no other way. The land, the garden, if you please, is our only safeguard.

I have spoken of the tree being the dominant factor in vegetation. While it may be permissible to call it dominant, how helpless it is alone. Strange as it may seem, the average farmer appears to be as heedless of the fact as the city dweller. Notice how quickly nature covers up with shrubbery and flowers a gap in the wood, to keep out the drying winds. Notice how spraying becomes necessary when the natural floor covering and wind breaks are not maintained around our fruits. If our hills are not kept covered with trees, shrubbery and perennials, the level or lower fields will suffer for moisture. The attempt of the modern Horticulturist to ignore the natural companionship or co-operation of various plants is one reason why we are fighting insect pests. There is a vegetable sociology as well as human. There is an interdependence between the classes of vegetation as well as between vegetable and animal.

I feel that humidity is the most important factor in horticulture or agriculture that may be considered as being within our control—and our control comes within the functions of applied forestry. Now in view of these statements or assertions, let us consider the city dweller and the garden. The city dweller has become a machine attachment diversified from the garden. The division of specialized labor has increased our producing capacity. But a man who keeps doing the same work from Monday a. m. to Saturday p. m., stops thinking, activity of mind is impossible—like the non-use of a muscle—his thinker loses power. Therefore while factories have grown larger the average mind for a while deteriorated.

This fact, together with the devitalizing environment, in which his home and labor is situated, puts him in a sorry plight. He has been going to pieces. This is why Great Britain has lowered their army standard of humanity for the third

time—and why Germany has been replatting her cities, and is now devoting so much time and attention to land utility for physical security.

It is why Milwaukee is now establishing its first Agricultural School of which we want three right away. It is why the city dweller's ranks are constantly replenished by fresh blood from the agricultural districts. It is why 80 per cent of the controlling energy of our cities was born on the farm. In short, it is why the land worker is destined soon to become the power and brains of our country. Our modern captains of industries and finances are proving their narrow minds and near-sightedness to have been entirely wasteful of our natural resources and humanity alike.

Of course, much of what is required for the restoration of normal conditions cannot be accomplished by individual effort. The individual finds himself handicapped by conditions over which he, as an individual, has no control.

The city and state must accept the responsibility for conditions which the city creates. *But*, the city is made of the individuals who in themselves must direct, and it is therefore incumbent on ourselves to acquire the personal experience necessary for intelligent control.

The fundamental basis for a higher and better living, therefore, is the individual garden experience. It is really astonishing what influence over a whole family can be acquired by getting the children interested in gardening a piece of ground twenty-five feet square.

There is the economic value of such a garden—it is very attractive to house keepers.

Then the pleasurable exercises of all the faculties—there is no occupation that utilizes all your knowledge, be it much or little, like garden work. It is nature's laboratory that is sure to exercise your intelligence.

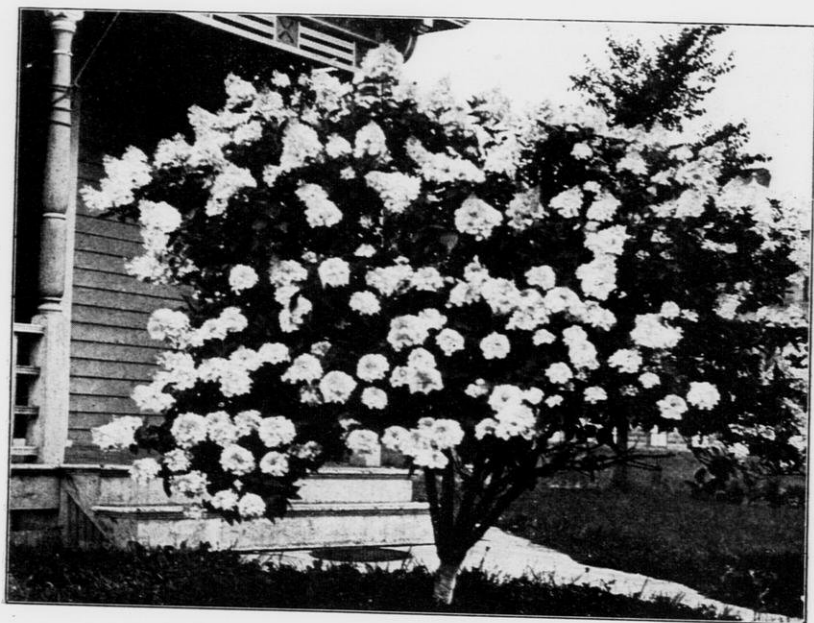
The success of the garden necessitates the combined physical and mental exercise under atmospheric conditions that builds healthy bodies.

The school garden is by far more important today than commercial trickery.

Children take it as natural as a duck to water. To punish a truant is like poisoning an invalid.



Our Poplar Orchard, October 4, 1910.



Hydrangea; Barron, Wisconsin, August, 1910.

Gardening is the never-failing cure for truancy, because it fills a gap in our city life for which every soul yearns.

The garden is the only leverage that can lift the city dweller into normal activity.

The intelligence to manipulate the leverage will be forthcoming from the cultivators of vegetation, whether they be called horticulturists, agriculturists or foresters—it matters little. They are simply divisions of the one great garden of our inheritance of which we must be the care-takers—individually as well as collectively—in order that we may breathe well, eat well and work to advantage.

DISCUSSION.

Mr. Irving Smith: There is one thought which occurred to me while the paper was being read about the city garden that it seems to me we, as a horticultural society, ought to take up in full, and that is, to give the people some idea of what can be done with, as was suggested, 25 feet square of land, or perhaps a smaller amount. If quite a number of us would take a little plot of ground and cultivate it intensively as a kitchen garden, keep an exact record of what is produced on that, to give to the city man or woman some idea of what their back yard is really worth, in pleasure as well as kitchen products, I think it would help considerably towards encouraging the work in kitchen gardens in towns. I heard for instance only a few days ago an Ashland man who has a little piece of ground in his back yard say that the amount of stuff grown on that ground supplies himself and all his neighbors around. There is a sample of what one man did on one of the principal residence streets of Ashland, and many of us can do that, and if we would give some detailed information as to what can be done and how to do it, I think it would be of advantage.

The President: I think it would be well if our society were in touch with those who have had experience and have made a success along these lines, and we would be glad if any one who has had such experience would pass it on.

Mr. Gouzenbach: If you gentlemen come to Sheboygan we will give you a practical illustration of the small garden and the possibilities of it. If the Horticultural Society wants to

get data, there will be at the end of this season a lot available. I happen to be at the head of the street railway system, and we have thirty acres of land lying idle. This year we plotted that into quarter-acre tracts and gave it to our employes free of charge. Every employe must keep his garden in good condition and we give prizes. At the end of the season prizes will be given to the men that can produce the largest variety; another for the most in money value. There are about forty or fifty gardens, all of them averaging one-fifth of an acre.

Mrs. Richardson: I happen to have some figures in regard to a garden I had two years ago which I think are really valuable, I will be glad to give them. I was given about a half-acre of ground and was told to do what I could with it. I was very fond of such things and kept a strict account of everything that was grown on the place. Perhaps there might have been a little more than a half an acre in the garden plot, and the expense of having the garden plowed and spaded and the cost of seed and the extra tools that I had to buy—very few indeed, as I took a place that had a garden on it, old fruit trees and currant bushes—was only \$15.65. I charged up all the vegetables used for my tables and canned for the winter, potatoes that I put in for the winter, and what I could not use I sold to the neighbors, and, figuring everything on the basis of what it would bring in the market, I made \$104.15 clear.

The President: That is something practical. We are glad to hear of such experiences.

Mr. Edwards: I believe one reason why we are so slow to speak on the question is that we had such a dry season that our returns from our gardens are small. I had a neighbor right across the street that has irrigated his garden, a very small patch of ground and has had wonderful returns. I do not believe that we can overestimate, but we are apt to underestimate the value of gardens to the people of our country. Of course it is in our hands how much we accomplish with our garden.

I was much pleased with one part of the paper in bringing the attention of the people to agricultural success. The time is past, I believe, when the boys should leave the land. The subject is "Back to the Land." That is the foundation of all our operations, and if we can teach the children to love the

soil, the tillage of the soil, it is a great item. The best crop that we raise in the country is our boys and girls, and the first task that we have on hand is to direct their efforts, and this is an important question, of how to lead them to see that there is a profit from the soil, in the garden and elsewhere, and teach them the idea that it is the most noble occupation that there is.

Dr. Loope: One thing that appealed to me was the reference to forestry and its effect upon the whole land, and it is no use for us to raise the boys and girls if we go on and destroy all the prospect that they have and leave the land a semi-arid country. The question of forestry is the burning question and I believe that that is the coming question that determines really the progress and welfare of the country. Our generation has destroyed most of the forests; we have therefore taken off the face of the earth the possibilities that were really inherent in the soil. Our children are going to suffer just that much and we are now, this year, tasting, not the delights but the sorrows of a semi-arid country. It is a burning question in my mind, and far beyond the mere gardening where you can irrigate. There is not any question but what, if we can re-forest the country that you can get plenty of rain for your gardens and get the best kind of gardens, but this year it has been impossible to do anything.

THE CITY MAN ON A SMALL FRUIT FARM.

By Mr. G. W. REIGLE.

This theme in all of its varied aspects is decidedly common and vitally important. It is so common that when a speaker arises to address an audience on the general subject of farm-lands in specific outline he realizes that much is expected of him and that the multitude remain to listen through cultivated politeness only. Something novel is wanted. Some new discovery is looked for by which honest labor with one's hand and brain may be reduced to an infinitesimal quantity. It might be said in passing that the trick of deceiving dame na-

ture whereby she is forced to bestow generous returns without labor and compensating values is yet to be discovered.

I fear therefore that before I finish this tedious history that some of you will have urgent business outside this hall while those who remain will liken the speaker to two musical instruments mentioned in holy writ, viz: "Though I have the tongues of men and of angels and have not *ideas* I am but sounding brass and a clanging cymbal."

For many generations there has been a movement from the land into the cities and a counter current of humanity from the cities to the farms. During the past few years, however, the rush for farmlands has been greatly augmented by the very high prices of farm products and by the oft-times selfish activity of none too honest real-estate agencies; reporting exceptional yields which might not recur in a life time or publishing statements and data which an expert only can attain has already given rise to discontent whereby comfortable homes have been sacrificed, snug little bank accounts have been swallowed up in the vortex of rubber plantations, banana groves Florida and Saskatchewan cheap lands and the glitter of the golden mountain sides and green valleys of the Pacific border.

Inoculating any man or woman with the poison of such discontent is being guilty of the blackest crime. There are hundreds of cases throughout our fair land where this accusation needs no qualification whatever. There is however a *bona fide* opportunity awaiting every man whose wages range between \$40 and \$70 per month. He must be able to think for himself and be able to plan and bring to a successful termination minor undertakings; but he who cannot work unless he is stationed at the tail end of a thrashing machine where he must work or be buried would better stick to his mule driving at his Ten a week.

The city man from clerkships and other occupations where clean hands and clothing are requirements will not take kindly to soiled hands, dirty shoes, and spotted linen. The odors of the cow, the horse and the barnyard will offend his delicate olfactory organs.

The wife on the farm cannot command an army of delivery men to lay at her feet in the kitchen all the necessities of living.

But the children—God bless their little hearts—are just where the Supreme Intelligence intended they should be born

and reared. The farm surroundings are their native element. The pure air and sunshine the blue sky, the babbling brook, the birds, the growing vegetation and the every day home duties contribute wonderfully towards developing that mental, moral and physical fiber so much desired in budding manhood and womanhood.

No longer may Mr. Newfarms arise at 7 a. m. No longer eight hours a day. Now eighteen hours will be the limit while the scalding sun is hazing him. The hail may pelt him and the bugs will surely bite him and his neighbors will wish to borrow his tooth brush and his safety razor.

Remember that this is Mr. Newfarms first year. Nothing comes his way except an enormous harvest of disappointments. In fact he is simply reaping the harvest of ignorance and inexperience which every freshman must endure or quit the game. It is nothing but hard work six days every week and continuous labor on the seventh.

His club life for the present must be suspended. The church will be remote, the public school will be small and inferior judged by present day standards.

Mr. Newfarms gives the orders now and his help must obey. This situation is agreeable but strange to him. He will now learn independence of thought and action. His mistakes, by thoughtful consideration, may be transformed into partial successes; daily contact with plant life will reveal many secrets of nature whose vital forces he will learn to control, resulting in health, wealth and happiness to himself and his family.

There is one commendable virtue Mr. Newfarms possesses which makes him shine like a morning glory in comparison to old Buff Whiskers who lives just over the wire fence on a 640 acre farm. Mr. Newfarms can tell you to a farthing whether his half-acre of strawberries were more or less profitable this year than last year. He can tell you whether the currants were marketed at a profit or loss and how much. Now if you ply old Buff Whiskers with a series of like questions for exact information relative to the farm crops he is growing, his stereotyped reply is apt to be that "I reckon I am a little somethin' ahead every year for I have lived right here nigh unto forty year and I have about forty dollars in the savin' bank."

A thirty acre farm having ten acres of woodland situated

near his home city on a main highway would make a large fruit farm and an ideal home for our fruit grower from the city. To learn intensive fruit growing on this farm; to stand out in the open without dodging or trying to hide behind his own monumental ignorance when the grape and canister of nitrates and phosphates and Bordeaux and lime-sulphurs are shot at him by the professors of the experiment stations will require all the nerve our city man can assemble.

And should he escape death at the hands of the blood-thirsty professors and get away by sailing out to sea Mr. Newfarms will there be doomed to shipwreck and a watery grave should he allow his life boat to be caught in the doldrums of a dubious dalliance.

Seriously, is a failure under the blue dome of heaven more humiliating than a failure in the midst of your unsympathetic rivals who have long been conspiring against you?

Mr. New farms should begin on a moderate scale and increase his plantings as he discovers on what fruit his home market is short.

Fifty trees each of apple, plum and cherry will make a respectable beginning in trees. These may be supplemented by planting 300 hardy grape vines, 100 bushes of currants, 100 each of red raspberries and black raspberries, and 50 Downing gooseberries. Plant one-half acre of strawberries and one-eighth of an acre each of rhubarb and asparagus.

For advice in regard to the planting and the culture of this garden I will refer you respectively to the distinguished gentlemen who have a prominent part in this programme, to the bulletins of the U. S. Dept. of Agriculture, to the bulletins published by our own experiment station and the experiment stations of other states. I must not omit the annual report of the Wisconsin State Horticultural Society and free bulletins issued by the same society. In addition to all these aids the secretary of our society, F. Crane-field, Madison, Wis., conducts a free correspondence course in relation to all questions horticultural.

A new periodical will soon be launched by the Wis. S. H. S. in which the very latest discoveries in the great fields of horticulture will be disseminated.

Where circumstances will permit it is advisable to plant in

long rows so that a horse may be used in cultivation. Mr. Newfarms should provide for family use two good cows, a pig and a flock of hens so that all waste about the farm may be utilized.

An aggressive colony of black bees might be added. These will at odd spells help Mr. Newfarms to forget some of his other troubles.

There are only two fundamental truths or principles underlying this business:

1. Production at the lowest possible cost.
2. Distribution to the consumer at the highest market price.

Quality and appearance of fruit and package will bring the highest market price. My own experience is that it is easier to produce A1 fruit than it is to collect from grocer or consumer the maximum price. When a man's dignity prevents his selling a private customer a dozen of the freshest eggs for twenty-four cents while his grocer will allow him only eighteen cents in trade you see we have an exact measure of that man's dignity. It is worth just 33 1-3 cents on every dollar.

The idea then to strive for is the largest crop possible without allowing the quality to fall below the best. Having the best in the market you will command maximum prices.

In summing the situation I will offer the following advice:

1. In middle life, without capital, do not leave a good city business for an uncertainty on any farm.
2. If you feel you are lacking in initiative do not leave a salaried position for the farm. Initiative means the ability to do the right thing at the right time without being told.

Cor. 1a. Let the sissy sizzle in silence in the sickly city.

3. My city neighbor, if you have brains, the fruitfarm offers you the gradest opportunity of your life to exercise them bringing to you commensurate returns.

4. There is easy money raising good fruit affording a delightful occupation, a table with most wholesome food and brings you in personal contact with the best families.

5. Many a laborer in factories, stores and mills has prolonged his life ten or fifteen years by moving onto the land where the virtues of out-door exercise have wrought their miracle of healing.

6. We need more horticulturists in the field and fewer make-believe horticulturists in real-estate offices.

7. Horticulture is the most healthful, the most useful, and the most noble employment of man."

THE CANADA THISTLE.

Mr. Babcock: I feel moved to make a remark which has occurred to me from my observation around the state of Wisconsin that there seems to be no real effort made to control the Canada thistle. I would like to get information in regard to the law in Wisconsin in regard to cutting and preventing the spread of Canada thistles. In my travels I see so many fields left neglected, enough to seed not only Wisconsin, but a good many other states.

The President: Perhaps Mr. Reigle can tell us about the law.

Mr. Reigle: I will not take the time to speak in detail with reference to the law on that point, but there is a very complete and just law regarding the control of the Canada thistle, and there is provision made in the law for a Canada Thistle board, a law that, so far as I know, is not being enforced through the state at all. There is abundant law.

Mr. Palmer: The way it is enforced in our section of the country is this. There is a little clause in the law that gives the town a chance to vote on the question of whether they shall have a weed commissioner appointed, or the road overseer shall act as weed commissioner, and they naturally say the road overseers shall act, and the road overseers simply forget to act and it does not cost the town anything.

Prof. Moore: Any communications in regard to the weed laws should be forwarded to the attorney general, or Prof. A. L. Stone of the Experiment Station.

WHAT THE CITY MAN OR WOMAN CAN ACCOMPLISH RAISING VEGETABLES.

By Mr. WARD DAVIS, Oshkosh.

(Read by Mr. Christensen.)

The question as to whether a city-bred man can succeed at market gardening is one that has many sides to consider. A man that has a natural longing for contact with Mother Earth and does not have too many obstacles in his way to work against him, ought certainly to succeed, while a man whose one desire from his boyhood has been to work about and study the plants, seeds and trees that God has given to beautify the world, need not question for a moment whether success shall crown his efforts or not.

The first thing needful then is perfect harmony between the work and the worker. There are many men who desire a change from city life to the farm but a large number of these are probably better off where they are. Any strong, energetic man need not hesitate on a change to out-door life, all other things being equal.

There are so many things to consider as being advisable or not that it is difficult to know which will reach the needs of the most people. Each person has his own peculiar hindrance that no one else seems to have, so experience must teach each one a great many things that cannot be learned from books or even from the experience of others.

A man that had saved about \$2,500 could make few better investments than buying a ten acre farm near a city of 30,000 inhabitants or more, and make his future work that of market gardening. Ten acres near a city of this size can usually be bought for about \$3,500 (buildings included). By paying \$1,500 down the balance of a \$2,000 mortgage with interest at 5 per cent can very easily be handled. \$1,000 will be needed for repair, outfit, etc.

A complete outfit should consist of one heavy wagon for hauling manure, hay, etc., one large market wagon and one

small one, 1 plow, 1 seven tooth and 1 fourteen tooth cultivator, Planet, Jr., seeder and hand cultivator, 1 harrow, 2 horses and one cow. A windmill and tank are also necessities to the successful market gardner. A good well—one that cannot be pumped dry—is one of the first things to consider.

The expense outside of living, after everything is bought, until the mortgage is paid off would thus be about \$150 per year, including taxes, insurance and other incidentals.

This condition of affairs with a fair crop and fair prices would in a short time pay off all debt. It is hard to advise just what vegetables to plant for a crop. So much depends on the nationality or class of people residing in the city. For the average city, however, a liberal supply of all the common vegetables and a few of the more uncommon ones as an experiment. The more particular crops raised around Oshkosh are cucumbers, tomatoes, peas, beans, corn, carrots, beets, celery, potatoes and cabbage, while a limited supply of lettuce, radishes, cauliflower, peppers and egg plant are grown. If the soil is suitable I should say by all means to add small fruits, the strawberry and the red raspberry being the most important.

There is a good market for black raspberries, blackberries, curants and gooseberries at present.

The soil for the ideal market garden should be composed of at least two kinds, a black rather sandy loam and two or three acres of medium heavy clay. The berries, tomatoes, peas and beans may be raised on the clay while the balance do better on the lighter soil.

In choosing a farm, it is not best to buy a place on a hill if one can be had on lower land with perfect drainage. Lower land will always average a better crop if properly drained.

While at first thought a change from city or factory life to country life sounds good and seems to have a pleasant outlook, yet there are always many things that a man never on a farm fails to consider. First he should realize that he will have to work hard. There is no occupation that demands as many hours of labor for success, as market gardening. There is always a danger of crop failure and one must make up his mind not to be discouraged.

Another important thing if the man has never done anything in horticulture is that he must realize that he knows little or

nothing about the work upon which he is about to engage and must be willing to learn and be told things by those who have had experience. Again he must not try to do more than he is able for a year or two. It will pay in dollars and cents to take things rather slowly for a while and branch out gradually. A person will be all the better for it and nothing will be lost.

The question as to whether a city-bred man will be able to make a living comes up. A man with a small capital and a family that is a help ought to have no trouble. A man that can have a little help from his family at weeding and berry picking time will have things much easier and has a bright outlook before him. Not only should he make a living but it need not be long before he will have a bank account from the proceeds of the garden.

Two plans as to raising a crop of produce appeal to me as wise and profitable. I have tried the first but think the second one as good if not very much better. The first is growing a little of everything and the other is specializing.

Each plan has its own advantages and disadvantages. In favor of the raising of everything I would say that if one makes the trip to town every day, he can have a good load each time during the whole season and also if one crop does not turn out as expected some other one will.

Against the first plan—There are so many things that come at the same time that one can not do justice to anything at the time it ought to be done. I will give a list of fruit, vegetables and the proportions grown on a ten acre farm near the average city.

One acre each of strawberries, cucumbers, tomatoes, early and late, cabbage and celery; one-half acre each of peas, sweet corn and potatoes; three-fourths acre each of onions, red raspberries and beets and carrots for bunching. This leaves one and one-fourth acre for gooseberries, currants, beans, winter onions, asparagus, lettuce, cauliflower and turnips.

A second crop may be grown after many of those just named, corn and celery can be planted after the strawberry bed is plowed in July. Cucumbers or corn can be planted after the peas, by putting in the seed about two weeks before the vines are ready to pull.

Sow a cover crop of rye on every bed not in use as soon as

the crop is off. Turnips, radishes, spinach or lettuce can be sown after any crop up to August 1st.

For the crops of the second plan I would suggest that a bed of pieplant, one-half acre in size be started and kept in good condition. The earliest vegetable in the spring is the winter onion; one-half acre of these is enough. Before these are gone the asparagus will be ready. One can handle about one acre of that. Strawberries, two acres; red raspberries, two acres; cucumbers, one acre; tomatoes, melons and celery, each one acre. This gives a succession of fruit or vegetables the whole season.

In favor of this plan I would say that one can take care of a large piece of any one thing easier proportionately than he can a small one. The quality will be much improved by being able to look after the one thing when it needs looking after.

The merchants also get the habit of looking and waiting for the man who has a lot of one thing when it is of good quality. It is sometimes as easy to sell a whole load of strawberries as it is to sell a dozen cases.

There is, on the whole, less to be said against this plan than the first one.

Growing crops in this way, especially if the soil is second cropped, a lot of goodness in the soil is taken away and a large amount of fertilizer is needed to give back to the land the strength that has been lost.

Commercial fertilizer or stable manure must be used. Whenever it is possible to get the manure it is usually advisable to use that in preference to commercial goods. It keeps the soil in better condition and is a constant benefit.

Hotbeds is another part of gardening which the city man will need to experiment with before he is able to manage successfully. When once learned it is very profitable as the bulk of the work comes at a time of year when the gardener is not quite as busy as he is later on.

A man may be discouraged from trying the market garden business by others who say that it is overdone now. This, however, is not true. The more gardeners there are the more produce there will be sold, but the main point in a true up-to-date successful gardener is quality. A man who seeks to make every vegetable or every box of berries perfection is the man

who is going to keep at the top and ahead of his competitors. Sharp competition is the best thing for garden and fruit farming as in everything else. Someone will come out ahead and it will be the man who brings the best goods to market. He not only will be able to sell them more readily, but will receive as a rule higher price to more than repay him for his extra painstaking.

I would advise any man to try gardening if he intends putting his whole soul into the work and has a genuine love for that particular kind of work. If he has not, there is little use to try.

DISCUSSION.

Mr. Gonzenbach: Is that paper based on actual experience?

Mr. Christensen: Yes, I am quite sure it is from actual experience. The man is on a ten-acre farm. He wrote that paper on the place which he describes.

Mr. Reigle: I would like to inquire how many men it takes to do the work on that plat?

Mr. Christensen: There are two men the year round, one or two extra men during the busy season.

Mr. Kellogg: I cannot see why the busy season does not last about nine months. I should think you would want a man to the acre, certainly, to take care of the things and do it up right. I can employ one man on a city lot right through the season, and I do not know that I would make any profit out of it, might have some satisfaction. I would like to see the facts and figures brought out; what was planted, what it cost and what the profits were. We want the practical side of this question, the dollars and cents applied to the acre. If a man has not any love for the business he had better keep out of it. There is one mention made here of an easy time; I do not know anything about where the easy time comes in if you go into horticulture.

Dr. Loope: Mr. Rasmussen is from the same locality where this paper came from, and he knows all about the business, because he is in it. He knows how much help it takes, and all the details. I would like to hear from him.

Mr. Rasmussen: I raise a great deal of sweet corn. If I only

had ten acres I would always want two acres of alfalfa to better the land with, and I think on that acreage my hired help would amount to about between \$1,500 and \$2,000. We have as high as five men, besides boys. I could have given you the exact figures if I had expected to be called upon, but I have not got them with me. Last winter I think I did state about what it cost to market an acre of tomatoes. This year I have taken two crops, and have kept an account of labor, both men and horses and cost of packages, but it is not far enough along yet to give figures. But on a ten-acre tract that is all garden, it would take \$2,000 to hire help, including board.

OPPORTUNITIES FOR CITY-BRED PEOPLE IN DOOR COUNTY.

By A. L. HATCH, Sturgeon Bay.

The continued success of cherry culture at Sturgeon Bay is now attracting wide-spread attention. With a good crop harvested this season and with apples and plums "standing up and doing business," it is evident there is something in Door County quite different from that found in most of the country where fruit growing has fallen down so completely this year. During the last eight years our cherry orchards have produced cherries by the car load, giving good crops every year. When it is known further, that behind this we have a record of forty years more without loss of our orchard fruits by spring frosts the situation contrasts so emphatically with what so often occurs in the rest of the country that many intelligent men who are well informed in fruit growing are not only "sitting up and taking notice," but are investing in lands and planting orchards in Door County.

What are the conditions that make this region contrast so sharply with the rest of the country? Are they reliable and permanent, and do they constitute "Opportunities for city bred men?" What opportunities does he want? In discussing

these questions I shall assume that he wishes a place to establish a home for himself and family and where he can get a living. Home building and getting a living are surely the most important of all employments, and I deem it very appropriate to limit my essay to fruit growing in Door county as a basis of home making and getting a living. This basis must be one to furnish the revenue, the money, necessary for the objects. Granted that Door County can produce the fruit better than other regions, can it be done profitably, will it pay?

To answer these queries in the order stated let us first consider the condition of climate and soil that makes the Door County peninsula possess such marked advantages for fruit culture. The modifying influence of the waters and ice of Lake Michigan and Green Bay gives the peninsula a cold, backward spring. It is generally considered that this retards bloom until frosts are over. The fact is, rather, that it prevents a rapid, tender growth that would not be sufficiently hardy to endure subsequent frosts. Further south there is too little steady cold, fruit trees burst quickly into bloom with the advent of warm days, and the tender growth succumbs to subsequent frosts. In Door County the buds come on very slowly; often it is several weeks from the time they first swell until full bloom. During that time they strengthen and become hardy. Further south what we consider hardy vegetables like the cabbage, the onion, or beet are sometimes destroyed by frost on account of their rapid, tender growth. In the fall of the year we have another effect of the waters which so modify the temperature that there is a long time when frosts are not severe enough to destroy the leaves, but allow them to continue their work to the fullest extent, ripening the twigs, storing surplus food for spring use, hardening and perfecting the buds. Thus our climate helps at both ends of the season. Fruits of this region are fine keepers and good shippers on account of the climate, and this is a valuable factor in commercial fruit culture.

The soils of Door County suitable for fruit culture are of such a nature as to produce the "bearing habit" in a very striking degree. When I first visited the county in 1892, in company with that splendid Christian gentleman, the late Prof. E. S. Goff, we noted this effect of the soil and climate upon the bearing habit of fruit trees. They were noticeable for the crops

they had borne, and their disposition to keep at it. On an apple tree I found a fruit spur that had borne seven times. To-day you can go in our cherry orchards and find branches with five and six feet of fruit buds, thickly and continuously set along their length. Our fruit trees bear quite young. Cherry trees four years planted often yield sixty or eighty crates per acre. Just as soon as we can grow bearing wood with properly formed fruit spurs we get fruit. On the rich prairie soils of the Mississippi valley states fruit trees do not form the bearing habit until much older, nor is it then so pronounced, reliable or continuous. Not only is this bearing habit shown in tree fruits but also in shrub fruits. Three hundred small two year old gooseberries planted last year on raw ground produced this year nearly twelve crates of fruit that sold for \$1.50 per crate. Since currant and gooseberries grown in considerable quantities have demonstrated their ability to produce \$500 per acre, they are by no means to be despised. Our climate seems to suit them completely, and nowhere else have I seen such immense bushes or such fine foliage that is held to the end of the growing season. The base of operations in fruit culture must necessarily be land. The average home seeker desires the least amount that will serve the purpose. In fruit growing we expect the largest revenue from the land so the amount needed to support a family is much less than that of other forms of soil culture. Little fruit farms of five to fifteen acres are common in Door County and promise to be sufficient for the purpose.

The next advantage our homeseeker needs will be some demonstrations of what is best to plant, what is commercially profitable. This has now been as fully demonstrated as need be and mostly at my expense. In cherries, for instance, it is now agreed that if a man plants one-half his orchard to Early Richmond and the other to large Montmorency he has sure money makers.

Another matter that should interest our prospective home builder is the development of fruit growing already established. Not only is the most of Door County a well developed farming community but fruit growing is rapidly expanding. We have wide awake young men engaged in the business, using up-to-date methods and appliances to secure the best results. To associate with those who are engaged in this work and making it pay, is of itself an inspiration and help. As an example of our



Oshkosh Musk Melons.



up-to-date practices I would mention the use of commercial lime sulphur wash as a summer spray. On my own cherry orchard I have the brightest foliage I ever had and have not found it necessary to spray after harvest as I did when using Bordeaux mixture. On my plums, especially the Japanese and American, there was a distinct stimulative effect, that came with the first warm day after spraying. On my currants I have no thrips as I had before. For two or three years I have made good progress in control of plum curculio by spraying with arsenate of lead just before and just after bloom. This year I used it again with lime sulphur with the astonishing result of completely eradicating the curculio from my orchard. Before this I had trapped the beetles, getting from two to four thousand a year. Since each beetle is capable of spoiling about a bushel of plums it is not hard to realize the importance of this in plum culture. In thinning my Burbank plums and removing thousands of plums in that way I have failed to find a single one that was stung by the curculio. This I think is unprecedented in the annals of horticulture. These facts open up a large range of possibilities that are very encouraging, indeed.

Next let us consider the question of profit. During the last eight years we've been growing cherries by the car load at Sturgeon Bay. During that time my own orchard has produced over 15,000 crates of sixteen quarts each, and bearing a good crop every year. An orchard of about five acres planted in 1898 has produced in the last three years 7,370 crates, that sold above cost of crates and picking, for \$8,246. With money at 6 per cent one-half this sum would capitalize the land at over \$4,000 per acre. As remarkable as this is I am sure it will be excelled in the near future by some younger orchards now coming on.

I have now enumerated several facts concerning fruit culture in Door County that should appeal to the city bred man who is seeking new environments. I have noted our fifty years' record without material loss by spring frosts to our orchard fruits; our conditions that produce the bearing habit and maintain it, as well as to cause early bearing; our demonstrations of what is best and profitable in varieties, as well as what is helpful and hopeful in methods, practices, and associations; and I have also shown that it is profitable, that it pays.

These are the opportunities Door County has for the city bred man. If he knows how to harness a team, milk a cow, grease a wagon, to plant a garden, to plow or cultivate a field, he may avail himself of these opportunities with the full assurance that they are as reliable, as satisfactory, and profitable as can be found anywhere.

The establishment of a fruit farm does not mean a loss of revenue from the land in waiting for the trees to bear. Paying and profitable crops should occupy the ground from the first until the room is required for the fruit trees. Strawberries have usually proven very profitable and come into full bearing in one year from planting. Shrub fruits should give paying crops the second year after planting and in case of the currant and gooseberry increase in bearing for several years. Of paying and profitable crops to grow in the young orchard, peas, beans and potatoes thrive finely in Door County, and their cultivation fits nicely the needs of the orchard.

Besides the man who must make his living as he goes there is another class to which our opportunities should appeal, the retired business man and the wealthy. Door County has a good reputation as a summer resort. Its large and wonderfully varied flora, its groves, woods and natural parks, its surrounding water, its excellent roads and fine summer climate, all make a splendid combination of highly enjoyable features. With a fruit farm as his summer home the well-to-do would find that horticulture is the refinement of rural life and adds a charm and zest to life that approaches the ideal.

Ideal homes are country homes with city conveniences. These are being rapidly developed in Door County. Telephones reaching every neighborhood give instant communication; fine highways being macadamized, of which our town now has more than twenty-five miles, makes rapid transit possible; automobile stages and liveries are now running everywhere, and our farmers and fruit growers are using many of these machines; electric service is reaching out from the city of Sturgeon Bay for domestic motors as well as lighting; everywhere there is an awakening to the splendid resources within our borders.

Among those now engaged in actual or prospective fruit culture at Sturgeon Bay we have sailors, doctors, printers, clerks, tailors, university students and graduates, farmers, teamsters,

engineers, barbers and carpenters, as well as fishermen and farmers. With such a wide representation among the various trades and profession the city man should find encouragement to believe that he too might join the ranks of the prosperous. Under conditions that make life well worth living.

DISCUSSION.

The President: As mentioned in our opening remarks, our State Horticultural Society has done much to develop the horticultural resources of the state and also to advertise them. Our Mr. Hatch is one of the leading members of our horticultural society, and I think if he had not early developed his love for horticulture, and others with him, Door County would not be what it is today. But I would say that at other times our society will call your attention to other parts of the state. We are calling attention to the advantages of Crawford county, still we lose nothing by directing your attention to Door county at this time. Our society will show you that horticultural profit exists all over the state.

Mr. Christensen: I would like to ask the cure for the curculio that is so effective; I did not get that.

Mr. Hatch: In common with the other growers we have been using arsenate of lead as an insecticide in spraying for the last three or four years, and during that time we found it far more efficient than any other insecticide. We found that spraying just before bloom was also a very effective time to hit the curculio for the reason that the beetle, while eating very little, will eat something and if we have the poison there when he does eat it kills him. In my spraying this season I was very much astonished at the results obtained. While I had found very few of curculios last year, this year I had absolutely none. You may examine these plums, that I have shown here. In thinning my Burbank, taking off thousands in that way, I did not find a single one stung by the curculio. I think it is unprecedented in the history of horticulture.

Mr. Christensen: When do you use the lime-sulphur wash?

Mr. Hatch: Just before bloom and just after bloom. Just after bloom we had some warm weather, and I think that made

the spray more efficient and give it a stimulative effect. Before this it was quite cool.

Mr. Christensen: How strong do you use it?

Mr. Hatch: I used a three per cent dilution. But as far as that is concerned, I think the cherries and plums might stand a four per cent solution and that apples a five per cent solution. This however only when used with arsenate of lead to modify its caustic effect.

Mr. Reigle: What solution would the grape stand?

Mr. Hatch: I sprayed the grape with the same and I did not have any injury with the lime-sulphur solution. The use of lime-sulphur is in the experimental stage yet, but it opens up so many possibilities, I am sorry I am getting old, because one of the great things we may do in the future, to save good foliage and this one very great thing in fruit culture now seems possible. Here is the foliage itself, on these branches I brought from home and it is eloquent of the effect.

Mr. Reigle: Do you combine the arsenate of lead with the lime-sulphur in spraying?

Mr. Hatch: Yes, I did. I am of the opinion that we might get better results by using it separately, for it precipitates the arsenate and necessitates more stirring to make it all right. The arsenate modifies the lime-sulphur wash very much, and it is likely much less should be used if applied separately.

Dr. Loope: In spraying the full leaf, do you find any injury with the lime-sulphur spray?

Mr. Hatch: When we let the stuff settle we thought we had injury. I am not certain on this point.

Dr. Loope: Did you use this to the exclusion of the Bordeaux?

Mr. Hatch: Yes, I did not use any bordeaux mixture. I used some on my apples, but not on my plums and cherries.

Dr. Loope: Would you think that the lime-sulphur would act as well upon apples without the bordeaux as the bordeaux would?

Mr. Hatch: Well, the experiment stations are still working on that, and the first report on it I think was from Oregon. It is being used a great deal this year and we will know more about it another year. Yes, I think it will substitute bordeaux mixture completely, but it is still in the experimental state, and I hope when we get the experiment station bulletins of this year,

that we will know a little better what to do. But it opens up a whole new field. We hope we can accomplish things in horticulture that we never dreamed of. Instead of the deleterious, injurious effects of bordeaux mixture we may get the stimulating, upbuilding effects of the sulphur wash on our foliage, and that means better fruit spurs and it means better fruit.

Mr. Reigle: Do you use the commercial product, or make your own?

Mr. Hatch: It is not practical to make lime-sulphur wash in Wisconsin for the reason, that we have no strictly pure calcium. The brand that we use was made by the Grasselli Company of Cleveland Ohio and also Milwaukee, and it is perfectly efficient. I tried to make some myself but it will not do, our lime is not right.

The Secretary: In stating the opportunities for city bred people in your county you painted them in glowing colors as to the city man, then you modified it by saying, a man that could hitch up a horse, grease a wagon or milk a cow. Suppose we have the other kind of man that does not know which end of the plow goes first, a man of middle age, brought up without any knowledge of these things, what would you do with him in Door county?

Mr. Hatch: I would advise that man, if he has a leaning that way, to go and find employment during a summer on a farm, until he can arrive at an estimate of his own ability. It is a personal question. One-tenth is the place, nine-tenths is the man. The glory of life is in accomplishing things and the pity and misery of city-bred people is that their children are growing up without ability to accomplish anything as far as getting a living is concerned. If you come to Sturgeon Bay you will find hundreds of boys and girls employed as little wage earners during the fruit harvest. It is a splendid thing for they learn how to work. When pay day comes around there is a lot of bright eyes and happy faces and money in their pockets and you never can pauperize that kind of people. I paid out a thousand dollars last year and this went into the hands of women and children; it makes them wage earners, makes them independent. The pitiful thing is that the city has thousands of children and families that are utterly helpless about earning a living, all the zest of life is gone, they are ready to become anarchists. I have

tried to tell you of the opportunities we have in fruit farming in Door County because I am most familiar with them. There are, however, other opportunities; in other places; the field is broad and this horticultural society should do some missionary work in exploiting them.

Mr. Babcock: Is the soil of the peninsula practically all the same, or are there limited regions that are adapted to fruit?

Mr. Hatch: The soil is glacial drift, but the rock is magnesian limestone, and this glacial drift went diagonally across the peninsula. On the west side of the peninsula there were groups of pine; perhaps one-sixth of the county was pine, that is splendid fruit farm land. Then over further is hardwood land, over further yet is the lake shore sand dunes and swamps. There are all grades, some good and some not, but the general average of the pine land is excellent for fruit and most of the hard wood land. It has nearly the same climate all through.

Mr. Smith: I want to ask how the curculio prospered in the orchards that were not sprayed as yours were. You said you had no curculio where you sprayed, what did the people have who did not spray as you did, in the way of curculio?

Mr. Hatch: Most all of the growers who have plums around Sturgeon Bay spray. They had some curculio, but they made progress. Mr. Coe was at our place, and I took him out into the orchard where I cut this branch off. (Referring to branch at the meeting. He will tell you whether I have told the truth or not.

Mr. Coe: I think you have so far as you have gone, but you have not told all the truth. I do not know of any language that will express it all. That particular branch that you cut off was a short branch. I took one home with a load of cherries on in my suitcase, showed it to some of the neighbors. We picked afterwards two quarts off of one branch about the length of the one Mr. Hatch has shown you.

Mr. Smith: The particular reason why I wish to bring out this particular point in regard to the curculio is that I have known in my experience of cases where, take the striped flea beetle for instance which eats up little plants as they come up, cabbage and turnips, I have known them to suddenly disappear, without any apparent reason. We used to have to fight flea beetles, little jumping fleas, almost sit up nights to fight them

and suddenly they would disappear, we did not see one for ten to fifteen years and I wanted to bring out the point as to whether that was possibly the case with the curculio. There has been so much said that it was impossible to poison it. I am not disputing anything Mr. Hatch says.

Mr. Hatch: Mr. Bingham perhaps can add something to what I have said.

Mr. Bingham: There is plenty of curculio in Door county. While Mr. Hatch uses perhaps cleaner cultivation in the orchard where he had these plums, adjoining the barnyard, the cultivation was quite thorough and the chickens come into that orchard more than some other orchards more isolated. Some curculio have been found in Door county, but they may not have sprayed at the critical time to kill the bug.

Mr. Hatch: I did not have any chickens in the orchard at that time.

Mr. Bingham: While I agree with Mr. Hatch in this much, that he certainly sprays his orchard very thoroughly, perhaps there is no man in the county that does it more thoroughly or goes at it as so nearly the right time, I could not say myself whether it was due to the spraying or not, because I had curculio where we sprayed thoroughly. .

Mr. Smith: Did you have chickens?

Mr. Binkham: Yes, we had chickens, but I had to resort to jarring for the curculio to get the balance of the bugs.

The President: I want to say a word in regard to this discussion. Your attention has been called a number of times to the healthfulness of Door County, and the climate, but I think not enough has been said in regard to the man behind the bugs. It may be profitable to contrast the appearance of these branches with some cherry trees a little outside of the city where the slug has nearly defoliated them and yet the trees are fair in size. I think if you will give as close attention to your trees as they do in Door county you might have a lot of cherries. They take good care of their trees in Door county and you people out here might do likewise and you would not need to go up to Door county.

WEDNESDAY AFTERNOON SESSION.

The meeting was called to order at 2:00 p. m.

The President: I promised you the pleasure of becoming acquainted with our two new professors, and I will first ask Doctor Jones, head of the recently organized Department of Plant Pathology, to come forward and to tell us why he is here.

Professor Jones: "I first wish to thank your Secretary for the courteous invitation to attend this meeting and become acquainted with the work of your Society. I have already been doubly repaid, first, by that which is of general interest in your program and exhibit, and, second, by that which is of special interest to me as helping toward the outlining of my own work, as plant pathologist, in Wisconsin.

You ask, Mr. Chairman, why I am here. One reason lies in the fact that Wisconsin is my home state. I was born and brought up on a farm some forty miles north of here. When partly as a result of your request, I am told, it was decided to organize a department of plant pathology in the University and Dean Russell invited me to come and take charge of the work, the associations of those first two decades of my life had a large influence in deciding me to come; partly because it was a homecoming, and partly because it seemed that such early acquaintance with the the State must prepare one the more readily to understand the problems to be met. But although those early years were passed in a farm home it was in contact with the problems of general agriculture rather than with those of the more specialized horticulture which your Society has helped to develop in Wisconsin during recent years.

You, as horticulturists, realize fully how different the problems are, especially those relating to plant diseases, when one passes from the seaboard to the Mississippi. Hence, you will sympathize with any hesitancy I feel in attempting at the outset to make practical suggestions, which would be so largely influenced by my New England experience. The understanding with your Secretary is that I am here today rather to learn than to lecture.

I may, however, be pardoned for advancing in quite general terms two ideas, pertinent to the discussion of this morning, as to spraying. The first concerns the lime-sulphur spray as a possible substitute for Bordeaux mixture. I wish to emphasize the points well made by Mr. Hatch, first, that this new compound promises much, and, second, that it is still on trial. Give careful heed to the evidence in its favor based on personal experience by Mr. Hatch or your Secretary or Professor Moore, who is testing it at the Experiment Station, or Mr. Milward in his trial sprayings in the orchards of the State. But remember also that injury has resulted from its improper use, and that it is on only a few crops, indeed, only on the orchard fruits, that it has as yet fairly established its claims as a substitute for Bordeaux mixture. On potatoes, for example, under the New England conditions it proved of much less value. Do not understand me as belittling the probable importance of this new spray. There is certainly great need for just such a combined insecticide and fungicide as this lime-sulphur is proving to be. All who have opportunity should either test it for themselves or follow closely the tests of others, and just so soon and so far as its superiority is clearly established its use should be practiced. The suggestion I make is simply that where we now know Bordeaux mixture alone or with arsenites to be efficient we should not hastily substitute lime-sulphur for it until the new spray has been adequately tested on that particular crop.

The other suggestion I would make is still more general. It concerns the whole question of spraying. It may not be good business for the doctor to belittle the importance of pills. Emphatically, I wish to go on record as urging more general spraying and especially, more thorough spraying. But spraying is sometimes looked upon, like pink pills for pale people, as a cure-all to be administered indiscriminately for all ailments. We are learning more clearly each year that with our own bodies the thing of first importance is to keep up physical vigor by wholesome food and right living, and along with this to keep the disease germs out of the body. In other words, the chief aim is to prevent disease rather than to cure it. So with the plant. The thing of first importance is to grow the plant to the fullest perfection of type and vigor; the choice of variety, the selection and care of seed, soil, fertilization, culture, these are the things

of primary importance. Then when the perfect plant is secured spraying comes in as the cultivator's insurance policy. It is not to cure the sickly plant that we spray to best profit, but rather to keep the healthy plant from getting sickly. Spraying is a preventive, not a cure, and we should aim to spray before the disease appears.

But I am coming dangerously near to the point of lecturing you upon practical matters. What I wish, instead, is to ask your assistance first in learning Wisconsin's peculiar problems and needs. It is for this especially that I came to the meeting. Thus Mr. Hatch, during a recent visit I made to his interesting grounds, outlined some of the problems in plant pathology of the orchard, and Mr. Kellogg has just pointed out in conversation some of the cucumber growers' troubles. Similar advice and questions from others will be most welcome at any time. We shall also be glad to receive letters, especially if accompanied by specimens of diseased plants. The simpler way to send such specimens as a rule is by mail rather than express, and if rightly wrapped the trouble and postage are both small matters. Frequently the mistake is made of placing delicate plant specimens, such as leaves or flowers, in boxes packed carefully in moist wrappings such as cotton. Almost always these discolor, mould or even rot in transit. The better way, and much easier for the sender, is to place the specimens between the folds of a newspaper, preferably with the plant leaves well separated so that the sheets of paper will tend to dry them out partially. Always lay the individual leaves as flat as may be and avoid matting several together. The paper with specimens enclosed can then be simply folded or rolled in an ordinary wrapper with open ends. Be sure when addressing it to place the name and address of the sender on the outside of the package and accompany it in the same mail with letter or card, giving data or request. In case of problems or specimens of peculiar interest we may send franked shipping tags for more specimens, which will carry such post free. It will be our policy also to visit the more important horticultural centers from time to time, and in this way to learn or advise as occasion may offer. Special requests for such personal visits will always be given careful consideration where there are urgent local needs.

Again I thank you for this opportunity of meeting you, and I

shall hope to be of further assistance both to the individual members and to your Society as an organization in years to come.

The President: We will now call on Prof. Sanders. We are wondering why a bright young man like him was allowed to come to us.

Prof. Sanders: Mr. President, Ladies and Gentlemen,—I might extend Prof. Jones' remarks to some extent, but he has so thoroughly covered the ground in several phases that I will not touch upon those at all. Of course I am glad indeed to meet the Wisconsin people. There are a few faces here that are familiar to me already, but many who are entire strangers, but I hope not for long.

Just why I am here, why I am here personally might not be policy for me to state; Dr. Russell might tell more properly, but why an economic entomologist should be in Wisconsin is apparent to every one who has had experience in growing fruits, in raising crops of any sort in Wisconsin. Wisconsin as a state is twenty-five or thirty years behind the adjoining states in economic entomology. Adjoining states have had entomologists seriously at work since 1860-1880-1885, but until February of this year no economic entomologist has even been appointed in Wisconsin. Entomology has been taught at the university, I must say, entomology of a certain kind, but not economic entomology. Entomologists would scarcely call it more than invertebrate zoology, since little other than the anatomy of insects was considered. The practical fruit grower does not care about the internal anatomy of a harmful insect, he wants to know what application can be made to control that insect which is damaging his crops; ruining his fruit. He wants to know when to spray, what material to use and why that should be applied at such and such times. He should understand thoroughly the reasons for applying the insecticide and a certain character of insecticide at a certain time. That is the all-important point in the control of insects.

I might go on at length and tell you some of my experiences that I have met in going over the state in my travels. Few of you know that I have charge of the state nursery inspection now, and I am taking the opportunity this year to travel over the state as widely as possible and do all the work myself in

order to get acquainted with the conditions and with the people and with the different characters of land in the various locations. In certain sections where I have been this year I am safe in saying 95 per cent, in some cases 98 per cent of the apple crop is injured by the codling moth and curculio where no spraying operations have been carried out. A great many people whom I met in certain sections said that, "Well, the frost had killed everything" and they would not spray this year, consequently they have more apples on the ground now that they have on their trees, and in a few weeks thereafter all will be on the ground and in this year of all years when if they had a good crop of perfect apples, they would certainly get a good price. Prof. J. G. Moore in one of his bulletins has said that three-fourth of the apple crop of Wisconsin is ruined yearly by codling moth and plum curculio. I can say that, considering all the trees in the state, outside of the commercial orchards and including commercial orchards, that 90 per cent of the apple crop of the state is ruined, as far as perfect fruit is concerned. I was looking over the exhibits here today pretty carefully and there is a comparatively small percentage of perfect apples in that exhibit. Of course we understand the character of the year, with the extreme draught in many sections. It is extremely unfortunate when a man sets out an orchard, cares for it, and the land is lying comparatively idle for that length of time, and he grows first class trees, but when he comes to harvest his fruit, the very thing that will return him his money is lost, simply through the ravage of insects or perhaps fungous diseases. At a total cost of perhaps ten to twenty cents a year a comparatively large tree can be sprayed and 90 per cent of the fruit can be saved. It seems unreasonable that people should allow their fruit to be so thoroughly and completely lost.

One other thing I want to say. I want to help every one of you as far as possible in determining the insects which you may send to me and in giving you remedial advice. Insects have to be treated a little differently than the plant diseases which Prof. Jones mentions. You cannot roll them up between pieces of newspaper. They should be put in a tight box, preferably a tin box. It is not necessary to make any holes in the box for air to get to the insect, because they require very little air. Some people send in insects, making large holes in the box,

and frequently the insects or their parasites hatch out and escape entirely, so we do not know what has infested the plant or fruit when it arrives at the office. Put the insects in a comparatively tight box and be sure to put your name on the package, accompanied by a letter, of course, describing the injury as far as possible in every detail.

I might mention a number of insects that have been especially important this year, but I will not take time here. Of course we know the injury caused by the codling moth and plum curculio, the two great pests with which horticulturists have to deal. The cherry slug has been exceptionally numerous this year, especially in the lake region. There is absolutely no reason in allowing the cherry trees to get into such fearful condition as I have seen thousands of them up and down the lake shore this summer, when a little arsenate of lead applied at the right time will control the slug absolutely. It is one of the easiest insects to combat and is perfectly amenable to control.

I thank you kindly for your attention. I want to meet as many people as possible, and if you have any particular insect problems that are uppermost at the present time, I wish you would communicate them to me.

Mr. Smith: I would like to refer to these gentlemen now an insect which has done a good many thousand dollars worth of damage in Wisconsin, that is the onion maggot. In the Green Bay districts, where there were a good many train loads of onions grown years ago, the industry is practically wiped off the map. If you suggest some way that insect can be controlled and prevented, you will earn your money, I don't care how much salary you get.

Prof. Sanders: The onion maggot belongs to a group of pests which is the most different to control of any that we have in the entomological line; it is one of a number of larvae of flies which are extremely difficult to control. Perhaps the best method of control for the onion maggot, first of all, is to destroy, burn the infested onions as they are found. Wood ashes scattered around the base of radishes and onions have a very deterrent effect on them. Some advocate the use of paper disks to prevent the laying of eggs of the flies, but that is not feasible in a large tract. The onion maggot and allied species are very serious pests and make large inroads on our crops. Probably the best remedy for

control of root maggots is the application of carbolic acid and lime solution with a sprinkling can or spray nozzle around the bases of the plants as soon as they appear above the ground. Slake fresh lime to a thin cream; add three pints to a gallon of water in which should be stirred a tablespoonful of crude carbolic acid. Coat the soil around the plants with this solution which hardens forming a crust too hard for the newly hatched larva to penetrate. To control the codling moth is comparatively easy as compared with the onion maggot to which the gentleman refers.

I might mention another insect that has done great damage this year, and that is the white grub. I have received 150 or more letters this past spring and summer in regard to the white grub. We make the mistake of plowing the land in the spring and immediately planting the corn. The white grub lives upon the grass roots, and sometimes cuts off the grass roots so completely that the sod may be rolled up without trouble. Fall plowing is the great remedy for the control of the white grub, and the plowing should be done as late as possible in the year.

Mr. Reigle: I have one question that relates to a little bug that I would like to know what he is there for. It is a small beetle of a general ochre color with black spots on its back. I think when I was a boy we used to call them lady bugs, but I find on the under surface of many of the grape leaves as many as 50 to 100 of these little beetles, seeming to be very contented and having a happy sort of life. I have been thinking as to whether I was not in danger of having a pest there, but may be they have been beneficial, I do not know.

Prof. Sanders: May I ask about how many spots there are?

Mr. Reigle: Yes, I think there are three rows, and I believe there are three, not very distinct, next to the head.

Prof. Sanders: That is one of our lady beetles I should judge. The lady beetles are all beneficial, and as they feed principally upon plant lice or aphids, they should not be destroyed under any circumstances.

THE OPPORTUNITIES OF A CITY-BRED MAN IN THE COUNTRY.

By ERNEST GONZENBACH.

This paper is part of a series to which is devoted the present meeting of the State Horticultural Society, and the mere fact that this entire meeting has been devoted to the "back-to-the-land" movement, and that all of the speakers and all of the papers have, in one form or another, discussed the returning tide from the City to the country, is an indication of the importance of the movement. Just how general the movement is, remains to be seen, but it is fair to assume that at present it is nowhere near as general as would be indicated by the amount of talk on the subject.

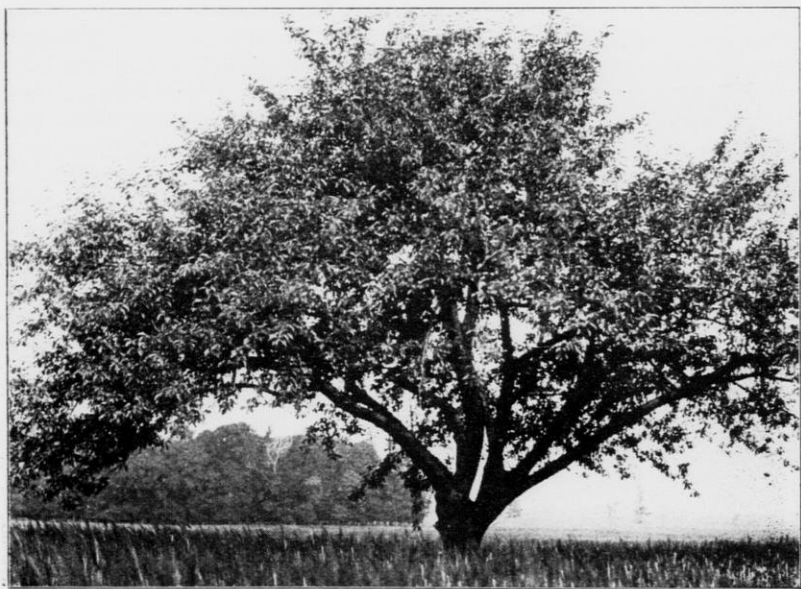
While the topic is a favorite one with all classes of people and in all classes of journalism, the actual amount of movement back-to-the-land has not been great enough to upset the general balance and frankly, I do not believe it ever will be. It is very pleasant to sit in a comfortable office chair and dictate to a stenographer about the movement back to the land. It is still more pleasant to take a ride in an automobile or trolley car and watch Nature as we glide past. It is agreeable to watch the sleek cattle, the waving grain fields, and note the general air of prosperity about farms and farm houses. It is enough to excite a desire in any man to go back to the farm. Little is ever said about the desire aroused in the farmer and when he sees these individuals ride past in their automobiles; when he sees their beautiful clothes, their well-fed appearances, and the general air of leisure and good nature about them. The contemplation of either one of these pictures may arouse desire. If it arouses a strong desire in the city man, it is simply because the farmer is less used to gratifying desires and anyway, it is because he recognizes the utter futility of such a desire. All of this reminds one of the distinction which a soldier of the line once made, when his opinion was asked about marriage. He stated that marriage is just like a besieged fortress—"those who are in would like to get out, and those who are out would like to get

in." That is virtually the situation in the "back-to-the-land" movement.

But, this back-to-the-land movement is not a new one. It has existed from time immemorial. Yet, in the face of this great natural desire for the country, the population of the cities has continually increased and that of the country decreased. Young men have continued to flock to the trades and industry and have forsaken the farms. The country will only attract a small percentage of city people in spite of the fact that almost every man may be found to have concealed, somewhere about him, a lurking desire to own a farm—and to retire to it at the end of his active business life. This lurking desire unattended to in time, has no doubt been responsible for more failures of city farmers than any other cause. A man is in business for ten, twenty or thirty years. He is actively engaged at his desk or at his workbench every work day of the year. He nourishes that secret desire to some time or other retire to the farm. His leisure time is spent in the usual time which the city has to offer. He and his wife have a few cronies; they play cards; go to the theatre; they picnic at some picnic resort on a Sunday; they read and they like to dream and talk about that future day on the farm; but, as for actual preparations, not one man in a thousand makes any preparations whatever for actually fitting himself so that he will be enjoying the life in the country which he looks forward to so longingly and lovingly. By Nature, all men are farmers. Desire to dig the dirt is just as natural in us as is the desire among birds to brood. The smell of the moist earth in the Spring arouses the latent soil instinct in the most crusty individual. Quite often the desire finds expression and gratification in the garden, which is started at great pains only to be abandoned during the heat of the summer season when enthusiasm and energy lag. These people are like those fowls which have been bred to forget their natural functions of sitting on eggs and rearing their young. Some strains of hens and ducks have been so bred by a process of selection that they have no inclination for their natural process of re-production. Such fowls occasionally will brood, but it does not take very much to discourage them and make them forget one of the chief functions of their lives. They are just like the people who start a garden early in the Spring. The natural instinct, the "homing



A row of McMahan. Orchard of D. E. Bingham, Sturgeon Bay, Sept. 4, 1910.



Fameuse Apple Tree near Manitowoc. Planted in 1854.

intelligence" of the average man have been bred out of him so it takes only the slightest discouragement to get him over his garden broodiness of the Spring, and to return him to the natural, or unnatural, everyday routine of his life. He becomes a denatured man.

But there are people who will return to the natural life, who possess the stick-to-itiveness which enables them to win in their struggle with Nature, who possess the qualities needed to make a success of country life and too often it is they, at whom fingers are pointed when individuals with gray whiskers and milk on their boots meet for a neighborly chat and laugh over the "city farmer." The latter is a menace to himself and to his neighbors and ought to have a guardian appointed to keep him from ever going to the country. Usually his type does not stay there very long in the country for no matter how mountainous his pride may be, it is never large enough to overcome his natural aversion to the duties of country life and sooner or later he finds a convenient excuse and returns to the level from which he started.

There is the other kind of a city farmer who does not secretly cherish his hope. He goes forth to give battle and is vanquished by the land boomer and real estate agent. The papers are full of attractive advertisements offering all kinds of land from which an easy living may be made from one acre up. To the would-be-farmer, who has a few dollars ahead, these ads look mighty promising and after his eyes have been feasting on a few half and full-page advertisements the glories of that "way-out-west or the "way-down-south" Arcadia, where he can make a living without working, by simply investing his money for a few years while his trees, berries, grass or whatever is offered is growing, he cannot be blamed for nibbling at the bait and possibly invests his little all in a rosy prospect, consisting of a sandy waste, a mud puddle or dreary desert which his imagination and a few dollars a week are supposed to convert into a pleasing landscape and a happy home. It is very rare, indeed, that this type of man is not disappointed. A few of these propositions have been put through with a profit for all concerned, but nine times out of ten it has been my observation that the man who invests in a proposition of this sort, is bitten, and bitten badly, especially when he buys without having

seen. He never lives to enjoy that ripe old age and that comfortable home without work, which he has been waiting for and paying for so long.

But I am to discuss advantages, not generalities, and will hasten to get through the husk and at the meat in the cocoanut.

Horticulture and Agriculture to-day are sciences. The old-fashioned farmers may have made money and are still making money, some times in spite of themselves. Many an old farmer's secret of success is the personal attention which he gives his business and it is that fact, and that alone, which enables him to survive and profit. The City farmer, or would-be-farmer, might just as well throw his money into a gutter as to attempt to go into farming without giving his investment his personal attention and his most thoughtful care. Agriculture and Horticulture are a condition of the mind more than they are a combination of money and brawn. Both are necessary, but above all, the man at it must have it on his mind, think about it, read about it, ponder, weigh, experiment, discard and select. These are all functions of the mind. Money and brawn are easy to get, the mind is not.

The city man who would really make a success of the country must begin at the beginning. One must creep before one walks. Dreaming of the day when one can buy a well-equipped farm and enjoy a hale and ripe old age is useless, for if one has money, and the age, he can acquire the farm but not the comfort which is supposed to go with it. Buying a distant home, to be paid for gradually, and to be seen once or twice during the few years, is slavery. One does not get any enjoyment out of it excepting the empty one of anticipation to be followed by disappointment. Therefore, I say that the city man who would farm should creep first, and the way for him to learn is to begin right now and right here. There is no use of going anywhere else excepting where you live. There is no city in this country so large, nor any town so small, that one cannot find a place which may suit one's idea somewhere within a short distance from the city. The mechanic can find his one, two or three acres, the salaried or high class man can find his small place, and the man of capital can establish his recreation farm or "play farm" all within convenient touch of his business. The place may be run down and ramshackle when it is bought. It

is a pleasure to fix it up and it is a double pleasure if one is limited in means and must count the pennies and do it slowly and carefully. The poor man can get ten times as much enjoyment and pleasure out of his place as the rich man and the chances are he will get ten times as much profit out of it as well. The home garden or the suburban garden is a good beginning, but it is only a beginning. While it gives one good experience, there is the one experience still lacking, viz., that of selling one's produce. Probably more failures have been the result of inability to sell, rather than inability to produce. There seems to be something particularly objectionable to the city man in the idea of selling the fruits of his garden and farmyard. We are slaves to social tradition and, in our minds, the selling of vegetables, eggs, milk, butter and other produce is associated with a type of man very much inferior to ourselves. "Ourselves" may be a hod-carrier or a corporation president, but at any rate, the work is inferior to ourselves. Unless a man is willing to overcome that pride and prejudice, he may as well give up the idea of going into farming. To my mind, it is not one whit less genteel to be selling vegetables or eggs than it is to be selling calico, street car rides, furniture or automobiles. Just how this foolish pride has originated is a mystery which is beyond fathoming. It is this pride which is at the bottom of most of the downfalls and is the ruination of more suburban homes and their financial wreck than any other one cause alone. Until this is overcome and until the man who wants to start a farm and live in the country or in the suburbs, believes that it is not degrading to sell the produce of his garden or farm, and still remain a gentleman, he ought to abandon all hope or idea of starting his career as an agriculturist or horticulturist. Therefore I say, starting a suburban home garden, while it may give experience in the ability to produce, will not give that most vital thing—ability to sell. The farmer of experience in the suburban or home garden is somewhat restricted in the method of production. The work is necessarily hand-labor on a small scale, quite generally water for irrigation is available and if anything interferes with the success of the garden, the financial loss is not very great. Experience can only come when operations are on a large enough scale so that in case loss through neglect or failure to sell occurs, it is actually *felt*. Experience also should be gotten

on a scale large enough to make the element of labor a factor to be reckoned with. Labor is one of the difficult problems which the city farmer or the man from the city will meet with the very first thing. There is a universal cry for experienced labor from one end of this country to the other. Even in those blessed regions of the South, where there is supposed to be an abundance of negro labor, the dearth of labor exists. In the neighboring industrial centers the noise over the dearth of farm hands can be heard over the noise and hum of whistles of industry. The labor problem will have to be met sooner or later by the city-bred farmer, and the way to meet it is to meet it. The subject is somewhat foreign to this paper but it may be mentioned in passing that the labor problem on the farm is one which is principally due to the farmers themselves. While wages have been advancing at enormous strides, the farmer has not handled his labor problem as other labor employers have handled theirs. The farm labor problem is acknowledged to be more difficult than that of any other trade or industry, but it is capable of solution and the solution of it will necessarily bring with it higher wages and a higher standard of living and a higher social status for the farm laborer, but that is another story, quite by itself.

To return to our subject, the suburban garden, aside from failing to give experience in the matter of selling, also is rarely sufficiently large to enable one to cope with the problem of labor. After selling, the labor problem is the next important one.

So the man who cherishes the ambition to become a farmer and hopes to get away from the daily routine of city life; who want to bring up his children on the farm with all that that implies in the way of pure air, pure food, health, good morals any sound minds, must not fall into any of the traps set for him. He must not plan and cherish—he must act—to-day—right here. The thing for him to do is not to go out to the suburbs and buy a little dinky bungalow or a shoddy house with a few scrub trees and some sickly spears of grass. That sort of home is too often considered a country home. To be sure, it has all modern conveniences—electric light, gas, telephone, etc., but that is not a country home. It is an apology for one. Too much is sacrificed to appearances and the man who really and conscientiously desires to live close to Nature will not sacrifice very much to

appearances. To a certain extent people all pay tribute to that tyrant, Appearances, as, indeed, it is only just that we should do so, but the suburban home as ordinarily found seems to be particularly designed to go to extremes. Generally, it is a hybrid, neither fish, flesh nor fowl. It is an incongruity, a sham designed to deceive ourselves and our neighbors. Take the ordinary middle class suburban house; it is usually planned by a city architect with no more idea of what a country home should be than a goose has of building a nest on top of a tree. There is the reception hall, parlor and dining room, whose location is determined by the exterior shape of the house. The main entrance must be invariably in front towards the street, so must the sitting room and parlor. The kitchen is usually at the back of the house, no matter what direction the house faces. No architect would consider one of these houses complete without that abomination—the butler's pantry. The real country home is not built for exterior appearances. The average suburban home is planned with the idea that the woman of the house has enormous leisure and is spending most of her leisure time in the sitting room and parlor. This is the plan which has been approved by generations of city-bred architects. It is the idea which is featured by our lives of sham aristocracy. The real country home assumes that the kitchen is that portion of the house in which the woman spends most of her time and it is therefore made as convenient, as central, and as cheerful as possible. The real country home disregards the street. . . It faces in the direction which is most desirable and that, in our climate, is usually the south. If we arrange to have our back door towards the street or highway, it is immaterial and of no consequence. The house is built for the convenience of the occupants or owners. Those who dare not have the back door of the house facing the highway are not imbued with the right country spirit. The true country home gets away from all tradition; it is planned for comfort and convenience. It saves the greatest number of steps and has the largest number of comforts and it puts appearances last in the list of items when the plans are made. As to modern conveniences, it is utterly absurd to think of a country home to-day being one of cold, cheerless comforts, where the water must be carried in buckets and the lighting is by means of kerosene lamps or tallow candles. A country home anywhere within ap-

proachable distance of any of our towns can have just as many conveniences as any city home and at decidedly less cost. The country home of to-day can be supplied with a sewage system at a less cost than in the city; it can be supplied with a water system at a ridiculously low figure, and if it is convenient to electric lines, it can have electric light and motor power for pumping water, or, if it is not convenient, it can at least have acetelyne light and gasoline engines. When we buy a lot in the city we pay a fabulous price, from ten to one hundred times as much as the land is intrinsically worth and why do we do it? First is location. The location usually determines the valuation of the lot and the location-valuation is usually determined by the nearness to desirable neighbors and other considerations. When we buy a lot in the city, we pay for the neighbors we are going to have. Furthermore, we pay for the ability to get water from the city mains. We pay for the privilege of connecting the city sewer with our property and that is why the land is sold us at instead of \$100 per acre, at a price of \$1,000 to \$10,000 per acre. After we have paid this sum for all these privileges, we may put up a building, and tradition and custom restrict us more or less in the plan of this building. The price of the city lot, expended in sewage and waterworks, for a country home would provide all the comforts and conveniences for about one half of the city lot price, and waterworks and sewage may also be provided. We need not be paying for the neighbors at all, for if we are half-way equal to our opportunity, we can make the neighbors come to us. Modern transportation enables us to do that, for we will naturally locate near a steam railroad or trolley line; if not, automobiles to-day can be bought at half the price of a city lot and about the price we would have to pay for our neighbors when we buy a city lot. Therefore, for the price of a city lot, we can buy the neighbors, waterworks, sewage and lighting plant, and at the same time we can have these things next to Nature where we may have the daily enjoyment of a country home and have that home a real home, one which will support us in a time of need.

The city man, when he starts out to buy a farm, makes a number of mistakes, but after he has learned by his mistakes, he is surely a better thinker and a better organizer than he was before, and in the end he is competent to make more money out of

his farm than his neighbor who makes fun of his efforts. But you cannot convince any average farmer that any city man ever makes anything out of his farm. Now consider some points of advantage, which are in favor of the city-bred farmer. In the first place, his city training makes him a close observer and student. He readily realizes his mistakes and after these mistakes have been overcome and he is on a properly established basis, he is a better *executive* than his neighbor. Nine times out of ten he can plan his work better, handle his men more satisfactorily, attend to his affairs more promptly and, above all things, it has been my observation that the average city man is more inclined to keep his machinery and stock in better condition and repair than his neighbor. All these things count. There are probably a good many city farmers who are making a fairly decent return on their investment who are not given credit for it by their less skilled but experienced neighbors. If, in addition to this, he can overcome his prejudices, he has one enormous advantage in the fact that most all vocations in the city require some sort of selling-ability. If he once makes up his mind that it is not degrading if he must sell his produce and that he will sell it to the best possible advantage, he will get from 50 to 100 per cent more for his produce than his neighbor. There are a thousand and one little tricks which the city farmer will observe and take advantage of. One of my friends is breeding ducks and guinea hens as a side-line on his farm, not because of any foolish notion of profit but he finds that by turning them loose in his potato patch, he can control the potato bugs, instead of spending time and money for poison. He reports the experiment successful as the ducks will not harm the potato plants. As soon as the potato bugs are out of the way, he fattens up his ducks and sells them at a profit. Chickens would scratch up the ground too much, and he takes mighty good care that no chicken ever gets into his potato patch. Another trick is a little vineyard which he keeps in condition of fine mulch by the scattering the grain for his chickens among the vines and allowing them to scratch for it. He scatters the food among the vines and with a little help of the hoe his vineyard is weed-free and in fine tilth.

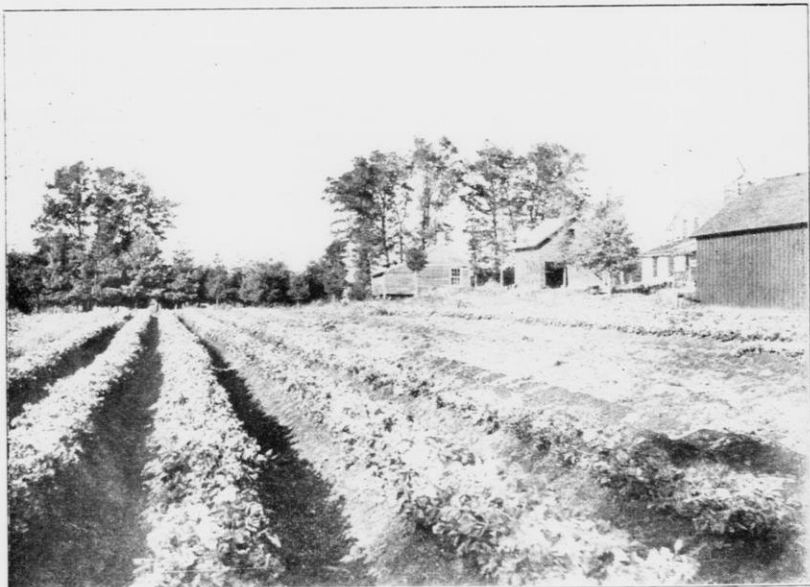
There are pitfalls into which every would-be city farmer is bound to step sooner or later, and one of the most common is

that of foolish literature and books on agriculture. The every-day farmer has every right to look with suspicion upon the average agricultural book. There are so few of them that are at all practical as to warrant the condemnation of this whole bunch of literature. Recently, a man who had been the editor of an agricultural paper informed me, when observing my field of alfalfa, that it was the first alfalfa he had ever seen, although for years he had been advocating the growing of alfalfa in the columns of his paper.

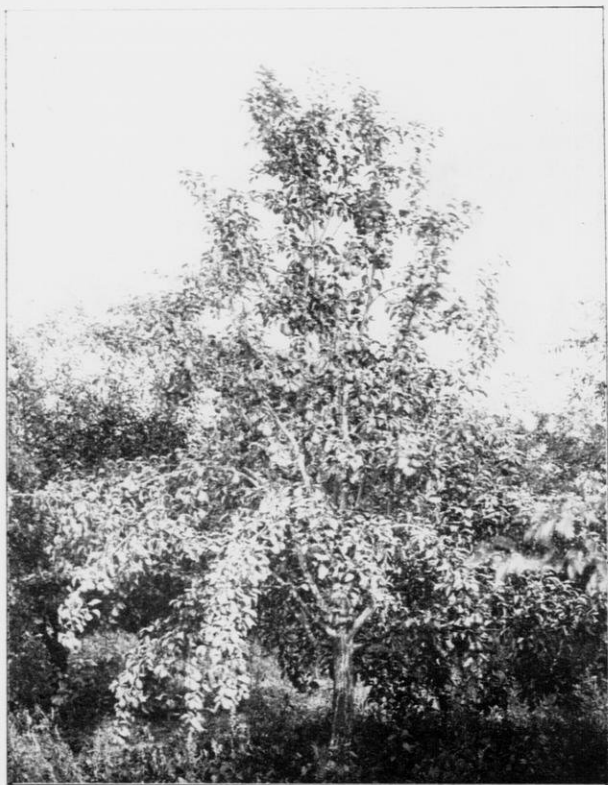
I could mention a number of books which are utterly absurd, but it would be unjust and unfair to give them even the little free advertising they would receive by mentioning them here. The most glaring one that I know of is a book written by a woman in which she describes how she made a home self-supporting by doing on a small scale a number of impossible things. She raised flowers for sale, vegetables for sale, fruit for sale, bred chickens and ducks, made her own butter and did all kinds of things herself. This book is too utterly absurd for anything, but, in-as-much as it appeared as a series of articles in a popular woman's magazine, it has victimized a number of people, who can ill-afford to be misguided by articles such as these, which should be designated as a plain, every-day swindle, and should be prosecuted as such.

Among the traits which should distinguish the city farmer should be one of minimizing hand-labor. If there is anything which causes a waste of time and effort, it is hand-labor, and the city farmer should not have failed to observe that hand-labor is the one all-absorbing and greedy waste of good money. The practical man, when he goes on the farm, will take particular pains to see that hand-labor is cut down to a minimum. If he makes butter, he will use a separator and combined churn and worker. If he goes in for gardening, he will use horse tools rather than hand tools. He will use the proper tools for most anything he has to do, and part of his skill consists in knowing how and when to apply machine labor as against hand-labor.

We must not close without referring to that bugaboo of country life which is generally referred to as "loneliness." This is the hob-goblin which scares the ladies mostly, rarely men. As a matter of fact, the women members of the family have more



Celery field, E. W. Sullivan, Alma Center.



Pear Tree in Orchard of A. W. Lawrence, Sturgeon Bay,
Sept. 4, 1910.

reason to fear being lonesome than the men, assuming that the man is usually occupied during the day and has an opportunity to see and converse with his equals. If the man follows the precepts of this paper he will move to the country while continuing his business in the city, and this, in itself, will relieve him from the possibility of being entirely lonesome and without companionship, but the woman must be on the farm all day long. As a rule it is the people with children who will take to this sort of life and the woman with children, without a doubt and with hardly an exception, will never become lonesome. It is rare, indeed, that a woman, unless she is a mother, will be willing to bide all by herself all day long on the suburban place such as we have in mind here without succumbing and gratifying that desire for companionship and contact with her equals. If she has children they, in themselves, will be desirable companions, and the greatest pleasure and the most valuable feature of the suburban place consists in watching the delight which children enjoy the freedoms of country life and the healthy and strong appearance of them. But even the children will not entirely make up for that companionship which is a necessity in every woman's life. Of course, if the woman is devoted to cards, false hair and wagging tongues, she has no business to go to the country to live in the first place, and it is useless to expect people of that stamp to take any interest in Nature, or to know that there is any World outside of the limits of a deck of cards. If the woman is interested in other things, such as literature, art and has the ordinary human interest in life, she will not lack companionship. She will be surprised at the intelligence and good breeding which prevails in many of the farms and homes in the country. I can positively state from personal observation that there is more good breeding, more actual knowledge of the things which it is useful to know in the average country home than there is in the fashionable streets of the average village or city. Loneliness need not be a bug-bear to the right sort of a woman.

In conclusion, I want to refer to one reason why more people are not living in the country. We are but slaves to tradition and we are wearing the marks of servitude on our person to-day. The buttons on the back of our coats are relics of one hundred years ago when the lower corners of the coats were buttoned back so as to give freedom of movement to the legs in walking and

horseback riding. The buttons on our sleeves are relics of the days when we used to button back our cuffs. None of them are necessary, yet for generations and generations, tailors have sewed on these buttons. Stiff hats are relics of barbarism and are unnatural and unnecessary, but we go on wearing them because our ancestors found it advisable to wear stiff hats in order to protect themselves against sword blows. We are miserable slaves to tradition and we do not know it. It is time that we break away from the thralldom of ancient times, break away from our unnatural lives, try to be our natural selves and get back to Nature, not with a halloo and a swoop, but gradually and gently. The very fact that we now look upon the tiller of the soil as a real man is an indication of renewed times and a healthy condition of society.

Agriculture was man's first occupation—this most natural occupation. In the most highly civilized countries of the world, agriculture is a gentleman's occupation. The great nobles of Europe derive their principal revenue from the proceeds of agriculture. Many of them farm their own lands and are nothing more nor less than a high class farmer on a large scale. It is not degrading to the Duke or Marquis to know that he receives his revenue on the money which he has invested in farms or derived from the sale of grapes, sugar beets, milk or any other agricultural product, and I cannot see why it should be degrading to our independent American to admit that he toils in the same way and gets his living and income in the same way.

A wrong condition of affairs is indicated by the way in which we refer to the success of a man when we say that he has "risen" from the farm to some eminence in political or social life. That is all wrong—he has not risen—he has fallen. When we get to the point when we can refer to the man as having risen from merchant or corporation president to be a farmer, then we shall have reached the true state of organization or society and when that time has been reached, there will no longer be any question of the opportunities of the city man in the country.

DISCUSSION.

Mr. E. E. Dunning: The subject that our brother has spoken on is one that is quite dear to my heart, because I have had considerable experience in that regard and I hope I may say

something that will be of help. I was brought up on a farm, I was a farmer boy until I was twenty years of age and then circumstances took me to the city and I have been obliged to be in the city ever since. I have endured the city ever since. No one can say that I have enjoyed it, but some years ago I bought a little piece of land, twelve acres near the city of Milwaukee, within twenty minutes' ride of my office. At the present time I employ about one hundred and fifty men in my city business. It seems to me that the speaker touched along the lines of people who have plenty of money, and I have been thinking that there is also another class of people that we might possibly be interested in, as I have come in touch with those people often, and that is the mechanic. We employ in our institution, for instance, tanners, machinists and moulders and they earn all the way from perhaps \$2 to \$3.50 a day. Now a mechanic of that kind, we will say that he is earning \$60 a month in the city. That may seem considerable to anybody that has not had experience, but as a matter of fact that \$60 a month, after the mechanic has paid for his rent, is eaten up, literally eaten up, he might possibly save a few dollars, he may save \$10 a month, he might have save \$20. He would work perhaps 20 to 25 years in the city, and he would do very well if he saved himself a little home somewhere. In our city we have, of course, real estate men who have lots to sell, and the gentleman here just spoke on that subject. These lots vary from \$1,000 to \$5,000 an acre, one of these parties will buy a lot which costs \$500 or \$600, put up a house that costs him \$1,500 or so, and he will work 25 years to save that property and he may possibly, if he is fortunate, he may have that paid for. Then he has a home in the city, that is all he has got. That home will not bring him in one dollar a year as far as living is concerned, excepting a little garden patch he might have. Now, it seems to me for such a man as that there is an opening in the country that would bring much better results at the present time, especially in cities like Milwaukee and other large cities. We have our interurban line which reaches out into the country; my own place is about seven miles from my office and yet I live there, I get on a car and in twenty minutes I am in my office. Now, it seems to me if these mechanics could purchase, instead of a small lot, a few acres, say three to five acres and build a

more modest house on that, save it in some way, by the time they got so old that they would not be able to work in the city they would not only have a home in which to live, but they would have something to produce a living as long as they lived. That strikes me as the opportunity of the city man in the country, and I do not know whether it is the office of this society to encourage anything along those lines or not, but in thinking of the matter it seems to me that there is an opportunity. After a person would get such a piece of land they would naturally want to work it, and they could gradually work out of the city job and into this. If they had some farm training earlier it would be an advantage. A great deal of money, as many of us know, can be made off a very small piece of land. We ourselves have taken off at the rate of \$500 or \$600 from a single acre of land in fruit, and the average city man that goes into the country could start in that way. There is always danger of going too heavily into some things. I find from several years' experience that there is a great deal in selecting varieties, especially fruit. Personally I made a great mistake by putting money into 3,000 currant bushes of a certain variety that I wish was not there, not because they do not bear, but because that land could be put to some other use. That is true of almost every line, some varieties bear two or three or four times more than other varieties. There is another thing that we should bear in mind if we go into fruit raising, that it is better to be near a large city where there is plenty of room for a good market and also be prepared to fertilize heavily.

As far as being proud is concerned, it made me think of a lawyer in our city, von Hausen—he is a “von,” at least Germans know what that means. He was district attorney in the city at one time, and in order to recover from overwork he settled on a farm. He said, “I am a farmer, and I am proud of it.”

I suppose the reason I went back to the land was not because I was starved to it, but there was something in my nature that was pulling me to the country and it did not seem as though I ever could get over it. We have the conveniences in the country just as much as we do in the city; we have electric lights, or at least incandescent lights and we have a water system and heating and there is practically nothing but what we

can not have. I could talk here all afternoon on some of the experiences we have had. This year I must say that we have not made very much money, I do not know that anybody has made a great deal.

WHAT DOES THE HORTICULTURAL DEPARTMENT OF THE AGRICULTURAL COLLEGE OFFER TO THE CITY-BRED FARMER?

Prof. J. G. MOORE.

I want to correct, at the beginning, an idea which might perhaps become prevalent in stating this question, which is, "What does the Horticultural Department of the University offer the City-bred Farmer?" Using that term "Horticultural Department," I want to say that we are confining the work of the department a little more at the University now than formerly. We do not attempt to teach our regular student who is interested in horticulture everything pertaining horticulture in the Horticultural Department. In order to be a good horticulturist there are other things besides pure horticulture which are necessary in order that we may make a success, and I believe it is true that the horticulturist has to know more things than a man in any other line of farming. There are so many questions which come up, questions which relate to plant diseases, questions which relate to insects, questions which relate to soils, and chemical questions in connection with the application of spray materials, that pure horticulture is not sufficient for success in fruit and vegetable growing, and so what I shall have to say today will cover a little more than just what we offer in the Horticultural Department alone.

There are two things which the city-bred man, the city farmer might do in order to secure the greatest advantage from what we have to offer in the Horticultural Department. We have what is known as the long course in agriculture, which not only takes up horticulture, but these other related branches

as well as other phases of agriculture. We have a four-year course and a two-year course. For a man who wishes to put in a comparatively short time, a man who has been interested in some other pursuit in the city, and who is unable to spend four years, or who does not desire to spend four years in a college course, the two-year course would be the one which would be most adapted to his needs, because in that course he would get practically all the practical work which he could get in the four-year course. The other opportunity which is open to him is the short course, a fourteen-weeks course, for two years, understand that is fourteen weeks each winter. The farmers' course is a ten-day course, which we call a cramming method, because in that we just touch the high places. In the horticultural department we can give and do give work along three distinct lines. There is first, and probably most important, the work along fruit lines. If you were to go to the University and take our course in horticulture, the first thing to be required of you would be to take our general horticultural course, in which we outline and give directions in the selection of sites for orchards, methods of cultivation, soil manipulation, pruning, spraying and questions of that sort, a course of lectures, from the theoretical side. You would next take up the class in fruit or orchard practice. We believe that the best method of teaching is to first give an idea of the general principles underlying the thing which we wish to teach and then turn the student loose, under direction, to put into practice these principles which we have instructed him in at the beginning. In following out this method of teaching as I have just said, we turn the student loose in the laboratory, in the orchard, in the gardens, and if you will come out next spring and look over the Agricultural College, you will find our students in the orchards planting trees, or you will find them in the orchard pruning or spraying, under direction, doing the very things that they will have to do when they take fruit growing for themselves. These are the two practical courses given in fruit growing.

We have a third course which is designed more particularly for those who are interested in fruit culture to a little further extent than just the orchard practice, and this is the course which is known under the name—we call it Pomology—that is

a high-sounding name and the course is not half as hard as the name. In Pomology, besides trying to instruct in something of the relationship of fruits and their botanical classification, we take up identification and fruit judging and scoring. We aim to have the student become familiar with the various common varieties which are grown in this state, not only that, but we aim to have him become familiar with the differences in the characters of varieties grown in the different locations and under different conditions. If you had visited our laboratory in pomology last year you would have seen the class working upon Ben Davis apples which had been secured from five or six different states in the Union, studying the different characters of the fruit when produced under the different conditions which existed in these various places. Not only were the students learning the difference in character but also testing for quality to see whether Wisconsin could not produce just as good fruit as the Bitter Root Valley, and I might say that, without telling the students where the fruit came from, we had very satisfactory results so far as Wisconsin fruit was concerned in judging for quality. In this course we also take up the methods of packing, the importance of putting the fruit on the market in good condition, and other things of a practical nature.

The second line of work which the department takes up is the vegetable work. I regret to say that in practically every college of agriculture in the United States the vegetable side of horticulture is not given the importance which it should have. We are more inclined to go to the fruit side and pass over the vegetable side. Just why that is I do not know that I am able to say, but we are open to the criticism at the University of Wisconsin just the same as in the other institutions that we are not at the present time and have not in the past given the vegetable side the importance which it should have, not so much perhaps along the line of teaching vegetable gardening, as along the line of experimental work in growing vegetable crops.

We have two courses in vegetable growing in the university which would be of value to the city-bred man. The first is the vegetable gardening course which takes up a discussion of the principle involved in producing vegetable crops. The

practical side is not neglected for we have work in the manipulation and construction of hot beds, the different methods of planting, and the process of vegetable gardening, such as cultivation and the control of pests which are likely to attack vegetables. The other line is that of vegetable forcing, which for the city farmer probably offers as inviting a field as any along the line of horticulture. Vegetable forcing is an industry of comparatively recent importance, that is, it has been carried on for a comparatively short time when we consider it in connection with commercial or truck gardening. I might here cite just a few little things which we do in our classes in vegetable forcing. Besides giving the students instruction in the methods employed in forcing houses, we have them make plans for forcing houses, give them instruction in methods and best systems of heating and other practical questions of forcing houses construction. In addition to this we turn them into the forcing houses, and give them charge of the various crops, so that they get the actual experience of growing the crop. The reason I am placing the importance that I do upon the actual work, the actual practice, the laboratory work as we call it in the University, in the Department of Horticulture, is that it is there that they get just what the speaker before me said was the reason why the city-bred farmer made a mistake, it was "because he did not have the knowledge concerning things that he was about to do." So you will find probably the most important part of our teaching, is in bringing the student into contact with the actual work. In our vegetable forcing course for one whole semester the student has no lectures, simply has crops in the green houses to deal with. He has the problems here of pollination, control of insects and diseases, harvesting and marketing and all that sort of thing.

I can tell you a little story of what it is possible to do in the way of forcing vegetables which will immediately show you why it is an opening for the city man. Last winter under the benches in what we would consider waste spaces in the forcing houses, a little patch about 4 by 5 feet, one crop of rhubarb returned to us \$7.50. We could have grown three crops of rhubarb in one season. Now you can figure out how many thousands of dollars you can make on a 100-foot house at that rate. The same is true with other forcing crops. The forcing

of vegetables offers a very great opportunity for the city man, not only when he is in the city, but also in the country, and we try to teach these things in our department.

There comes the third line of horticultural work in which we are to teach our city-bred farmer, not so much from the commercial side as the esthetic side, and that is the problem of home decoration, landscape gardening. We are giving in the university a course in landscape gardening which includes the study of plants suitable to the various method: of laying out grounds, the principles involved, the methods of culture of plants, and also the planting of home grounds. This is not only a thing which the city man may avail himself of, but it is a thing which every farmer should be interested in. There is no excuse for the unsightly appearance of so many farm homes, and there is no one investment of a like amount which will add to the value of any place which has been given no previous attention in this respect as much as the proper planting of shrubs and the care of the grounds surrounding the farm house. The same applies to the city. For the city-bred farmer, the city-bred lady farmer, we give a course in home floriculture, in which we take up not only the discussion of decoration of the dooryard and the lawn, but of the methods of house decoration in the way of growing plants.

There is one course which I neglected to mention and which is a very important one, particularly from the standpoint of the fruit grower, and that is the matter of plant propagation. We give a course in plant propagation in which we take up a discussion of the various methods of propagating our various economic plants, and also in which we do work in the laboratory in the actual propagation of such plants. There we give actual practice in root grafting, in top grafting, in budding and all the other details of various methods of plant propagation.

In addition to this work which we give in the horticultural department we have the two lines of work which were spoken of by Prof. Jones and Prof. Sanders, these lines of work are so closely associated with horticulture that we must consider them in connection with horticulture, and so while we are trying in the horticultural department to give the actual application in spray materials for the control of plant diseases and insect

pests in the departments of plant pathology and economic entomology, there is given some insight into the insect pests and plant diseases which would be most likely to be encountered in the growing of the various crops. In the Soils Department, which is not represented here today, we take up the study of soils, fertility and the matters pertaining to the best conservation of the fertility of the soil, and also moisture, and in that way we have in these four subjects a rounding out of what might be called a good horticultural education. Perhaps to some of you it is not clear how the city man can avail himself of this, but if you come down to our ten days' course and make your wants known, I will assure you that we will find some way of giving you at least something along the line in which you are most interested. Not only that, but the Horticultural Department stands ready to give advice just the same as does the Horticultural Society at any time, when there are any questions which perplex you. We would be glad to have you ask for information; if we cannot supply it we will get Cranefield to do it.

DISCUSSION.

Mr. Whitnall: I, for one, feel very proud of our Wisconsin University, I think we all have reason to feel that way, but I will not hesitate before an audience of this kind to offer just one criticism, I offer it in friendship. The University still wears buttons on the back of its coat, as Mr. Gonzenbach spoke of, and the buttons are of this nature; when any of our boys or girls feel a desire to attend the university, they are required to pass an examination. There are a certain amount of credits required that are handed down from some other school, usually the high school, and it not infrequently happens that the applicant is one, two or three points short and that the shortage comes from a lack of knowledge in Greek, Latin or French, and it seems to me strange that a boy or girl shall be barred from taking a course in agriculture for being deficient in obsolete languages.

Prof. Moore: I suppose it is up to me to speak in reply to the criticism. I might say that I think every person in the

University is not only willing, but glad to have criticism fired at us, so that we may know where our weak points are. However, I think Mr. Whitnall is just a little mis-informed, and I am speaking now for the College of Agriculture and not for the University as a whole, we have nothing to do with the College of Letters and Science, with the college of Engineering or the Law School. The requirements for entrance to the four-years course in Agriculture require a certain number of units from high school, that is, a student must be a graduate of a high school which is on the approved list of the University. In that entrance requirement is a certain amount of German, I think about two years of high-school German is the requirement for the entrance to the four-year course, which is the only language requirement outside of English, which is required in the four-year course in Agriculture. That student, if he lacks his credentials in German may enter the course in Agriculture with his German back, having to make up those credits before he receives his diploma. That is the 4-year course. Now let us consider the 2-year course. The 2-year course is designed primarily for those students who do not wish to go into research or science work, but who wish to go back to the farm. In the 2-year course in agriculture there are no language requirements, not a language requirement outside of English. A student can enter the 2-year course in agriculture without having looked inside of a German, French, Latin or Greek book. He can complete that 2-year course in agriculture and receive his diploma, "Graduate in Agriculture," without having taken any foreign language. After he completes the two-year course in agriculture, he can go on and take the 4-year course in college and receive his degree of Bachelor of Science in Agriculture by making up the four year requirements. It is true, he has to come up to the standards of the long course with the exception of the language requirements.

Now let us go one step further and take the short course, in which we give two years of fourteen weeks each. In the short course no examination of any kind is required of any student over, I think it is sixteen years. Any boy or any girl can enter the short course in agriculture without any examination and at the completion of the course, without having studied any

language, English included, can receive his diploma of a graduate of the short course in agriculture. That is the exact status of the entrance requirements of the courses of agricultural study in the University.

Mr. Whitnall: I am very glad to know that those buttons have been clipped off, because it is only two years back that I took a personal interest in a young man that was barred from the University on account of not having the necessary credits in language.

Mr. Gonzenbach: I think Mr. Whitnall is wrong, I think language is very important in agriculture. There are occasions on a farm when it is very valuable to have a command of language, for instance, when a cow refuses to give down her milk.

Mr. Reigle: Our friend there is making good and proper progress in the way of becoming a good and substantial farmer.

The President: We have a number of pleasant surprises. Mr. George Kellogg can tell us this year how successful Wisconsin is in the raising of peaches, when Michigan is making an evident failure of it.

Mr. Kellogg: I spent two days with Ben Bones at Racine. He is just outside of the city limits, a little south. It has been seven years since he planted the pits, grew the seedlings, budded 400 trees and they commenced bearing at two and three years old. Two years ago he raised 370 bushels of peaches like these, and sold them at Racine. I do not know what he received for those. He is selling now 200 bushels at \$2.50 a bushel, just loading down the wagon every morning and going to the city. He is right on the sandy soil, he is within a mile of the lake shore, and this peach is a Canada peach, I do not know the name of it, it is a clingstone, but it is very sweet. Now, perhaps some of you might want a pit, a peach pit to try it and start a seedling. I was overjoyed with the crop myself, almost made myself sick eating peaches for two days, I did not suppose they would ever make anybody sick. I want to call your attention to his success. He cleared \$700 this year on less than an acre of strawberries and he is harvesting what will make him \$500 in tomatoes, selling them now at \$3 a bushel, and he sells his strawberries, he has a peculiar strain of the Jessie, that 15

fill a quart right along; he has the finest strain of Jessie, and he has kept it up from the original Jessie.

The President: Eating peaches for two days, for as old a man as he claims to be, I think it is wonderful that he has carried through it so well, but it shows what horticulture can do for people. You who have looked over the vegetable exhibit, the flowers, etc., have been particularly attracted by the vegetables from Lake Geneva, especially because they are not entered for competition, they are a good-will offering for us, and we ought to be very much pleased that our Lake Geneva brothers are willing to spend so much time bringing them here for our instruction and entertainment, and any one who has not looked them all over will have missed it, and that is without any reflection on the others. These on this side (indicating) I understand are altogether from the Lake Geneva Gardeners and Foremen's Association.

Mr. Smith: Several times in the past our Lake Geneva friends have done something of this kind in the way of bringing flowers or something of their products here, and I think it is only proper that we should tender them, as a society, a vote of thanks for this production of theirs. It is certainly very fine and helpful to us, to show what can be done even in a dry season. I move you, therefore, that a vote of thanks be given this association for their exhibit.

The motion was seconded and carried.

FLOWERS FROM FROST TO FROST.

FRANK R. KUEHNE, Lake Geneva.

This is a subject of such proportions that it is impossible to do it justice in the time allotted for such a paper as this.

To do this subject justice one would need to consider the whole category of Perennials, Annuals and flowering shrubs, and so, to make this paper valuable as far as it goes, is well for us to confine ourselves to such varieties of perennials annuals, etc., as would prove of value to the amateur as well as the professional gardener.

When the storms of winter grow less fierce and the sun begins to climb higher in the heavens, how glad we are when we look in some favored spot and find that our dearly loved friend the snow-drop has arrived to welcome the long looked for spring.

Following the snowdrop comes the Crocus, which makes a splendid showing when massed in separate colors in the shrubbery, on the lawn, or in some conspicuous place in the woods.

The pretty little blue *Scilla Siberica* is always welcome and leads a procession of such old favorites as the Hyacinths, Tulips, Narcissus and Jonquils, which will, when given very little care, give a succession of bloom from early spring till late in May. These bulbs are cheap and when planted in the early fall and given a slight mulch of coarse litter throughout the winter, will amply repay anyone for the trouble and expense. There are a great many varieties of these bulbs on the market, but as the list is so long I will only say here that nearly all of them will give satisfactory results if planted early in the fall and given time to root well before severe freezing weather sets in.

Following these bulbous plants comes a procession of perennials and annuals that is truly entrancing to the lover of these beautiful flowers. The list is so great that it almost hopeless to do them justice in a paper of this description, so we can only hope to mention some of the most valuable ones for the perennial border or for cut flowers for home decoration.

Among the first to come into bloom is the *Digitalis* or Foxglove valued not alone for its beautiful spikes of bloom, but for its medicinal properties also. The best method to obtain large spikes of bloom is to sow the seed in May, transplant the seedlings when large enough to a well prepared piece of ground, keep them shaded till they are well established and in the early fall when they are strong plants, they can be planted out where they are intended to bloom. Dig in plenty of well rotted manure in your beds or border as the Foxglove is a great feeder. These plants will do well for two or three years, but it is best to grow new plants every year, if first rate results are expected.

The *Aquilegia* or Columbine is another old fashioned flower that does well under the same treatment as the Foxglove. Some of the newer varieties of long spurred hybrids are beautiful additions to this interesting family.

The *Campanula* is also an old favorite and does well under

the same treatment as the Foxglove and Columbine. There are a great many varieties of *Campanula* or Canterbury Bells but the most valuable varieties are *Campanula Medis*, *Campanula Pernicifolia*, Blue and White, and *Campanula Pernicifolia Grandiflora Moerhimi*. These are all beautiful and valuable either for the border or for cut flowers.

The Hollyhock is also worthy of a place in the garden and when well grown makes a splendid showing. Unfortunately the Hollyhock is subject to blight and to be successful with them they ought to be sprayed several times during the season with Bordeaux mixture. Chater's strain of double Hollyhocks are fine and give some splendid colors. Treat them the same way as advised for the Foxglove, etc., and when they commence to grow in the spring, spray with Bordeaux and your hollyhocks will be a thing of beauty and a joy, as long as they last. There is a new strain of annual Hollyhock that can be sown early in the spring and flowered the same season but they are inferior in quality to the older kinds.

In growing perennials from seeds the methods advised for the growing of those already mentioned will be satisfactory in all cases of hardy perennials. Sometimes it is advised to sow perennials as late as August, but as a rule that is too late and the best results will be obtained if they are sown early in the season and treated as advised. In the case of our old friend and favorite the pansy, August is early enough to sow and the plants will be large enough to go through the winter with a little protection, or if wintered in cold frames will give fine flowers for cutting early in the spring. The English daisy will do well treated the same way as the Pansy but needs a little more protection in winter.

The *Dianthus* family give good results, one member of this family Sweet William (*Dianthus Barbatus*) is an old favorite and is hardy and prolific in any spot of the garden.

Scotch Pinks (*Plumarius Poeticus*). Her Majesty, the best of the hardy pinks, a free bloomer, pure white and easy to grow. Most of these can be grown from cuttings, or seed, but in the case of Sweet William from seed is the best way.

The annual varieties are a very pretty and useful class of plants. They can be grown from seed sown inside early in the spring and when the plants are large enough planted outdoors,

or the seed can be sown outdoors where the plants are intended to bloom. They will give an abundance of bloom till the frost snuffs them out.

The Delphinium or hardy Larkspur is one of the most magnificent and satisfactory flowers we have in the list of hardy plants. When well grown the splendid spikes of beautiful blue flowers are certainly an ornament to any border. The Chinese Delphinium is quite a different type, being of a dwarfer habit growing and flowering in bush form, colors blue and white.

We also have the annual Larkspur which gives beautiful cut flowers. When the seed is sown outdoors in the spring where the plants are intended to bloom they will give a supply of bloom long after the older and hardy varieties are gone.

Where white flowers are in demand there is nothing to equal the old Achillea, The Pearl. The plant is very hardy and is a profuse bloomer and the pretty bunches of little double white flowers are fine for cutting and last well either when cut or on the plant.

The Iris family is well worthy of consideration and some of the different kinds ought to be in every garden. They flower in the following order, Spanish, German, English and Japanese. There are other varieties but these are the best. The Spanish and English are bulbous and the bulbs should be planted in the fall, when planting Tulips or Narcissus. There are some good varieties of German Iris which are all easily grown and are very useful. For magnificence of bloom however the Japanese Iris is easily first in the list and when given a good rich soil and plenty of water in the growing and blooming period they certainly give splendid results. They should be divided and replanted every third year as their natural tendency is to grow from the outside of the plant leaving the center to decay.

The Peonies may be classed as successful rivals of any hardy plant that adorns our gardens. They rival the finest roses in color and fragrance and produce a gorgeous effect when in bloom and are very satisfactory as a cut flower. They are perfectly hardy requiring very little protection during the winter. They are not subject to disease or insect pests and the foliage after the flowering season is over keeps clean and always looks good in whatever situation the Peony is planted. The following kinds are usually considered among the best: (Festiva Maxima)

large white, the inner petals tipped with bright crimson. (*Edu-lis Superba*) mauve with lighter shadings. (*Festiva Alba*) white. (*Marie Lemonie*) ivory white. (*Louis Van Houtte*) crimson maroon. (*Alba Plena*), pure white. (*Dorchester*, flesh color. (*Duchess De Nemours*), pure white.

There are many others worthy of mention but time and space does not admit. As the Peony improves with age, before planting, double dig your ground working in plenty of good well decayed cow manure. Plant not less than three and a half feet apart each way and with good care and generous cultivation your Peonies will keep on improving for many years.

Your garden will certainly be incomplete unless you have a good bed of hardy roses. Everybody the world over loves a rose. The rose, violet and lily of the valley are famous in song and story and are greatly loved by everyone and are usually linked together in our memories of bygone associations. The hardy or Hybrid Perpetual rose rather likes a stiff soil and good rich soil of this description will give splendid results. The ground should be thoroughly prepared and enriched before planting the roses. The plants should be set so that the union or graft will be about three to six inches below the surface of the ground. The plants should then be cut back to about three buds to each stem, cutting out all the weak shoots altogether. The plants should not be allowed to flower much the first year but should be encouraged to make a good growth and when the plants are well ripened in the fall they should be tied down and when the ground has become frozen so that the mice will not bother the plants, they should be covered over with a good mulch of coarse litter or leaves. This will give them good protection and in the spring when the weather has become mild enough, the litter should be taken off and when the plants begin to show signs of growth they should be pruned back to three or four buds and the weak shoots cut out altogether. Treated in this way your roses ought to give you results that will delight your heart. The following varieties are perfectly well suited for the above method of cultivation and are considered among the best varieties.: Paul Neyron, dark pink: Baroness Rothschild, satin pink: John Hopper, bright rose; Marchioness of Londonderry, ivory white; Margaret Dickson, white with pale flesh center; General Jacqueminot, scarlet crimson; Frau Karl

Druschki, pure snow white. There are many other varieties worthy of a place in every good garden.

The climbing roses should also have a place in the garden and when given a proper place such varieties as Dorthy Perkins, The Farquhar, Crimson Rambler and others add greatly to the beauty of the garden.

Among hardy plants the hardy Phlox takes high rank. They start blooming early in July and continue till late in the fall. They give the most effective display when planted in masses of one color. There are a great many varieties of this class of plant but if six or ten of the best kinds are selected this will give a selection that will give good satisfaction. The following six varieties are very good: Bridesmaid, pure white; Pantheon, rose color; Coquilicot, scarlet; Stellas choice late, white; Selma, pale rose; Lord Raleigh, purplish red. There are many other varieties that are very good. The suffruticosa varieties are worth mentioning. This type does not contain the rich colors of the standard varieties but are invaluable for their early blooming which commences in May and continues through the season. Of this type the following are good: Indian Chief, Miss Lingard, Ringleader, Dr. Hornsby. The Phlox responds well to good cultivation and will well repay anyone for good care and cultivation. Phlox Subulata or moss phlox which flowers in the spring with its moss-like foliage is fine for rockeries, borders or beds. It is best propagated from cuttings taken in the spring and will flower the following spring.

In a mixed border of plants the Shasta Daisy is very effective and is useful as a cut flower as well as effective in the border.

The Asters both perennial and annual should not be overlooked. They are all splendid for cutting and look well in the garden. Many bulbs are planted in the fall but others can be planted in the spring and give good results. The gold banded *Lilium Auratum*, *Lilium Speciosum Album* and *Rubrum*, the Tiger Lily and many of the native lilies are all suitable for garden culture.

Among the bulbous plants the Gladioli and Montbretia are of easy culture and are splendid for border planting or growing for cut flowers.

There are so many fine varieties of flowering plants that one feels at a loss how to do them justice in a paper of this kind when

many of them are fit subjects for a paper all by themselves. Take the lilies for instance what a valuable paper could be written on them alone and yet we can only glance at them as we pass along.

The Canna is another valuable flowering plant and is almost indispensable in a well ordered garden. What splendid effects can be produced with massed beds of Cannas and what a splendid assortment of varieties are being produced by lovers of this magnificent class of plants. The culture of the Canna is simple and anyone who will give it a little care will be well repaid.

The Dahlia is another old favorite that is becoming more popular every year. They flower at a season of the year when other flowers are on the wane and their gorgeous blooms are doubly valuable at a season when Jack Frost is beginning to get in his first work. The Dahlia like the Canna likes a moist, rich, soil and is of easy culture. The tubers can be planted outdoors in May and if only one shoot is allowed to grow splendid plants can be grown in this way.. The method mostly used with gardeners is to start the old tubers in the greenhouse and when the young shoots are about four inches long they are taken off and rooted in a propagating bench.

There are many valuable flowering plants that can only be mentioned in a casual way but are valuable in the garden in the fall of the year. The Rudbeckias, Golden Glow and Purpurea, are well worthy of a place in any garden. Pyrethrum Miginorum is one of the finest things for cutting in the late fall. Boconnia Japonica is a tall stately plant with panicles of white flowers that is useful as a background in large beds or borders. Boltonia Asteroides is one of our finest native perennials and Boltonia Latinquama is also valuable in the late fall. For producing a gorgeous effect in the fall there are few plants that equal the Salvia. They are easily raised from seed sown in the spring and are usually one of the last flowers to be seen in the garden in the fall.

Before closing I want to say a word for the hardy chrysanthemum. These are perhaps the last flowers to be seen outdoors in the fall and if planted in a sheltered place can be had in flower well on into October. I feel that I have done this subject but slight justice but this paper is probably long enough and you may get more benefit from the discussion of the subject than you get from the paper itself,

Mr. Periam: I think this paper ought to commend itself to every lady in this room, but there is one thing I would like to advise them, do not undertake too many varieties.

Mr. Whitnall: There is one feature in which most catalogs are deficient, a matter that would be helpful to their customers, amateurs generally, and that is how to use these perennials in naturalizing them in their gardens. When we go through the woods and find wild flowers, if we start early in the spring we find the hepaticas, later the anemones, etc., each have their turn and are the most conspicuous, but as the turn of one comes the other disappears. Unless you are accustomed to looking for them you forget about that, but I notice in most of our gardens around the city they are planting, say, a clump of peonies. It is very beautiful for a little while, but when it fades there is nothing beside it to come up and cover it and let the peony go to sleep. There should be something awake and something sleeping all the time, and it is these combinations for making a garden perpetually beautiful and are easy of culture, that become naturalized and take care of themselves, that is the feature that our modern catalogs do not care of.

Mr. Reigle: I have one definite question I would like to ask, on the supposition that I have a large clump of peonies that have "gone to sleep," I want a definite answer as to what I can put in there to liven up that portion of the ground where the foliage has died.

Mr. Whitnall: A clump of larkspur near a peony will hold back until the peony has had its day and then screen it very nicely, and they get along very beautifully together.

Mr. Reigle: That answers my question very satisfactorily. What I wanted was something in the way of color to take the place of the high color that had been there before, only different. The foliage, we know, usually remains pretty well during the proper season.

BEST VARIETIES OF VEGETABLES FOR THE
AMATEUR.

By Mr. KRUPA of Lake Geneva.

To make this list of Vegetables as complete as possible, I will mention all the species of vegetables in alphabetical order, and those which are mostly cultivated.

Those marked with a "X" are not of much use, to an average grower.

X 1. *Artichoke*: A vegetable which is not much known to many growers, as same necessitates a long period for growing and there is small demand for it, except in large private gardens. Seeds sown in January produces plants fit for use in following fall; those sown later must be protected over Winter to obtain a crop for next year. *Large Green Globe*.

2. *Asparagus*: This delicious vegetable should find a place in every garden or farm. The culture of same when once established, is simple. The best method to establish it is: to buy roots, which are carried by most commercial nurseries, and plant them in a well-drained, well manured and well prepared bed. The rows should be 3 feet and the plants in the rows 2 feet apart. The roots should be covered with 6 to 10 inches of loam. When the bed is planted in above mentioned manner, all there is to do the first two years is to mulch the beds every year with good, rotten manure and dig it in in the Spring and keep the beds loose and clean from weeds by cultivating them often during the Spring and Summer.

The third year after the planting has been done the cutting can begin. The first year very sparingly and should not be continued any longer than about the 15th of June; then leave the growth until the Autumn, when same should be cut down to about 4 inches from the ground.

Mulch your beds for Winter, and if the beds are attended properly, they will yield good crops, as long as 15 to 20 years, even longer. Salt is a good stimulant and should be applied, when the beds show signs of exhaustion.

Varieties: *Colossal*, *Giant Argenteuil*, *Columbia Mammoth White* are the most cultivated.

3. *Beans, bush*: The chief object is to select the best varieties to be grown. *Boddington's Bountiful*, *Burpee's Stringless*, *Refugee*, *Currie's Rust-proof Black wax*, *Wardwell's Dwarf Kidney Wax* are considered as good as anybody can wish. For Winter use in dry form: *Michigan Wonder*, *Boston pea bean*, *White Marrowfat*.

4. *Beans, pole*: *Kentucky Wonder*, *Scarlet Runner*, *Horticultural-Cranberry*.

5. *Beans, Lima bush*: *Burpee's Improved*, *Fordhook's*, *Dreer's*.

6. *Beans, Lima pole*: *Dreer's Improved*, *Ford's Mammoth*.

7. *Bects*: Sow in drills 18 inches apart and thin out from 8 to 12 inches in the rows. Seeds can be sown as soon as the ground opens, and continue by four week intervals until end of July. *Boddington's Early*, *Model-Red-Globe*, *Egyptian*, *Electric*.

8. *Borccole*: In some quarters very useful vegetable. The young leaves are used and prepared like spinach. *Curled Scotch*.

9. *Brussels Sprouts*: Delicate vegetable for Fall and Winter use. Culture like that of cabbage. *Dreer's Select Matchless*, *The Wroxtton*.

10. *Cabbage*: Sow seeds for early varieties in March, if possible, under protection, and plant out as soon as plants and ground are ready, in rows 2 feet apart, 18 inches in the rows. Varieties: *Earliest of Earlys*, *Early Winningstadt* (for sandy soil) are as good as any.

For second early: *Improved early Summer*, *Succession*.

For late: *Danish-Ball-Head*, *Large-Late-Drumhead*, *Dreer's Selected-flat Dutrh*, and *Dutch Winter*.

11. *Cabbage, Red*: *Early-red-Dutch-Erfurt*, *Othello*.

12. *Cabbage Savoy*: For early: *Early-dwarf-Ulm*;

For late: *American-Drumhead-Savoy*.

13. *Cauliflower*: For early: *Early-Dwarf-Erfurt*, *Early-Snowball*; For late: *Dry Weather*.

As all cabbage varieties are subject to all kinds of injurious insects, as: maggots, green-worm, black-fly, grass-hoppers, etc.,

much care has to be exercised from beginning to the end to protect the cabbage-plants from the ravages of the insects.

In early stages of the plant's life, the black fly is the most dangerous enemy. To protect the young plants, use the hose or sprinkling-cans freely and dust with wood-ashes mixed with tobacco-dust.

Next comes the cut-worm which is very hard to combat and guard against. A little fine, pulverized nitrate of soda, or un-slacked lime, placed around the roots, is effective.

Then the green-worm comes in. This pest is easier to combat, but it never should be left to gain headway. As soon as it puts in appearance, the weapon in the form of slug-shot, hel-lebore or pyrethrum powder, in a piece of cheese cloth would be used against them immediately. These above mentioned powders are very effective, and entirely harmless to mankind, as they lose their poisonous properties after being exposed to the air for three or four days; the dust should be perfectly dry to enable it to fall through the fine meshes of the cheesecloth, when it is shaken over the plant to be treated. All cabbage varieties like a deep, rich and moist soil.

14. *Carrot*: Sow in drills 15 inches apart and as soon as the ground is open, and then as often in succession as desirable, until July. Rich, deep ground.

For early: *Early Parisian*.

For intermediate and late: *Chantenay-half-long*, *Danvers-half-long*.

15. *Celery*: Sow in March in flats or pans, as seed requires a long period to germinate; plant in drills 3 to 4 feet apart, two rows to a drill; rows 8 inches apart and plants 8 to 10 inches apart in the rows. Later in the season, the celery has to be blanched by means of boards, or by drawing the loam toward the plants. Only through this process it attains its crispness and delicacy. For early: *Improved White Plume*. For late: *Giant Pascal*. Deep, rich ground.

16. *Celeriac*: Culture the same as by above, only it don't need to be blanched. Of this variety, only the roots are used for salads in Winter. *Large-smooth-Prague*, one of the best.

17. *Chard Swiss*: Should be more known and cultivated, its tender leaf-stalks replace, in Summer, the asparagus of Spring.

Culture not unlike that of bets or mangolds. *Silver-Lyon-Swiss*, one of the best.

X 18. *Chicory*: Culture like that of carrots. Tender leaves when blanched used as salad. The roots are used commercially as an adulterant of coffee. *Large-rooted*.

19. *Corn Sweet*: No need to explain how and where to grow corn; the main object is to select the seed and variety. Sow as late as July, always selecting late in season the earliest varieties.

For extra early: *Burpee's first of all*, *Golden Bantam*, *Early Cory*.

For second: *Early Stowell's Evergreen*, *Dreer's Aristocrat*, *Early Champion*.

For late: *Black Mexican*, *Country Gentleman*.

20. *Corn Pop*: *White-Pearl*.

21. *Cucumber*: Sow in hills or drills, beginning in May until end of July. Red spider, Fungi and black fly are the chief amongst the enemies of the cucumber. Use as remedies: hose if available for the first, sulphur powder for the second, and tobacco dust for the third.

Rawson's-white-spine, *The Davis-perfection* are two good varieties for every purpose.

X 22. *Dandelion*: Sow in drills and thin out to 6 or 8 inches, when grown up, cover with boards. Thus treated, it becomes tender and the leaves furnish a wholesome and delicate salad. *Thick-leaved French*.

23. *Egg-plant*: This vegetable should be more grown than it is now. Start the seeds very early in flats or pans, if hot-bed available, the better. Prick off in small pots and plant out, when danger of frost is over, in rows two feet apart and two feet in the row. Black-fly often destroys the young plant in few days. For this reason, the grower should be watchful to intercept it by its first appearance. Syringing with clear water or dusting with tobacco dust or hellebore powder are effective. *New York-Spineless* is as good as any.

X 24. *Garlic*: Propagated by division of the old Bulb. Culture like that of onion.

25. *Kohlrabi*: A very delicious vegetable, but not very often seen and not much grown. Culture almost same as that of cabbage, to which family it belongs, although entirely different in form. Seed can be sown from March to August; 6 to 7 weeks

is the average growing period. *White Vienna* and *Purple Vienna* are standard varieties.

26. *Leek*: Sow seeds as early as possible. When plants are big enough, transplant in drills 12 to 18 inches apart, 6 to 10 inches in the rows. As the plants grow up, draw the soil around them to make growth crisp and tender. *Prizetaker* one of the best.

27. *Lettuce*: What would a garden be without this ever refreshing vegetable? Its wholesome qualities and easy culture enables it to be found in almost every corner of the globe, and its many-fold varieties are adapted to as many climates and soils. If warm frame is available, try *Grand Rapids*.

For out-doors in early Spring and Summer: *May-King*, *Big-Boston*.

For hot and dry summer months: *California*, *Cream-Butter*, *Salamander*, *Hanson Improved*, *Self-folding-Cos-Romaine*.

28. *Melon Musk*: Although the melon ought to be classed in the fruit, more than in vegetable class, the mention of it is made, because it is mostly found growing in the company of vegetables. For its refreshing and delicious taste no garden or farm should be without it. The culture is not difficult, but its enemies in the form of insects and fungi are many. The most destructive is the so-called Pumpkin or Squash bug, which sometimes preys upon the plant from beginning to the end of the plant's life. Dusting or sprinkling with Paris Green mixed with 40 to 50 parts of gypsum or unslacked lime, or diluted with 50 parts of water are in most cases effective to get rid of the troublesome bug. For the Fungus, use Bordeaux mixture, diluted with 40 to 50 parts of water and dust with sulphur. The most popular varieties are: *Emerald-gem*, *Milwaukee-Market*, *Early Hackensack*, *Rocky-Ford*.

29. *Melon—Water*: For this species, the climate of Wisconsin is not very favorable, especially so the Northern parts of the State. The growing period is long and it seldom gets ripe. Several smaller varieties may be successfully grown, as *Cole's Early* *ixie*.

The culture is not unlike that of musk melon, but it is not subject to as many diseases and injurious insects as the former. The growth is strong and vigorous, for which reason, ample room should be allowed to each hill.

30. *Mushroom*: If anybody has a suitable place in the form of a cellar and some time to spare. Mushrooms would I know be welcomed and appreciated on every household table. The culture is not so difficult as many imagine. The success depends more in the exactness and thoroughness of the work. Any spawn is good if it is attended right. Spring and Fall are the best time for its culture.

X 31. *Okra*: A vegetable mostly used by the Orientals. The pod which is used for flavoring soups and stews is not unlike that of cayenne pepper pod, green in young state and cream yellow in progressed state. Used only in young state. Culture about the same as that of pepper.

32. *Onions*: Grown from seed or from sets. Sow the seed in March-April in drills, or if frame available, in frame and transplanted as soon as plants are ready, in rows 12-15 inches apart and 6-10 inches in the rows. Sowing in the drills for table use can be continued until July. To obtain sets, sow seeds in drills in June quite thickly; lift when the top is dry and save in cool dry place till spring and plant out as soon as the ground is open.

Ailsa-Craig, *Yellow Globe*, *Prizetaker* are good varieties. *White-Bartletts* excellent for pickling.

Sets can be obtained from any variety.

33. *Parsnip*: Sow seeds as soon as the ground is open in drills 15 inches apart and thin out to 4-5 inches in the rows. Deep rich ground is favorable.

Improved-Hollow-Crown will answer every purpose.

34. *Parsley*: Sow in drills as soon as the ground will permit; thin out 8-10 inches in the rows. Triple Moss curled is a good one. *Hamburg rooted*,—the roots of this variety are used for flavoring soups.

35. *Pepper*: Sow seeds in flats or pans and transplant out-doors, when danger of frost is over. Sweet-pepper furnishes a very delicious salad but it is not much known; same can be preserved for winter use and is used in many other ways. When once established, it needs little attention; insects seldom attack it.

Hercules, *Upright-Sweet*, *Bull-nose*, *Ruby-King*, *Mammoth* for sweets, *Chili*, *Long-Cayenne* for pickling.

36. *Peas*: No need of instruction. Sow as early as possible

as it stands a good deal of frost, and sow in succession during almost all of the growing season, except the hottest months. Use beds well manured the previous year, as in fresh manured field the crops will not be as abundant. For early: *Bodding-ton's Early-Bird*, *Nott's Excelsior*, *Gradus*, For Intermediate: *Senator*, *Telephone*. For late: *Mammoth Marrowfat*, *Alderman*.

37. *Potatoes*: Rich sandy soil suits best. For early and intermediate: *Early Rose*, *Acme*, *Early Ohio*, *Beauty of Hebron*. For late: *Carmen No. 3*, *Rural New Yorker No. 2*. Be in time with Paris green and mixture or the potato-bug and rust will have the better of you.

38. *Pumpkin*: Don't fail to provide for the proverbial pumpkin pie. *Large Cheese* and *Sugar* are good enough.

39. *Radish*: This relish should find a little corner in every garden or farm, the more as it grows so freely and the culture is so easy, especially in the Spring. Sow in drills or broadcast, and then thin out to 2-3 inches. Use wood-ashes if black-fly sets in appearance and sprinkle freely. Good loose ground the most suitable. *Non-Plus-Ultra*, *Cooper's Sparkler*, *Long-white-Vienna*, *Icicle*, *Olive-shaped-scarlet* are amongst the best.

X 40. *Radish-Winter*: Sow in July. Culture and treatment like that of the turnip. Save the roots for Winter use. *Winter-Black-Spanish*.

41. *Rhubarb*: A couple of hills should be found in the smallest garden. No need to explain that this plant furnishes one of the earliest, the most wholesome and most delicious material for our table. Extremely rich and deep ground is the most suitable. Heavy Mulching preserves and stimulates the plant. *Linnaeus*, *Victoria*.

X 42. *Seakale*: Plants preserved for winter, having tender leaves, which are used and prepared similar to asparagus.

X 43. *Sorrel*: Sow in May in drills, used for sauce. *Large-leaved-French*.

44. *Salsify*: Culture same as parsnip; used for soups and in same manner as asparagus. *Mammoth-Sandwich-Island*.

45. *Spinach*: Sow as early as possible and in succession as far as September. *Round Viroflay*, *Victoria* for Spring and Fall. *New Zealand* for hot Summer months.

46. *Squash*: Few hills scattered through the cornfield, or well-cultivated in the garden always brings a dish of this whole-

some vegetable. Culture identical with that of melon or squash. *Early-White-Bush*, *Golden Custard*, *Vegetable Marrow*. For Winter: *Hubbard*, *Boston-Marrow*, *Winter-Crook-neck*. Be on lookout for the squash bug.

47. *Tomato*: For its wholesome qualities and manifold uses no one can grow too much of it. To attain earlier crops, sow the seeds in flats or pans and plant out when danger of frost is over. Any good soil will suit it. Black fly is its chief enemy and should be guarded against constantly. *Livingston's Coreless*, *Sutton's best-of-all*, *Dwarf Stone*, *Tall-Stone*, *Ponderosa* are amongst the best. For Pickling the: *Yellow-Cherry*, *Red-Cherry*, *Yellow-plum*, *Yellow-pear*.

48. *Turnip*: For early use sow seeds in April in drills 15 inches apart and thin to 6 inches in the rows. Sow at intervals of 4-5 weeks and there will be always some young turnips for the kitchen. For Winter, sow seeds in above manner in July and preserve the roots for Winter. For early and Summer; *Extra-early-purple-top-Milan*. For Winter *Golden-Ball*.

49. *Herbs*: These should find also a little corner in every garden, as for the sweetness and aroma they find various uses in the kitchen and household. Among them may be mentioned: *Sweet-Basil*, *Dill*, *Hyssop* (medicinal properties) *Chives*, *Lavender* (sweet perfumes) *Marjoram*, *Mint*, *Peppermint* *Rue*, *Sage*, *Savory*, *Taragon*, *Thyme*, *Wormwood* (med. prop.).

As a final word, will say: Buy your seed from a reliable firm, procure a couple of sash, they will repay themselves many-fold. Keep the hoe and cultivator busy all the time, and do not allow them to rust or the weeds will triumph. Be liberal with manure and fertilizer; wage war on insects incessantly and with all available means and success in vegetable garden will be assured.

MAKING COUNTRY HOMES ATTRACTIVE.

By Mr. E. H. NILES, of Oconomowoc.

In discussing the question of how to make country homes attractive, it might be well first to consider why it should be made so. The American farmer is practical, and he will ask why before he undertakes a proposition, so we will give the following reasons. First, a man should be and is largely judged by his works, and what work more clearly shows the character of a man than the way he keeps up his home. The historian can tell the stage of civilization any people have attained by their manner of home building. What is true of classes is true of the individual. If you drive on a country road you are consciously or unconsciously forming an opinion of the head of the family as you pass each home. Of course you cannot always tell who the head of the family is, but whoever it is, the head is usually responsible for the appearance. The first may be neat, all the implements placed in the shed, every bit of rubbish picked up from the shady lawn, house and barn freshly painted, and you will put that man down as being careful of details and usually successful in business; the appearance alone will help his credit financially. The next may be slovenly, with old broken down fences, broken implements scattered out over the lawn, lawn either bare or mass of weeds, hot sun beating down on the house all day, you will put that man down as being careless, thoughtless of his family and unsafe in business. The next may not be especially neat with its wealth of roses and vines growing rampant over the fence and the cottage nestled back among honeysuckles and lilacs, but you will judge that person to be artistic, with a soul large enough to appreciate the simpler forms of nature. Then you will pass on to one, where, with its old flower garden of holly hocks and verbenas, pinks and daisies may be the most inviting of all, because it indicates the good mother's care. It will bring to you memories of other delicate hands that used to dig among those same old flowers of your childhood. This will appeal to you most of all, possibly more than the grand estate of wealth, because it shows the love

and labor it has taken to produce, not the wealth. But some one will say that this is merely for show, so we will take another view.

Our greatest duty in life is to make the world happier and better. This refers to ourselves, our family, our neighbors and humanity in general. One way to accomplish this is to make the world, or some part of it, more beautiful. If your home is made attractive it not only makes every member of your family happier and better, but every one who passes that way. The idea will spread to the neighbors and then to other communities and finally to every hamlet in the land, as this movement for landscape improvement is doing today.

One of the greatest economic questions of the day is how to keep the boy on the farm to raise food for the increasing millions. One of the most practical ways of solving it is to make the home in the country more attractive. Landscape improvement not only makes the farm more attractive, but more valuable. Some other forms of improvement depreciate in value, but trees add to their value each day. Therefore, considering that it is advisable to make the country home attractive, how will we go about it?

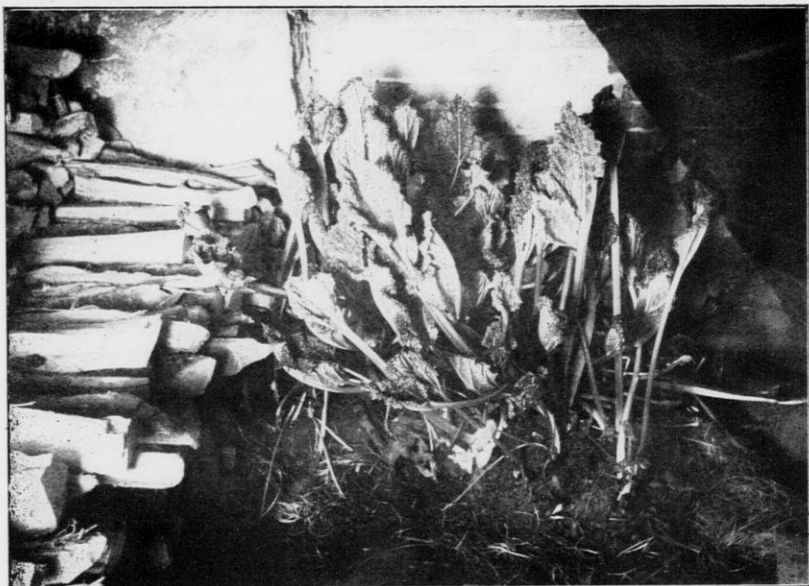
First make a good lawn, grade it so that it is well drained, especially about the house. It is not necessary, especially on a large place to grade it to a uniform slope, because natural elevations and depressions often produce the prettiest effects. After the proper grade is established apply a good coat of fertilizer and pulverize the ground thoroughly. After this is done it may be necessary, if the ground is especially poor, to put on a layer of black soil, but in ordinary soil good fertilizer is sufficient. Then put on good seed and put it on thick, roll this thoroughly and it should come up in a short time, especially if the weather is favorable. Of course the weather has a great deal to do with this. This should usually be done in the spring. A good coat of top dressing every few years in the fall will help to keep the lawn in good condition.

Now the place is ready for planting, but before putting in a single plant, make a careful plan of the entire ground. This is just as essential as having a plan for a house, because if you do not you will soon be putting in shrubs here and there, wherever you have an opening, and you will never have symmetry

of form or harmony of color. In this you can also avoid the defect which has been mentioned this afternoon, of having one big spot full of bloom at one time, and the rest of the season bare, but plant so as to have a rotation of flowers. In regard to the time after the flowers are gone, if bloom is wished in that position, the idea that has been mentioned today of putting delphinium there is very good. Another good flower is phlox, which can be used in among peonies to bring bloom later on. The Oriental poppy is another flower that is very gorgeous while it is in bloom but its gets rather shabby later in the season. This should also be covered up with some flower that blooms later. In planning the lawn several forms or styles of landscape architecture can be used; there is no time to discuss these various styles, but the one most appropriate for the country home, and in fact nine-tenths of American homes is the natural or English style. This calls for an open lawn bordered with masses of shrubbery. Everything should be grouped naturally and grown naturally. Trimmed trees are out of place, that is, trimmed to geometrical forms. So in planting evergreens in this style, do not trim them up, let them branch to the ground. In planting trees use the native varieties largely; they will give the best satisfaction, although there have been some good ones imported, especially from Japan. You will usually find that the plants from Japan will give better satisfaction in Wisconsin than those imported from Europe, because Japan, like Wisconsin, is east of the continental divide, while France, England and Germany are west of the divide, as Oregon and Washington in our country. These trees should be arranged naturally and slightly in groups, so as to give the contrast of light and shade over the lawn. The shrubbery should be in masses. The most common mistake is to scatter the shrubbery all over the lawn, in this way they are harder to take care of, do not grow as well and do not look as well as where they are placed in beds. They can be used to screen unsightly views, to break the sharp angles of buildings and to place in angles or sudden turns in walks and in general as a framework for the lawn. They can be so arranged that you can have bloom all the year, from the golden bell of the spring to the hydrangeas in the fall. Many of these are fragrant, as lilacs, upright honeysuckles and philadelphus. Others brighten the quiet days of autumn with gorgeous colorings of

foliage and berries. Among these I might mention the high bush cranberry, the dogwood, the sumachs, the elders, the coral berry and the barberries. Among the flowers the perennials are very satisfactory and will brighten up the lawn as nothing else will do. Usually the person who has not much time to spend will get the most satisfaction from the perennials and from those that are perfectly hardy. In this class the old standbys are the peonies, the bleeding heart, iris, delphinium, phlox, golden glow, some forms of lilies, and others. Another class is very desirable but not as permanent as *coreopsis gaillardii*, Oriental poppy, hollyhocks, and Shasta daisies. Use these as borders for the shrubbery beds or in beds by themselves. The soil for them should be prepared 15 to 18 inches deep and should be kept well cultivated. This is even more important than watering although watering is necessary in dry weather to get the best results. Then, with a few vines over the porches our picture is complete.

And now with the finished picture we can look back over the undulating lawn with its patches of shadow and sunlight to the background of shrubs and flowers, to the framework of other shrubs on the sides, and then to the house under the swaying branches with its base and angles screened by shrubs and vines hanging from the porches. The picture is brightened by patches of bloom here and there from the iris at our feet to the cherry and apple blossoms in the back, while with the rustling of the leaves comes the fragrance of the wild crab, the lilacs and mock orange and you must be convinced as I am that the American farm is the finest place to live in all the world.



Rhubarb forcing in ordinary cellar. A single root on cement floor and packed in excelsior yielded 23 lbs. of salable stems in addition to many small ones.

Transactions of the Winter Meeting

Madison, Jan. 10, 11, 12, 1911.

TUESDAY MORNING, JANUARY 10.

The meeting was called to order by President Toole at 10 a. m. in the Madison Free Library, Madison, Wisconsin. The President introduced Hon. J. C. Schubert, Mayor of Madison.

ADDRESS OF WELCOME BY MAYOR SCHUBERT

Mr. President, Ladies and Gentlemen.—As mayor of Madison it gives me great pleasure to welcome you in behalf of the city and the citizens of Madison. We always look forward to the meeting of the State Horticultural Society with some anticipation. We feel that the State Horticultural Society has come to this city, to stay so far as their conventions are concerned, which we appreciate. There is one particular branch of work in Madison that perhaps you would be more interested in than you would to know what kind of a fire department we have, or perhaps what kind of police department we have, or some other branch of the local government. The organization of the Madison Park and Pleasure Drive Association is somewhat unique. Its members started out with the idea that we ought to be able to show to strangers what there is in Madison and what there is around Madison so far as its lakes are concerned, and the lay of the country generally and the natural growth. That was done, by organizing and building a few miles of drive on the west end of the city, and then a few more drives on the north

end of the city, then extended toward the south, until they had completed quite a system of drives. After they had got along with this work a short way they soon found that the field they are working in was large and that they had to extend their work. They occasionally hired a landscape architect to come here for a day or two and make a plan and give them advice and they gradually connected those drives with the city, and today they are building as much city as drives and in fact they have so connected the work that the president of the association is at present mayor of the city. After they had secured the advice of landscape architects, it dawned upon members of the Association that we would have to hire a permanent man for that work, we would have to have some one on the ground practically all the time, and so, after the city had agreed to pay a small amount toward the maintenance of the work, they secured the assistance of a man who was trained by one of the leading architects in the country, Olmsted Bros., of Boston, and we had him with us for a period of two years. During that time he developed the work inside of the city. He was a practical horticulturist. He knew more about plants and trees and shrubs and vines of all kinds than he did about city building, so he developed that feature about as far as a city of the size of Madison could reasonably be expected to develop horticulturally. Then he secured a place in the West, and we have secured a man who is not so much of a horticulturist as he is a city builder, and today a large part of the city building of Madison is done through this organization, The park and drive association. It has always been the object to develop a clean, beautiful city and surroundings. One of the things which the president of the association in former years advocated is shown in a report by John M. Olin, on behalf of the board of directors in April, 1895. "It is also intended to plant this year, along parts of the drive, a number of the more hardy flowering shrubs. Many people think these will be destroyed, some of them may, but in time there will be created a public sentiment that will not tolerate any such vandalism." That was in 1895; that shows what the feeling of the president of the association was at that time, for the protection of shrubs, vines and trees, and we have gradually developed that feeling. The next year it shows in the same report that we planted 668 trees and shrubs and this is the lan-

guage used by Mr. Olin: "I think also there is a growing public sentiment against injuring any of the tree shrubs or vines along the drive, and I hope the time will soon come when everyone using the drive or any of the drives connected with it, will feel it is a part of his duty to protect it, and in that way secure for it the largest and best use for the public. Now, the feeling has grown, it has grown until the people of Madison have been educated to respect the trees and plants and vines just as much as they respect their homes. It is very, very seldom today that you will find any one going out in the parks or along the drives or in fact any where and injuring any tree or any flower, plant, shrub or vine. I have come to feel a great deal like a lecturer said at one of your meetings here, that he felt almost the same about seeing a tree injured as he would to see a human being injured, and that is the feeling that we are going to spread broadcast in Madison. To show you very briefly what horticultural work the city of Madison is doing, I will read one paragraph from the last annual report: "In eight years prior to 1909 the association had planted 140,839 trees, shrubs and vines. During the season of 1909, 9,110 were purchased from outside nurseries, 83 trees were obtained from our own nursery and 10,509 plants were collected, making a total for 1909 of 19,702. For the present spring we have ordered 199 trees and 8,309 shrubs and obtained from the nursery 136 trees and 560 shrubs and have collected 8,000 shrubs and 40 trees, making a total of 17,244 or a total, for the ten years, of 177,435 plants trees and shrubs. The principal planting this year has been in Brittingham Park, where the number of plants has been 10,426, Tenney Park 3,218, 3,090 on the drives, 350 in Henry Vilas Park and 210 shrubs in Orton Park.

Now, that is in a way only a beginning. In addition to this work we also develop playground places for children to be taken care of; we hire instructors to teach them to play, to teach swimming, to teach them to bathe during the warm months of the summer. We provide them with public boathouses in which they can keep their boats at a nominal fee, provided them with a river way which connects the lakes, and have just raised \$16,000 to \$17,000 to connect another lake with the two lakes that are already connected. We have perhaps a better chance here

to do work of this kind than they have in other cities. We have all the benefits which can be derived from a state university where agriculture and horticulture are taught, where all the modern methods are put forth, and we have this work right before our eyes, and in addition we have the help of those men who are educated along that line and who are educating others. We want you to see as much as possible of the winter scenes in Madison. If you are skaters, we provide several places for skating in our parks and lagoons. I trust that your convention will be a successful one, that you will assemble again in Madison a year from now, and I wish you God-speed.

Mr. Davis: Will it be out of place for me to ask the Mayor a few questions? I understand most of this work that you are speaking of has been done by public contribution or by the city, I mean, was it direct tax, or through contribution?

Mayor Schubert: The contribution through the association by private subscription has been \$272,926. The city expended on this work \$121,595. \$84,000 of that \$121,000 consists of bond issues at various times for the purchase of land necessary for the building of the parks and for connecting water ways. I should like to have gone into that, but the time is so short.

The President: Our Society fully appreciates the very cordial reception which has been extended by the mayor of the city, and we fully appreciate the cordial relations that are growing between our Society and the city of Madison. We of the state, because this work is developed at the capital city, feel that it will reflect glory not only on Madison, but also on the state of Wisconsin. Now I have the pleasure of introducing to any of you who do not know him, Dean Russell, of the College of Agriculture.

ADDRESS BY DEAN RUSSELL.

It is with pleasure that I come before you to extend the greetings of the university, as the mayor of the city has done with reference to relations existing between this society and the city.

The relation between the College of Agriculture and the State Horticultural Society have been of great mutual help; from the time of our dear friend, Professor Goff, who was the first professor of horticulture at the university, down to the present time there has existed a warm relation between the work of the College of Agriculture and that of this society. This society we of the university consider in the light of a parent, and I think we may look upon the development of the work of horticulture at the university as in a sense your child. That work has been expanding from its inception until at the present time it bids fair to take a position with reference to horticultural development that is commensurate with the attitude which the whole subject of horticulture is taking in the nation at large. Just now there is being constructed an adequate building for the housing of the department of horticulture. The main building is now in the process of erection, and the greenhouses and potting houses connected therewith are already built. Unfortunately a few weeks ago we suffered from an incipient fire which has delayed the occupation of the greenhouses and potting houses for a few months, but inside of two or three months' time that damage will have been repaired and these aids to the instruction and the research work of the College of Agriculture will be available. It is to be hoped by the opening of the college year next fall that the main unit of the horticultural buildings will be completed. These additions to our resources will cost somewhere in the neighborhood of about \$70,000. Now, that represents a big development for horticulture at the university from the days when Professor Goff was there, many years ago. It used to be considered that horticulture was a sort of side issue at the university, that work in horticulture should take a back seat in comparison with some other phases of agricultural industry. The same view has more or less prevailed through the state at large with reference to the development of

horticulture, for as one looks back, fruit raising has been generally regarded as a side issue to the general business of farming. We are now experiencing a stimulus in this subject throughout the whole nation at large. People are beginning to pay attention to horticulture as a commercial proposition. The enormous increase of interest, not merely in the west, where it has been perhaps accentuated more than in other portions of the country, but throughout the Mississippi Valley and the East witnesses a remarkable change in the minds of the public relative to the importance of the industry.

Now, as long as horticulture was considered as a side proposition, where the farmer simply planted out a few fruit trees in order to get the necessary product for his own purposes, and where he marketed the excess, naturally but little care was taken under those conditions, and the result was that horticulture languished, as we might expect that it might languish under that condition of affairs. But with the development of horticulture along these lines has come the introduction of the fungous and insect pests which now ravage our orchards and horticultural crops, so that it is no longer possible for a man to plant any considerable number of orchard trees, or even small fruits, and have them exempt from the ravages of these insect and fungous pests. I am speaking now of portions of the country that are more thickly settled, for here and there in the newer portions of the country it is still possible.

Last year I was in the northern part of the state, back something like twenty miles from a railroad, and there I found a section of the country where there was a small community in which they were growing some of the finest McMahan apples I ever saw. I said to the man with whom I was staying, "can you grow these apples up here right along?" He said, "Yes." I said, "How many have you got?" He said, "I have ten barrels of those in my cellar." There they were, great big magnificent fruit, absolutely free from all blemish. I said, "Of course you spray?" I wondered how a man way back there in the back woods had learned how to spray. He said, "I don't know anything about spraying." I said, "Do you mean to say that you grew those apples without giving them any more care and attention than the average farmer would give them?" He said, "There are my trees and that is all I do for them; I planted them and they are growing this fruit." That is possible twenty

miles from a railroad, way back there in the country, where these insect pests have not been introduced, but you open up that country like the southern part of the state is opened up, and it will only be a short time before McMahan apples will be covered with the coddling moth, the same as our fruit.

With this development of horticulture that has come up in this small way, we are now meeting a set of conditions which is calling for an entire change of front. The distribution of these fungous and insect pests is practically making it impossible for satisfactory fruit to be produced, unless they are attended to in the right way, and that is bringing about an entire change in horticultural procedure. From many points of view it is a good thing to have to combat these pests, because it teaches us the necessity of utilizing the best scientific means for control, and gives an opportunity for the use of brains. If we had none of these pests there would soon be such an overplus of fruit that the market would go down to practically nothing. They say that the price of hogs, for instance, is determined by the amount of hog cholera that exists. Now, if we have got hog cholera, we know how to combat it, and the man who intelligently combats hog cholera can get the prices that are now paid for hogs. whereas the man that does not use brains in that connection suffers the penalty which ignorance has to pay.

In the early days of fruit raising, a similar condition obtained, but with the widespread dissemination of these fungus and insect maladies, we are reaching the condition where horticulture must become a commercial and intensive proposition, and with that comes a change in the attitude of mind which the horticulturist must have.

We see throughout the nation at large today this enormous development of horticultural interest, spreading not only in the West, but throughout our own region as well as the East. There are some dangers, however, which confront us in connection with this widespread development. Is it overproduction? I myself do not believe that this will prove a serious danger, because so many people are now going into horticulture, especially in the western parts of the country that go there lured by the glittering allurements of the printed page, but without having any adequate knowledge of how to handle their proposition. A year ago I took a trip through the fruit regions, paying special attention to these conditions. In Colorado, Yakima,

Bitter Root and Hood River. I found people pouring into those regions who were paying extravagantly high prices for fruit lands. I inquired further into the character of the population that were thus seeking this Golconda of gold that they were to secure from fruit and I found in a very considerable percentage of cases, in fact the majority of cases, where the question was asked, that it was the rich men's sons, for instance, who were sent out there by their fathers, or they were speculators, but they were not horticulturists. Now, you need not fear overproduction from that kind of competition. When those people go out there and put their hard earned dollars, or the dollars of somebody else into a proposition of that sort, without any adequate knowledge of the scientific care that is necessary to grow an orchard crop, you can rest assured that it will only be a short time before that property will be for sale at less than what they paid for it.

Another point is the distance of this fruit from the market and the difficulty and cost of getting it to the big markets. When all of the fruit trees now planted in Washington, Oregon and Idaho come into bearing, they told me in Spokane that it would take 180,000 freight cars to haul that fruit to market. When you consider that it takes thirty days for a refrigerator freight car to leave Spokane and go to the Atlantic seaboard and return and you see that the rush of the season is confined to thirty to sixty days, you can see what inadequate facilities there are for the transportation companies to carry a full crop when it is produced. Frequently these areas are connected with the markets in the East with one single thread of steel. I went through the Royal Gorge of the Arkansas and two days after I went through, there came a cloud burst which ripped up the Denver & Rio Grande road, covering it with three feet of mud. Peach trains were held up on the other side of that gorge for three days, while their cargoes rotted in the cars, because they could not get to market. That was the only thread of connection between the producer and consumer, those two steel rails which were subject to a cloud burst of that sort. The man that goes out and puts his money into that kind of proposition is taking long chances in comparison with what we would be if he remained in the Upper Mississippi Valley, or even went down East.

This question of the danger of overdoing the business in my

mind is not likely to be realized for the various reasons that I have mentioned.

If there is anything today which requires brains, it is the two subjects of dairying and horticulture. The handling of a dairy cow and the growing of orchard fruit requires a degree of concentration, a knowledge of scientific procedure and an application that is not met by any other phase of agriculture. That to my mind is one of the great advantages of the subject, because it gives an opportunity for the boy with brains, for the "laird o' pairts" to stay on the soil, and utilize the gray matter which the Lord gave him. We hear a great deal nowadays about the drain of the cities, that all our boys are leaving the farm. Why have they been going to the cities? Largely because there has been but little opportunity for them to use brains or gray matter in the agriculture of a generation ago. With the change which has now come, with the introduction of scientific methods, and the necessity of utilizing these methods, there is as large an opportunity for the boy with brains to use those brains on the farm as there is in the city, and you will find that many of them are staying under these new conditions, dairying and horticulture are the two phases of intensive agriculture that permit the fullest utilization of these brains.

With this development which is spreading over the entire country, practically from the Atlantic to the Pacific, there has come the necessity of more than mere manual application and even more than scientific procedure. We have got to know more than the mere matter of how to combat apple scab and codling moth, or how to handle this or that fungus pest, we have got to introduce methods of marketing and handling our products that are more up-to-date than they have been. When the farmer grew a dozen or twenty apple trees and put what he wanted for his own use in the cellar and then dumped the rest on the market, he got for that excess of fruit what it would bring, but what did it bring? The quality of the fruit was poor and has become increasingly poor with the spread of these fungus diseases, but with the application of these scientific methods we can secure perfect fruit, and that is the lesson which we are learning from the West today. There they are reaping the reward of their foresight, not merely from the application of these scientific methods, but from the fact that they have learned the art of combination, they have learned the art of marketing. They

told me at Palisade in Colorado that the Fruit Growers' Association of that town had increased the value of the land twenty-five per cent; that is, a man's extra compensation for his fruit product was twenty-five per cent greater by virtue of the fact that they had combined and pooled their issues and handled their product by modern methods in comparison with the old method of competition. Now, when a bearing orchard is worth \$2,000 an acre, and you can add \$500 to its value by simply combining and handling things on a modern basis, is it not time that co-operation should be considered an important feature of the whole subject of horticulture? This method we have got to adopt in the East, in order to compete with the West. We ought to do it of our own accord, not only because of the increase in our own returns which we get from cooperation in this respect, but from the fact that that is the modern mode of dealing with things. It is the application of the corporation method which we find in manufacturing industry. We would not think of going back to the old fashioned methods of our industrial manufacture and do away with the corporation, even with all the evils that are attendant upon the corporation. There is that underlying economic principle that in union it becomes possible to do that which cannot be done individually, and the modern industrial world is moving toward cooperation, toward collectivism, toward the union of forces in this way, so as to eliminate the losses which would otherwise occur, so as to reduce the cost of operation, and thereby make it possible to secure larger profits.

Now, I hope in this new development of Wisconsin, in these districts where horticulture is bound to increase with great rapidity, as, for instance, in the Door county peninsula, or in the Bayfield peninsula, which seems to be particularly adapted to the raising of certain kinds of fruit, that we will be wise enough to take advantage of the sociological principle of co-operation and develop these Fruit Growers' Associations in the same way that they have in the West.

I was talking with a man from the Hood River country yesterday, and he said, "We have got all these pests that you have here, and we have to combat them regularly, but we are getting stricter and stricter every day. The time is going to come—in some states it has already come—where the state government steps in, and if you are negligent in the proper care of your

own orchard, the state official steps in and puts an end to the trouble by doing the work and charging it against you, just the same as when you will not build your sidewalk in this town, the common council has the power to build it and charge it against the property and you have got to pay it. Now, for the state to force you to take care of your own orchard might be called paternalism, but it is necessary, because of the fact that we are your brother's keeper and we cannot get away from it, and if we are negligent in our practice, permitting spread and distribution of these maladies that will ruin our crops, then somebody with more power than the individual must take hold of the matter and control it.

The development of these associations in this way make such things possible. They are not merely selling associations, but they are associations for mutual improvement, and the great advantage, to my mind, in addition to the financial advantage, is the fact that these associations make possible the uplift and the improvement of their members along the lines of higher living. When you can get under the crust of apathy and ignorance and indifference, you completely change the man and if you can teach him in one way or another that it is necessary to spray his fruit trees you are going to reveal a new world to that man, and he is going to cast off those blinders that have blinded him in the past, and move on toward improved methods in other directions than merely the one by which you have first gotten hold of him. When you have done this you have transformed and converted him, but this must be done individually, it cannot be done collectively. It must be through the medium of individual contact and in societies such as this where you come for mutual benefit, to exchange your ideas, to give your personal experience, it becomes possible to receive a stimulus and an incentive which cannot be secured alone.

I thank you very much for this opportunity of appearing before your society and saying just a few words in regard to this very important subject.

Introduction of delegates from neighboring states being next in order, the President introduced Mr. G. O. Black of Iowa.

Mr. Black: I was sent here by the President of our State Horticultural Society as a delegate, he not knowing that I am a member of your Society. I am glad that I am here, although most of you are strangers to me. Just the other day I read an article in the Century magazine by Prof. Bailey, of New York. The title of the article is "An Iowa Plant Breeder." You probably all recognize who it is, Mr. C. G. Patten, of Charles City. If you will read that article on Mr Patten's work, it will give you an idea what we are doing in Northern Iowa for the advancement of horticulture. I have had the privilege of going over Mr. Patten's grounds a number of times and it is wonderful to see the painstaking and accurate records that he has kept of the work that he is doing. He has at the present time about 10,000 apple seedlings. These are not simply apple seedlings sown from promiscuously gathered fruit, but they are all from selected fruit, and a good share of them from crosses, some of them have been crossed down from the fourth and fifth generation, at least, and in that collection of 10,000 trees undoubtedly there will be something that will be a blessing to Wisconsin. It is conceded by Minnesota at the present time that some of his seedlings are better adapted to Minnesota than they are to our own state, Iowa.

The President: I am sure we are glad to hear what Mr. Black has had to say in regard to the work of Charles Patten and we are proud of the fact that Mr. Patten used to be a Wisconsin man and he has told me that he carried with him to Iowa from Sauk County the seeds of his Patten's Greenings.

Mr. S. G. Soverhill, delegate from Illinois State Society: We in Northern Illinois have some of the up and downs that you Wisconsin people have, sometimes we think it is a little more down than up. Still we have succeeded in growing some very nice fruits and we are learning lessons all the time. A great many of us who came from the East thought we must grow certain fruits here in the West that we had been accustomed to growing in the East. They were in the habit of growing Baldwins and Greenings, Spitzenbergs and some such apples as those. Later we have learned that these are not a success in the West,

but we have succeeded in getting varieties now that I think are equal to those that are grown East.

Mr. H. G. Street, delegate from N. Illinois Society: We in Northern Illinois, just south of Geneva Lake, are watching your trial orchard there with a great deal of interest and it should be a good object lesson to those in Northern Illinois as well as the Southern part of Wisconsin, and we hope that the trial station that the Illinois State Society is maintaining just a mile and a half from your State line will be a good lesson to more of them. We are testing such apples as the Delicious, King-David and Jonathan, although that is not really new, the McIntosh, and it is rather hard work for us along line to decide what varieties to put out, if we try to limit ourselves to just a few. I notice that the majority of those that I meet here are from north of Madison, very few from the southern part of the State. With us, the majority of those that are interested in horticulture in Illinois are pretty well south, especially that part of the State that Mr. Soverhill comes from, so that there is, you might say, for one hundred and fifty miles of territory nothing much of interest in the way of apple growing. Perhaps, it is due to the fact that the district is too much interested in dairying and the people do not have time for much else.

Prof. A. R. Kohler, delegate from Minnesota Society: The most important work in our State in which the Horticultural Society has combined and helped the College of Agriculture in Minnesota was in the case of helping to establish the fruit breeding farm at Lake Minnetonka. Many thousands of seedlings are being grown there at the present time of all kinds of fruit adapted to Minnesota and there is every probability that as the result of this work we will in time be able to add many valuable varieties to the horticulture of the Northern Mississippi Valley and we may also develop varieties that may be beneficial in Wisconsin.

THE LURE OF THE LAND.

Supt. E. W. WALKER, Delavan, Wis.

Mr. Cranefield has asked me to discuss the "Back to the Land" movement insofar as it applies to professional people. It is true that teachers, physicians and lawyers the country over are turning their thoughts toward the time when they shall reach that period of life at which they hope to shake off the heavier responsibilities of their professional career. They do not wish to retire absolutely to a life idleness. They must have something to do, something to look after; and thousands of these men, I may almost say hundreds even within my acquaintance, are turning to the pursuit of agriculture in one form or another. I am asked to say something about the whys and wherefores of this movement. I am, therefore, not expected to talk on anything pertaining in a practical way to the subject of horticulture. This is fortunate. I could not say anything on practical horticulture if I would. This field is all before me and I have much to learn.

My subject is a philosophical one. Why do professional people turn in later life to the land? Some time ago the following sentiment caught my attention: "Life is worth the living only to him who is a follower of illusions." There is much in this that is fundamentally sound. No matter what we are doing for life's occupation we are thinking of something else in the form of an illusion. This is necessary to maintain a mental poise and balanced judgment. The mind that seeks not to follow some illusion loses the zest of life and becomes a drudge. Illusions change. One lasts but for a short time. It either reveals its illusive character and we cease to follow, or it may be worked out in a practical way and becomes a reality. In either case it has served its purpose and abandoning it we pass on to other illusions.

The philosophy of every individual is necessarily worked out through his own experiences. I must, therefore, illustrate by something from experiences of my own. In indicating just what I mean by these illusions you will see why one professional man at least turns to horticulture as age creeps upon him. I recall

shortly after going to housekeeping that Mrs. Walker said "We are wasting a great deal of substance from the kitchen. We must have a pig." Dutifully I went to the stock yards and purchased the pig, paying therefor \$2.50. I also paid fifteen cents for a tobacco pail and thirty cents for a half barrel to be used as swill pail and swill barrel respectively. This pig became the central factor in the family activities for a season. I kept an account book for his benefit and found that with the initial cost plus the cost of pail, barrel and shed the total expense amounted to \$5.50 by Thanksgiving time. This did not take into account the fact that I troubled my father to drive out of his way three or four times a week to leave some skim milk from the creamery; nor does it take into account the fact that on the Fourth of July when we were away from home the pig became unduly hungry and broke out doing damage in the garden to the amount of several dollars. We had fully expected to kill the pig in the fall but he had become a sort of a pet and had become so much a member of the family that it was too much like cannibalism to eat him, and some way he had not taken on the generous proportions that we had expected. So instead of killing him I sold him. The price of pork had declined and I received for him \$4.98. A losing venture, you say. Not so. He was an illusion and as such he was worth while. He was a safety valve by means of which I could let off superfluous professional energy and the amount of fun we had figuring out the career of that pig was well worth his cost. He warded off many a family jar. As a practice he was a failure. As an illusion was a success.

In later years, having purchased a place containing two acres of land I seeded down an acre and a half and bought some Shropshire sheep. They were good ones, imported from England. There were five ewes and a ram. My mathematical conclusion ran something like this: This particular breed of sheep usually breeds twins. It was easy to see that next year I would have ten lambs. In the natural course of events, five of them would be ewes and five of them rams. The rams I would sell at \$25.00 a piece and would keep the ewes, thus doubling the breeding flock for the following year. It was equally easy to forecast that within seven or eight years I could retire from teaching and live on my flock of sheep. It so happened that the next spring I became an institute conductor. In this capacity I was away

from home during the spring vacation. As ill luck would have it one pair of twin lambs came during this time. It was in a March snow storm and I was not there to take proper care of them. They died. One ewe had one dead lamb. Another did not breed at all. I have forgotten the mishap to the fourth, but out of the flock one good, healthy lamb survived. It pleases me now to know that in the midst of my disaster I had enough sense of humor left to register this under the name of "Solitaire". Then the democrats came into power in 1892. They took the tariff off of wool, the bottom dropped out of the sheep market and I sold Solitaire for \$10. But this was no losing venture. For a twelvemonth this little flock of sheep absorbed my thoughts to the extent that I could not shrink in upon myself and my own work, a thing that professional people are so prone to do. They kept me wholesome minded and I say in all seriousness that I believe I owe whatever I possess of profession and temperamental poise to just such illusions as these. It is, therefore, not because I am getting old that I am turning towards horticulture. It is because I am a follower of illusions. It is my hope that the apple illusion will turn out more fortunately than these earlier ones, but even if it does not it will serve its purpose as well as did they.

Most professional men were brought up as farm boys. I say this with no hesitation. I happen to have been some years ago in two clubs of professional workers, one of lawyers and one of teachers. The poll was taken one night in a club of prominent teachers in this state. Ninety-four out of a hundred were farm boys. A similar poll of lawyers showed that ninety-one per cent were reared upon the farm. This doubtless has much to do with the fact that later in life these men turn back to the farm. In age the mind loves to linger on the experience of boyhood. Of course we all have a certain personal quality about us that turns us one way or other without reference to our boyhood years. But still in a general way age attempts to ripen the boyhood experiences.

Now, on the premise that we are to live a balanced life we must be followers in one direction or another of something outside of our professional career, I would like to invite your attention to two or three reasons why I think professional people as they become older do turn towards some such pursuit as horticulture.

In the first place, it has been said that fundamental, elemen-

tal strength is imbibed in no other way so well as by absorbing it from the ground through the soles of the bare feet. This is surely elemental, isn't it? And harks back to our boyhood days; but I firmly believe there is much of truth in it. There is an unconscious tendency in each one of us to anchor to that philosophy. It leads those who possess real elemental strength to love the soil.

This love united with the fact that most professional workers were brought up on farms leads us to turn to something like farming and yet in middle life and age one hesitates to take up the more vigorous kind of grain and dairy farming. What so well avoids the hard and continual labor of these and yet secures the tendency of life's philosophy as horticulture?

Then again, Age tends to simplicity of life. I suspect no professional man escapes this feeling. He lives ever amidst the crowd. The physician and lawyer in his office, the teacher in the school room, the clergyman in the pulpit, all these can never escape the great fact of their professional lives. They live amidst the crowd. There is pleasure in it. There is growth in it. There is a condition in it which ought to build good normal, healthy vigorous young manhood and middle age. But there comes a time when a man loves to withdraw from that condition; when the pleasure of the crowds grows stale and may even irritate. That is the time when the spirit of philosophy grows. Age ripens this philosophical spirit. Then it is that a man loves to be somewhat by himself, yet he does not seek idleness. He desires to do something; to carry out some form of activity where he can be somewhat with his own thoughts. Many men make the serious blunder in withdrawing wholly from activity in old age. The philosophy of such tends toward cynicism. The wholesome philosopher of age must still be busy at something. What finer or more beautiful thing can life present than to crown a most active and strenuous career with this philosophical spirit?

The man who has lived in loneliness all through his younger years, therefore, never feels the above mentioned tendency. The average farmer looks ahead to the time when he will retire and move to town. He desires to be in the crowd because he has been away from it all his life. It is perfectly logical and entirely human for his ambitions to turn towards new experiences. Also the man of meager mental attainments, of little education,

of but little power to read or think spontaneously. When he retires seeks the crowd because he must have thought stimuli.

But he whose experiences all through his active years have been such as to put him in the crowd, in the midst of multitudes of people, finds creeping upon him as he grows older the desire for solitude. That is accentuated if he is a man of reading and thinking habits. I remember something like thirty years ago in this very city that I wrote a little poem—I am not going to inflict it upon you. I belonged to a little social club that met semi-monthly and I recall upon one occasion writing a little poem one stanza of which was:

“The noble thoughts, the great ideas, must have their birth in
solitude;
Yet from society’s full halls methinks there comes the greatest
good.”

I was a young fellow then looking ahead to the time, logically I think, when a man’s best impulses and inspirations could come from his association with his fellows. That is the mental attitude of the university student, the student who expects to go out and feel the influence and inspiration of men and women. Therefore using society not in its superficial sense but with its fullest significance, I wrote “from society’s full halls comes the greatest good.” That was the philosophy of my youth. Now as the philosophy of age begins to ripen I understand that there is a limit to the application of my boyhood poesy. After all the best things, the best thoughts, do come to us, perhaps not in complete solitude as in the dungeon cell, but in our association with nature and Diety. That calls out the best that is within us. It requires a nature somewhat artistic, and very decidedly sentimental and spiritual to feel this tendency. It is among*professional men that we are apt to find such temperament, and therefore, these turn to horticulture in old age.

Still again, I call your attention to this thought. You may challenge it but as a teacher who has long observed in regard to the operation of children’s minds I believe it is true that youth and early manhood love completed things and chafes at the process by which the thing is complete. The boy will work with zeal to complete his building. My manual training boys working daily at their benches are consumed with the desire to see in its completed form the minature sled, windmill, etc., but

they chafe at the drudgery of the process by which alone they can be completed. This is the habit of youth and young manhood, but there comes a time when the finished thing does not appeal to us; when we love to see growth; when the growth is more attractive than the completed article. Growing is more than growth; working more than work; running more than the race; climbing more than the hill. The process ever outweighs the thing. Therefore, immature youth loves the thing; philosophical age loves the process. So I suppose there is a tendency for all of us as we become older to turn to an occupation where we can watch things grow; where we can see the process of nature as it is being carried out. All these things are entirely philosophical. Possibly they do not appeal to everyone and yet I suspect as I have been talking you have said to yourself "why. this fits my experience; this accords with my thought."

Now, then, for ten years I have had in mind possessing, as I became older, an apple orchard. I traveled through large sections of the irrigated West. I went up and down the Appalachian mountain region from Pennsylvania to North Carolina, visiting many of the great orchards there. Without going to them personally I talked with people who had visited the Michigan and Missouri sections. From all this I became much impressed with the thought that if we would do in Wisconsin what they do in these other places we could do equally well in the horticultural or orchard line. I may be all wrong in this conclusion but at least I have not arrived at that conclusion hastily. I have observed and I have studied.

Also I bethought me of this, that when I become old enough to shake off the heavy responsibilities of professional life I will be too old to be a pioneer and I shall not wish to go to the West or to the East and form new associations. I shall wish to enjoy my old age among the friends of my activities, of my youth and manhood. In passing let me say that if I were in my youth and horticulturally bent I would head for North Carolina or at least for the Appalachian region rather than the West, but that is not the question now under discussion. Having determined upon Wisconsin I read of what has been done by your Society for a good many years and talked with your secretary. Then I looked around and happening to live near a range of hills, clay hills with coarse gravel scattered through it, with

good slopes, I invited an expert on soils to visit the range with me. My next step was to learn of a few farms in this region that could be secured. The next and final step was to invite Mr. Cranefield to spend a day with me. Out of a dozen farms I had selected as good apple farms I invited Mr. Cranefield to inspect five that appeared to me the best. His judgment selected the one that I, myself, was most anxious to secure and that could be purchased. I showed him the field that I thought was the best of all. We went over it carefully and I exhibited it to him with a great deal of pride. Courteously he fell in with my view, because right near it is a nice little lake filled with fish and he knew all the time I was thinking of the fish instead of the apple trees, but still he said it was a good field just about the right kind of soil. I said, "While we are looking over the farm let me show you the other piece on the hill. It will be worth the climb because of the view." As we plodded along the woodland lot he became a little more enthusiastic. I am not built for hill climbing as Mr. Cranefield is and he was several rods ahead of me and before I had emerged from the woods he was standing with his arms waving and exclaimed "Eureka! man alive, this is the most ideal apple orchard site that I had ever seen." It had not struck me that way at all. This shows you how much of a novice I am. By the way, I am going to beat Burbank all to pieces. Half a mile from my orchard site, the trees are not planted yet, still I speak of it as my orchard—there is a trout brook and a lake is on the farm. I am planning to graft a trout onto a quince root and develop a trout tree. I already have some basswood trees on the farm. Am I not right in saying that with this plan consummated I shall out-Burbank Burbank?

Doubtless I have talked enough for you to conclude that I am going to make a failure of this. Perhaps, it will turn out as the sheep and the pig did, but even so, my friend, I assure you that it will be worth while. I am going to live for the next seven or eight years in absolute certainty of having everything work out just right. I shall have all the fun seeing things grow that most philosophical men of old age ought to feel and not the least of the illusion I cherish in connection with this matter is that I shall be a member of this organization and may meet you in these sessions from year to year.

SMALL FRUITS.

LESSONS LEARNED IN A DRY SEASON.

Mr. E. A. Richardson (Sparta): I was very much pleased in listening to Dean Russell with the stand that he takes in regard to co-operation, because if there is anything I am interested in, it is co-operation in growing, packing and marketing our fruit, and I was very much pleased to hear him talk upon that subject as he did. Found one lesson that I have learned this summer in my work as manager of the Sparta Association was this, that while we are very apt to think that fruit growers, as a rule, that is, the banner fruit grower, is liable to fly the track when there comes a dry season like this year, when prices are up and there is a temptation to sell his own fruit our members at Sparta were loyal to our Association. It was somewhat of a surprise to me that some of them, getting the offers for their fruit that they did, stuck by us, but all that we were able to make a better showing to them through our Association than through the offers that they received from outside growers.

Another thing—it was my good fortune to be in Kansas during a portion of the harvesting of the apple crop this fall, Ben Davis and like apples, and the lesson was impressed very forcibly upon me that if they had co-operation there, that they could have got a much better price for their fruit than they did. At Sparta the bulk of the apples were selling for \$1.00 to \$1.25 a bushel; in Kansas they were selling at 25 cents a bushel; the freight from Kansas City to Sparta is 47 cents a barrel, I think, so you can see if they had had associations there, or if they had co-operated in hunting up markets, they would have had a very good margin of profit to pay any man a salary for doing it.

I take it that you are all conversant with the conditions of the weather throughout the last growing season of 1910. It was not only a dry season, but it was a season that had unusual weather conditions in other respects. We had no apples on account of the mild weather in March, followed in April and May by cold and snow, and the conditions were such that the lessons we learned may not be fully learned until another season. The

dry weather with us to a great extent cut our crop, I should judge about in half. The frost killed nearly all our bush fruits, all of our apple fruits and shortened our strawberry crop I should judge about one-third. We expected to pack 60,000 cases for shipment, but we only shipped about 11,000 cases. We commanded a good price, as we naturally would, fruit being scarce, but I learned this, that the fruit that we did get would not stand the shipping, it would not hold up, it would not look as good after it reached the market within some ten or twelve hours, as it usually does in the ordinary season. Two of our neighbors tried irrigating in an experimental way. One party had an irrigating plant that cost him \$139, the pump, well and connections that he put up for irrigation. This he applied to one acre of blackberries. In conferring with him a few days ago, I asked him if he thought it paid him, and he said it did. He marketed fifty-seven cases of blackberries, 24-pint cases, which brought him \$113. The plant cost him \$139. At first thought, we would naturally suppose that that would not pay him, but our investigations are not complete and will not be complete until another season. He took into consideration the growth of his canes for next year. He had a very good growth, much better than any yard in the section where he was that was not irrigated. Of course we cannot tell whether the wood got properly ripened, or whether he watered them too late, or cultivated them so that the fruit buds might be damaged, until another season. I take it that we might think that the last season was very disastrous to us and we are very likely to mourn a great deal because we had a short crop, and we feel that we were rather, as the saying is, sat down on. But a great many of these lessons were taught to us before, and that is in the way of conservation, mulching and cultivating and conserving moisture in the soil. We have been taught those things not only by the Horticultural Society, but by the Agricultural College, but in a season of ordinary rainfall we are very apt to forget those things, and I take it that this dry season was really in a sense a blessing in disguise, it teaches us to practice economy, economizing the moisture that is in the soil and teaching us how to act in such times. In regard to the quality of the fruits, I found on our county farm where the superintendent irrigated the strawberries, that the strawberries

that were irrigated from that farm in shipping would not stand up as well as those that were not irrigated. While they looked nice and fresh when they came to the shipping station, yet they were full of water, and the conditions were not such as to have them hold up. I found almost invariably where we sent those out on local orders, we would get back reports that they did not carry through in good shape. These lessons, as I said before, are incomplete. We take it for granted that in a dry season we have got to economize, but at the same time the work that we do may have results the following season.

A Member: Would not culture have obviated most of the difficulties of a dry season?

Mr. Richardson: I don't know. Last year the frost killed a great many blossoms on the strawberries that were not favorably situated. On my own yard, I have two acres and a half, and I only picked three cases of strawberries off two and a half acres. The blossoms were killed during the early part of May. We had nine frosts in the first thirteen nights so that we cannot tell, at least I couldn't. Some people more favorably situated, on a good soil, got a very good crop. I think mulching and cultivating will help a great deal.

The president: Our boys have become interested in irrigation, piping, etc., the result was that instead of going without strawberries in our little family patch, we had enough for ourselves. In regard to transplanting, when it comes to getting your strawberries toward the stage of bearing you cannot do anything with cultivation. If you cannot pump on the water, cultivation at that point is not going to do much to remedy past mistakes.

Mr. Christensen: We have about an acre of strawberries and we have a 12-foot wheel arrangement and a gasoline engine that will pump about 3,000 gallons a day. We had strawberries worth perhaps \$200 and we thought we possibly would have \$50 at the expiration of the season. Then we have grown raspberries, most of them for next year. I think there is a great deal better showing than that made by Mr. Richardson.

Prof. Kohler: I believe Mr. Richardson left the impression that irrigation produces berries that you could not ship very successfully. I would like to ask if the time the water was applied might not have something to do with the firmness of the berries, so that they would hold up in shipment.

Mr. Richardson: I presume it would. In regard to the benefits of irrigation, I have no doubt but what it pays to irrigate if we are situated right, but putting a plant in at that time, it does not seem to me as though it really would pay to irrigate, because we cannot tell until the end of next season, but certainly we get better growth.

A Member: I would like to ask if there is any one that has had experience in irrigation as to whether it is not better and more successful to use warm water than well water, for instance, river water, or water that has been pumped from a well and allowed to get warm in a reservoir or tank? I noted the experience of a friend of mine this summer who was situated so he could put in a gasoline outfit and pump water onto his strawberries where he only had to lift the water a little ways from the river. I have not got the figures in my mind, but he a good deal more than paid for his plant, that is, his pumping outfit and pump. There were a good many others of us who were compelled to lose what would be much more than one-third of the crop, and he was putting in nice, large, handsome berries, and they were giving him a great deal better prices than other growers were getting that did not irrigate. But he had that condition in his favor, that he had the warm river water, and while I have some drilled wells and gasoline pumping outfit, I would be afraid to use this water as it comes directly out of those wells. I would like to know if any one has had any experience.

The President: I have had no opportunity for comparison, but I have used this cold water when the weather was so hot that it did not take long for the air and soil to warm that water up, but the result was good.

Mr. Richardson: I think that question was brought up several years ago by Prof. Goff, the question was asked him and he thought the temperature of the water did not make any difference.



Eldorado Blackberries, fruit farm E. W. Sullivan, Alma Center.



Four Year Old Cherry Trees. Orchard of D. E. Gingham, Sturgeon Bay,
Sept. 4, 1910.



FRUIT RAISING IN JACKSON COUNTY.

E. W. SULLIVAN, Alma Center.

Jackson county lies up in central Wisconsin, on Black River. No doubt many of you have the impression that it is mostly pine stumps and sand. This is true to a great extent, but we have some land there as good as any in the state, and even that sandy land we find raises good strawberries, raspberries, blackberries and the more favorable locations are making a fine showing on apples and grapes.

I am not going to try to talk to you on all those kinds of fruits, but I am going to tell you a little about the strawberry, because the strawberry has been a great friend of mine, and I have been growing it for about twenty-seven years in the location where I am now, Alma Center. Twenty-seven years ago, when I commenced, there was not a whole acre of strawberries in Jackson county that I know of. I made a great many blunders in raising them. The first strawberry I got was a perfect flowering sort, and I knew nothing of them. I set out many of them and they did well for a while. Next thing I got an imperfect sort, or pistillate, and they did so nicely that I thought I would have a whole acre of those, so I set a whole acre of the imperfect sort. Then a neighbor told me he had a fine kind of strawberry, so I got about 300 of them, and by accident I set them up alongside the others. This was the old Gandy, a perfect flowering sort, so when my berries come to bear, I had pretty fair berries for the first row in, then a little further out they got poorer, and on the outside I had all nubs and buttons. So from this I learned the lesson that in a strawberry bed, if we set an imperfect variety we must have at least one row in two or three of the perfect flowering sort.

Then another mistake I made was in not covering my beds properly for winter. Because my berries did not die entirely and there was life in the spring, I thought that was all that was necessary, that they bore berries. But I found later that by covering I increased the yield one-half, and may be two-thirds.

After I had trifled with berries for about ten years I began

raising them until I made something out of them. The neighbors watched me for a while, and after five or six years some of them began to think I was getting a little too much of the root of evil and they began to fall in line with strawberry beds, and the strawberries have increased from that time on, and last spring at Alma Center and Merillan (the two places are four miles apart, Merrillan being on the main line of the Omaha, to St. Paul, and Alma on the Green Bay line) these two places had about 80 acres of strawberries and they formed two strawberry associations. It should have been in one, Merillan is the natural place to ship the berries from, but we had a very dry summer and the crop was only half a crop. We shipped something like 4,300 cases; the price we received was about \$1.25 net. We shipped three carloads. The two places worked together. Most of the plants this year are looking fine, except some of the growers claimed that they got plants that were winter killed. This is the one thing that we all ought to look out for, that of getting winter killed plants. Where these winter killed plants were set out they have not got more than one-half or one-third of a stand. It is easy to tell winter-killed plants. The roots on the plants should be clear cream color right up to the crown; a winter killed plant is dark brown, or reddish brown, or sometimes there is just a little of the brown on the tips, other times it comes down two inches. These plants do not show much to the inexperienced man when he is digging them up, but any one that is used to them can see it readily, when they are dug up, if a bunch is put in water and it is washed off clean, you can see every spot where it is winter-killed. This winter killing is caused a great deal by having plants in exposed places where the snow blows off and these plants that are left and not dug up at once will bear half a crop, but I think this can be overcome to a great extent. When we have such exposed places for strawberries, if we plant two or three rows of sunflowers on the north and west side, it will do a great deal to catch the snow for the strawberry plants, and it is an advantage to plant a row of corn crosswise of the rows of strawberries. That would not interfere with the raising of the bed of strawberries; leave it stand in the winter time, it would make a great protection to catch the snow. When the snow blows off and there are thaws

and freezes, it does the bed a great deal of injury. A bed of strawberries that lies under a bed of snow all winter will bear a great deal more than if exposed.

We raise in matted rows, try to catch them in just as soon as we can to get the center of the row filled, then we work with fine tooth cultivators. These fine tooth cultivators draw the dirt toward the middle of the row and leaves it hollow next the plant, and we have got the middle of our row full of good plants, then wait until we get a good lot of runners. After cultivating them all one way, we put two boards into the cultivator, about four inches wide, and we fasten them with wire, then we run that right in the middle of the row with a horse. They will run pretty fast, let them stick out behind the cultivator two or three inches, we can roll over those loose runners and even in the dry summers that we have we can get a good catch of plants in about three or four weeks. They will come up through the dirt, and we will catch them, even with scarcely any rain. We think it is quite a mistake for people to plow under the old strawberry beds. It costs quite a lot to get a new strawberry bed started; I figure it costs about fifteen dollars for plants, and it costs at least five dollars for setting on an acre, and if the old strawberry beds are mowed and burned over, instead of being plowed up, I think it will be a great saving. I do not recommend burning all the straw. At least I think it is a good idea when straw is scarce as it has been this year, to go on and take up at least one-half or two-thirds of the straw, and then there will be enough left to make it burn over. Burning a bed too hard is not good for it, but if you can just get far enough to go over and kill everything of a weedy nature, it cleans up the bed in good shape. Now, if you put those \$20 that you pay for plants and for setting into labor taking up those weeds and cleaning them up in first class shape, you will always get a better crop on an old bed than you will on a new one. That is about all I can tell you about strawberries.

Mr. Soverhill: How many years do you think you can succeed with your beds?

Mr. Sullivan: We have beds three years old that are the cleanest on the farm, but I hardly ever keep them over three years:

A Member: What do you cover your beds with?

Mr. Sullivan: Rye straw mostly, we have wheat straw this winter. If you are able to get marsh hay, that will be good.

Mr. Soverhill: Cannot you save your plants from freezing by covering them?

Mr. Sullivan: Covering does not always do it. I have had acres of strawberries winter kill that were well covered. There will be some places where there is no snow on and they will winter kill. If we put straw enough on, I guess it will do the work.

Mr. Kellogg: I would like to ask Mr. Sullivan how deep he recommends covering?

Mr. Sullivan: We cover enough to get the plants out of sight, spread the straw out as thin as we can so that we do not see any leaves between the rows and later shake it out thin, because I think between the rows it is needed as much, if not more, than on the plants, because the leaves themselves protect the rows to a great extent, and between the rows there is nothing to protect it. We leave on the covering as late as we can, until we see some growth start, then rake the straw between the rows, try to do it at a wet time, if possible, if we cannot get a wet time, we have to take it anyhow.

A Member: Is it positively necessary to uncover them?

Mr. Sullivan: I think they will come through if the mulch is very light. It is better to leave a little, but there is always some left. I covered one strip with sawdust and they did very well. I thought some of getting sawdust this year when the mulching was so scarce, but we managed to get enough straw to cover ours, so we did not haul the sawdust.

A Member: I saw last fall quite a large patch of berries at Menominee that had oats sowed between the rows. I think it was sown possibly along the last of September. When I last saw them, the oats had a big strong growth, looking crosswise across the field you could not see the rows at all.

RASPBERRIES AND BLACKBERRIES.

A. R. SOVERHILL, Tiskilwa, Ill.

My appearance here today to read a paper before this meeting is because my son, who was requested to give the paper on this subject is unable to be present.

Brush fruit is a very live subject at the present time, and while for the most part, those present at this meeting are growing small fruit of various kinds and thoroughly understand the business, my remarks will be more in the nature of instructions to the beginner based on my own experience as a fruit grower in Illinois.

In the first place it is desirable to raise brush fruit with as little hand labor as possible. In every instance where the conditions of things will permit the work of cultivation must be done with a horse and cultivator. To make this system possible certain preliminary steps must be taken. I would first select a level piece of ground and get it in proper shape for planting by having it well manured and cultivated the year before to some crop that will insure it being free from weeds. The ground should then be well worked up in April or as soon after as may be.

After the ground is carefully prepared the rows should be marked out as follows: First let the rows run the long way of the field and be 3 1-2 feet apart. In the first row on the side should be early potatoes, the next row berries and so on alternating potatoes and berries for six rows of berries, then leave out the berries for three rows and instead plant these three rows to potatoes or beans or whatever you want to plant that is early. Next row will be berries again and so continue in like manner until the whole field is laid out and planted. This is the way for the first year. When planting time comes for the second year, only one row of potatoes is planted in the space where the three rows stood the year before, for the reason that the spraying wagon must pass along here and it can straddle the one row. It is no trouble to spray the three rows of berries on each side and manure can be thrown from the

wagon the same distance if needed. The vacant strip will also be found very handy when it comes to burning the brush when trimming. One can build a fire on the windy side and burn a small amount of brush at a time as carried out. In this manner the patch will be free from brush and burned clean when the trimming is done.

Now as to the berry planting. Black berries and Raspberries need about the same room in the row. My experience shows about three feet to be right distance in the row. When the young raspberry sprout is about a foot high the top must be cut off and then cultivated. The row of potatoes should be dug early and this tends to leave the ground soft and mellow and if free from weeds there will be plenty of good plants for the next year.

As the plants increase in size it is necessary to provide means for supporting them. This is done in this way. Set a good post at each end of the row and on each side of the row. Eight feet in from each end of the row set another post with a ten foot brace running from the top of the first post to the bottom of the second. The intermediate posts should be about 30 feet apart. The posts should be from two to two and a half feet long above the ground. While touching the subject of posts, I should add that the posts mentioned here should be by all means hedge as they can safely be depended upon to last as long as needed. The posts should be set as soon as the frost is out of the ground. Here again care must be used in setting them. The posts should be set not less than 8 inches apart nor more than 12 inches apart of the bottom and leaned out so as to be 20 to 24 inches apart at the top. Next a No. 12 wire must be stretched along the posts on both sides one foot from the ground and the ends of the branches tied fast to it. The ends of the branches should be cut off 2 or 3 inches from the wires. This system has the following points in its favor: The vines are not in the way; the cultivator tooth can run under the wire and close up to the plant and get the weeds and best of all you have no berries on the ground to get dirty.

Cultivation should be started as soon as the ground is in shape to work and the result will be that you will gain two or three pickings ahead of your neighbor. Immediately and as

soon as picking is completed the wire must be raised to two feet then all will be right for ten years. This height protects the young sprouts so wind can't break them off and keeps them out of the way of the cultivator. When the new sprout gets 6 inches above the wire it should be cut off. It is highly important that this be done at once and not wait until the sprout is away up and then cut off a foot or two, for then you have lost a week's growth on the next crop. There is also an added advantage in the matter of picking the berries. Pickers are not hard to get when the rows are well wired.

In the case of black berries the wire is not needed until June of the second year. The posts are set the same as for raspberries except 6 inches longer. The wires should be three feet high to save all young sprouts. With wire at this height, six inches above the wire the sprout should be cut off above the wire each year. Berry patches handled in this way will last from ten to twenty years. Of course the plants must have proper care. By proper care is meant spraying as well as cultivating and trimming. The wire keeps the bushes out of the way of the cultivator. As it frequently happens in picking time a dry spell will come. In this kind of a case the berries are usually picked in the forenoon and cultivated in the afternoon. The berries are not damaged and with a dirt mulch to hold the moisture. This makes the last picking as good as the first.

Red raspberries may be planted a little closer than other kinds. New growth needs no pinching off until spring. Old wood and small young growth is better cut out soon after bearing. This is true of both black berries and raspberries. When the ground is frozen the old wood breaks off with little trouble. In no event should the matter of cleaning out this dead wood be left until Spring.

Don't say that it don't pay to spray. Blackberries, raspberries, currants, goose-berries, strawberries and grapes must be sprayed. Don't say that it don't pay to wire the plants. Just try a few rows as an experiment. I have picked 300 quarts on a row 40 rods long at one picking. There is no brush laying on the ground and no soiled berries which is a marked advantage in selling.

Currants and goose-berries want to be planted about the

same. Trimming every spring more or less. Spray at the roots and head off the worms and never have to spray on the fruit. The demand is constantly increasing. The Victoria is a fine bush and a good bearer in fact much better than the Fay. If the new growth of raspberry and blackberry have been topped at the right time there will three to six good branches to start and need no further cutting till Fall. Then cut back to from 6 inches to two feet according to size of branch. The large branches can carry and ripen four times as much fruit as the small branches.

My experience has shown the Snyder to be the best Blackberry.

Raspberries—Cumberland Eureka, proven good; and Plum farmer has the promise of being a good berry. The Columbia is the best berry for canning we grow but not hardy enough for northern Illinois climate. Same is true with the Gregg. So many of the new growth kill but it is a very fine late berry.

AFTERNOON SESSION—TUESDAY, JANUARY 10, 1911.

FROST, DROUGHT AND STRAWBERRIES.

H. B. BLACKMAN, Richland Center.

The yield of strawberries in this section for the season of 1910 was far below the average. This was partly due to the severe freeze in April and May, also the drouth that prevailed during the ripening season and partly due to those that went out of the business due to poor prices in former years. The average wholesale price received for strawberries last season was a little over \$2 per 16 quart case and there was not enough to supply the demand at that price. I will give a list of varieties and their behavior for the season of 1910.



Six year old orchard, H. G. Street, Hebron, Illinois; "grown under up-to-date methods recommended by the Wisconsin State Horticultural Society."



Senator Dunlap.—The freeze seemed to do this variety little or no damage. It set a tremendous load of berries, but the drouth affected it quite a little as the berries run medium to very small, had to pay two cents a quart to get them picked. The quality could not be improved upon. They also bore a crop in the fall.

The Highland was among the earliest to ripen its fruit. The freeze did not seem to affect it any. The berries averaged large with a bright red color which extends to the center of the berry. The yield would have been above the average but the dry weather seemed to be too much for it, as the foliage would wilt and expose the fruit (which is quite tender) and this cut the crop short about one-half. I think Highland is a very promising variety.

Warfield.—This went through the freeze with very little damage, set a big load of berries but the dry hot weather ruined it. In the hottest part of the day the foliage would wilt and roll up, exposing the fruit, which was cooked by the sun. The root system on this variety seems to be deficient, which is a very serious fault in a strawberry plant.

Improved Bubach.—The frost damaged this sort about 25 to 40 per cent. However the dry weather did not seem to affect it in the least. All through the fruiting season the plants remained fresh and green in the midst of the awful heat and drouth. The berries averaged large to very large and it yielded a fair crop of fancy berries. I had the Bubach on a heavy stiff clay soil and all through the ripening season the ground appeared to be as dry and hard as a brick.

Wonder.—The freeze almost ruined this variety and what fruit was left the dry weather finished. It did not bring a berry to maturity.

Pride of Michigan (Kellogg's strain) fared about the same fate as Wonder, plant, growth and type of berry about the same.

Buster.—Very similar to Wonder and Pride of Michigan. The freeze and drouth ruined it also.

Pride of Michigan (Baldwin strain).—From this variety I did not get enough fruit for even a fair test. The freeze and dry weather used it up.

Glen Mary.—This ripened up some very nice fruit. The

frost cut the crop short about half, but the dry weather affected it very little. Glen Mary has been one of my paying varieties in former years.

Parsons Beauty.—Started out to do wonders, but all of the blossoms and the fruit which had set also the most of the buds were frozen, there was not enough fruit left to tell what the dry weather would have done for it.

Red Bird.—The season of 1909 this variety did extra well, but the freeze and dry weather damaged it so badly last season that it bore no fruit. Introduced as extra early, with me it is not much earlier than Dunlap, and the quality is very inferior as compared to Dunlap.

Virginia—also sent out as extra early but with me it is no earlier than some of the standards. A very weak grower and not productive. The frost and drouth did not injure it much.

Fremont Williams.—I have grown this variety three years and it is the best late sort I ever tried. It is as late as Gandy or even later, more productive, better flavor and a more vigorous grower. The frost did it no damage as it does not show up its fruit buds until very late in the season. Berries average large with a bright red color, smooth and nearly round in shape. Affected but little by the drouth. It was one of the paying varieties for the freak season of 1910.

Pocomoke.—Frost and drouth affected it but little. Produced some very fine fruit. The yield was above the average.

Evening Star.—Another late variety claimed to be better than Aroma. It stood the freeze and drouth well but was only moderately productive and is not as late as reported. Winter kills bad unless mulched very heavily.

Blaine.—I cannot see that this is a better variety than Gandy. There were great claims made for it but with me it is so near like it that it could be classed the same. It did not stand up well during the dry weather.

July.—Fully as late as Fremont Williams and even more productive than Senator Dunlap, but the berries averaged medium to small. I think this was partly due to letting the plants set too thick. The berries are a golden color and only moderately firm. It stood the freeze and hot dry weather well, picked more fruit from July than any other variety in the field last season.

Stevens Late Champion.—The freeze seemed to damage this quite a little also it did not stand the dry hot weather very well, as to productiveness, it is O. K. However, the berries run to small and inferior, so many were inclined to be bitter, think this fault was due to the dry weather as it was not affected that way in the season of 1909.

Pan-American.—Affected very little by the freeze and drouth, a poor plant maker, bears heavy until it freezes up.

Autumn.—Bears excessively but the berries are too small and inferior, damaged badly by the dry weather. Stood the freeze uninjured.

The above two varieties are not recommended for general planting.

Nettie.—Very late, stood the frost and drouth extra well. However, the berries are so sour and the color so poor that this variety will never be popular. Does best on a black loam soil.

The new varieties that I have on trial that will fruit in 1911 are Black Beauty (fig type), Grand Marie (fig type), Berlin, Red Prolific, St. Louis and Iona Market. Berlin and Red Prolific are very vigorous growers and seem quite promising.

Among the raspberries, Early King and Shippers Pride were only two that survived the freeze, but the drouth cut the crop short about 75 per cent. The varieties the freeze ruined were Cuthbert, Herbert, Eaton, Manitou, Cumberland, Hoosier, Cardinal, Plum Farmer and Munger. Gooseberries, currants, cherries plums and apples were all frozen.

In conclusion I would say I always mulch my strawberry plants very heavy. Put the mulch on from two to three inches thick. After careful tests and experience I find that a field of mulched strawberries will average 50 per cent better than a field that has not been mulched. As to mulch used, I prefer clean oat straw, wheat straw or marsh hay, corn fodder also makes an excellent mulch if it is run through the feed cutter, but any other straw such as barley, rye, etc., will do very well, but in my opinion not so good. I would never use manure for mulch as it is most always infested with grass seed, weed seed and causes more or less trouble.

Mr. Richardson: Do you use any commercial fertilizers for your strawberries?

Mr. Blackman: No, sir, I use barnyard manure.

Mr. Soverhill: Do you recommend pinching off the blossom of the Pan-American to stop its fruiting out of season?

Mr. Blackman: It is better.

Mr. Gonzenbach: We have heard something about substituting the growing of oats in place of straw for mulch, sowing the oats in July between the strawberry beds and allowing them to grow, and they are naturally ripe by the time the frost comes, and the oats makes a natural mulch. The advantages claimed for this are that it is somewhat easier and keeps back the late weed growth. I would like to know if any one here has ever tried that?

Mr. Coe: I have tried that and there are several serious objections to it. In the first place, we do not get growth enough of oats to make a mulch. That is one serious objection, another serious objection is that it checks the growth of your strawberry plants, you do not get the growth of plants that you would otherwise. That is enough to kill it in my estimation.

Mr. Blackman: Another serious objection I see to it is that it does not let the sunshine or air into the plants and they will not produce so many fruit buds.

Mr. Richardson: Mr. Sullivan spoke this forenoon about using sawdust for mulch. I would like to ask the gentleman if he has ever used sawdust or shavings for mulch.

Mr. Blackman: No, I have never used sawdust. I would hesitate somewhat to use the fresh sawdust, I do not think the old sawdust will injure. I have heard of success in using sawdust, but I never found out just what it was, whether it was fresh, or whether it was two or three years old. Planing shavings I would not hesitate to use. I would use anything for mulch that was not infested with weed seeds rather than to let my plants go unmulched.

A VISIT TO A FARMER'S UP-TO-DATE GARDEN.

H. G. STREET, Hebron, Ill.

Let us suppose that it is about the middle of June and we will take a trip over to one of our neighbors, about a mile and a half from my place, and he is almost a neighbor of yours too, being only a mile and a half from your state line. There are not very many farmers that are growing what you might call an up-to-date fruit garden, but it seems to me that it is not so hard to grow, if they merely put the same attention to it that they do to all the other work. We will have to go over to this neighbor to learn a lesson from him. As we come up to his place, we find that it is on a little elevation, at least fifteen to twenty feet above the average of the surrounding country, and just east of his buildings he has a field of about half an acre, it is about ten rods long and eight rods wide. It is close to the road and it is fenced in with a good wire fence to keep out chickens, pigs and cattle, and we find also that five years ago this was a kind of clover field. The first crop of hay was cut and the second crop was left until about August and then about eight loads of fertilizer were applied on the top of the second growth. This was plowed in in August, then just before frost, about four loads of well rotted manure were spread on top of this. That lay over winter until spring, as soon as he could get in he went to work and thoroughly disked this five or six times, then he plowed it as deep as he could, then disked it again until it was in fine shape for planting. We find that in the first row he put in asparagus. These are the long way of the garden, about ten rods long. Then there is a row of grapes, on a trellis six feet high, four wires, the bottom wire two feet from the ground, and I think the first that this neighbor saw of that method was demonstrated by our friend Mr. Soverhill some fifty to sixty miles south of us. He has vines that are about thirty-seven years old. That shows that the hard winter of 1898 to 1899 did not affect them and they are about the only ones that we can find that were not affected. He does not believe in growing varieties that have to be cov-

ered in the winter and we find that we do not have to cover the hardy varieties. The method of pruning would be the same the first two years as generally advised. About the second year he leaves two of the best canes and cuts them back about half way. He lays one of those each way on the bottom wire, and the next year he will have enough so that he can leave about four canes. Next we find about two rows of black raspberries, they are composed of the Old Cumberland and the Caledonia; then he has a row of blackberries. These he trains just about the same as you were told before dinner by Mr. Soverhill. Next after that comes the strawberry. When I was there the last time it was about the 15th of June, we had not looked over these other things, had not found anything that was good to eat, but when we looked over the strawberries, we saw something was moving and on looking a little closer, a boy and girl jumped up. I think they were not strangers there and they were bareheaded and pretty soon they picked up their hats and they were full of nice strawberries. We found that they were in their accustomed places and they seemed to be right at home. We jumped about varieties and we found out where the children were were the Dunlap, they did not eat on the Warfield row, left those for canning. Besides those, he had the Brandywine and the Sample, and on the outside he had a dozen Norwood and a dozen Ozark. He likes to experiment a little bit. In inquiring as to how he cultivates, we found he puts them in about three feet apart, that is, the rows are three feet apart and the plants about two feet apart in the row, and instead of letting them go out to eighteen inches wide in the row, he keeps them down to about ten to twelve inches, and keeps them thoroughly cultivated even up to very nearly the time that it freezes so that no grass and weeds will be started at all. When it freezes up, of course he mulches with marsh hay and in the spring just spreads it enough so that they can get through without smothering them. The question was asked this morning if they would come through. A good many come through, but you will not get nice bunches if you make them go through too much, but if you open the mulch just enough, they will come through very well. I have not told you everything, but if you have any questions to ask, I will be glad to answer them.

Mr. Moyle: How did he keep the chickens out?

Mr. Street: He had a good woven wire fence, but it was not proof against the children.

THE WISCONSIN FRUIT GROWERS' ENVIRONMENT.

By GEORGE GIRLING.

Mr. Joseph Chapman, a prominent banker of Minneapolis, said to the Wisconsin Bankers' Association at their recent meeting: "I never believed in Bankers' associations spending all the time in their conventions talking about rates of exchange and discounts." I likewise believed that horticultural meetings should not be limited exclusively to matters strictly horticultural. It is probable that the Secretary knew that I was not an expert horticulturist so he would have me talk about The Fruit Growers' Environments. Let us, therefore tackle the subject assigned. The one thing of utmost importance is Life itself, and I first want to call your attention to the fact that in a recently published government list of mortality statistics of the various states the commonwealth standing at the head with the lowest death rate was the good old state of Wisconsin. Next to healthfulness comes the question of prosperity and I invite your attention to the fact that wherever on this globe of ours you find the maximum of prosperity it will be in a latitude and under climatic conditions similar to those of the same good old state of Wisconsin. Whether this condition is owing to climatic influences, fertility of the soil, the purity of the water, the energy of the people, or any or all of them is immaterial to the fact that it does prevail. The greatest vigor in manhood or womanhood, the greatest vitality in animal life, and the greatest perfection in vegetable life are well known to prevail in this latitude. And what about productiveness?

Let us look for a moment at some official figures, taken from the Crop Reporter of the United States Department of Agriculture, showing the comparative production per acre of important grain crops.

Among the twenty-five states producing twenty-five million bushels or more of *corn* during the ten year period ending 1910, Wisconsin stands fifth, the leading state (Ohio) exceeding Wisconsin by only 2.4 bushels per acre; Indiana by 1.5; Illinois by 1.3; Pennsylvania by 1.1; a difference hardly worth talking about.

Among the nine states producing one million bushels or more of *barley* during the ten year period ending 1910, without irrigation, Wisconsin stands first.

Among the sixteen states growing ten million bushels or more of *oats* during the ten year period ending 1910, without irrigation, Wisconsin stands first.

Among the seven states producing more than one million bushels of spring wheat during the ten year period ending 1910, without irrigation, Wisconsin stands first.

Among the thirteen states producing five hundred thousand bushels of more of *rye* during the ten year period ending 1910, Wisconsin stands fourth, the three other leading states exceeding Wisconsin by only a trifling difference.

Among the eight states producing ten million bushels or more of *potatoes* during the ten year period ending 1910, Wisconsin stands second, led only by a state which consumes an enormous amount of commercial fertilizer.

Of all the states reported as producing flax during the ten year period ending 1910, Wisconsin stands first.

Of all the states not using irrigation according to the latest table for a ten year period in hay production Wisconsin stands fifth.

The statistical tables indicate that Wisconsin leads all non-irrigating states in sugar beets and comes within a ton per acre of equaling the average of the much talked of irrigation states.

The above statistics would be enough to convince any thinking man that if he were in Wisconsin he should stay here, or if he were not in Wisconsin he would do well to come here instead of spending valuable time in a fruitless endeavor to find a better place. But this is not all by any means. I have already called attention to the fact that vegetable life attains its highest perfection in latitudes and climates similar to those of Wisconsin. It should be a matter of pride to Wisconsin



Japan plums orchard D. E. Bingham, Sturgeon Bay, Wis., Sept. 4, 1910.



people and of interest to homeseekers and investors everywhere that under the encouragement of Professor R. A. Moore and his capable assistants, and with the high quality of seeds they have introduced, the Wisconsin farmer is not only in a position to grow crops of maximum yields but of such fine quality as to create a demand for them for seed purposes at high prices, not only in the surrounding states but in distant commonwealths and foreign countries. And I want to remind you that progress along this line dates from the recent past, and promises in the early future to assume proportions to which its present development will seem as nothing.

In this connection it may be said that in 1905, 275 members of the experiment association of which Professor Moore is secretary grew an average of 59.2 bushels of corn to the acre, while the average of the whole state of Wisconsin that year was 37.6 bushels. At the same time the average yield in the North Central states east of the Mississippi was 39.2 bushels In North Central states west of the Mississippi was 32.4 bushels In the North Atlantic states..... 36.7 bushels In the South Atlantic states..... 16.0 bushels In the South Central states.....21.8 bushels In the Far Western states..... 26.3 bushels

That same year the experiment station at Iron River, within twelve miles of the shore of Lake Superior, grew 47.7 bushels of corn per acre, grown from pedigreed No. 8 Yellow Dent seed, developed by Professor Moore, from whose work the benefit already received by the state would many times over pay his salary for a lifetime.

The list of awards taken by Wisconsin at the last National Corn Exposition in Omaha, in January 1910 reads like a sweepstakes event for our state, Wisconsin taking *first on Barley, Rye, Buckwheat, Cloverseed, Bundle of Clover, Sheaf Barley, Timothy Seed and Wheat*, and second, third and fourth on many of the above. First on Oats went to Minnesota by a decision of three to two of the Judges. On the few remaining farm products Wisconsin stood second.

DAIRYING.

The best evidence that Wisconsin is supremely adapted to the production of the finest dairy products with the greatest

economy lies in the fact that the output has been increased during the last thirty years from practically nothing to a value of seventy-eight millions of dollars in 1910, leaving its title to being the greatest dairy state in the union disputed only by New York with the probability of Wisconsin being in the lead.

In these days when conservation is so popular it is worth while noting that this industry which pays the producer so handsomely and that robs the soil the least of all the branches of agriculture, flourishes most profitably only in such latitudes and climates as those of Wisconsin.

Blest as Wisconsin is with an invigorating climate and fertile soil, adaptable to the production of a wide range of crops she is in no less degree blest with that other essential to agricultural success and prosperity, the ample and nearby markets necessary to give value to food products. Within the state and the four immediately adjoining states there are over fifteen millions of people, while adding to this the four states bordering upon the Great Lakes to which Wisconsin products can be taken at a nominal cost of transportation, there are upward of thirty-nine millions of well-developed human appetites, or nearly one half of all the people in the continental United States. Human appetites give the only value to food products that they ever had or ever can have and it is no more useless to grow products in the absence of a consuming public than to grow them at such a great distance from the consuming market as to have all profits absorbed by transportation charges and deterioration in transit. The moral in this suggestion is not difficult to discover. From a standpoint of geographical location and transportation facilities, Wisconsin's markets are unsurpassed anywhere.

If in other respects the Fruit Grower in Wisconsin can produce results, in addition he is certainly blest with environments with which he should be satisfied. Now let us take a look at the situation from the fruit growers' standpoint. The Wisconsin apple grower has environment conditions peculiarly suited to the production of apples for the fall and winter market. In the production of these varieties he uses trees of early maturity, the greatest hardiness, and maximum productiveness. He has no need for storage warehouses, no need to wait many months for returns while paying cold storage charges,

but is able to put his products immediately into a market at a time when the apple appetite is keenest and when the supply is the lowest. He has practically no competition either by other fruits, which later enter the market, nor from extensive producers of the same varieties of apples. An examination of the market reports during the months when the Wisconsin apple as now grown, is on the market with its minimum freights, the absence of cold storage charges, the absence of the hazard in shipping and with consequent losses, will show that the Wisconsin grower receives a higher net return than does the orchardist in the regions that are now being so loudly proclaimed as the only places to grow apples. The future presents a cheerful aspect when we know that the state of Wisconsin may multiply its apple products by ten or a hundred without having approached the limits of the immense markets that are within easy reach, and without having to add to our present varieties the so-called late keepers. I admire the energy and activity of those who devote their time and thought to the development of new varieties of apples as well as other farm and orchard products, but it is my opinion that the development of new kinds of apples, especially the so-called late keepers, is entirely unnecessary in Wisconsin at this time, or any time in the early future. Our Duchess, Yellow Transparent, Wealthy, McMahon, Northwestern and Patten's Greenings and two or three of the varieties of crabs that are so well suited to Wisconsin conditions furnish a list of varieties that as far as markets and profits are concerned amply fill our requirements. I am not attempting to leave out other varieties of which there may be champions here in this audience, but what I want to impress upon you is that you now have a market at your very door, which you cannot for many years fill, regardless of whether your varieties are few or many.

I will add here what I have often said elsewhere that the Wisconsin apple grower can produce his crop and put it on the market at a cost less than the orchardists of many distant regions will have to pay in freight before reaching the ultimate consumer and also he has the advantage of an active market before the apple appetite has lost its keenness or the market has become supplied with the many other fruits that effect the situation. And let me add the further thought that no mat-

ter what may be the relations of supply and demand in the near or distant future the Wisconsin apple grower will be the last one to have his profits wiped out by a declining market, because of his unsurpassed location. The districts in Wisconsin suited to apple production are too numerous to be discussed fully in this brief time. The many districts are being rapidly developed and it is my opinion that the recognized apple districts in this state will be markedly increased as the industry progresses.

The area in Wisconsin that is suited to *cherry* production is undoubtedly more limited than that which is suited to the production of apples. However, it is an unquestionable fact that cherry growing will be one of the industries for which Wisconsin will be noted, and which like our apples will have a practically unlimited market. With orchards producing from \$500 to \$800 an acre there is no question that cherry growing will be rapidly increased in the early future. I will not attempt to state the amount of new plantings that are being made in this state, for the reports are coming in so frequently it would be difficult to make up any schedule now that would be correct when the spring plantings are done.

The grower of *small fruits* in Wisconsin has the same advantage as to market that applies to the grower of tree fruits. He is able to grow a wide variety with most excellent returns and put them in the immense nearby markets while they are fresh. Regardless of what is said by exploiters and special writers with reference to the returns to growers of small fruits in isolated sections, the fact is undeniable that the same growers located in the state of Wisconsin where long distance transportation, deterioration, and other losses are not encountered, would produce much more handsome results.

While the fruit growers in Wisconsin for many years at least may have little or no need for marketing associations, or any other associations to meet disadvantageous conditions, they do need and now have one of the best, strongest and most progressive horticultural societies that prevail in the United States, headed by our experience and venerable president Toole, and stimulated by our energetic, persistent and aggressive secretary, Crane field. The Society has done noble work in the past and its present prosperous condition both from the standpoint of

membership and active usefulness presages its many triumphs in the future.

Although I have traveled over the state a great deal in the past my numerous trips last summer increased, if possible, my appreciation of the productiveness, prosperity and development in every section that I visited, and the more I studied the almost certain developments of the future, that will be applied to the various resources of the state, I cannot resist wondering how the greater Wisconsin of twenty-five years or fifty years hence will compare with the magnificent state of the year 1911. Last fall I had occasion to be with the Commissioner of Immigration in making the Wisconsin exhibit at the Illinois state fair, and when scores of Illinois farmers, or I may say hundreds, perhaps thousands for that matter, looked over the exhibit in admiration and voluntarily told us that they could not produce such results on their two hundred to two hundred and fifty dollar an acre land, I thought my admiration for Wisconsin had reached its limit. However, it has been my privilege to be in charge of the exhibit of the Wisconsin Advancement Association in the city of Chicago and when there I am told by every visitor that the products exhibited are marvelous, almost beyond their understanding, I begin to wonder whether or not I too have failed to appreciate the possibilities of the state of Wisconsin for agricultural achievement. What the development of the ten millions or more acres of fertile unused lands in the northern half of the state, together with the harnessing of the almost innumerable water powers and the use of their energy in running the factories, the presence of which will mean not only hundreds of millions of dollars in industrial institutions, but the employment of hundreds of thousands of workmen that will make many of these valleys not even second to those of the far famed Fall and Merrimac rivers—what these developments and the activities necessary to the development of the many other latent resources of the state will mean in the enrichment of the state and the increase of the prosperity of the people is a question too vast almost for contemplation, not to say for definite answer. We know that with these developments which are certain to come, that not only will the natural wealth of our now undeveloped regions be made available, but that this more complete utiliza-

tion of the state's resources will reflect its benefits upon the state as a whole, including the present highly developed portions, and we know also that from these additions to our now wonderfully rich state will come a large increase in the state's revenue that will richly repay for the endeavors now being put forth for these accomplishments.

Whatever may be the ideas of others as to the future needs and uses of the state for revenue that will come from the development above referred to I will content myself by merely pointing to the fact that in my estimation a large investment might well be made in the enlargement of the Agricultural college that will be necessary to accomodate the ever increasing attendance, the addition of many experiment stations in various sections of the state, and in the increase in the force of the various departments of the agricultural college, so that field work may be materially increased and not only the knowledge of agriculture be carried to the door of the farmer, but that he may be stimulated by the enthusiasm resulting from coming into frequent personal contact with those skilled people who are devoting the best years of their lives, many of them with inadequate and disproportionate compensation, in spite of which they are continuing to give of their abilities and energies to the cause of progress and enrichment of the state. We need more of them.

In closing let me say that while I have said little of fruit growing it is my candid belief that all that I have said as to the strength of Wisconsin's position applies to fruit growing even more than to any other line of production from the soil. You have the climate, the soil, the productiveness, the markets, and pleasant environments—and what else would anybody want.

SELF-BOILED LIME-SULPHUR SPRAY.

G. W. KEITT, U. of W.

Believing that, as practical growers of good fruit, you will wish a practical discussion of self-boiled lime-sulphur spray, I have planned that we center our attention upon the following phases of the subject:

1. Adaptation.
2. Preparation.
3. Application.
4. Results.
5. Cost.

Before taking up these points in detail, however, I feel that it may be profitable for us to consider very briefly the general needs that called this preparation into existence, and to take a hurried glance at the history of its evolution.

During the two decades succeeding what we may term the birth of modern practical plant pathology, in the discovery of Bordeaux mixture by Millardet, in France in 1892, great strides were made along the lines of economic plant disease control. The evolution of Bordeaux mixture and the improvement in spraying equipment made possible the conquest of disease after disease, until our plant pathologists and horticulturists began, almost, to forget that any limitations were applicable to this great fungicide. This status of affairs, however, could but be of brief duration. In vain the owners of the great peach orchards of Georgia and other sections turned to Bordeaux when, in a single week, perhaps, the scourge of brown rot turned the most promising harvest into a dead loss, or when the ravages of scab ("black spot", "mildew") rendered an otherwise perfect crop unsightly and unmerchantable. In desperation, they appealed to the United States Department of Agriculture for aid, while many growers pulled up their trees and went into other lines of work. The peach growers were not alone in their plea. The apple orchardists of the country were beginning to tire of russeted and misshapen fruit from many of their most choice varieties, as a result of spraying with bordeaux mixture.

Thus, in response to this general feeling of a great need for a summer spray that would supply the efficiency of Bordeaux mixture, without the injurious effects of that fungicide, arose the lime-sulphur investigations. By no means have these investigations been confined to the Department of Agriculture or to any single group of men; yet, I think, to Prof. W. M. Scott, of The Bureau of Plant Industry, to whom this work was assigned, far more than to any other individual, belongs the credit for the successes that have crowned these investigations.

Realizing the apparent inefficiency of the copper preparations for the purpose in view, Prof. Scott, and others, turned, naturally, to the sulphur compounds for experimentation; and, out of this branch of the investigations, have arisen the "commercial" or "concentrated" lime-sulphur solutions that are so rapidly replacing Bordeaux mixture in apple spraying. Harmless, however, though this preparation is on the fairly hardy foliage of the apple, it was found to be impossible to the tender foliage of the peach. In other words, when the solution was made dilute enough to be harmless to the host plant, it was not strong enough to control the fungus. Thus, Prof. Scott was still confronted with the whole problem of peach disease control; but, by dint of thorough and persevering experimentation, he succeeded in creating a new field of possibilities in the origination of self-boiled lime-sulphur spray.

A brief consideration of some of the essential differences between the different lime-sulphurs, in order that we may better and more clearly understand the solution under discussion, and we pass on.

The lime-sulphur preparations, as you well know, may be divided into two distinct groups; viz., first, the "concentrated" solutions, which may be sub-divided as "commercial" and "home-boiled," according to the method of preparation, and, second, self-boiled lime-sulphur spray. These two groups of solutions differ widely in their preparation, their chemical composition, and their fields of usefulness. In the "concentrated" solutions, the active agent, being both fungicidal and insecticidal in value, consists of the higher poly-sulphids of calcium, formed in the process of preparation by a chemical reaction between the lime and the sulphur, at continued high temperature.

These sulphids of calcium are, however, also the active agent in the production of "spray injury." Thus, the prevention of their formation in injurious amounts is one of the primary considerations in the preparation of the self-boiled solution, the active fungicidal agent, in this case, being the finely divided sulphur in suspension in the liquid. In order to obtain a maximum formation of the higher poly-sulphids of calciums, it is necessary, in the preparation of the "concentrated" solutions, that the mixture be boiled. Conversely, in the case of the self-boiled mixtures, in order to prevent the formation of these compounds, continued high temperatures must be avoided. Hence, in large measure, the use of the lime as a source of heat in the preparation of self-boiled lime-sulphur.

Let us now turn our attention to a further discussion of self-boiled lime-sulphur preparations as above outlined.

Adaptation. Self-boiled lime-sulphur is peculiarly adapted to the summer spraying of tender-foliage hosts. It has been shown to be especially efficient in the control of peach and plum brown rot and peach scab, while it is equally applicable to brown rot of cherry and allied fruits. It has been found, under favorable conditions, to control certain apple diseases; but, in these cases, the "concentrated" solutions have proved more efficient, and equally harmless to fruit and foliage. In addition to the immediate, intrinsic values of the lime-sulphur solutions, however, I wish to call especial attention to their wonderful potentialities. Even at this early stage in its evolution, the self-boiled preparation has revolutionized the spraying of stone fruits, while the "commercial product" is rapidly coming into use in the summer spraying of pomaceous fruits. With these results behind us, let us be keenly alive to the possibilities that still lie before us.

Preparation. The *raw materials* necessary for the preparation of self-boiled lime-sulphur solution are few, simple, and relatively inexpensive: viz., lime, sulphur, and water. The quality of the lime, however, is a most important factor, a good stone calcium lime being absolutely essential. As the whole process of boiling is dependent upon the heat generated by the slaking lime the air-slaked product is utterly worthless for this purpose. If magnesium lime is used, chemical complications occur, leading to the formation of hydrogen sulphide.

The fungicidal value of the resulting preparation is lowered, while the hydrogen sulphide evolved is unpleasant and injurious to the manipulator. The sulphur may be readily secured in bulk "flour sulphur" and flowers "of sulphur" seeming to be equally efficient. The former product is usually somewhat cheaper.

The apparatus necessary for the preparation of this solution is as simple as are the raw materials used. It may consist of a stout barrel, a paddle, a pair of hand scales, or other weighing facilities, several buckets, a sifter, and a strainer. The barrel should be water-tight, and of good construction. Any ordinary oil, vinegar, or lime-sulphur barrel is quite satisfactory. Its capacity should be known, in order to facilitate the handling of the standard solution. The paddle should be stout and well made. It should be about six feet in length and four inches wide, with the bottom and the edges sharpened, in order to render possible a thorough mixing of the thick, pasty, boiling mixture. The nature of the buckets is of little importance the individual grower using those that he finds most efficient and satisfactory. An ordinary meal sifter—18 to 20 mesh to the inch—is satisfactory in reducing the lumps that may be in the sulphur. The ordinary strainer that goes with spraying machinery will serve for straining the solution. Brass mesh is desirable, in order to withstand the corrosive effects of the chemicals that pass through it.

The formula that has been found most efficient in the control of peach and plum brown rot and peach scab is as follows:

Lime	8 lbs.
Sulphur	8 lbs.
Water	50 gallons

The best conditions have been found to obtain when batches of four times the above formula are prepared. The preparation of the solution is quite simple; yet the process should be carried out with great care. The lime, thirty-two pounds, is put into the barrel, and nearly covered with water. As soon as this begins to slake, the thirty-two pounds of sulphur, which has been run through a sifter to remove the lumps, is added. It is merely dumped, in the dry state, into the barrel. If the lime is of the proper quality, a violent period of boiling will ensue.

From the time that the sulphur is added and the boiling begins, the mixture should be kept thoroughly stirred, while water should be added, from time to time, as the mixture gets pasty, and threatens to "burn." When the lumps of lime are slaked down, a fairly thick, hot, pasty mass should result. It is important that this be cooled off promptly, by the addition of water, as the sulphides of calcium, which, as above stated, are injurious to tender foliage, are formed if the solution is allowed to stand at this high temperature. Several buckets of water should be added, the liquid being constantly stirred, in order to prevent lumping. The solution may then be made up to any desired volume, one-fourth of it being used to charge a fifty gallon barrel, or the whole amount comprising a charge for a two hundred gallon tank. At this stage, the preparation is ready to be strained and applied. In straining, all free sulphur should be carefully worked through, as the free sulphur in suspension is the active fungicidal agent. In order to secure even concentration, the stock solution should always be thoroughly stirred before it is removed from the barrel.

Application. The same spray machinery that is used for general spraying may be used in applying self-boiled lime-sulphur. Barrel pumps may be used satisfactorily, though, here, as elsewhere, the power machines are more efficient. As the sulphur of this solution is in suspension, it is very necessary that the preparation be thoroughly agitated. Thus, all other points being equal, the machine with the best agitator is to be desired. There are many good nozzles on the market. Among others, the double Vermorel and the Friend have been found, in our experience, to be satisfactory.

The following schedules of applications are recommended by Prof. W. M. Scott, of the United States Department of Agriculture, being based upon the results obtained from the experiments that have been carried on under his direction in Georgia and other sections for the last three seasons:

For treatment of peach and plum brown rot and peach scab in Northern districts:

I. For early varieties, as Carman, Hiley, Champion.

1. Self-boiled lime-sulphur, about one month after the petals fall.

2. Self-boiled lime-sulphur, about one month to six weeks before fruit is picked.

II. For later varieties, as Elberta, Smock, Salway, etc.

1. Self-boiled lime-sulphur, about one month after petals fall.

2. Self-boiled lime-sulphur, three or four weeks later.

3. Self-boiled lime-sulphur, a month or six weeks before the fruit is picked.

For the curculio treatment, arsenate of lead, at the rate of two pounds to fifty gallons of self-boiled lime-sulphur, should be used in the first application, but not in the others. Where the curculio is a serious factor, an application of arsenate of lead, two pounds to fifty gallons of water, with two pounds of lime, may be made a few days after the petals fall.

The trees should be thoroughly sprayed, the aim being to "pepper" each leaf and fruit with spray, rather than to drench the tree. The last application should be made very light, though thorough, in order that the fruit may not be splotted with spray in such a manner as to detract from its value at harvest time. For this application, a nozzle with a small aperture should be used, in order to secure the spray as a very fine mist. With average care, there is no danger of putting on so much of the fungicide that it will be evident at picking time.

Results. The results that attended the lime-sulphur investigations carried on in Georgia by the writer and others, under the direction and supervision of Prof. W. M. Scott, demonstrated thoroughly the efficiency of self-boiled lime-sulphur in the control of peach and plum brown rot and peach scab. As a complete account of this work will probably appear in an early publication of the Bureau of Plant Industry, and as our time is limited, a detailed consideration of these results is not necessary. I shall merely give you two extracts from our tabulated results.

Plats No. 1 and No. 2 consisted, each, of seventy six-year-old Elberta trees. The blocks were adjoining, the second being merely a continuation of the rows of the first. The trees were in the same condition, and they received the same treatment, with the exception of spraying. Plat No. 1 received two applications of self-boiled lime-sulphur (Apr. 27 and June 18), combined with the arsenate of lead treatment for the curculio. Plat No. 2 was unsprayed. The summarized commercial results from these plats are as follows:

	Total bushels.	Per cent rot.	Per cent culls.	Per cent merchantable fruit.
Plat No. 1.	116.5	0.61	2.96	97.04
Plat No. 2.	53.75	26.25	45.91	54.97

As these figures show, the spraying produced, for these seventy trees, a gain of 81.8 bu., or approximately 130 crates, of *merchantable* fruit. This, however, does not by any means, tell the whole story of the superiority of the sprayed over the unsprayed fruit. Nearly all the sprayed peaches ran "extra fancy," while the unsprayed product had to go into the lower grades. The sprayed fruit was far ahead of the unsprayed in color, symmetry, and uniformity, while it ripened evenly and normally on the tree, and packed and carried to market in excellent condition. There was a demand for sprayed fruit, at \$2.00 to \$3.00 per crate, when the unsprayed product was "a drug on the market" at \$1.00 to \$1.50. While this much difference in price between the sprayed and the unsprayed fruit is, perhaps, a bit abnormal, there is a constant difference of at least \$0.35 to \$0.50 per crate, in favor of the sprayed fruit.

Just as striking as the above results, were those obtained from Summerour (Atlanta) plats, under relatively the same conditions, the plats having seventy trees, each, and receiving the same treatment as those above. As this variety ripens late, it was found that another application of lime-sulphur will be necessary to a thorough control of the diseases. However, while the control, under this treatment, was not perfect, the relative results are striking. They are summarized below:

	Total bushels.	Per cent rot.	Per cent culls.	Per cent merchantable fruit.
Plat No. 1.	135.	5.35	14.98	88.02
Plat No. 2.	53.5	38.74	93.51	6.49

As these results show, the Summerour crop of the unsprayed Georgia orchards, last season, was practically a dead loss, many growers not attempting to pack any of the fruit, whereas an excellent yield of good fruit was obtained from sprayed trees.

Cost of Treatment. Self-boiled lime-sulphur is a relatively cheap fungicide, the actual cost, of course, varying with the cost of lime and sulphur in different sections. In the South, the solution can be prepared for one-half cent per gallon, eight pounds of "flour of sulphur" costing, at the rate of two and one-half cents per pound, twenty cents, and eight pounds of lime costing a little less than five cents. The process of preparation is so short and simple that the cost involved is practically negligible. The cost of application varies so much with the cost of labor that an estimate is scarcely profitable. It may, however, be considered as a basis for comparison, to be the same as that involved in the application of any other of the standard summer sprays.

In conclusion, I wish again to emphasize the potential, as well as the present intrinsic value, of the lime-sulphur solutions; and I hope that the horticulturists will continue to cooperate with the plant pathologists in furthering the development of these promising fungicides.

Mr. Sperbeck: I should like to ask the speaker if this preparation was sufficiently strong to combat the oyster shell bark louse on the apple tree?

Mr. Keitt: No, I think not. We have as yet carried on no definite investigation as to any insecticidal value in the self-boiled lime sulphur. I have been inclined to think that the insecticidal value will be minimum, certainly, because you see the active agent as an insecticide of the lime-sulphur preparation is composed of the very sulphate of calcium that we are trying to keep out of this solution. The active agent in the concentrated lime sulphur solution is composed of these sulphates of calcium and here we have made every effort to keep out the sulphates and they are present only in a minimum quantity, so I am inclined to think there would be very little insecticidal value in the compound.

A Member: I would like to ask if this lime sulphur will spoil if made a few days or hours ahead?

Mr. Keitt: No, we have found that it will keep its efficiency certainly for a few days. No extensive experiments have been made in that regard as to the actual length of time that it will

keep, largely for the reason that there is no necessity for keeping it any length of time, owing to the ease of preparation. We have carried it over as much as four or five days ourselves, with no injurious effects.

Mr. Gonzenbach: I would like to ask Mr. Bingham to tell us what they do with lime sulphur in Sturgeon Bay.

Mr. Bingham: We have used it quite a little up there this past season. We found the commercial lime sulphur will free the trees of the oyster shell bark louse if used as a dormant spray, about 1 to 11, and for a summer spray we get good results using lime sulphur, judging from this year's use only. Some of us used it in the cherry orchard entirely, that is, spraying a certain number of trees, three or four applications, used it in other cases for apples, three or four applications, growing a good crop of fruit under those conditions. Other orchards we used it in that gave us not so good results, and then we used Bordeaux in other sections of the orchard, where we got perhaps about the same results that we got where we used lime sulphur. One of these orchards was struck with hail, showing imperfect fruit, and the codling moth seemed to be more in that orchard than in other orchards sprayed with lime sulphur. We use it in connection with arsenate of lead and we had some trouble keeping the arsenate in suspension, arsenate of lead settled quite noticeably more than it would in the Bordeaux mixture, and I think if we would use that we would get better results by using it alone, or by keeping it sufficiently agitated, putting an extra person on the spray tank and keeping it constantly agitated.

The President: With 1 to 11, what would it cost?

Mr. Bingham: The cost per gallon as a summer spray, of the commercial lime sulphur, is about $1\frac{1}{4}$ cents per gallon.

A Member: I would like to ask Mr. Bingham if he noticed any injury to the leaves of the cherry trees by using the commercial mixture.

Mr. Bingham: No, we did not notice any injury at all on the apple and cherry, and we used it entirely on the Burbank and Japanese plums and European plums. We found the effect of the lime sulphur on our Japanese plums was much better, that is, the foliage was not affected at all as it was with the Bordeaux mixture.

The President: What is the effect on plum rot?

Mr. Bingham: We had very little plum rot, not enough to speak of; once in a while a specimen. It did not spread. Whether the conditions were unfavorable for the spread of plum rot, I do not know. Some years we have had it spread all over the orchard when we used Bordeaux, where we thought we had it fully sprayed. We did not have it this year.

Mr. Sperbeck: Isn't it a fact that we have to spray in the winter for this bark louse on the apple tree and that it is necessary to be applied stronger than the summer spray,

Mr. Bingham: It would not be safe to use it anywhere near as strong on trees with leaves as for the dormant spray. One to 11 or 1 to 9 would kill the oyster shell bark louse if the work was done thoroughly.

Mr. Richardson: Can it be made strong enough to kill that insect known as the rabbit?

WEDNESDAY MORNING SESSION, JANUARY 11, 1911.

WISCONSIN'S HORTICULTURAL CONDITIONS.

President WILLIAM TOOLE'S Address.

The year which has passed since the last winter meeting of our society, has been notable in several ways, both as regards climatic conditions and horticultural activities. Probably no member of the society remembers such a succession of frosts as prevailed last spring, almost entirely preventing any yield of fruit of several kinds, over a large part of the state. Notwithstanding these temporary reverses, there has never before been such an awakening to the possibilities for profitable fruit growing in Wisconsin, as prevails in our state at the present time.

If we have, at any time, felt jealous of the promoters of western fruit lands because they have attracted people and capital from our state we may soon become indifferent, because we know that our own state can offer inducements for profitable



Sturgeon Bay Cherries. A fair sample of the 1910 crop on eight year old trees.

investment of capital in apple growing, which, if understood, would be very attractive.

We have reasons to thank our horticultural brothers of the west, for the lessons they have taught us in business energy, in the direction of producing and marketing fruit. I have eaten of the fancy apples from the west and they are good; but a year ago I enjoyed apples grown on our own place that were better. If we follow their example of careful selection, we also can put attractive fruit on the market, at a lower price, for better fruit. As good a percentage of profit can be realized on apple growing here in Wisconsin, with less investment of capital either for installation or running expenses.

And judging from the quality of eastern grown apples which are placed in our home market, we can meet such fruit with our second grade, which will be of better quality than they furnish us at fifty cents a peck.

The conditions of marketing are such that many Wisconsin people do not know how good Wisconsin apples are. In the past we have made a record for Wisconsin apples, when we have shown at the various national and international expositions, and we have surprised the people of our own state, as much as those of other states. During the past few years, invitations have been extended to our society, to represent our state at some of the leading fruit shows, with exhibits of Wisconsin fruits. It seems to the officers of our Wisconsin State Horticultural Society, that what is most needed, is to show Wisconsin what Wisconsin can do. Why cannot we, late next fall, or in early winter, have a state show of apples which will fairly illustrate Wisconsin's horticultural resources; and if others, east or west, care to match fruit with us, we are not afraid of comparison.

Last season's experience has taught us that we must not neglect to spray. The untimely frosts of last year left us all the enemies of our fruit trees, and just about fruit enough to support them. There was more fruit than we thought, and if we had not neglected spraying, we could have raised apples in quantity, and quality, sufficient to pay well for the effort, with a good profit; and the breeding stock of fruit enemies would have been greatly reduced.

We have passed the time of necessity for exhorting wide

awake orchardists to spray, but we must not forget the careless growers, whose neglectful methods may become a menace to the success of those whose interests may become largely invested in fruit growing. While not forgetting that we owe a debt of gratitude to many small growers, whose experience has helped to teach much of what our Horticultural Society has brought together in the way of fruit growing knowledge, we must see to it, that none shall become indifferent to the value of horticultural progress. The State of Wisconsin's motto of "Forward" must be the moving spirit of every fruit grower who can be reached by the influence of the Wisconsin State Horticultural Society.

Among the beneficial activities of our society, what we have done to promote horticultural decoration of school grounds is worthy of special thought. I hope that each member of this society will follow its lead in this direction. Each should make a special effort in his or her school district to promote public interest in the subject of school ground improvement. Our secretary, in his annual report, will probably give all the data in regard to what has been thus far accomplished by the society in this line.

We find in our experience with beautifying school grounds, that it is necessary to consider the area needed for playgrounds; while many schoolgrounds are too limited, there are communities where the children do not know how to play. Would it be within the province of our society to suggest ways of helping children to the opportunity of enjoying the delights of childhood, which will promote healthful social conditions?

A year ago last winter, we were surprised to learn that many members of the legislature did not understand the purpose and work of our society. Our members should see to it that knowledge of what our society has done and is doing for the development of Wisconsin shall become more generally known. If I should speak in detail of the good work we have done it would probably be a repetition of what will appear in the Secretary's report.

The legislature has been generous in the past and has encouraged permanent, progressive work, the value of the results of which has proved to be very great; it would be a misfortune to the state, if there should be any interruption to the work

which is now established, because of lack of support. The space allowed in our annual reports is not equal to our needs. It has seemed necessary to cut the reports of our delegates to other conventions. We should endeavor to have more pages added to our report.

While the importance of apple culture will continue to require leading attention by our society, it will be necessary in the future, as in the past, to give well balanced attention to the whole field of horticulture. As our state increases in wealth there will be increased desire for beautiful home surroundings. More and more will attention be given to school ground improvement, and park, drive and cemetery plantings are increasingly appreciated. Attention to market gardening is coming well to the front, and suburban life becomes increasingly attractive. More than ever farmers appreciate the healthfulness of garden products, and beautiful lawns are not the exception in some farming districts. It seems as though we should give more attention to farm forestry.

We more than ever realize the value of our summer meeting to make it possible to consider all of the subjects requiring our attention. These meetings, being held in different localities, help to establish new centers of horticultural activity and make people acquainted with our work who else might not know of the benefits to be derived from affiliating with us. Not all summer meetings have been successful in attendance because of the location, but all have brought together valuable knowledge. With such summer meetings as those held at Oconomowoc and at Sturgeon Bay, we can, for the value received, well afford to risk occasional disappointments.

REPORT OF SECRETARY.

Nearly one thousand acres of apples will be planted in Wisconsin in the spring of 1911 and an equal or greater acreage of cherries. This refers only to commercial orchards of 10 acres and upward. If the home orchards were to be counted this acreage would be more than doubled. Of this nearly four hundred acres will be planted by orchard companies and the remainder by individuals in lots of 10 to 50 acres. When we

add to this what we already have, the Melville plantation of 60 acres, the Knight orchard of 135 acres, the hundreds of orchards of 5 to 40 acres, even the most skeptical must admit that we are "going some."

Not in 20 years, never in fact since the first apple tree was planted in Wisconsin has there been so much real interest manifested in fruit growing as during the past year and this in spite of the most disastrous season in 75 years.

Wisconsin indeed has arrived! Probably the most encouraging feature of the movement lies in the fact that with possibly one exception every dollar invested in the new planting is for the purpose of raising fruit and not for the purposes of promotion of "unit share" schemes.

The future successful development of tree fruit raising in this state must be through commercial orchards. The farm orchard idea has proven a distinct failure in the eastern states, in New York, in Michigan and just as surely will prove a failure in Wisconsin. Orchards large enough to command the time and energies of the owner from the beginning of the season to the end are the ones that will prove profitable while the farm orchard of 100 to 200 trees planted in sod, unsprayed, unpruned and visited but twice a year, at haying and at apple harvest season will surely leave us twenty-five years hence where we were 25 years ago.

If it is urged that we as a society should educate the farmers to properly care for such orchards I must answer, as a result of twenty years experience, that it is an utterly hopeless task.

From my experience I estimate that it would take 3,000 years to educate and convince the 300,000 farmers of Wisconsin in the way of raising fruit for market while 3 years will be enough to convince 3,000 men who must live from their investment the wisdom and the necessity of proper care of their orchards.

While there is scarcely a county or a township in the state that does not afford more or less land suitable for small fruits or orchards yet three counties are distinctly in the lead in the "new movement" viz., Door, Bayfield and Crawford and these three are destined to be the fruit counties of Wisconsin.

Door County is now known as the cherry county, and while the orchards so far planted are mostly in the vicinity of Sturgeon Bay, the time is near at hand when extensive orchards will

be planted all the way from Sturgeon to Ellison Bay and on Washington Island.

The influence of large bodies of water on retardation of fruit buds was demonstrated here last spring beyond any doubt. Door county possesses exceptional opportunities for fruit growing and it is not unreasonable to expect that 20,000 acres of tree fruits will be planted on the Door peninsula inside of 20 years.

The Bayfield county shore line from Washburn north and west to the Douglas county line possesses much the same characteristics as the Door peninsula, having excellent water protection. While we have heard mostly of Bayfield it should be kept in mind that the conditions which prevail there are common to at least 50 miles of the Lake Superior shore line.

Crawford county, with its thousands of acres of clay ridges, is at last coming to be recognized as one of the very best apple regions in the United States. The recently organized Gays Mills Fruit Farm Co., which has acquired 130 acres of land all of which will be planted to apples within the next five years is but the forerunner of other similar company and individual orchards which will enrich the crests and hillsides of the picturesque and beautiful Kickapoo region.

North, east and west of Chippewa Falls lie thousands of acres of hardwood ridges splendidly adapted to fruit raising. Other sections altogether too numerous to mention may be found where fruit raising might easily become the leading industry.

While an enumeration of the possibilities of our state may not at first glance seem to be a proper topic for the annual report of your secretary it should be kept ever in mind that this society is one of the forces shaping horticultural destiny in Wisconsin.

The business and affairs of the society for the past year are of interest to every member and are here briefly outlined:

The membership has shown a gratifying increase during the year and we now have 1,239 annual and 180 life members, a total of 1,419.

The quality of the membership is an even greater cause for gratulation than the number, for we have never gone into the

highways and the byways searching for members to swell our numbers, seeking rather only those who were honestly interested in horticulture and as a result membership in the W. S. H. S. is coming to be recognized as a privilege.

The activities of the society have been, with one exception, along the same lines as in former years.

The trial orchard work has been extended and is promising in every particular.

The attendance at the 1910 annual convention was larger than at any previous convention in the history of the society and yielded the richest material for our annual report of any convention.

The summer meeting at Oconomowoc was a success in every particular. The two features which have been too often lacking in our summer conventions were the special points of merit in the Oconomowoc meeting, viz., local interest and the attendance from outside points. The welcome given the society by Oconomowoc people will long be remembered by all who attended the meeting.

Owing to the unwillingness on the part of the State Board of Agriculture to cooperate with the society in making an extensive exhibit of spraying machinery and insecticides our board of managers decided to omit entirely the usual state fair exhibit.

We need a building exclusively our own at the state fair wherein we can show not only the work done by the society in our trial orchards, school grounds and other fields but also a complete line of spray pumps and spraying material.

Owing to the shortage in apples last season the demand for expert judges at county fairs was less than usual. All of the large fairs and many of the smaller ones now appreciate the value of expert judges in the fruit and vegetable departments and in the opinion of your secretary we can now well afford to withdraw our aid.

We have spent almost \$1,000 in the past three years in aiding the county fairs and judging from reports of the judges employed there can be no doubt the money was well expended. However, if we continue much longer there is danger that the fair association will come to consider it as a prerogative rather than a privilege.

Our contribution to the Department of Farmers' Institutes has been continued for the present season, the society paying one-half the salary and expenses of a special lecturer on horticulture. Mr. Bingham was again appointed and attends four to five institutes a week. Mr. Bingham is the only special worker on the institute force, all the others covering two or more subjects.

The school grounds improvement work is proceeding slowly but in a satisfactory manner. Very many difficulties have been encountered but we hope to overcome all of them. Most of the school boards appeared willing to enter into a contract with the society whereby the district would receive \$75 to \$100 in value of trees, shrubs and superintendence, but few of them seem willing to give even the little time required during the season to cultivation, mulching, etc., which is so essential to success.

While everything has seemed to conspire so far to defeat the object we aim at we have not by any means given up in discouragement.

Two schools were added to our list in 1910 making seven in all. One of these is located a short distance south of Fond du Lac, known as the Mihills school and one 6 miles southwest of Waukesha, known as the Salesville school.

The work so far is largely experimental. It may be that we will need to change our plan. One thing is certain we should not stop short of our aim, changing the appearance of the 7,500 rural schools of Wisconsin.

While the secretary's report would seem to be incomplete without mention of local societies there seems to be little that is new to be recorded.

Two new locals have come into existence since my last report, the Sheboygan Society, organized December, 1909, with 14 members, and the Washburn Society organized Oct. 27th, 1910, with 46 charter members. To offset this two locals have died a lingering death, viz, Gays Mills and Barron, leaving the number of local societies, active and otherwise, the same as one year ago.

Three bulletins were issued in 1910 as follows:

No. 17—The Truth About Fruit Growing in Wisconsin, 24 pages. An edition of 10,000 copies of this bulletin, which aimed to set forth the advantages of Wisconsin as a fruit state, was quickly exhausted and a reprint of 5,000 copies was ordered.

No. 18—The Elementary Facts Concerning Orchard Practice in Wisconsin was confessedly written for beginners and contained only elementary facts as stated in the title. An edition of 5,000 copies was issued.

No. 19—Spraying, was largely a reprint of bulletins 15 and 16 and was issued to meet a never-ceasing demand for formulas and directions for spraying. 5,000 copies were printed.

A discussion of Society publications involves mention of our new magazine, WISCONSIN HORTICULTURE, the inauguration of which was the most important new business of the year and one big step in advance.

As is well known to older members our society at one time published a monthly magazine known as the Wisconsin Horticulturist which was sent free to members. This publication, established in March, 1896, suspended publication February, 1903. No records of the society are extant that show why the magazine was suspended but from conversation with members who were connected with its management it is learned that it was not self-supporting and a very considerable portion of the appropriation received from the state was used to pay bills. Mention is made of this fact merely to show us the way more clearly to success in our second venture.

The Executive committee in session at Oconomowoc, August 16, authorized the publication of a monthly magazine to be known as WISCONSIN HORTICULTURE, the paper to be sent free to members until further action should be taken by the committee.

Our new magazine has met with a hearty reception, everybody seems to like it and a few, a very few members, write for it. The future of the paper depends wholly on the will of the membership body. No person no matter how clever with the pen, or the shears, can successfully furnish material for successive issues of the magazine, but if a few members contribute each month the simple facts acquired in their experience we may easily have a paper which will be more valuable to members than any other feature connected with their membership. Whether or not the magazine will be sent free to members in the future must be decided by the Executive Committee.

These rambling notes called by courtesy a report cover in some measure the work of the Society for the past year.

In conclusion: A few words about the work done in the office of the Secretary may not be out of place.



Wealthy, Lake Geneva Trial Orchard, Aug. 1910.

Planted April, 1908.

The past year has been a very busy one in the office, the increase in membership necessitating an immense amount of clerical work and the Society is fortunate in having in Miss Memhard an able and efficient clerk who not only keeps the records with neatness and accuracy but is also a faithful and loyal partizan of the Society.

The information bureau has worked over time during the year in answering questions sent in by members and others. While our magazine WISCONSIN HORTICULTURE will relieve to some extent the Information Bureau it will not entirely supplant it. Many of the questions, most of them, in fact, require an immediate answer.

A multitude of other duties edging in from day to day makes the office a busy place. Of work there is plenty but of drudgery none for association with members of this Society can never be drudgery; lending a helping hand when possible, aiding even if in a feeble way the development of horticulture in Wisconsin, the satisfaction of knowing that our Society is a potent, vital force, a power in the land, relieves whatever duties present themselves of any semblance of drudgery.

REPORTS ON TRIAL ORCHARDS.

REPORT SUPERINTENDENT TRIAL ORCHARDS.

My report as Supt. of Trial Orchards will, as usual, be brief as the details of management of the different orchards cannot possibly be of interest to this audience and for the further reason that the report of the inspection committee gives many of these facts.

From the viewpoint of the Superintendent, the trial orchards are all working out to a successful conclusion. There have been checks and set-backs but certainly no effort is worth while if the way is smooth and easy.

Possibly there are members who doubt the wisdom of spending so much money on this work but to these we can only say,

go and see what has been done; talk with the people of Marathon, county, investigate with an open mind before criticising.

It must not be forgotten that orchard demonstration is a slow process. We are only now, after 13 years, getting the best results from our orchard at Wausau.

The following brief review of the work is presented for the benefit of new members and our guests.

The Wisconsin State Horticultural Society in 1897—8 planted 10 acres of tree fruits at Wausau on land leased for 20 years. Marathon county was then considered "farthest north" for tree fruits and the venture a bold one. Soon after, a similar 5 acre orchard was planted at Medford and following the policy thus established ten orchards and one grape station have been planted in as many different parts of the state. In addition to Wausau and Medford we now have from one to seven acres as the following points: Whitehall, Poplar, Maple, Barron, Manitowoc, Sturgeon Bay, Lake Geneva, Gay Mills and Sparta.

These may be roughly divided into two classes; Experimental in which class we may include Wausau, Medford, Barron, Poplar, Maple and Sparta:

Second, Demonstration orchards which may include Manitowoc, Sturgeon Bay, Lake Geneva and Gays Mills.

From a purely experimental standpoint the northern trial orchards are a success but for quick returns from a dollars and cents standpoint the demonstration orchards in the southern part of the state are far in the lead.

These demonstration orchards inspire confidence. This is plainly shown at Gays Mills. Apples have been grown in the Kickapoo region for 50 years but no one considered seriously the raising of fruit for market until the trees in our Gays Mills orchard began to grow.

This is also true in Walworth and Manitowoc counties. If these demonstration orchards are brought to a successful and profitable conclusion we will have added to the wealth of our state thousands of dollars for every cent we spend.

As the report of the chairman of the Trial Orchard Committee will no doubt give in detail the condition of the different orchards no separate account will be given here.

The duties of the Superintendent become not less but more strenuous each succeeding year. Over 12 thousand miles of

travel are required each year in visiting the different orchards. The orchards comprise 55 acres and 4975 trees and each and every tree requires attention in the spring as to pruning; each rod of ground requires cultivation and of the eleven resident managers each has a different disposition from any of the others. This last is an item not heretofore appearing in any of the records.

As to the policy of the Society concerning the extension of the work there would seem to be no present need of establishing more orchards on either of the plans now followed. We are covering the state fairly well both where testing of varieties is needed as well as in sections where demonstrations are needed although applications for orchards are not lacking from almost every county in the state.

There is one phase of orchard work however that might well be taken up in the near future and that is the testing of the newer varieties of late keeping apples.

The standard winter apples such as Baldwin, Rhode Island Greenings, etc., were thoroughly tested and discarded 50 years ago but new varieties of high quality, late keeping and reputed hardiness have recently appeared that seem worthy of trial. Among these are Delicious and Black Ben.

If a small orchard of these and similar kinds were planted in one of our best known apple sections it would answer questions that hundreds of fruit growers are now asking.

REPORT OF CHAIRMAN TRIAL ORCHARD COMMITTEE.

J. H. PALMER.

The first orchard visited by your committee was the Barron orchard established in 1905. Here we found planted Duchess McMahon, Wolf River, N. W. Greenings, Longfield, Patten and Hibernial. These were all killed by the April freeze except the Hibernial. The new planting is fair but made little progress owing to drouth which was very severe here. Native plums were all right.

Next the Sparta Vineyard, one acre planted in 1908. Varieties Moores Early, Delaware, Campbells Early and Moores Diamond. The vines are thrifty and have made a good growth. The fruit was all killed by the freeze in April. The Whitehall, Trempeleau Co. orchard, established 1909 consists of one acre each of McMahon, Okabena, Hibernial, Wealthy and Duchess and one acre of cherries planted in 1910. All trees in this orchard are thrifty and have made a fine growth.

The orchard is situated on a north slope on clay soil mixed with limestone.

The Wausau orchard established in 1897 contained something like sixty varieties originally planted of which McMahon, Patten, Okabena, Longfield, Repka, Wealthy, Dominion, Duchess and a few others showed a fair crop of fruit this season, N. W. Greening not bearing. All trees are thrifty and fruit clean and free from worms and other insects. The crop was estimated at 25 per cent. of last year's, about 500 bushels.

The Manitowoc orchard established in 1908, was visited next. Wealthy, McMahon, Fameuse and N. W. Greening all appear thrifty and made a fair growth. The McMahon trees were headed very low and badly formed, a defect very hard to remedy. The cherry orchard planted last spring on a sand knoll overlooking lake Michigan has early passed into history. The drouth was very severe here and cultivation not good, the trees are all dead or nearly so.

The Lake Geneva orchard established 1909 contains McMahon, Fameuse, Talman Sweet, Wealthy and Duchess. The bark on the Fameuse trees cracked just above the ground, seemed to loosen and dry, destroying nearly the entire planting. These trees have been removed and the ground replanted to the same variety. The trees are all thrifty now. The cherry orchard planted last spring is good except a few trees planted in sod which are all dead.

Poplar orchard established in 1904. The condition of this orchard has improved somewhat since it was tile drained. Of about 40 varieties originally planted, Hibernial, Wealthy, Duchess, Patten, Okabena, Martha and Transcendent remain and are making some progress now. The plums look well and produced some fruit this season. In the Maple orchard Wealthy, Duchess, Hibernial, Patten, and Transparent are good. Wolf River, N.

W. Greenings fair. McIntosh, FaMeuse, Longfield and Utter, poor.

While in this lake shore region we visited some private orchards to learn something of the adaptability of this locality to fruit growing. Near Port Wing we found many orchards have been planted some of ten or more acres in extent and all we saw were promising well.

Medford orchard, established in 1903. A few cherries were planted here and are about all dead now. Plums are good. Of apples, Wealthy, Duchess, Wolf River, Fameuse, Price's Sweet, Hiberna, Longfield, Whitney and Transparent are good. N. W. Greening, Scott's Winter, Eureka, fair. Willow Twig, Gano, Newell, Tetofsky and Walbridge are bad. Of seven Windsor in the original planting two are alive and in fair condition. One Talman sweet still lives.

The Gays Mills orchard has made a remarkable growth in the two years it has been planted. One N. W. Greening tree measured nine inches in circumference near the ground. All trees are very thrifty. Varieties, McIntosh, Newell, N. W. Greening, McMahon and Wealthy. 100 cherries were planted last spring and are nearly all alive and growing nicely. The Vineyard is good but there was no fruit this season.

VARIETIES OF APPLES FOR COMMERCIAL ORCHARDS.

The President called on Mr. J. S. Palmer to give a list for a twenty-five acre orchard.

Mr. Palmer: Assuming that the orchard is to be in my own locality, I would plant, first, Duchess, Wealthy, the best apple to rely on in all seasons that we have, next I would plant McMahon it has good qualities enough to overcome what defects perhaps it has in quality of tree. Then I would plant Fameuse, the best apple to tackle in the Southern part of Wisconsin. It has stood for longer years than any other apple we have and still do business. That I think would be about a long enough list for any commercial orchard.

The President: For a fifty-acre orchard, I will ask Mr. D. E. Bingham,

Mr. Bingham: For a fifty-acre commercial orchard, I would plant in our section Duchess, Wealthy, Dudley, Snow, McIntosh, McMahan and Northwestern Greening. I would not plant as many trees of some of these varieties as of others. I would plant largely of the red apple, taking perhaps the three first, Duchess, Wealthy and Dudley; and then Snow and McIntosh; those five red apples. And then say five acres each of Northwestern Greening and McMahan.

Mr. Daub: I see you omitted the Russet, give us a few reasons for not planting a few russets.

Mr. Bingham: We plant commercial orchards to make money and we cannot make any money out of the Golden Russet.

Mr. Daub: Is there any particular reason why you cannot make money on the russet?

Mr. Bingham: If you plant Russet, you will get small apples, if you get any, you will get very few in our section of the country. There is a difference of course in varieties in different sections, but I believe that the Russet has no place in the commercial orchard of Wisconsin in any section of the State.

The President: I wonder if we might ask that same question of Mr. J. Palmer, why he would put it in a small commercial orchard? I remember his saying that he had made good money out of the Golden Russet.

Mr. Palmer: The Golden Russet in some parts of my own plantation has proved very good, but it is not a safe proposition in many localities, and even in my own planting I would not dare to plant it extensively. It does very well in favored locations, and I find it, where it does do well, a profitable apple. It is a good bearer with me where I have it planted and they always sell very well.

Mr. Daub: Perhaps I am a crank on the Russet apple, but I would at any time pay fifty cents or a dollar more for the Russet apple, and certainly more than for any apple raised under the irrigating system, or the Yakima apple. I have never seen an apple that I would pay as much for as the Russet. They are almost perfect in the "Garden of Eden," or Paradise Valley, I live close to it.

Mr. Bingham: I would like to ask Mr. Palmer if he does not find the Russet needs a deep soil, good, rich soil? All the Russets that I ever saw were on a pretty rich deep soil, that is, in

the lower part of the valley where there was some wash. In regard to this gentleman's remark that he would pay a dollar more for the Russet than any other apple the grower would have to have three dollars a barrel more for Russets to make the same amount of money out of his orchard that he would for the Wealthy.

The President: We will ask Mr. R. J. Coe to say what he would do in the way of choice for an orchard of 100 acres.

Mr Coe: I want to say that living where I do, I would not plant a 100-acre orchard of any kind, because we are not in the apple section, but for other sections of the State my list would be something like this, and you will notice it agrees very closely with Mr. Bingham's list. My list would be Duchess, Wealthy, Fameuse or Snow, McIntosh, McMahan, Dudley, Northwestern Greening and I think I would put in two or three acres of Talmann's Sweet. That is the list I would grow in an apple growing section for profit in Wisconsin.

Mr. Gonzenbach: I would like to ask if any of the gentlemen can give us any information about the Delicious apple. I have been particularly interested in that, because some members of my family got a taste of Delicious and I have to pay for the Delicious apple, and the price I pay looks to me as if there must be a good profit to somebody and if there is such a profit, I want to know if we can grow it in Wisconsin.

Mr. Black: I suppose you look to me to say something about the Delicious, as the tree originated as a stray seedling in our State near Des Moines, and we find as it grows around Des Moines it is a very good apple, really the quality is much better than that of those that are brought in from the West, although they do not grow quite so large and fine looking, but they grow, they are hardy and the quality just suits my taste. Any one that requires a tart apple might find it lacking a little, because it is something on the order of the None-Such, and about as sweet, but I think it is thoroughly hardy. I have small trees growing, about three years old, and it appears as though they were going to be fairly hardy, would be all right to top-work on trees in Northern Iowa, and I think really you have a better location along the lakes here than we have there. Yet, I would advise any one here to try it sparingly until it has been tested in this part, but I think it is going to be the coming apple for a dessert apple.

Mr. Coe: This 100-acre orchard that I was talking about was purely a commercial orchard. I think if I were able to have a 100-acre orchard, I would be able to have a little fun as well, so that I should want to plant a few trees of a number of varieties outside of the commercial varieties, and among those trees I should want assuredly to put in some of the Delicious. I do not know much about the Delicious in Wisconsin, whether it will live long, or whether it will even bear fruit, except that I have been talking with a man from Menomonie, who is growing the Delicious and his trees are old enough to bear apples, and his statement is that the tree is a good grower and good bearer, and so far has proven hardy, and I think it is very well worth the trial here in Wisconsin, especially where we can grow other apples. I will say that we are going to plant about fifty Delicious apples this spring.

Mr. Soverhill: So many are talking about setting out large orchards the coming season, and I think the information should be given out that one should not set more than four rows of one variety. If they want to enlarge on that variety, then set one or two rows, two rows are much better in harvesting the fruit, then succeed with two other rows again. They will probably pollenize the two rows. Pollenization is something that we all want to study.

A Member: I would like to ask these gentlemen in planting 25 to 50-acre orchards, what part of the orchard they would set to Wealthy?

Mr. Coe: If you are going to plant a 100-acre orchard, you are going to plant for profit. I had a list made something like this: Wealthy, 25; Snow, 10; McIntosh, 15; McMahan, 10; Dudley, 10; Northwestern Greening, 10; Duchess, 12; Talman Sweet, 3. That makes 95 acres and you remember I said a few moments ago I wanted to have some fun and so I would plant five acres to a good many varieties to have some fun with and get some profit out of too.

Mr. C. L. Richardson: I would like to ask either Mr. Bingham or Mr. Coe as to the acreage they would plant of McIntosh Red.

Mr. Bingham: I would just as soon plant as many McIntosh as any other orchard apple we have. It is an early bearer and bears a good crop and the apples will sell on any market, it is a



Sod-Mulch Orchard. James Melville, Chippewa Falls.

good dessert apple, perhaps as good as any we grow, East or West, and I would not hesitate to make my planting of McIntosh equal that of any other commercial apple.

Mr. Bingham: Mr. Richardson spoke about the McIntosh. I wish to say a word in connection with my judging apples at Chippewa Falls Fair. I found there on exhibition as fine a Duchess as I ever saw, I found as fine Wealthy, I found some as fine Snow apples, not so many this year, but I found the finest McIntosh that I ever saw in my life, as large as a Wolf River, perfectly red, one of the prettiest crimson reds you ever saw, and perfect in every way. If, with the climatic conditions that we had this season we can get such McIntosh apples like the specimens I saw, you can get \$5 a barrel everywhere that apples are sold.

Mr. Richardson: The reason I asked about the McIntosh from these two experts was because in James Melville's orchard at Chippewa Falls last year the Wealthy and McIntosh were the two apples that under the severe drought and the heavy frost of the spring stood up the best. I think I am safe in saying from an inspection of his orchard about picking time that he had nothing else that was in the class of those two last year. That is why I wish to call attention to the McIntosh Red.

WEDNESDAY AFTERNOON SESSION.

QUESTIONS.

No. 1. What effect will a fall crop of strawberries that ripened in many places this year have on the same vines next year.

Mr. Coe: You said that you thought perhaps I might make a guess on this, and it certainly would be a guess, for we all know that the strawberries form their fruit buds in the summer and in the fall for the next year's crop, and if by virtue of some conditions of the weather these fruit buds have produced a crop of fruit in the fall, I do not see how they are going to produce a good crop next spring. Therefore I should say the result would be a very material shortening of the crop next year.

Mr. Post: Several years ago we had a very wet season and

the plants made a strong growth in the fall of the year, they began blossoming in October and were almost white with blossoms. I sold two or three dollars' worth off that patch that fall, and there was a lot of green ones on them when the frost come, but the next year we had a good crop.

Mr. Coe: Don't you think you would have had a better crop if you had not had that crop in the fall?

Mr. Post: I don't know how that would have been. They were all I could desire the next year, although I thought there would not be any the next year, on account of there being so many blossoms; this year there were a great many on the patches and I have marked them just to see if it will make any difference or not. It did not that year and there were three blossoms that fall where there was one this year.

Mr. Richardson: I do not think the crop of berries that you got last fall will make much difference in the crop that you will receive next year, because the amount that you receive per acre in the fall crop is very small. We shipped over two hundred cases and probably those two hundred cases were picked off from thirty to forty acres, you see that is a very small percentage, a small crop. One of our growers picked about thirty-two cases off from three and a half acres, which you see is a very small yield, and I do not believe that he will notice it, will see any material difference in the crop next year.

Mr. M. S. Kellogg: One fact in connection with this small crop of strawberries that we must not overlook is that we must expect to get our main crop next year from plants that have not fruited so far, and our observation is that there has been very little fruit on all these plantations that have been fruited last summer, those plantations that are old. I think, generally speaking, that the fall berries that we had this past fall will not materially reduce our crop the coming year.

No. 2. What size crates are best for marketing strawberries and where can I get them?

Mr. Rasmussen: We prefer the 16-quart crates, the strawberries in quart boxes, Michigan quart.

The President: I will ask Mr. Rasmussen, as he has had in mind very much the importance of an agreement on uniform size of packages, if at this time he will give us a little brief discussion in regard to the desirability of uniform sized packages.

A question was asked in regard to the distance apart that trees should be set.

Mr. Bingham. We plant the Wealthy 20 by 20, other varieties, 25 by 25.

Mr J. Palmer: We have always planted 24 feet each way. I think that in my experience would be about right

Mr Coe: About 24 by 24 feet. If I had the courage to take out the trees when they get older, I should plant 20 by 24 and take out trees, but to be on the safe side, I should plant 24 by 24, or 25 by 25.

A Member: When is the best time to prune?

Mr. Black: I think the best time is when the growth starts in the spring. I think then the growth is more rapid and the cuts will heal over sooner, so there will not be so many wounds open for insects and fungous diseases to get in. That has been my practice and I find that it will heal over and make a sounder and better tree. From that time up until in June.

A Member: I would like to ask if there is not a chance for loss there, if it would not be advisable to prune before the sap starts? There must be some loss of energy in that tree where the sap has developed, when the limbs are cut off.

Mr. Black: I think as a general thing that the tops of the trees are too thick, and that is a fine way to thin fruit. I have not noticed any loss.

Mr. Beddell: It has always been my practice for the last eight or ten years to go around in the winter time and mulch my trees after we have had a great deal of severe weather and the ground is frozen, and I have worked on this theory that by getting frost into the ground and then putting mulch around, that it would hold that frost longer in the spring, and thereby keep the fruit buds back so that I would not stand the same chance of losing them by frost. I would like to know whether I am right or wrong in that practice.

A Member: It seems to me that the time to prune is just before the growth starts in the spring, so there will be less so-called bleeding of the twigs and that question that you asked in regard to the starting out of the buds is more a matter of warming up of the wood itself than the warming up of the soil.

Mr. Rasmussen: I have a paper, Mr. Cranefield asked me to write a paper which I could read in five minutes, I cut it down to three.

SHALL WE VOLUNTEER, OR SHALL WE BE FORCED TO ADOPT A UNIFORM SIZED BERRY BOX?

By Mr. N. A. RASMUSSEN.

What I have regarded for several years as one of the most serious problems with which the fruit grower is confronted is our short measure berry box and as I have watched the situation, conditions have rapidly grown worse. At one time in one of our local stores last season we counted seven different sized berry boxes, every one short measure, but they were all made, filled and sold as quart boxes. How long will the public put up with this kind of treatment before they will call on the State to take hold of the matter and then we may have a law that will not look good to the berry grower.

A few years ago we had mostly short measure milk bottles. The manufacturers told us "use short bottles sell your milk per bottle not per quart and make some money, no law can prohibit that." But a law did prohibit it and today only full measure bottles can be used.

The law seems to have gotten after weights and measures of all kinds, they must be true and up to standard and the day will surely come when a berry box law will go into effect.

What about our apple barrels and boxes? A few days ago I purchased a barrel of apples from one of our local commission men and I called his attention to the size of the barrel. He said that it was a full size barrel a 17 inch head and, so it was but it was straight up and down and looked more like a coffee drum than an apple barrel.

About the only objection one could have to a law of this kind would be, that goods put up in dishonest packages could not be shipped into the state and I do not think any one, grower, dealer, nor consumer would object to that.

Now, brother horticulturists, let us have a committee ap-

pointed to draft a bill to this effect, get it before the Legislature and let Wisconsin lead with this law as she has with many others and I feel sure that our neighboring states will join us and help the good work along. Let us not wait until we are forced to be honest but let us hold up our heads, raise our voices and say "the Wisconsin Horticultural Society is for honesty and justice."

Mr. Smythe: In Michigan we have not a law controlling the size of boxes or barrels, but it is coming to the time when we have got to have it. The 16-quart crate, which is the berry crate with us, is supposed to hold sixteen quarts, they generally hold full quarts. Now, there is coming onto the market a short 16-quart crate. We are paying just as much money for the 16-quart crate that is holding a short amount as we were paying for the other crate. The consumer is beginning to find out that we are using the smaller crate and we are getting less money for that box of berries. We are paying as much for the crate, as much for the transportation and just the little gain that we are getting now by putting in less quantities of berries, we are paying for in the end, and it is a very short-sighted thing to do to put up anything like a short package. We have a short bushel in Michigan, and the time is coming when the people will not pay as much for the short as for the standard bushel. It seems to me this is one of the wisest moves that we can make, and I only wish we could make it a National law instead of a State law. We had an Institute at Benton Harbor at which a resolution was passed asking our help to put such a law through the state of Michigan this year. These things move slowly, and we will have to work quite a great while before we can get it through. Last year about the 10th of January there was a bill presented to Congress for the control of the size of barrels and boxes. Our Western friends did not like that, because it did not allow them to use the sized boxes they wanted to use and they killed it. Now, then, it has got to come, because it is the thing. We want to get these farmers down to where they will be honest, reliable men and we can look a customer in the face and say that when we put up a barrel or basket of fruit there are so many cubic inches in it. In Canada there is the Fruit Marks Act, which provides that whatever fruit is put up, the size of the package

is marked on it, the owner's name or number, and if it has been inspected, the inspector's name is on there, so that no man can put up bad stuff on the market and make the consumer take it if it is not up to the standard, and I am very glad that this subject has been brought up here, because it is a vital thing and the Horticultural Society is bound to take it up and not let it get into the hands of the consumers.

Mr. Rasmussen: Is not the wine quart the Michigan quart?

Mr. Smythe: It is the wine quart, it is not a full dry quart. I think the standard quart is sixty-nine and some cubic inches; that is dry measure; and the wine quart is something like sixty-three or sixty-four.

The President: I think that no more important move could be made, and no move that would make it more general than to push the whole matter before Congress so far as Interstate Commerce permits it, have honest packages clearly defined so as to be the only ones recognized by law, then the States will be compelled to adopt something to correspond. At the same time I would not by any means remit our efforts for honesty in our own State.

Mr. C. L. Richardson: I would like to call the attention of our Society just for a moment to a phase of the question wherein we can handicap ourselves. We can pass a law in this state stating the size of a berry box or of an apple barrel, or any other package, but under the rulings of the supreme court in interstate commerce cases, we cannot prevent a party from another state shipping in a box or package of different size and marketing it in this state in competition with us, and therefore it seems to me that it will be of vital importance to us if we do not wish to handicap our local dealers, to see what we can do in the line of a general federal law at the same time, because if we do not, we are going to place our local growers at a certain handicap in this matter. This was taken up in Minnesota two years ago.

Mr. Rasmussen: Would a dealer be allowed to ship into the state and to offer for sale boxes of berries that are not up to standard any more than a quart bottle of milk?

Mr. Richardson: They can be brought into the state and sold the first time. If they were brought into the state and sold to a commission dealer in bulk, the commission dealer could not again

make a second sale, but if, on the other hand, those barrels of apples were shipped into a state consigned to John Jones, to Thomas Brown and to other parties, the state law cannot prohibit that first sale, because they are still in transfer until the time that they do become the property of that party under the terms of the sale. The one transaction is a complete transaction over which the state has no control under the interstate commerce act, but after that first sale to a party in the state, they then become subject to the jurisdiction of the state and you could prevent a second sale.

ORCHARDING IN MINNESOTA.

Professor A. R. KOHLER, Minnesota Agricultural College.

To discuss orcharding in Minnesota, one hardly needs to go outside of apple growing. The apple is the only fruit of much consequence that is grown within the state. Cherries are a negligible quantity. Plums are grown to a fair extent, principally in the southern third of the state, but in no way comparable with apples in quantity.

Plum growing in Minnesota is attended with great variability in results. Many growers find it unprofitable, while others make it pay. The worst enemy of the plum is the curculio. It has been demonstrated at university farm that the curculio can be kept pretty well under control by the proper use of arsenate of lead. Those who spray thoroughly for this pest undoubtedly find it profitable to grow plums if their other conditions for the crop are favorable.

The 1910 crop of tree fruits was a failure in Minnesota for reasons with which you are familiar. Practically no plums were picked, and the apple crop was but a very small per cent of a normal crop.

The apple producing section of Minnesota is the east half of that part of the state to the south of the twin cities. The heaviest producing counties are those along the Mississippi river below the twin cities, and the counties next to these as the lower end of the state is reached.

The surface is more or less uneven in many parts of this section, and the soil on the slopes is more or less clayey in nature. This affords many good locations that are well adapted to apple growing.

According to the twelfth census of the United States, there were ten counties in the above named section that produced from 4,500 to 10,000 bushels of apples in 1899. Apple growing has been on the increase in this section since that time. This may best be illustrated by referring to Fillmore county, for which I have figures at hand for some of the years since that time. Mr. O. W. Moore, of Spring Valley, says that from 7 to 10 carloads were shipped out of the county in 1900, and that perhaps twice that amount was used for home consumption. In the 1908 annual of the State Horticultural Society, he gives a list of shipments from nine stations in the county, which amounted to 78 carloads, or 37,440 bushels if there were 160 barrels to a car. I do not have his figures for 1908, but for 1909 he says, in a letter, that about 35 carloads were shipped out and 25 carloads used for home consumption. Thus the yield has more than doubled in the last ten years, and Mr. Moore says there is a large prospective increase in the next 10 years.

Most of the orchards of the state are not large. I know of a number that contain upwards of 4,000 trees, and there are undoubtedly many others of equal and larger size.

The predominating commercial variety in the apple producing section is the Wealthy. Following it come the Duchess, Patten's Greening, Okabena, Anisim, and a few others of minor importance.

The distance apart at which growers have planted their trees and their present opinions concerning the distance apart at which they should be planted is an interesting study. In September, 1909, I sent out a circular letter, in which I asked a variety of questions concerning the practices of apple growers. It was found as a result of this that the vast majority of the trees are planted at a distance ranging from 16x16 to 20x20 feet. Some were planted closer, and a small proportion at distances seldom over 20x24 feet. Because I was of the opinion that most Minnesota orchards were planted too close, I included in this circular letter a question asking how far apart they

would plant a new orchard. The data which follows was taken from replies received from the principal apple-producing section of the state, as previously given. The answers were classified, according to the age of the trees the growers had, into those who had trees 1 to 5 years old, 6 to 10 years old, 11 to 15 years old, and over 15 years old. As the summary of this data is given, you are especially requested to notice how those whose orchards were young thought their trees were planted far enough apart, and how the distance given for setting a new orchard grew greater as the trees grew older.

Of 12 whose trees were 1 to 5 years old, 1 gave a closer distance for a new orchard than he had set before, 9 gave the same distance, and 2 gave greater distances. The one who said he would set closer than before had 250 trees set 24x24 and 20x24 feet respectively, and gave 16x20 feet as his distance for setting a new orchard. His reason was that close-set trees pollenized better and bore younger. The 9 who said they would set a new orchard the same distance apart as before had an aggregate of 6400 trees, planted at an average distance of 17x19 1-2 ft. One who had 300 trees set 14x16 feet said he would set a new orchard 18x20 feet. Another who had 200 trees, also set 14x16 ft., said he would set a new orchard 12x13 feet, and cut out part of the trees later.

Of those who had trees 6 to 10 years old, 2 gave closer distances than they had set before, 2 the same distances as before, and 9 gave greater distances. One who gave a smaller distance had about 175 trees 10 years old, set 25x25 ft., and had planted a new orchard of 500 trees 20x20 ft., 8 years later. The reason he gave was that he could get more trees on an acre and still have room to cultivate. Another, who gave a smaller distance, had 200 trees set 12x34 ft., and said he would set a new orchard 12x20 ft. His reason was that land was too high-priced. The two who gave the same distance for a new orchard as they had previously set their trees had 500 and 200 trees respectively, set 20x30 and 24x24 ft. respectively. Eight who gave greater distances had an aggregate of 4625 trees, set at an average distance of 16 1-2x19 1-2 ft. The average of the distances at which they stated they would set a new orchard was 20 1-4x22 1-2 ft., or an increase of 3 3-4x3 ft. Another who had 400 trees set 15x30 ft., said he would set a new orchard 13x22 ft., and later cut out every other tree.

All of the 8 who had trees 11 to 15 years old gave greater distances for setting a new orchard than they had previously set their trees. They had an aggregate of 745 trees set at an average distance of 15 1-4x17 1-2 feet. The average of the distances at which they stated that they would set a new orchard was 20x25 ft., an increase of 4 3-4x7 1-2 ft.

Of 6 who had trees over 15 years old, all gave greater distances for setting a new orchard than they had previously planted. One who had 50 trees set 16x16 feet simply said "much wider." Four, who had an aggregate of 640 trees, had them set at an average distance of 17x18 1-2 ft. The average of the distances they gave for setting a new orchard was 24x25 1-2 ft., or an increase of 7x7 ft. It is significant that the man of this group who had the most trees, namely 400, gave 25x30 ft. as the distance apart at which he would set a new orchard. One who was not included in the average, because he did not state the number of trees, said he had them set 22x26 ft., and that he would set a new orchard 30x40 ft.

The reason most frequently given for planting farther apart was that close planting did not give enough room for team work between the trees. Quite a few especially mentioned a lack of room for spraying when set close. That the trees should have more light, so as to give better color to the fruit, was frequently mentioned. Others said the trees crowded each other too soon when planted close and so on down the line until the whole category of reasons was given.

It is altogether probable that if a consensus of opinion were to be taken among these same growers ten years from now, a marked increase in distance apart over the present opinion would be found to prevail.

The lesson to be gained from the experience of these growers is of the utmost importance to prospective planters, and it is to be hoped that those of you here in Wisconsin who expect to set out new orchards, and especially those who have had a limited experience with trees, will profit by it. While the practice of planting close may not be so general here, it is altogether probable that a corresponding condition would be found to prevail if the data were available.

Most of the apple orchards in Minnesota are planted on a northern slope, in a clay or clay loam soil, with a clay sub-soil. Many have limestone underneath, which they consider favorable.

Very few growers cultivate their orchards after the first 3 to 5 years. Most of the orchards are in a clover timothy sod. They are usually mowed twice. Most of them leave the grass where it is cut, some put it around the trees, and a few feed it for hay. The data at hand from the few who cultivate their bearing orchards was not sufficiently extensive to determine whether it pays or not. It seems that around Lake Minnetonka a number of orchards have been ruined by cultivation because it increased the susceptibility of the trees to blight. The Jewell Nursery people, who have a large orchard, cultivate theirs, and believe very strongly that it is the better system. Whether to cultivate the bearing orchard is probably a local problem. It is my belief that it pays to cultivate if the orchard will bear it. If cultivation results in an excess of blight, it had probably better be kept in sod more or less of the time. If the orchard is on a steep slope where there is apt to be much washing of the soil, it should not be kept under cultivation all of the time. Where the whole surface cannot be cultivated, it is undoubtedly a good practice to work up more or less soil around the trees each spring, especially around young trees. It seems that the conditions around Lake Minnetonka are less favorable to cultivation of the orchards than they are in the greater share of the principal apple producing sections of the state.

Mulching with strawy manure is quite an extensive practice. The mulch is most generally applied in the fall, partly for winter protection, and partly for adding plant food to the soil. The amount was from 2 to 6 inches, more generally the latter. Some used the grass they cut in the summer for mulch and applied it when cut. The practice of applying strawy manure mulch in the spring was quite frequent also. The object given in these cases was to hold the moisture during dry spells in the summer.

Very few applied any fertilizer outside of that contained in the mulch. The use of wood ashes was mentioned in some instances.

I have no data on pruning, but according to observation, there is much room for improvement in this respect.

Of 25 who had enough trees of good bearing age so that spraying should have been quite an object, 5 said they did not spray. 4 did not answer and it is to be presumed they did not

spray, 1 sprayed once, 7 sprayed 2 times, 1 sprayed 2 to 3 times, 3 sprayed 3 times, 2 sprayed 3 to 4 times and 2 sprayed 4 times. Thus, about 1-3 did not spray, and 2 applications predominated among those who did spray. The usual remedy was a combination of Bordeaux mixture and arsenate of lead, and the usual time for the 2 applications was just after the blossoms fall and 2 to 3 weeks later. The barrel outfit was most used. One used a power outfit, and several were spraying large trees with knapsacks and the small compressed air outfits. The latter growers must have done very inefficient work.

It is little wonder that so many of our growers should fail to spray when we consider, for instance, that many do not regard the codling moth a serious pest, even though it may infest a large per cent of their apples. They are too accustomed to seeing wormy apples and the results of other injury to realize the aggregate of the preventable damage done. They take the injury too much as a matter of course.

The codling moth is perhaps the worst pest in the state. Many say the plum curculio does more damage to apples than the codling moth does. Scab is also more or less destructive. Fire blight and sunscald do more or less injury, and there are of course a few other minor pests.

Reported yields per tree that could be used in computing an average were not very numerous. I will give you a few figures on the Wealthy and Duchess for the year 1909. It will be remembered that 1909 was a fairly good apple year in this section, but probably only about two-thirds as good as 1907.

A few here and there reported yields of one peck per tree on trees 5 years old, and occasionally on trees 4 years old, but it seemed evident that most trees of that age were not bearing much.

The results of the reports on trees over 5 years old are given in the following table:

Variety.	Age.	No. of reports averaged.	Av. bu. per tree.	Range in yield given.	Av. age per tree.
Wealthy	6—10 yrs.	9	1	0—3	8¼ yrs.
Duchess	6—10 yrs.	7	1	0—3	8 yrs.
Wealthy	11—15 yrs.	4	2 1-8	1—3½	14¼ yrs.
Duchess	11—15 yrs.	Only 2 given yrs.
Wealthy	Ov'r 15 yrs.	5	5	1-10	22½ yrs
Duchess	Ov'r 15 yrs.	8	5	0—9	31½ yrs.

Up to 7 bushels per tree was given for 14 year old trees in 1908. The man who reported no yield from 30 year old Duchss trees in 1909 reported 10 bushels per tree for 1908. One man who reported 20 bushels from a 30 year old Wealthy tree was not included in the average because he had only one tree of that age. Much may be said about the reliability of a grower's report of his yield per tree, but it remains, nevertheless, that the reports which were here considered seem quite reasonable, and they are probably as nearly correct as such reports can be obtained. With an average of 130 trees per acre, which, though too many, is the actual number which has been planted, there should, if the yields given are reliable and making no allowance for imperfect stand of trees, have been an average yield of 130 bushels per acre for trees about 8 years old, 276 bushels per acre for trees about 14 years old, and 650 bushels per acre for trees over 20 years old in the year 1909. This is for the principal apple-producing section of Minnesota. The yield per tree would undoubtedly have been larger and the general quality of the apples better after the twelfth or fourteenth year if they had been planted farther apart.

The results would seem to indicate that planting double with the intention of cutting out later is advisable, but since probably not one man in a hundred will cut out the extra trees when he should, the practice of planting double is to be very strongly discouraged. If I were *sure* that I would cut out the extra trees when I ought to, I believe that I would plant 18x32 ft. apart. This would ultimately leave the trees 36x32 ft. However, since I am not so sure that I would cut out the extra trees at the proper time I personally believe I would plant about 28x32 feet. This is for the apple producing section of Minnesota. I do not pretend to recommend for your state.

The methods of marketing are simple. The barrel is the universal package where the fruit is shipped. Grading is not yet as well done or as generally done as it should be. The success of the western box pack has aroused the growers about Lake Minnetonka, and the Excelsior Fruit Growers' Association is making arrangements to pack Wealthys in boxes this year. If they have a fair crop and get a good experienced man from the west to do the packing for them, according to western methods of grading and packing, there is little doubt but

that they will make a considerable success of it within a few years. The expense of getting a western man should be necessary only the first year. During this time he should train such local help as would be likely to be available in subsequent years. I expect their inclination to let more or less wormy and otherwise defective fruit go into the boxes to be their greatest stumbling block. They will have to spray even more thoroughly than they have been spraying, and do everything else that they can do to get the fruit to the packing tables in first-class condition, in order to help make box packing a financial success.

In reply to the question asking "What is your opinion of apple growing for market in your section of the state?" nearly everyone answered to the effect that he thought it was a good proposition. It is noteworthy that many added "if the orchard is properly cared for." It is questionable whether it will pay a general farmer to plant an orchard as a mere side issue. If the greater per cent of his interest is in field crops, the greatest per cent of his energy will invariably go there. A man is more apt to make a success of growing apples if he is dependant upon them for the greater share of his returns. He must make it a business and study up on the pests, learn to combat them in the best manner, learn to care for his trees and crop in the best possible manner in every other respect. select the right varieties, plant them in the right soil in a good location, get as near as possible to a railroad station on a good railway system, get acquainted with the markets and marketing, and put up his fruit in the best possible manner. Growers who will do these things to the best of their ability who have a fair degree of intelligence will undoubtedly reap large profits from growing apples in those sections of Minnesota best adapted to this fruit.

MICHIGAN GRAPES.

R. A. SMYTHE, Pres. Michigan State Horticultural Society.

We are growing a great many grapes in Michigan. I think Michigan ranks about fourth in the grape production of the United States. I am not definite as to this, but we are growing a great many grapes. We have in one quarter, known as the

Pawpaw and Lawton Grape District, almost the entire country given up to grape growing. They are picking their grapes and packing them and sending them out through the Packing Association, which they find is a very desirable way of disposing of the goods. They get a very much better price, and I think the consumer profits by buying through an organization, because they are sure of a good pack. If a man in this organization packs badly, he has some number or sign on his basket so that it can always be proved, so that if a car of grapes comes shipped out of somewhere and it comes here and we find there are a certain number of baskets in this car that are not up to grade, the man will notify the member himself, and that man will lose whatever is in this car. That is one way to make us pack honestly. It is a misfortune that so many of us have to eke out an existence on fruit farms, and we are desirous of getting so much out that we are inclined to put in a little something that is not up to standard. That is where the Westerners have us beaten. They put their packing and sorting in the hands of experienced men. A man who grows the fruit rarely ever packs it himself, so a grower would not be apt to put anything in that a man who inspects it would not send out. We think the quality of the Michigan fruits is far superior to anything in the United States, from the fact that we are surrounded by water, and the climate is a little better for grapes than it is elsewhere and we have a long, warm fall quite late. The Armour people in looking over the country to found a grape juice factory, looked all over and they came to a small place in Michigan, because they found on examination that the grapes in that particular quarter contained 16 per cent more sugar than they do in some of the other growing quarters in the United States, and 10 per cent more than the California grapes. It is sugar, of course, that they are looking for and that is why the quality of the Michigan grape is so much sought for. We have a great many acres in grapes, and more grapes being put out every year.

For the production of grapes, too they are going into better cultural methods, and the variety, for commercial purposes, is almost exclusively the Concord. There are other varieties grown, but the Concord is the standard variety of grapes. The grape juice industry has come into the state and we have numerous

factories all over the state making grape juice, and it now is becoming quite largely a summer drink, and a very healthy drink it is. There is some wine made in the country, but very little. Many of the growers are adopting this practice of picking grapes and sending them into the packing house, sorting them over, and the illy shaped bunches, bunches with straggling berries on them, are put into Jumbo baskets and these are sent to the vinegar factories. So there is no loss of grapes. A man can always sell grapes, of course he cannot always get the same price for them. Most of the grapes are shipped out in iced cars. We ship a great many grapes to Texas, Arizona and Kansas, and they go into the northern country. I do not know that it is necessary for me to go into details as to what the cultural methods are. I wonder how many are growing grapes in this State, will you raise your hands? There are not many growing grapes here. Do you have to lay them down in winter.

Mr. Reigle: I lay them down.

Mr. Kellogg: Not in the southern part of the State.

Mr Smythe: I should judge you are in the same latitude that we are and I should judge your grapes would grow in the southern part of Wisconsin, but I know your winters are a great deal colder than our winters. The price of grapes varies. This fall we got a good price, because our crop was only about one-eighth of a crop. The grower got from 17 to 23 cents, ordinarily we got from 9½ to 12 cents for an eight-pound Climax basket. That is another thing that is creeping in. The standard has been a Climax eight-pound basket, now they are getting so they are buying them in six-pound baskets. That is a thing where the consumer does not realize the fact that he is being beaten two pounds on a package. I think the time is coming when they wil not be allowed to do that, the time is coming when we must do something on this package bill, everybody unite in it and see if we cannot do something. If we cannot do it as a State, let us try to do it in the United States, and we must agitate this thing to bring it about. We can fool some of the people some of the time, but we cannot fool them all the time.

Mr. Scverhill: What is the best time for you to trim grapes?

Mr. Smythe: We trim grapes as soon as the leaves are off and they are dormant, and if the weather is pleasant they begin to grow right away.

Mr. Sperbeck: Is the Worden one of your best varieties?

Mr. Smythe: No, sir; the Worden is an excellent home grape, but it is very much inclined to shell, it is a grape that cracks very badly.

Mr. Kellogg: What has been your experience with the Campbell's Early?

Mr. Smythe: Campbell's Early is a good marketable grape, but not a good eating grape, and it is almost too bad to whet up people's appetite wanting grapes, to sell them Campbell's Early, because then if a really good grape comes along, you cannot tempt them again.

Mr. Street: What do you find the best material to tie the canes onto the wires with?

Mr. Smythe: We use twine, a sort of jute twine; we wrap it twice around the vine and then twice around the wire so that it does not slip.

Mr. Moyle: What is your experience with Moore's Early? Is that grown on a large scale?

Mr. Smythe: It is grown to a certain extent, but not on a large scale.

A Member: Are any of the white grapes profitable, commercially?

Mr. Smythe: No, sir; only a certain amount will sell. If you have a good local market, it is all right.

A Member: Do you grow the Delaware?

Mr. Smythe: That is another one that is not a good market grape, unless you have a special market. We grow them and ship to Chicago in a flat, holding about 4 pounds to the basket. To a certain extent, we can sell them, but beyond that they do not sell.

A Member: How about the Brighton?

Mr. Smythe: The Brighton is excellent in quality, but it is a poor grape because it does not fertilize in bloom. Unless you grow it with other grapes, you very seldom get a good bunch. It is always straggling. Munson's King is a good grape.

A Member: Do you think it will take the place of the Concord?

Mr. Smythe: I don't think so. It is a larger grape, but it is more acid. It is later than some of the earlier varieties and the flavor or aroma is not so pleasant.

Mr. Reigle: What price did the growers get in Michigan for grapes produced in 1909?

Mr. Smythe: I would say the average was about 10 cents a basket. You see 1909 was one of the largest grape years we ever had.

A Member: Is that a profitable price?

Mr. Smythe: Yes, that is a profitable price, if you take it on land that is not too expensive. A good crop of grapes would be from fifteen to twenty-five hundred baskets per acre, eight-pound baskets. The grower furnishes the basket, the ordinary basket costs \$2.85 a hundred.

Mr. Reigle: About what is your average price on grapes?

Mr. Smythe: I think if a man can get anywhere near 11 cents, that will allow him, if he can average a cent a pound that would be \$20 a ton for his grapes; he is doing very well, he is making money. You will hardly average that.

Mr. Kellogg: Wouldn't he better raise hay?

Mr. Smythe: He would if he could raise it on that land, but he cannot raise hay on that land.

A Member: How far apart do you set your grapes?

Mr. Smythe: Either nine by eleven, or ten by ten. The prevailing practice now is to set them nine by eleven so as to get more room for passing between the rows.

A Member: About what is the average number of pounds to the acre?

Mr. Smythe: Now, you have got me, I cannot answer definitely as to that. I think they will pick in the neighborhood of about four eight-pound baskets, that would be about thirty-two pounds to the hill. The expense of picking per basket is one cent.

Mr. Gonzenbach: I wonder if I might be permitted to remark that might be of interest to some of these gentlemen who have been discussing grapes here as a by-product almost to fruit growing to have me tell them something of grape-growing as I saw it in my boyhood over in Europe and the enormous value of the industry over there over almost the entire continent of Europe. The vineyards there have been cultivated for hundreds of years. On my own home place there was a grape vineyard that had been in cultivation that we know of for one hundred and fifty years. This talk about grapes has brought me back to my boyhood days when we would talk grapes, and

sleep and drink and eat them. It is the life and the blood of the nation almost. The noble houses of Europe are supported principally from products of grapes and when there is a failure in the grape crop they have to come to America and marry neiresses, and it is interesting to me to hear this discussion. I might further say that the cultivation of grapes is carried on to an extent which is almost unknown here. We do not know anything about training grapes on trellises. The grapes are all trained to a single stem and trained on a pole as you would beans. They are cultivated almost continuously from the beginning of the season to the end of the season, and while the berries of the grapes are not as large, the yield is very heavy indeed.

Mr. C. L. Richardson: Mr. Smythe stated the grape growers market their crop through an association I would like to know in what manner, whether it is pooled, or how they manage about payment.

Mr. Smythe: When a carload of grapes is sold, they know the grapes at that point, and they are sold by the Association there, they are almost all sold by wire, and as soon as the grapes are sold, the money is ready in the bank for the grower. Does that answer your question?

Mr. Richardson: In a way, but does each grower put so many baskets in the car and get his returns, or is each day's pick pooled and prorated?

Mr. Smythe: No, each grower gets according to the number of baskets that go into that car.

Mr. Richardson: Then, the product is sold on its merits?

Mr. Smythe: On its merits. They do not take the number of baskets by weight; if you have so many baskets they have to weigh so many pounds. If they do not weigh that number of pounds, they check on your weight so it behooves every man to put all the grapes he can into the basket.

Mr. Richardson: Each individual's product is sold on its merits?

Mr. Smythe: On its merits. Each man that puts fruit into that car has his number on the bottom of the basket and if that car is reported, if any grapes are bad, that man has to stand whatever loss there is on the entire car. I think the Association now has been in operation ten years.

THE APPLE SEED.

Mr. G. D. BLACK, Iowa.

If the title of an address should read "A Man," you would not expect the speaker to say much about the coat that covered his back, nor of the bones, flesh and other constituents that composed his body. You would expect to hear of his life and character that had been inherited and received through the influence of others. You would expect to hear of his characteristics of mind and disposition that could act upon the lives of others and would continue to influence coming generations. It is in this manner that I wish to consider an apple seed, not by making a chemical analysis of its material parts.

The Creator has not revealed unto us the mystery of the invisible thing in the seed that we call life, but by the manifestations of the characters in a life which we call heredity we are enabled to dimly read the history of its ancestors. In the life of each apple seed there are numerous forces in varying degrees of potential ability that it has inherited from past generations. These powers are shown in the straight body of Peerless and the crooked growth of Pattens Greenings, in the hardness of Pattens Greening, which enables it to withstand the Manitoba blizzard, and the tenderness of the Jonathan, which is not able to stand upon its own legs in Northern Iowa, in the horizontal limbs of Longfield and the upright Whitney, in the slender growth of Limbertwig and the heavy growth of Tetofsky, in the large healthy leaf of Yellow Transparent and the sickly leaf of Walbridge, in the early bearing Bismarck and the late bearing Christmas, in the blight resistant Peerless and the Red Warrior which blights to death by its side, in the immunity of Northern Spy to crown gall and woolly aphis, in the adaptability of some varieties to certain soils, in size of fruit of the large Wolf River and the small Allen's Choice, in the eating quality of Delicious and the unsavory taste of Hass, in the sweetness of Sugar loaf and the acidity of Scott's Winter, in the bright color of Brilliant and the dull color of Black Annette, in the emerald Green-

ings and the golden Fall Orange, in the leathery covering of the Russetts, in the stripes streaks and splashes of color and patches of russet in many other varieties, in the dots of the various colors, forms and sizes on the fruit and on the bark of the tree, in the white flesh of Fameuse and the yellow flesh of Arthur, in the many different forms of the fruit and its different parts and the differences in form, size and color of the seeds themselves and in the color, hardness and texture of the wood of the tree.

Those who have made careful research and study of the apple have found so many different characters that in describing varieties they have been obliged to form many classes. Dr. Robert Hogg, a noted English pomologist divides the different varieties into 1536 classes and subdivisions. Dr. Ed. Lucas, of Germany makes 1620 separate groupes. These inherited characteristics had their beginning and were originated as the result of certain conditions and environments. There is cause for each one of them. None of them came by chance. I have gone thus into detail that we may more fully realize that the most important elements in a seed cannot be seen until developed by growth, and then we can only see the manifestations of these realities. With our manner of propagating the apple it is hard for us to comprehend the possibilities embodied in one apple seed. All the Wealthy apple trees in existence are the product of one seed planted by Peter Gideon who denied himself the necessities of life that he might obtain apple seed to plant.

An author has thought of heredity in man as a stage-coach in which he is riding with all his ancestors as fellow passengers. Others have pictured it as a tree with its numerous braches. Nothing conveys the life and characteristics of the apple to my mind more clearly than a mighty stream of water and its tributaries. The Mississippi river receives through the streams that flow into it nearly all substances that are found in the greater portion of the United States. The chemists will find traces of gold and silver from the Rocky Mountains, traces of iron and coal from Pennsylvania, and disease germs that have come through the drainage canal at Chicago. He will not only find foreign matters in its waters but also where it has been deposited on its bed and along its banks. You may take thousands of samples of water from various places in this river

and have them analyzed and the chemist will tell you that no two of them are exactly alike. Each sample will differ in composition and proportion of its elements. A sample taken from the head-waters of the river is comparatively pure. As we go down the stream the impurities increase. We may consider an apple seed as a sample taken from this great pomological river that I have in mind. We can analyze this sample by planting it and letting its invisible elements show themselves in tree and fruit. Some of the characters may lie dormant during several generations and then assert themselves under favorable conditions. We are familiar with this principle in animal life and the same is true in the vegetable kingdom.

The junction of the Missouri river with the Mississippi is like the crossing of two varieties that are the products of many previous crosses, in that it brings together in one variety many elements both good and bad, some of which are not common to both parents. In this process the elements common to both parents may be intensified and become dominant while some of the weaker ones of each may be dropped. Man has helped to broaden this stream by bringing together many different species and permitting them to cross-fertilize each other.

When I retired at night I was thinking of the analogy of the life in the apple to a river in many different ways. It is not strange that I dreamed of a river and its banks lined with fishermen among whom I recognized the familiar faces of Mr. Pat-ten, Prof. Black and others. It seemed that instead of catching chubs and suckers they were pulling out of the water apples of different sizes and colors. Some of the fishermen after long, difficult search had found the best places and when they were fortunate enough to land a large red and yellow specimen, the others would gather around to congratulate and admire. Then many would try to cast their lines where the fine catch had been made.

The breeders task is to make such combinations that the good qualities will be enhanced and the bad tendencies eliminated.

As an illustration of the dominance of character there is a tree in my test rows known as Hybrid Wild Crab. It resembles our own native crab apple very much in leaf color of bark and other respects. The fruit is also a fair sized native crab apple with its characteristic fragrance and taste, but is about half

covered with red. I have so much doubted its hybrid origin thinking that its red color might be a freak of nature, that I expect to plant a quantity of the seeds next spring and see what the next generation will bring forth. Last June I picked up from under the tree fruit that was still sound and in fair condition. If we could combine the hardiness of tree and long-keeping of this crab apple with the size, quality and color of Wealthy and at the same time drop out their faults, we would have an ideal apple for the upper Mississippi valley, but we could not expect that the tendency in both to blight would be diminished in their offspring. In the distant future when the breeding stations of our country have compiled accurate records of their work, man will be able to more fully understand the causes of these hereditary characters. Then he can be systematic in his crossing, inbreeding and selecting. Then he will accomplish things that we might think impossible now. It is not convenient for many of us to make crosses by hand pollinization and keep records of them. This is logically the work of the general government because the public is benefitted more than the individual. Most of us can save and plant seeds from the finest and best apples that have grown on trees adapted to any locality. We know that a variety of corn is improved by selecting the best ears for seed, and that garden vegetables are made better by saving seeds from the best beets, melons and tomatoes. It is reasonable to believe that the favorable conditions that caused the apple to grow large and fine and develop good quality will exert a beneficial influence on the embryo trees contained in the seeds. I believe it will pay us who live in Northern Iowa to plant seeds of Wealthy, Fameuse, Duchess and Malinda, as these have already produced promising new varieties. If a few scions of Delicious or Johnathan were grafted in the tops of the trees from which the apples for seed are selected it would probably not harm the quality of the fruit of the next generation.

A few years ago when I commenced to get a glimpse of these mysterious forces in life and heredity, my religious training had been such that in my ignorance I thought it sacrilege to assist nature in making the so-called new creations in plant life. I have since then come to understand that each individual in the animal and vegetable kingdom is in a certain sense to

a limited extent a new variety being different from any other.

We read in Genesis that God gave man dominion over all other forms of life, and placed him in the Garden of Eden to dress it and to keep it. That he might be able to properly perform this task God created him in his own image by giving him a calculating and intelligent mind. With this divine authority in mind let us continue in conjunction with our Creator to improve and keep every tree that is pleasant to the sight and good for food.

GRAPES IN NEW YORK.

REV. C. S. KNIGHT, Baraboo.

I am honored by you in having this opportunity to speak of the grape culture of my native state and I sincerely hope that I may be able to give you the information you desire.

In order that you may understand the situation I will ask you to come with me in thought to the top of a range of hills that rises to an elevation of about 700 feet, in Chautauqua Co., western New York, known as the Chautauqua watershed. The water that falls upon the south slope of these hills eventually reaches the gulf of Mexico and that of the north slope into the Gulf of St. Lawrence.

Looking south we view a rolling well wooded country, home of the dairy farmer and catch a glimpse of the shining waters of Lake Chautauqua, home of the world famous Chautauqua Assembly, gleaming among the trees. Turning northward the vast expanse of lake Erie lies shining at our feet, its blue waters dotted with white sails and streaked with smoke from the funnels of palatial steamers.

Between the lake and the hills upon which we stand stretches a level plain two to 3 miles wide, the ancient shore of a primeval lake, Erie, the old shore lines being still very plainly traceable. But no waves break on the water worn pebbles of this shore now, instead the sun smiles down upon its vast successions of vineyards, shaded drives, orchards, beautiful resi-



Seven Year Old McMahan. Orchard of D. E. Bingham, Sturgeon Bay. Sept., 1910.

dences and prosperous towns and cities of this Southern California of the East, the Chautauqua grape belt that extends east and west farther than one can see.

I. HISTORY.

Here in the village of Brocton, 92 years ago Deacon Elisha Fay planted the first grape vines. They were wild vines brought from the Deacon's boyhood home in New England. But, while the vines grew luxuriantly the fruit was unsatisfactory. So in 1822 the Deacon procured at great trouble roots of Millers Burgundy, Sweetwater and Black Hamburg. But these also proved a failure.

This worthy pioneer did not give up however, but in 1824 he procured Isabel and Catawba from Long Island and planted a vineyard, 8x2 rods in extent, which proved to be Chautauqua's first successful vineyard. From these vines in 1830, the deacon made 10 gallons of wine, a thing deacons ought never to do.

In 1834, Lincoln Fay, a nephew of Deacon Fay, started the sale of grape vines, but there was very little call for them until 1850 and in 1859 there were only 20 acres of bearing vineyard, where now there are thousands.

During the decade that followed the Concord was introduced, a grape lacking in the food and wine values of the Catwaba, yet a prolific grower, producing fruit beautiful to the eye and pleasing to the taste. From the introduction of this variety the development of the industry has gone on till there are now 30,000 acres of grapes in Chautauqua Co., every acre of which is worth from \$100 to \$400.

The first complete carload of grapes was shipped to Philadelphia by Jonas Marten, of Brockton, in 1880. Since that first car the business has increased until as many as 8000 cars have been shipped in a single season.

II. SOIL AND CLIMATE.

The soil of this section is especially well adapted to the grape industry. The bed rock, according to Tarr, is upper Devonian shales, and sand rocks, this is overlaid by Dunkirk clay, gravel, gravelly loam, sandy loam and shale loam.

Vineyards located upon the clay loam are most productive, though the quality is not so good as those raised upon the shale

loam. Grapes raised upon the gravel ripen a week or more earlier than those on other soils for this reason, most of the Moore's Early, Worden and Niagara are raised upon this soil to supply the demand for early grapes.

The climate is exceptionally favorable in the Chautauqua district. This is due to the proximity of the lake, which heated by the summer sun, acts like a huge hot water bottle to keep away the autumn frosts. We do not look for killing frosts before the middle or last of November. The lake also equalizes night and day temperatures in summer. The in-shore and off-shore breezes, night and morning, keep the air in circulation and help in the protection from frosts.

The rainfall seems to be just about right. Very little falling during the maturing months of August, September and October. This whole region is proverbially free from heavy dews, which accounts, no doubt, for the freedom from black rot and other fungi that this region enjoys.

III. CUTTINGS.

Most of the 12,000,000 grape vines now growing in Chautauqua county, N. Y. have been raised from cuttings. Good quality canes are clipped into lengths of 9 to 10 inches, leaving 3 buds on each, these are stuck about 2 inches apart in rows 18 inches apart by hand and are kept free from weeds and well cultivated during the summer. After the frosts have killed the leaves these roots are plowed out, taken to nursery cellar and graded into 1, 2, 3, and culls according to the quality of the roots they bear.

IV. PLANTING.

For planting we first plow a series of dead furrows 8 feet apart, in these we dig holes 7 feet apart and in these we plant our grape roots covering with loose top soil and keep them well cultivated all summer. The next spring we drive chestnut or locust posts from 21 to 25 feet apart in the row. To these we staple a black iron, No. 9 wire from 28 to 32 inches above the ground to which we tie the young vines.

The following spring we add another wire from 22 to 36 inches above the first and tie the canes to this. We now have a vineyard that with proper care will produce good crops for a lifetime.

V. CULTIVATION AND PRUNING.

We aim to manipulate the ground to a depth of several inches from the first of May to the middle of August, keeping a dust mulch to bridge through the drouth we usually have in mid-summer.

A gang-plow, 2-horse diamond cultivator and a horse-hoe will keep a vineyard in good culture without the expenditure of more than one dollar an acre for hand work.

We trim or prune our vines in the winter cutting away all but 8 or 10 canes, which are to bear the next harvest.

It is customary to branch the vines at the lower wire extending an arm for two or three feet in both directions along that wire and from these arms to lean the canes that are to bear the next crop.

After the trimmers have passed through and done the cutting, the brush pullers pull off the brush which is dragged off and burned. After this as soon as the weather becomes sufficiently warm for such work we tie the canes to the top wire with 4 inch pieces of no. 18 annealed wire, tied in such a way that when the brush is pulled off the following winter these tie wires drop off the wire and leave it clear.

We cut the tops of the canes leaving only one bud above the tie, and are ready for God's fresh air, rain and sunshine to grow an abundant harvest.

VI. PESTS.

About ten years ago we were visited by the leaf-hopper, which settled upon the under side of the leaf, sapping the vitality, killing the leaves and exposing the grapes to the sun.

We tried sticky shields, like fly-paper, carried along both sides of the row and so caught a good many, also whale oil soap solution, 1 pound to 10 gallons of water, but as this stains the fruit a solution of 8 to 10 parts kerosene oil is better.

Burning up leaves and rubbish in and around the vineyard is a good practice. These hoppers did considerable damage for several years then left us and we have had no further trouble from that source.

The little trouble we sometimes have with grape rot, mildew rotting of stems and the root-worm is controlled by spraying 2 or 3 times with Bordeaux mixture thrown from a 2 horse power sprayer, making a fog on the leaves.

VII. HARVESTING.

Grape harvest in a Chautauqua vineyard, seen through the golden haze of a bright October day is a beautiful sight.

The rows and rows of luxuriant vines, loaded with the rich blue vintage. The warm air heavy with the sweet aroma of the delicious clusters, the merry songs and laughter of the pickers as they rapidly fill baskets and crates. The chuckling grape trucks loaded with fruit being taken to the shipping station all go to form a scene that leaves an impression upon the mind both delightful and lasting. Most of our grapes are shipped through the Chautauqua and Erie Grape Co., though some growers do their own marketing. Cars are filled with grapes from half a dozen different growers, each load being carefully weighed and inspected before being put in the car and each grower receiving so much for each full weight basket that he puts on board.

Our grapes go all over the country and are welcomed in every home. You may wonder what we do with the thousands of car loads of perishable fruit that must be disposed of in the short period of 6 to 8 weeks.

If we ever had any trouble we have had none since the introduction of the unfermented grape juice business. This was originated by Dr. Welch, of Westfield, N. Y. and has rapidly grown until he has two immense factories that work night and day during the pressing season with the exception of Sundays, for the doctor is a Christian.

The methods used in the Welch factories are as follows:

The best grapes obtainable are run through a machine which rattles them off the stems and breaks the skins. In this condition they are dropped into the steam jacketed cauldrons, where they are heated almost to the boiling point, from these cauldrons they are hurried hot to the hydraulic presses that extract the last drop of juice and also rich velvety lining of the skin. Still hot they are corked tight in 5 gal. glass demajons and placed in the cellar.

Before final bottling this juice is re-heated and bottled hot. No sugar is ever used and no alcohol can form because the juice is always hot while exposed to the air.

Conclusion: The grape industry has brought wealth and prosperity to Western New York, good schools, summer resorts, autos, electric railway and the opportunity of travel, but I fear

that very few look up with thankful hearts to praise God from whom all our blessings flow.

Mr. Street: I should like to know how they keep up the fertility of the soil, whether they sow any cover crop and also at the same time how they loosen up the ground in the spring. He spoke about the gang plow, as I understood it, and I would like to know whether they plow a few inches deep in the spring or how.

Mr. Knight: We do not often use very much fertilizer, it does not seem to be necessary. Some do plant clover in the vineyard and find it to be a pretty good plan, but it is not at all common. We do use a light gang plow to a depth of about two inches to begin with. When the soil is fairly loosened with a gang plow, we keep it loosened with the cultivator. We use a horse hoe for plowing around the vines, right close to the vine. Where we cannot touch it with a horse hoe, we use a hand hoe. We sometimes plow toward the vines, sometimes away from them. Plow away one year, plow to the next. Just before the grape harvest, it has become the custom to drive a sort of smoother, something like a snowplow to smooth it over, to facilitate the work of the pickers. Our brother from Michigan spoke about tying with string. We used to tie with string, but we find the up-to-date most satisfactory, and the way the brush pulls off most easily and quickly, is to use a four-inch piece of No. 8 annealed wire and by a little twist of the finger we can tie this against the upper wire and cut off the end of it above the wire.

A Member: Do you use the four-cane method?

Mr. Knight: Not to any extent; a few tried it as an experiment, but it is not common.

Mr. Smythe: We use the four-cane system entirely in Michigan, where the platform system is not used.

Mr. Soverhill: Do they use any sugar in putting up the grape juice?

Mr. Knight: Not a particle.

A short recess was here taken, after which the Students' contest was taken up.

THURSDAY MORNING SESSION.

Question No. 1. What attention should an asparagus bed have?

Mr. Irving Smith: In our practice with asparagus, we have manured heavily in the spring. We manure in the spring because if it is done in the winter, it retards the thawing out and opening up of the soil, in other words, makes it a little later, so we always manure in the spring and work it down thoroughly. If it is a home bed, work it down with a six-tined spading fork, turn it under by hand, or if it is a commercial proposition, go over it with a disk. If the ground is pretty light, the disk will be better without the harrow. Work it as deep as you can without tearing up the ground. Keep it cultivated between the rows, keep the weeds out during the season. Perhaps that covers the point.

Question No. 3. Is there any profit in trying to grow pie plant in Wisconsin for winter market?

Mr. W. A. Toole: Near almost any small town, I think there would be a profit in it, especially if he has a greenhouse to utilize what otherwise would be wasted. In most of the small towns I do not think it would pay to put up special houses for housing them, but possibly near the larger cities; that is, cities the size of Madison, where the prices seem to be higher in the market generally, it might be better to go into it on a fairly large scale. Under our conditions, why it is simply a little extra crop that we get by growing it under the benches.

Mr. Palmer: Isn't it possible to force it in the ordinary furnace cellar,

Mr. Toole: It is possible to grow it in any ordinary cellar and I do not know but what we might get large enough returns from that to pay for the trouble. It rather musses up the cellar somewhat when you grow it in large quantities.

THE CABBAGE-RAISING INDUSTRY IN SOUTHEASTERN
WISCONSIN

W. J. MOYLE.

Back in the sixties Mr. B. R. Bones, of Racine; Wisconsin, a man with a naturalistic, horticulturist turn of mind, found himself growing among his other garden crops for the Racine market, that very ordinary common place vegetable, the cabbage. This fact attracted no attention until 1874, that season Mr. Bones ventured into the business of making sour kraut, having quite a large acreage of Early Winnigstadt and the local market being glutted and as it was too early in the season to store for winter use he cut them up into 45 barrels of fine kraut.

During the following winter he managed to dispose of 12 barrels, storing the balance, 33 barrels, in a barn cellar as such an unheard of quantity could not be sold.

The next summer after some boys opened the cellar there were 33 explosions and in a few days as Mr. Bones humorously expressed it. The effluvia would have out done 33 German corpses in the last stages. (It made a fellow want to pull a skunk on his nose for fresh air.)

With varied success Mr. Bones however kept on growing cabbage until 1887, that season he grew 8 1-4 acres, mostly Fottlers Brunswick and Flat Dutch, the varieties at that time best adapted for winter use.

This eight acres of cabbage made him the laughing stock of the entire community, his neighbors said he would never sell them. People drove miles to look at this remarkable field of cabbage. A little lake of beautiful green as it were without a break on its surface. From this field was harvested a crop of 20 tons to the acre. Four carloads were hauled direct from the field and shipped to Kansas City, the balance was stored. That winter when cabbage went up to \$45 a ton in Kansas City he tried his best to secure refrigerator cars to ship in but the Railroad Co. refused to furnish them, claiming the cabbage would spoil the cars. He was the forced to barrel his cabbage in order to ship.

The cash return from this crop going over \$2,300 or around \$250 per acre. People stopped laughing, Mr. Bones was proclaimed "Cabbage King."

The next season he had some cold frame cabbage plants sent him from Peter Henderson and Co., New York, for testing, on these there were eggs of the cabbage worm butterfly. These hatched and got the first foothold on Wisconsin soil.

In 1888 a cabbage planter being unheard of, he set out 14 acres in the old back way that we follow in planting a few dozen in the garden. Wm. Hanseke planted 4 acres and thus was started the cabbage industry of southeastern Wisconsin.

The crop above mentioned yielded well but the market was poor and little was realized above expenses, however in 1889 a much smaller acreage was planted and the tail end of this crop sold for the remarkable price of \$106.20 per ton.

About this time W. Attle Burpee introduced the Danish Ball-head. Mr. Bones bought 2 oz. of this seed out of which he raised 4000 plants and 3999 1-2 solid heads in the fall, from the stalks of these he raised 84 pounds of seed which was widely distributed under different names, yielding the grower, however, very little profit for his trouble in growing the same. This is the cabbage commerce today. The Danes called it Solid Emperor, Mr. Burpee is credited with renaming it "Danish Baldhead."

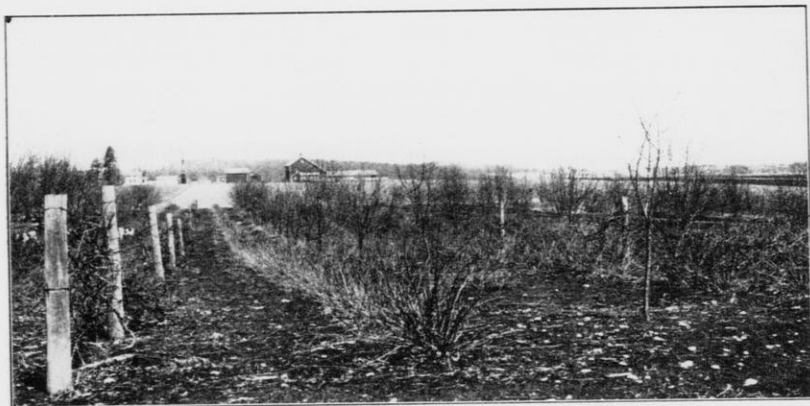
This variety originated on the island of Arnager, Denmark, was imported into Holland and then introduced in this country under the name of Late Holland, Hollander etc.

Mr. Bones was also the first man to investigate the disease of the cabbage known as black-rot. Through his efforts an expert bacteriologist from that department of Washington, D. C., made a careful study of this disease on his farm, distinctly isolating the germ and giving it the afore mentioned name. This disease has no remedy known of and once effected will remain so for many years so cabbage grown on this land is of necessity discontinued.

The climate and soil around Racine seemed particularly adapted to this vegetable and the acreage grown increased rapidly until the season of 1909 when Union Grove, one of the principal shipping points of Racine county billed out 625 carloads. A half-dozen other shipping points within a radius of 30 miles had equally as good records. It is therefore safe to estimate



More Union Grove Cabbage.



Fruit Garden of J. H. Turner, Hebron, Ill.



The Cabbage Market at Union Grove, Wis.

the crop at 50,000 tons from this part of the state that season. Figuring this on a \$5 per ton basis we find it putting into the growers pockets the nice little sum of \$250,000.

In this estimate we have not taken in account the three large kraut factories in active operation in this territory. They use thousands of tons. The F. W. Gunther Co., of Racine, from a small beginning in 1882 bought 7000 head by count at 5 cents per head.

In 1883 this Company established the weight system paying \$22.50 per ton. Mr. Gunther believes himself the first to adopt this method in the U. S. For a number of years they bought by weight and sold by head. It was like a gold mine but the trade soon caught on. This firm has enlarged until their present capacity in 4,500 tons annually or approximately two and one quarter million head.

At Franksville, Wis., is situated the "Frank Pure Food Co." factory, one of the largest and best equipped in the United States, which also annually converts thousands of tons into the finished product.

What becomes of all this cabbage might be asked? It is shipped all over the country! Chicago, alone, when its appetite is keen, will clean up 20 car loads a day.

Many growers have built themselves storage buildings holding their crops for higher prices. Early in the business some remarkable stories are told of wealth thus acquired. One man cleaning up \$40,000 in a single deal.

The past few years, however, little has been made from storing cabbage.

In conclusion, we would say that the cabbage crop of Racine and Kenosha counties has become an important and profitable factor in the farmers rotation. It is here to stay and only goes to show how great and varied are the Horticultural possibilities of the State.

A Member: How many tons do you get on the average to the acre?

Mr. Moyle: From twelve to fifteen tons on an average is a good yield. This year we got only about seven tons to the acre, on account of the drought. Fifteen tons is the ordinary crop, that is, with the Holland; with the sauer kraut cabbage we can get twenty tons with good cultivation.

A Member: What distance do you plant and with what do you plant?

Mr. Moyle: Plant with the cabbage planter made at Racine. Put them in rows fifteen to eighteen inches apart, according to the varieties, and the rows so that we can go through with the sulky cultivator, thirty-eight to forty inches apart. Cultivate one way and hoe between the plants. We put about 7,000 plants on the acre.

A Member: What do you do for the cabbage worm?

Mr. Moyle: Nothing. We plant big enough so that they can get all they want to eat and then there will be plenty left.

A Member: I just took a pail and a whisk broom and sprayed on salt solution. If you will put a worm in salt water, it will dissolve in a very few minutes.

Mr. Moyle We have tried salt, but the tendency is if you put any quantity on it, the cabbage head will burst. The cheapest way in dry time is to take a shovel and throw dirt on the heads.

HOT BEDS, COLD FRAMES, AND THEIR USES IN CONNECTION WITH MARKET GARDENING,

J. W. ROE, Oshkosh, Wisconsin.

We gardeners find these harbingers of spring quite indispensable. A season of prodigious profits are the early cold months of winter. This is a time when gardening on paper is usual, estimating future crops, laying out our summer work and enjoying the prospect of spending the money that will come rolling in.

But there comes a time when the sun gets higher and when the pile of cash in our pockets has shrunk then it is we feel we must get out and hustle to make a little with which to grease the wheels. Then we get at the hot beds.

I'll tell you how we build them. We lay out our beds for 20 sash in length and between the beds we allow 9 feet for a drive way. The spaces between the beds are filled in with cold frames after the hot beds have been packed.

If the pit system is used, drainage has to be provided by use of tile. To build a bed of this kind we first remove the soil to a depth of 12 in. and 6 ft. apart. The posts on the lower side should be 6 in. shorter than those on the upper side which will give the sash pitch to the south when the bed is complete. This allows the water to run off and also allows the sunlight to strike in more freely.

The posts having been set and sawed to a line, we next spike on top a 2x4 set edgewise and flush with the outside of the posts. These are for the sash to rest on. The lower side of the bed measuring from the bottom of the pit should be 10 inches high. Braces, 2x4, are put in, spaced, so that the outer rail of each sash has a bearing on the brace. Board up the sides and ends next, raising the boards a little above the 2x4 frame. This will allow the sash to butt up against the board at the bottom and will break the wind from blowing in on either side. Some make an outer casing and fill in with cinders. We have not done this on account of the expense. We bank the outside with manure. Would advise the use of common cypress lumber. The cold frames are made for 5 sash and are movable. The corner posts are 6 in. longer than the width of the 12 in. boards at the top and side of the bed are flush with the boards at the lower side. This gives a pitch to the frame. In buying sash profit by the experience of one who has found many requisites wanting in common factory sash. Buy the best clear cypress sash made of 2 in. stuff and don't allow them to paint them, as you will want to see if you get what you are paying for. Do your own glazing. Bed the glass with one-eighth in. lap in good putty mixed with linseed oil and with lead. Putty won't stay on top of the glass and only helps to rot the rails. One light coat of oil paint every year will make the sash last a long time. Use fresh horse manure that has still the heat in it. Fork it over until the whole pile is thoroughly mixed and all of it heating, then pack the bed 12 inches deep and tramp down well so that the bed will not settle much. Then use from 4 to 5 in. of soil over all. This completes the bed. Allow the bed to lay 3 or 4 days to get rid of the first heat. By that time the bed ought to be in shape to sow or plant.

What to grow in hot beds depends on your market. Leaf lettuce and forcing radishes are always in demand in the

early spring. They are safe crops as they stand more grief than other crops. A small bed started early will furnish lettuce plants for a large number of sash. They are transplanted where they are to grow when in the second leaf, planting them 4x5 inches apart. The soil should be moist but not wet and do not water until after the plants get a good start to grow. But if the sun is hot, shade during the noon heat. Water only when quite dry. Some day when the weather will allow, take off the sash and stir the ground.

Watering is a particular part of the work and must be looked after by one with judgment, as too much is liable to rot or mildew the crop. This is especially true of lettuce. Water should be applied during the early hours of the day and when the sun is shining and after watering give plenty of ventilation. The ventilation of the beds should be looked after and the sash raised according to the heat of the day, closing up in time to hold the heat as the sun goes down.

Radishes are easy to raise. Do not force them too much as a few days longer in growing will produce a better radish and they are not so liable to go to tops. A common mistake is to sow radishes too thick. All the small imperfect seed ought to be sifted out. The stand of radishes should average from one-half to an inch in the row and the rows to be five inches apart. Better radishes are grown from large plump seed and in less time.

Forcing carrots can be sown at the same time with the radish seed and in the same rows. The radishes do not bother the carrots much and are pulled in time to give the carrots a chance.

Beets seeded for greens follow a lettuce crop nicely. Kohlrabi and cauliflower plants can be transplanted into the beds between the radishes and quickly follow the radish with a crop of early vegetables. Our beds are used also for starting plants for later planting in the fields such as tomato, early cabbage, peppers, etc. Our melon and squash plants are started in the beds. We find that we get away from fighting the bugs in this way and also get the crop out sooner.

A good way to do this is to cut sods into sections of about 4 in. square. Then fit the inverted sods into flats. Sow the seed in each sod and place under the glass. When the plants are ready to plant take the flats into the field and plant directly from the flats.

Cold frames are handled the same as the hot-beds, the only difference is that not much manure is used and that they are laid better. In the south the cold frame is used altogether and they find the sash enough protection. Here we use mats or boards for night protection, which means a lot of work, especially on Sundays when your man don't show up to help with the chores. I should not advise a man to go in very big in this line unless he can stand exposure, as planting early beds is usually done when it is not very pleasant sitting down and with bare hands working in the moist earth and often it happens that orders have to be gotten up in rainy or cold weather. On such days hot beds are not hot beds but cold frames in every sense of the word. Nevertheless there is some fun in getting a start of old Dame Nature and some profit.

The soil for the beds is prepared and piled up in sufficient quantities in the fall and covered so that it can be gotten out without the use of the pick when wanted.

Mr. Bedell: I would like to ask Mr. Roe if he ever had any experience with cement hot beds?

Mr. Roe: I have never gone into the cement hot bed business. At the time the cement age was practically upon us, we started in building greenhouses instead of hot beds and I found that a little more satisfactory in my line. It costs about the same to build the greenhouse with the piping as it does to buy the board and sash, and the cost of working in the hot bed. We found it about as cheap to build a substantial greenhouse and it worked just as well.

Mr. Irving Smith: I would like to ask Mr. Roe why we must water in the early part of the day, why must we water only when the sun shines, why must we give special ventilation after watering?

Mr. Roe: The reason for watering early in the morning and when the sun shines is this, that we have all day for the moisture to rise and the leaves to dry off, and if the sun shines, that dries the moisture also, and it dries off the plants more rapidly. The period of cloudy weather and dark nights is very productive of mildew, and especially in the early months of the hot bed season, it is very difficult to get a crop through without some mildew, and we find that it is well to stir the ground

if possible, as soon as the surface of the ground is dry enough, so that we could loosen it without its being sticky. That allows the air to enter and also helps to stop the mildew. The most particular part in hot bed growing or in the greenhouse is watering. We do not trust watering to any man that is not experienced, until possibly, later on, in May, or the last of April, when the sun is usually drawing the water very rapidly. I attend to the watering myself and never think of turning another man in there.

Mr. Irving Smith: Why do you water young plants after they have grown instead of immediately after they have been set?

Mr. Roe: The young plants of the lettuce especially are very susceptible to root rot and when the change is made from transplanting, unless the root starts immediately, if the ground is too moist, the root will start to rot and turn black, and if the ground is just simply moist the root will strike quickly, and there is not that danger. It is better to establish and leave the plant. The leaf will wilt down, and by the next morning the plant will strike a very fine white root, and the leaves will stand up again, and you will be surprised how dry the ground can be when you plant lettuce and find that you do not need to water it at that time. If you do water it, you are very much in danger of flooding the roots and drowning them out and loss is likely to follow.

REPORT OF COMMITTEE TO INVESTIGATE EXHIBIT AT LAND SHOW.

Mr. L. G. Kellogg: At the November meeting of the Board of Managers our President appointed Mr Cranefield and myself as a committee to investigate the possibility of making an exhibit at the Land Show, which is annually held in Chicago, with the end in view of making an exhibit there for the purpose of diverting a portion of the professional and other people who are now investing their money in Northwestern orchards, to plant their money in good old Wisconsin. This Land Show is quite a mammoth undertaking. As near as I can learn upon the best authority, it is backed by some of the largest railroad companies in the

United States. And I think that the evidence will bear me out in that. The Land Show is held in the large Coliseum building in Chicago and the space is sold to the different States in the Union and some of the States secure perhaps three or four allotments of space at fabulous prices. I was informed that the State of Wisconsin, through the Immigration Commission of which I think Mr. Campbell is secretary, secured a small space about 10 by 16 feet, and displayed the products of the State, together with some fruit, and this space I am informed cost about \$700, so from a financial standpoint I do not think it would be possible for this Society to go to the Land Show and make an exhibit. However, they might unite with the Immigration Commission, perhaps obtain space there and make a very creditable exhibit. There was also held in connection with the Land Show at the First Regiment Armory, a duplicate of the National Apple Show, which was moved bodily from Spokane, Washington. There were a great many carloads of apples displayed, whole carloads of single varieties like York Imperial, Newton Pippin, Spitzenberg and Grimes' Golden. This was a very fine show, but was attracting very few people. The Land Show seemed to attract the bulk of the people and one point that struck me more forcibly than any other was the number of land agents that you met on every turn and corner, that were endeavoring to unload those Western lands at fabulous prices. From the impression that I received during the short time that I was in Chicago I would not deem it advisable for this Society to endeavor to make an individual exhibit at the Land Show.

Mr. Daub: I would like to ask Mr. Kellogg if he did not find the public a little bit skeptical in regard to investing in these lands?

Mr. Kellogg: No, I should say, on the contrary, they were very much interested in these Western lands, and as near as I could learn people were buying. I saw them investing in this land that they haven't even seen. They were easy.

Mr. Daub: Then you mean to say that Barnum was a true prophet?

Mr. Black: Our Society in Iowa was anxious to understand the conditions out there and two or three of our members were out there looking the ground over and we found from their re-

port, on good outhority, that most of the land there that will produce these fine crops of apples is sold and that at the present time real estate agents are laying out land where they never can get water onto it. They are planting trees in the winter and they are selling planted orchards for a large sum of money \$1,000 an acre. Those trees next summer will not live if there is no moisture there at all and you cannot get the water there. but they have got the land sold and that is what they are working for.

The President: We have gone over that ground pretty thoroughly, but really the thing we have in mind is that Wisconsin people do not know what a good State Wisconsin is. That is the direction, I think, that our Society should turn its mind toward, let them know the good things that we have and then they will not be looking so much elsewhere.

Mr. Reigle: I have in my hand a personal letter to me which seems to have the stamp of truth upon it in regard to Washington State. I will read a part of that letter and the mathematics of it I want you to figure out for yourselves. It will be quite easy. (Reads).

SWEET CORN AND ITS CULTIVATION.

WM. NELSON, OSHKOSH.

In raising sweet corn we aim to get it planted as early as possible; as, the early corn brings twice the money in the market. It pays to spend a little extra time in starting the early varieties. I start my early sweet corn on sandy soil, which is my earliest land. I cover land well with horse manure and plow it under. Plow about 4 inches deep as early as possible in the spring, then pulverize quite deep after each hard rain, to warm the soil; until the weather is favorable for planting. There is quite a little chance work in planting early corn, as we may loose the first planting; but I always have plenty of the early seed on hand, in case this does happen. I planted my early sweet corn last spring on the 20th of April, just before the hard blizzard we had on the 23rd, and it proved alright. I plant about 4 acres of the

early corn each year. As soon as the weather looks favorable for planting, I take about half as much corn as I intend to plant and soak it until the sprouts begin to appear; to do this, I put it in an earthen jar and cover with water over night, then drain off all the water, cover with a damp cloth and keep in a warm place until the sprouts begin to show, which will take about two days. You will perhaps wonder at my sprouting the corn in this way but I find, after the sprouts have started, and there is life in the kernel, it will stand a great deal more wet and cold weather, than it does otherwise and also makes it earlier. While this corn is sprouting I work the ground up fine and mark it both ways, having the marks 2 ft. 8 in. apart each way. Now I take the corn which is sprouted and put an equal part of dry corn with it in case anything should happen to the sprouted corn. I plant this with a hoe, being careful to get it not over an inch deep. Putting about 8 or 10 kernels in each hill. Be very sure to plant exactly in the square, or it will be more difficult to cultivate. As soon as this corn begins to peep through the ground, I drag with a fine tooth harrow, which helps to keep the ground warm, and destroys the little weeds, which have started to grow. When we can see the rows we begin to cultivate with a fine tooth Planet Jr. cultivator, and continue with this until the corn is 6 inches high. Then we thin the corn out, leaving about four of the strongest, most vigorous stalks. At the same time we pull out what few weeds are in each hill. After the corn is thinned out I use a coarser cultivator.

I plant White Cob Corey for my earliest corn, then Perry's High-bred. I used to plant the Early Minnesota, to come on after the Corey was gone, but by carefully selecting the earliest corn for seed each year from the Perry's High-bred I find it is ready for market as soon as my Corey is gone, and it is a much larger corn than the Minnesota. I plant my Perry's High-bred 2 feet 8 inches apart the same as the early corn, using a hand planter, dropping 5 or 6 kernels in a hill. This is planted deeper than the early corn which I planted with a hoe, therefore it will stand more dragging, which saves time, as cultivating takes much longer. The stalks of this variety grow quite tall and rank, so I thin this corn to 3 stalks in a hill, instead of 4. Now I want to tell you about a field of fodder corn, which I planted

a few years ago. This land was timothy and clover sod, which I covered with coarse barn-yard manure early in the spring. Then I left it until about the last of June when it was covered with a very heavy hay crop. Then I plowed under both hay and manure and pulverized it thoroughly and planted it to corn on the 3rd of July. This was a bumper crop. I never did like drilled corn on account of the weeds, for they are our worst enemy; so being raised in a potato country thought I would use my potato marker for this field of fodder corn, and row it both ways. This marker was 2 feet 8 inches. The yield of this field more than came up to my expectations. I had in twenty acres of corn that year and this field of fodder corn of about 4 acres grew so fast and got ripe so that I husked it, and it proved to be the best, and produced the greatest number of bushels per acre of any corn I ever raised. Thereafter I discarded my corn marker to use the potato marker to mark corn ground, getting better results with the field corn as well as with sweet corn. Field corn only plant 2 or 3 kernels per hill. If possible have the potato field join the corn field as by doing so you save a lot of labor by cultivating both at one time. I began selling my early sweet corn last year on the 25th of July. Putting it up in sacks of 100 ears and selling directly to the dealers; first at \$1.50 per hundred ears, then at \$1.25 and later at \$1.00 per hundred. I have sold late corn as low as 50c per hundred ears and think it is a profitable-crop even at this low price. I consider the stalks very valuable as fodder, more so than the field corn. My early sweet corn last year brought me over \$30.00 per acre, but the late corn did not bring so much, though we get so much more fodder per acre, and consider it so valuable for feeding stock that this crop proves very satisfactory. I have not had very much experience in raising Evergreen corn as it is not ready for market until about the 1st of September; and as I raise about 6 acres of muskmelons each year, they are ready to market at this time, so I give my full attention to them. I prefer saving my own seed corn, to do this, I leave a few of the best rows, and do not pick them when picking for market. When this corn is fully matured I carefully select the best ears for seed, husk them, tie together with binding twine, putting about a dozen ears in each string, and hang in the attic where I leave it until the following spring,

when I take it down and shell by hand. Removing the small kernels at the tip, and the large thick kernels from the butt. Then I put 100 kernels in a small box of earth to test it, and it should test 95 per cent good seed.

Bq keeping a few good Holstein cows, and a few pigs all of the crop not marketed is consumed on the farm, and brings big returns; although it is not directly in cash. The manure produced is also a big item and worth considerable money. I find from experience that all of the fodder from the sweet corn is eaten greedily by the live stock with very little waste but with evident relish. I also consider the little extra time spent in preparing a good seed bed pays well. As does also frequent cultivation, as we cannot in this part of the country raise a good crop of early corn and a crop of weeds on the land at the same time.

Mr. Davis: I never have planted any corn by guesswork, I never made allowance for so many to come and so many to rot. If I wanted a field to raise and sustain three kernels that is what I planted, if I wanted two, that is what I planted, if I wanted four, that is what I planted, and I always got what I called for and expected. I planted two rows about thirty rods long with two kernels to the hill and when it came up I went up and down the rows and every hill had two stalks of nice light spears and then there was a snow storm and there were about two feet of snow drifted over corn alongside the fence and I do not think there was a hill but what had pretty nearly a full stand of corn. About saving seed corn, I never had to buy seed corn in my life. I have had lots of men husk for me and tell them to save seed corn and I never knew them to pick out one ear in fifty that would make good seed corn. I can show you good seed corn and all you want to do is to save your corn early and be sure that it is well cured and keep it where no moisture can get at it.

ONIONS.

H. C. CHRISTENSEN, Oshkosh.

The annual onion crop of the northern portion of the United States is estimated at three and one-half million bushels. It is of such commercial importance that it is one of the few vegetables to get a special crop report. The onion is not a lazy man's crop as its successful culture requires more labor than the average vegetable.

The soil best adapted to its growth is a black loam; the deeper and richer the better. It also requires a generous application of fertilizer to the soil; either in the way of well decomposed stable manure or commercial fertilizer, we have always used the former, never having used the latter except in an experimental way. The land should be well drained, for while the onion requires a great deal of moisture for its growth it will not do well on soggy soil. Onions do well on the same soil for a number of years, but the maggot and fungous diseases make an occasional change necessary. In preparing the soil for onions, we like to grow some crop the previous year, like celery, cucumbers, or cabbage, that can make use of a large amount of fresh stable litter either as a mulch or plowed under. When the crop is removed the land is plowed late in the fall, and during the winter as heavy a top-dressing of well rotted manure as can conveniently be worked in, is applied. We use the spent manure from our hotbeds of the previous spring for this purpose.

As early in the spring as the land is dry enough to work, the soil is thoroughly pulverized to a depth of five or six inches. The soil is then smoothed off either by raking or planking so that a fine, level seed bed is secured.

The seed is sown in rows sixteen inches apart. Care should be used to make the rows as straight and even as possible so as to facilitate work with the wheel hoe. Seed should be sown thickly enough to mature eight to fifteen bulbs to the foot; more or less according to the richness of the soil. A much larger number of seeds will need to be sown but care should be taken not to get them too thick as it is difficult to thin onions.

As soon as the plants appear above the ground the wheel hoe is run along the rows and as often thereafter as the rain packs the soil or the growth of weeds requires it. Cultivation should be kept up until the growth of top prevents it. The most tedious part of onion growing is weeding. As no machine has been invented than can distinguish between a weed and an onion plant it must be done by hand. We employ boys provided with sharp knives for this work; keeping at it not longer than five hours a day. Longer than this they tire and then they do poor work. We prefer to go through the patch three or four times and take out the weeds while small. It may take a little more time but the onions are disturbed less than when the weeds are allowed to grow large.

As soon as most of the tops have fallen over, the onions are pulled. Five or six rows are thrown together. They are allowed to cure in the sun for about 10 days; when they are topped off in crates. Boys and girls are employed for this work, being paid so much per bushel. The onions are then hauled to a shed or barn and placed on shelves for farther curing. From here they are marketed or if stored are placed in the cellar when cold weather comes. Running them over a screen with a $1\frac{1}{4}$ inch mesh, removes the small ones and also the leaves and trash.

For the northern market the yellow varieties are the favorites; the globe shape being preferred. We like an onion with a rather thick skin that does not crack and a little darker than straw color as it seems to keep better than a thin skin light colored one. There is not much call for red ones, except for shipment south of Chicago. The white onions are not as good keepers as the yellow but usually command a little higher price if the quality is good. They are better than either the red or yellow for bunching as they keep fresh looking longer and are easier to peel.

The question of seed is one of great importance to the grower. Only the best should be used. It will pay any grower who is going to store, to grow his own onion seed. In the fall select as near ideal onions in shape, size and color as possible and keep them in the cellar over winter. When planting in the spring reject all those that have made any growth in top or root and by following this out for a few years, a strain of onions will be secured that for keeping quality cannot be excelled.

We have tried growing the large Spanish onions, by raising them in the hotbed and transplanting them to the field. While we could get the size of the imported ones the quality seemed to be lacking. This is a good way to grow any variety for exhibition purposes as they will grow larger than when sown in the field.

Mr. Street: I would like to ask Mr. Christensen if he practices rolling the tops down as soon as the first ones commence to fall.

Mr. Christensen: I think possibly because we raise our own seed and grow onions year after year, we do not have that trouble. Possibly for the first year or two they ripen unevenly, but after that they ripen more evenly.

Mr. Black: I have had good results with hen manure, it is almost equal to guano.

Mr. Christensen: We find that hens and gardens don't agree very well.

Mr. Hagar: Has the gentleman ever tried sowing onions in the fall?

Mr. Christensen: I have tried the hardy white variety recommended for fall sowing and one year I succeeded in wintering them over, but I have tried it a number of years since and have not been able to winter them.

Mr. Irving Smith: Do you find it necessary to plant 16 inches did you say, apart in the rows?

Mr. Christensen: Yes, from 14 to 16. My neighbor plants them far enough apart to cultivate with a horse.

Mr. Smith: Don't the tops stand up sufficiently straight so that weeds will grow in between them after they get to a point where you do not wish to cultivate any more. Will not the weeds grow in between 16-inch rows if you have light soil, that is, will the tops shade the ground sufficiently to keep the weeds entirely out?

Mr. Christensen: We find by having them 16 inches apart we can go through them more frequently and more conveniently than when they are planted 14 inches, and we are not troubled that way.

Mr. Smith: You say you pull them soon after the tops fall

away, you do not wait until the tops dry before you pull them.

Mr. Christensen: We allow them to partly dry; they are still partly in the green stage when we pull them.

Mr. Smith: At what stage in an onion's growth comparatively, does the top fall over? Is it one-half, or three-fourths or more grown?

Mr. Christensen: I think it falls down when it is pretty near fully grown. There are exceptions, if we happen to have, as we did this year, have a dry season and then have a rain after the bulb has grown.

Mr. Roe: I want to ask about keeping onions directly after taking them off the field, will it be possible to crate them up, put them in, two layers wide, and pile them up under the roof, at the same time keep them there for a month or six weeks without re-handling.

Mr. Christensen: I think that is what the eastern growers are doing. I see some of them recommend piling them up in tiers, one above the other, as high as six or eight, and keeping them in crates.

Mr. Reigle: What experience have you had in growing Prize-taker?

Mr. Christensen: We have grown good sized bulbs, I think weighing two or three pounds, and still larger ones of the Gigantic Gibraltar.

Mr. Reigle: Cannot you get better prices for those than you can for the rest?

Mr. Christensen: We have been able to get a better price, but the imported ones come in competition and they prefer the imported ones to the home-grown.

Mr. Reigle: And the consumer knows the difference in some cases?

A Member: How many bushels do you get to the acre?

Mr. Christensen: From two to six hundred. We do not make any big claims.

The President: How do you keep them, in an ordinary cellar, those that you carry over?

Mr. Christensen: We simply place them on shelves about 10 inches thick in the cellar, to keep them. If you raise your own seed you are sure of keeping them, if you do not, you have to rely always on the seed you get, you will have difficulty in keeping them unless you keep in cold storage.

Mr. Moyle: Have you had experience in planting sets in the spring?

Mr. Christensen: I have never had experience in that way; I hardly think it would pay, unless you have an early market that will take them and pay an extra price; you will find the large majority of the sets will run to seed, you can hardly get them small enough so that they will not produce seed.

Mr. Moyle: Some of the growers in our locality are growing sets by the hundred bushels for some markets, I don't know where. They are grown by acre and shipped out; I should like to know who uses them.

Mr. Christensen: Are they not used for the green onion business?

The President: We have a local market gardener who raises sets a great deal for the bunch onion trade. This same person is very much pleased with his experience in starting early in the hot bed and then transplanting. He says, while it seems a great deal of work to transplant them, other labor is saved, because there is less labor afterwards; there is no thinning and much less weeding and he gets very attractive onions for the early market, and all he has yet been able to raise are very acceptable in the local market.

Mr. Reigle: What is the wholesale price for onions in your locality, per bushel?

Mr. Christensen: We simply grow for the local trade, we do not ship, and we have been getting the last few years from .75 to \$1.00 per bushel, but we retail them to the stores and do not sell to the wholesaler.

Mr. Roe: A question that has not been touched on at all is this onion maggot. Is there any remedy that can be applied, or is there any preparation on sale that will exterminate this pest?

Mr. Irving Smith: I have never heard of any remedy except to stop growing onions, that cures them. That is what they did up at Green Bay and we used to raise them by the train loads up there. The onion maggot came in and we were simply driven out of business; you could go out with a wheelbarrow and bring in the crop from one acre of ground. They will eat the onions off when they are not over two inches high and from that they will keep on, if you are fortunate enough to get a few, they will keep on until you ship them out in the fall. We will have to look to our professors I guess for some remedy.

Prof. Kohler: I believe the United States Department of Agriculture has done a little work along the onion maggot line. A great deal can be done towards controlling the maggot by pulling the onions as fast as they are attacked by the maggot and destroying them thus doing everything possible to prevent them from getting a foothold. In that manner, where maggots have been troublesome, onions have been grown twenty years on the same land. Now, I would like to ask what experience you have had with California grown onion seed as compared with eastern grown onion seed. What is the status of opinion in regard to it?

Mr. Smith: I would like to have one word on that proposition. We thought we were pretty smart a few years ago when they first came in and we found for a few years that by planting onions a little later, we avoided the maggots so we planted them later; that year they ate off the late onions. Then we learned if we planted on heavier soil, the maggots would not eat them, and we planted on heavier soil, and the maggots moved. That has been our experience, that we never knew one year what the things would do next, or where they would stop that year and personally I do not believe his conclusions are correct in that, that the pulling up of the onions would be a prevention to any great degree, from the experience we have had, I think that it is simply the fact that the maggots for some reason did not develop very freely there. When they would eat acres from one to two inches high you have quite a job on your hands in thinning them out.

Prof. Kohler: I cannot talk about this so much from personal experience, but I will say in regard to this pulling proposition, that will prevent their becoming large in numbers, they do not get rid of them entirely but I know that they have been kept down to such numbers that they could continue to grow onions successfully by this method.

Mr. Christensen: I want to say one word in regard to California and eastern grown onion seed. I am positive the eastern grown seed is preferable to the western grown, from the very fact that we have a colder climate, and the onions must be stored in the larger part of the onion growing section, it requires some selection. In California they have a climate that does not require any storing. I have seen acres of onion seeds

growing, and where they grow such large quantities, they cannot take the pains they can in growing small lots, as they do in the east.

RABBITS.

C. L. RICHARDSON, Stanley Wis.

The law protecting rabbits has been a structure of slow growth. As long ago as 1898 the hunting of rabbits was prohibited under penalty of fine or imprisonment in the county jail. The closed season has varied from time to time and varies at present in different counties. The latest law upon the subject—that of 1909—provides:

“It shall be unlawful and is hereby prohibited to take, catch, kill, hunt or pursue;

“Any rabbit, . . . between the first day of February and the 10th day of October next succeeding, except as otherwise provided, and excepting further than (that?) in the counties of Chippewa, Rusk, Eau Claire, Pierce, St. Croix, Portage, Waupaca and Waushara, it shall be unlawful to take, catch, kill, hunt, or pursue any rabbit, . . . between the first day of February and the 10th day of September next succeeding; but in the counties of Crawford, Grant, Iowa, Kenosha, La Fayette, Richland, Sauk and Vernon, there shall be no closed season for the hunting of rabbits.”

“It shall be unlawful and is hereby prohibited to have in possession the green hides of any of the above enumerated animals during the closed season for taking of same and all guns, traps, boats or other implements used in violation of the provision of this act may be seized, confiscated, and sold by any warden as provided by law.

“Any person or persons found violating the provisions of this section shall be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars or by imprisonment in the county jail not less than thirty days nor more than sixty days or by both such fine and imprisonment.” (1909)

"Any person who shall have in his possession or under his control any variety of fish, animals, . . . during the closed season prescribed by law therefor (except alive) . . . shall be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars or by imprisonment in the county jail not less than thirty days nor more than ninety days. Such possession or control . . . is prohibited, and the penalty attaches, whether the said animals . . . were taken within or without this state or lawfully or unlawfully taken."

"It shall be unlawful and is hereby prohibited to hunt, take, kill, or pursue rabbits with ferrets, or to have a ferret or ferrets in possession while hunting, but this act shall not prohibit such hunting upon any lands by the owner or occupant thereof, or by any person having the consent in writing of such owner or occupant, provided that such owner or occupant or any such person shall also have a license to hunt."

"All guns, traps, boats or other implements used in violating any provisions of this section and all game taken in violation thereof may be seized, confiscated and sold by any warden as provided by law.

"Provided however, that nothing contained in this section shall be construed so as to prohibit the owner or occupant of any land from hunting and killing rabbits thereon at any time without a license."

On account of the defense sometimes set up that fish and game after capture are the exclusive property of the captor it has been provided:

"The ownership of and the title to all fish and game in the state of Wisconsin is hereby declared to be in the state, and no fish or game shall be caught, taken or killed in any manner or at any time or had in possession except the person so catching, taking, killing or having in possession shall consent that the title to said fish and game shall be and remain in the state of Wisconsin for the purpose of regulating and controlling the use and disposition of the same after such catching, taking or killing.

"The catching, taking, killing or having in possession of fish or game at any time, or in any manner, or by any person, shall be deemed a consent of said person that the time of the state shall be and remain in the state for said purpose of regulating the use and disposition of the same, and said possession shall be con-

sent to such title in the state whether said fish or game were taken within or without this state." R. S. 4560.

"It shall be unlawful and is hereby prohibited for any person or persons to hunt any game of any kind with a dog or dogs during the month of November, in the counties where deer are allowed to be killed or hunted." (4560a—20. 1909.)

The state fish and game warden or any of his deputies may enter buildings, camps, wagons and practically all places except sealed railroad cars and dwelling houses, without warrant, and search for and seize any fish or game found in violation of law. The fine varies from \$25 to \$100 and costs, or from 30 to 90 days in jail. (1b.a—23.)

In shipping fish or game the name and address of the sender must be in plain letters on the address side of the package, and must state the number of game inside. Failure so to do or falsehood is punished by fine, confiscation and imprisonment.

A license to hunt is required with certain limitations. "Any resident or non-resident of this state who shall pursue, hunt, kill or trap any of the birds, fowls or animals protected by the laws of this state without being at the time of such pursuing, hunting or killing, in possession of a license duly issued to him, which license shall cover the period in which he shall be so pursuing, hunting or killing such game, or who shall furnish to another person during the open season for such game, or permit such other person to have during the said open season a license issued to him, shall be fined not more than twenty-five dollars nor more than one hundred dollars or be imprisoned in the county jail not less than one month nor more than six months, or by both such fine and imprisonment. Provided, that nothing in this act shall be construed to prevent the owner or occupant and members of their families of any land from hunting and killing rabbits thereon at any time or in any manner without a license." (1489a—1)

"Any person while hunting, pursuing or trapping game shall have such license on his person and shall display the same upon the request of any person authorized to enforce the fish and game laws. The failure of any person to display such license as hereinbefore provided shall be deemed prima facie evidence of the violation of the provisions of this act."

Hunting licenses are for residents or for non-residents. Res-

idents pay \$1 for such license, and non-residents \$25 for a full hunting license including deer and \$10 for a limited license, not permitting the killing of deer.

"Residents" are defined as those persons residing within the state for one year previous to the time of issuance of the license. The state game warden may issue licenses in his discretion to actual settlers who have been a less time in the state. (1498s—1. 1909)

Elsewhere the law provides:

"Any person who shall pursue, hunt or kill game protected by the laws of this state without being at the time of such hunting, pursuing or killing in possession of a license duly issued to him, which license shall cover the period in which he shall be so pursuing, hunting or killing such game, or who shall furnish to another person during the open season for such game or permit another person to have, during such season, a license issued to him, shall be fined not less than fifty dollars nor more than two hundred dollars, or be imprisoned in the county jail not less than two months nor more than six months." (4562a)

A following section provides similar fine or imprisonment for all residents of the state violating the law, with the following exception "Provided nothing in this section shall be construed so as to prohibit persons residents of this state under section 1498s of the statutes of 1898, under eighteen years of age from hunting, without the aid of a dog or dogs, . . . rabbits or squirrels during the open season therefor, without the payment of a license fee, on land owned or occupied as a homestead farm by their parents."

Having considered the law on rabbits the question arises: What is a rabbit? Why is a rabbit? And what are you going to do about it? He is if not a touring car, at least a "run about"—of which a new model appears pretty frequently. The 1911 model is just out, equipped with sun- and rain-proof top, puncture-proof tires, Bosch magneto—all bosh in fact—torpedo body and long eccentric springs. It is warranted to run on any road, or where there is no road at all, requires no lights and the motor requires no gasoline, will not overheat in summer or freeze in winter. Both body and running gear can be secured in white or light brown as desired.

His status is difficult to define—it is so fleeting and evanescent.

He has this in common with a partnership that all the tribe are held responsible for the actions of any member of the firm. He is not a corporation—though often invisible he has a body and sole. He is not a mortgage, although an incumbrance upon the land; he is not a cloud upon title, but a cloud upon the happiness of the orchardist. He is not the personal property of the owner of the land, for the law declares that title thereto is and remains in the state. He is not a tenant-at-will or at sufferance, for his tenure is not with the consent of his landlord. He is not a tenant from year to year for his rent day never comes around, he cannot be removed by process for tenants holding over, and there is no efficiency in an action of ejectment—he is in chronic contempt of court. He might perhaps be regarded as a covenant of warranty as he runs with the land—only the owner is not thereby assured of peaceable possession nor quiet enjoyment. He might be defined as a perpetual nuisance, equipped with a powder-puff at one extremity where the tail ought to be, an automatic self-sharpening set of teeth at the other extremity, where his brains ought to be, and in his midst, direct-connected to the aforesaid teeth, a single-cylinder, forty horse-power appetite for apple-tree bark.

The proper remedy for this pest is to spray with the celebrated sulphur-salt-peter-lead solution. A suitable outfit can be purchased at small cost and most farmhouses contain an old-fashioned outfit. From three to four drams of the sulphur-salt-peter powder in dry form is placed in the machine, rammed down and held in place with a wad of paper. The granulated lead, of about four or five size is then poured in and similarly wadded down. A percussion cap and hammer secure the discharge of the contents when desired. Then go out into the fields, orchard or wherever the nuisance abounds, direct the machine at the aforesaid nuisance and discharge the contents thereat. With a little experience, a single application will be found successful. Apply on your own premises any day in the year.

THURSDAY AFTERNOON SESSION.

A GARDEN FIFTY BY NINETY FEET.

By Mrs. WADE H. RICHARDSON, Wauwatosa, Wis.

My garden is new, only eighteen months old and very little should be expected of it for sometime, and my experience, in such work, consists in practice for one summer on an old garden which we rented.

There we had a little more than a half acre in the garden plot, and on it were forty-eight large currant bushes, two Duchess and two Yellow Transparent apple trees and four large early Richmond cherry trees. These and the well tilled soil gave us a great advantage over my new place. Forty crates of fine currants and some bushels of apples and cherries produced more than half the income of that garden.

I like to grow things, I always have some house plants. Living in a city flat I would almost try to have a little bit of a garden on a window sill.

So when the opportunity came for us to have the whole of fifty by ninety feet in a garden, we pitched into plans and work with perhaps more willingness than wisdom. Besides my natural liking for outdoors, flowers and gardening, I had a determination to try to disprove the statements you so often hear among city people, that a garden costs more than it comes to, that you can't compete with people who understand the business, or those strawberries will cost you twenty-five cents apiece when you count all the cost in time and money.

Our little patch is on a high bluff, at the back overlooking the beautiful Menomonee Valley and faces southwest on a street. The sunlight is a little interfered with on the west by a very large black cherry tree, native to the place, and our house and a neighbor's house. The soil is sandy and not very rich and the drainage is even too good. Perhaps this does not seem an especially choice place for a garden, but it delights us and it looms up like a little farm to our city trained eyes.

We laid out the garden with one walk lengthwise in the center and two crosswise about thirty feet apart.

We allowed the one-third nearest the street for early potatoes, we did not try to raise late potatoes, and all the other delightful things both hardy and perennial had to go in the other two-thirds.

The ten grape vines, two gooseberry bushes and six perfection currants are disposed along the fence of the rear portion of the garden. The asparagus bed of fifty plants is next the currant bushes in two rows on the southeast side of the patch. Just outside of the fence, at the back and near the house, we have two rhubarb plants, two of horse-radish, a little spearmint and a plant of Tarragon. On both sides of the long walk we have one row of strawberry plants.

We could not spare any more of the space in the garden for hardy things but we wanted some fruit trees. So on the lawn, instead of the ornamental shrubbery we might have used, we have two dwarf Duchess, one Yellow Transparent and two dwarf Wealthy apple trees, and one dwarf pear, two plum and two cherry trees. We use part of the steep bank at the back, where it is springy and full of wild raspberries, for blackberries and raspberries.

Last spring the weather looked so fine in March that we were in a hurry to plant things. The land had been put in good condition the fall before, so that with little spading it was ready for seeds. We had a small hot bed made, using only three small sash not meant for hot beds, costing fifty cents apiece. For the frame we found enough boards in the cellar. Into this we put tomato, cabbage, cauliflower, cayenne and sweet peppers and some flower seeds. I had learned that the multiple onion sets do well when planted in the fall and those were really growing. By the seventeenth of March we had some of them on the table.

Fortunately a neighbor advised us to delay planting in the open ground until the twentieth of April and we minded him or the great snow storm of April would have ruined things.

We planted in rows running lengthwise of the garden rather than in raised beds so as to hold the water better. Lettuce, the May king, we put in a short row and later transplanted from it. Radishes, onions, parsley, Swiss chard, beets, carrots

and early potatoes went into the ground about the last of April. By the middle of May we had one planting each of early red valentine beans, wax beans, bantam corn, little gem peas and all of these we planted again at intervals of two or three weeks till July fifteenth. May twenty-sixth we put in two twenty foot rows of pop corn which yielded one peck of fine corn.

We started our osage melons and cucumbers under glass in an ordinary soap box and transplanted them in their places in June. They take more room than some things. The melons had about fifteen by thirty feet but they did very well. The Kentucky Wonder and Lima beans were planted the latter part of May. There was a row and half, about forty feet of lima beans, which produced abundantly. We had all we could use fresh and three pint cans for the winter.

The space about the hills of melons was used for transplanted lettuce, which all came out before the melons needed the room.

June is a busy month. Transplanting tomato, cabbage, cauliflower and the other hotbed plants must be done then and the weeds kept down. Okra, leeks, Brussels sprouts, celeriac, celery, garlic, more onions, summer squash, Hubbard squash and pumpkin were not forgotten though not given much room for each.

Between that merry-go-round of crops, transplanting, weeding and guarding against pests, June and July were spent, but we did not give all our time to it by any means and we did not hire work done. A little while in the morning, an hour or two in the evening or after a rain and things did well.

Gardening was so new to me that I was unacquainted with some of the pests which were preparing to bother us. I had to be introduced to the cut worm, but having seen him I studied it a little with murderous intent. I learned how to find him by the little wreck he leaves, caught one at work and found that he did not reach the stems of my tomato and cabbage plants much above the ground. I did not find anything that would kill him but something heavy on a hard piece of ground, but when I put in my cauliflower and tomato plants for the third time, I wrapped the stems loosely with a little, two inch high, collar of writing paper about where I thought those dark grey

enemies would attack them. Although this would be too much trouble in a large garden it baffled the worms that time.

The potato bugs were even more intent upon ruining three egg plants and two wonderberry plants someone had given me, than upon eating up the kindred potato plants.

We felt ourselves quite well informed upon this old trouble and gaily dosed the plants with Paris Green. Reasoning that if some is good more would be better we thoroughly sprinkled them with a solution of one large table spoonful to two gallons of water. Some neighbor, passing that day, remarked in a very superior way upon the vivid decoration of the patch. I immediately put on my thinking cap and concluded it was time to get out the garden hose. It helped some. I didn't have many potato bugs and I didn't have many potatoes.

The green aphid did not trouble us, perhaps because there were so many of those nice lady bugs in the garden. The cabbage troubles I do not yet know how to control. We had a fair crop from that family but not what we should have had.

The tomatoes were too thrifty for pests. They were tied up to stout stakes so as to allow crowding and the ground was often hoed about them. The Child's Diamond tomato grew to great size, many weighing as much as a pound, and one, one pound and six ounces. The value of the garden crop was not high as none of the hardy things were bearing fruit, but I kept a daily account of all that was gathered for the house, either for summer or winter use, and at the market prices it amounted to a little less than thirty-five dollars. I saved seed, also, from everything as far as possible.

The expense of the plowing, the fall spading, the fertilizing and the seeds was nearly fifteen dollars.

Possibly this does not look like a very good business proposition to men, as we probably did not pay the taxes, the interest on the investment and expense of the garden fence in the one summer. But a woman's time has small money value and if she can do all that is expected of her in the house and with a little help on the heaviest work, take care of a garden, no matter how small, she can make it pay.

City people are afraid of the tools that are needed. A hoe or a rake is a dangerous thing only fit for a hired man and a spading fork means wreckage. Used in moderation, a short

time each day, with care at first, they are perfectly safe tools for women and their use will greatly improve their health, add to their comfort and reduce the price of living.

Mr. Soverhill: How many pies did you make from the Wonder Berry?

Mrs. Richardson: I did not think very much of the Wonder Berry at the beginning and when I got through I thought less of it.

PLANTING AN ORCHARD.

The A B C of Starting an Orchard.

Mr. Coe: We have not made any arrangement as to how this subject shall be divided, but it seems to me that the best thing to be considered is of course the site and the preparation of the land. I want to say first, however, that all people who consider themselves horticulturists are not fitted to be orchardists. A horticulturist must have a lot of energy, he must have a lot of perseverance, he must have a lot of enthusiasm, and an orchardist must go a little further than these things, he must have a lot of imagination. No man can go into any business and make a success of the business without he has imagination. He must be able to look forward to the time when that business shall be completed and be put on a paying basis. So then, the orchardist must be not only a horticulturist, but he must be a little more; he must not only have all the requisites for a horticulturist, but he must have in addition to that a lot of vivid imagination.

About the site for an orchard, there seems to be quite a difference of opinion, and yet the orchardists themselves are pretty well agreed that we should not plant one a south slope, that we should have a good soil, in other words, we should have a limestone soil, or a clay, that we must have our orchards so situated that they will have good air and soil drainage. I am

not so particular whether this orchard is planted on a hill side or on a slope. I would just as soon have an orchard on level land, provided always that it is upland; so that we have good air drainage. I would object very seriously, however, to having a sharp, or even a very moderate south slope, because of the fact that trees on the south slope in the spring get the warm air and the sunshine and they start to grow, or the sap starts a little bit on the southwest side of the tree, and a sudden freezing at night bursts the sap cells and then we have the loosened bark. A safer plan to have an orchard preferably on a north slope, or east or west slope, or on elevated level land. The preparation of the soil I consider quite an important item. If our soil is such that we can plow deeply, the deeper the better it suits me, because we want to have our soil in condition that it can take up a lot of water and will hold this water, and the deeper we have this soil, before we get to the hard soil below, the more it will hold, therefore we have a greater supply of water in reserve, so that our trees, when summer time comes and dry weather, as it almost always comes during some part of the season here in Wisconsin, we will be able to draw upon the moisture that is in the soil. Then there is another factor in having deeply prepared soil. We all of us know, I suppose, that soil washes, and if we have our orchard on a hillside, it washes under two conditions more particularly. One is when we have an excessively hard rainfall so that the soil cannot take up the water as fast as it comes and then it runs off and we have the washing. Another one is when we have a rainfall, it may be long continued, but when the soil gets full of water, gets thoroughly saturated then, of course, it must begin to run off, and when it begins to run off, then we have the washing of the soil. The deeper the soil we have, the more water it will take and hold, and the less liability we have of washing. So that it seems to me that we want the soil deeply plowed and very thoroughly worked. I would like to have it plowed in the fall, leaving it rough, and in the spring, just as soon as the ground is dry enough to begin to cultivate, cultivate the surface, harrow it so as to break up the crust that naturally comes on top of the land, to hold the moisture that we already have there, and this should be done several times, and when the time comes for the planting of the trees, then of course our soil is in good

condition, it is in good tilth and it is holding moisture that has come with the winter snows and the spring rains and our trees are enabled to get the full benefit of the water that is in the soil. Soil that is handled in this way is of course much warmer than soil that has not been so handled.

Mr. Bingham: I should like to say a word in regard to the selection of a site for an orchard. The selection of a site seems to depend a great deal upon the location; that is, the locality in our state in which that orchard is going to be planted. For instance, if we plant an orchard in Crawford county, I would not necessarily put any on high land on the top of a ridge, that is, I would not take a south slope in that location, not an abrupt south slope, but in Door county, where the general land elevation is about equal, I would plant on a south or north or east or west slope, practically no difference, because we have a good circulation of air and it is about the same temperature on all slopes, not an abrupt slope perhaps, but any slope that we have in that locality. As Mr. Coe says, we want air drainage; that is the principal thing in the selection of a site, air drainage, enough altitude for a good air drainage, then the slope does not matter so much, if it is not too abrupt.

BEST SIZE AND AGE OF TREES, APPLE AND CHERRY.

Mr. Bingham: It has been our experience in planting to use a well grown tree, what I mean by that is a tree that has grown thrifty from the start. We like a tree that has grown to the planting size as soon as possible. If a tree can be grown to a planting size in one year, we would like a one-year tree. If the average practice is two years to grow a good tree on good nursery soil and not over large, a two-year old tree is all right. In regard to a cherry, especially, I think there is practically little difference in one and two-year old trees. One point in regard to one-year cherry trees, the top starts generally at about a foot to fifteen or eighteen inches and we have a little different problem brought before the planter than in a two-year tree, and that is in regard to the forming of the top. We find that if the top starts low, we have a chance to remove some of those bottom limbs, which are almost always vigorous. The average planter does not know that the bottom limbs take too much of the growth of the tree and they will circle around the tree so

that they cut off entirely the circulation of sap. We like to remove the bottom limbs alternately, so that we get a circulation. The pruning of the roots is of importance. With trees dug in the fall and buried in the ground all winter, I would not touch the roots in the spring. If the nurseryman has dug those with the tree digger, the wounds are not very bad, I would leave them the way the nurseryman has dug them, burying them in the trench, taking them out in the spring and planting without any root trimming. If we get trees dug in the spring, I would prune the roots.

In regard to the care of the orchard; perhaps the best tools to use in the orchard are the spring-tooth harrow and a little gang plow. If our orchard is plowed in the spring when our trees are planted, we do not plow the ground any more that season. In the case of our soil we sometimes have Canada thistles and we turn those under; if in any stage the weeds bother, we put in a gang plow and turn the weeds under, giving us a good chance to cultivate again without the harrow. Cultivation otherwise than that depends largely upon the man that has the orchard planted. If he wants to put in a cultivated crop, it is all right for the orchard if the land is rich enough to produce several crops until the trees are several years old. He can grow a crop of beans and perhaps a few rows of corn. Corn is not good on account of the shade it furnishes. We found our foliage mildewed in a heavy crop of corn, where if we had left an entire row out of the corn, we would have had perhaps better success. Those crops can be rotated. Sometimes we use spring peas. The moisture that we have depends largely upon the crop that we grow in the orchard, we want to give it thorough enough cultivation so that it will hold the moisture. We do not want to put anything close enough to the trees to use the moisture the trees should have. Therefore with peas we leave about four feet on each side, then running a cultivator over that land, each side of the trees a little oftener than we would if we had the orchard all open for cultivation. That gives us plenty of moisture for the first year's planting, ordinarily. Now, this line of peas should be spread straight enough so that the space would be uniform.

Mr. Kellogg: How long would you recommend the cropping of an orchard that way?

Mr. Bingham: That depends upon the condition of the land. If my land were level enough so that it did not wash any, and I had only a small acreage, I would crop that land for about four or five years. Say the first years we plant five rows of potatoes in an orchard, in which the trees are twenty feet apart, and then we will plant a row of beans along the tree rows. That will necessitate hand work in the tree row. If you cultivate the ground, you might as well have the row there and pay for the labor in caring for the pea crop. The second year we can plant five rows of beans, we can plant closer together than potatoes. The next year, if we planted potatoes again, we would plant only four rows between the trees, because we need to have more room for the trees. The next year we would have only three rows. It is doubtful if it pays to have the three rows, although we have employed those rows in some of our home orchards. We find that the strawberries are detrimental. When you fruit them it checks your orchard trees as it takes out more moisture than the orchard can spare.

Mr. M. S. Kellogg: Mr. Bingham spoke of trees being buried outside as being preferable to trees that have been in storage. Do you believe that the spring-dug trees standing in the nursery rows are preferable to stored trees.

Mr. Bingham: I could not say positively. I will say this, that I have received trees badly injured that were dug and stored. If they are grown in a climate that does not injure them in the winter, we are not so apt to get them on our farm in an injured condition. That is in the control of the nurseryman handling that stock in his packing house. If he has in the packing house practically no evaporation, he can handle trees all right, but sometimes they are injured. We do not know anything about how they are handled; we know they come to our place in an injured condition.

Prof. Moore: I should like to ask what objection Mr. Bingham has to an open-centered tree for Wisconsin?

Mr. Bingham: The only experience that we had along that line that led us to adopt the other method was that in an orchard of five acres, where the leader was cut out after the trees had been planted for about four years, and the man has had a great deal of trouble with the breaking down of trees. The use of wire became necessary in order to hold them up. That trouble was not experienced with orchards where the leader

was left in. Now, that might have been done too late in the life of the tree. The leader of the cherry, in fact, is entirely lost after they are planted out.

Prof. Moore: I refer to the apple, of course; the cherry is a better centered tree.

Mr. Bingham: We find the same thing true in an apple or chard in our place, that we lose that leader in a few years after planting, and we leave it on simply to run the side branches a little higher than we would if we cut it out.

Prof. Moore: It seems to me that in our climate, and with the fact that we need every bit of sunshine we can get in the top of the tree, and if we grow what is known as a close-centered tree, it has a tendency to close up the top. I can see why the gentleman you referred to had difficulty in cutting out the central leader after four years. The time to cut it is when it is planted, or when it is in the nursery. When you cut it out at the end of four years you leave a hole in the tree. In filling up the frame work of the tree, those branches should be cut out at the time the tree is set, if not, you will have difficulty ever after, particularly if it has lived more than two years. Now, if you cut out that central leader and branch your trees just the same as you have in the apple, take out the central leaders, you make your trees more open, you get what is known as an open center, and you would not have any more difficulty with your trees breaking down than you will if you leave in that central leader.

Mr. Palmer: In my experience in planting, when I began I used to cut back as severely as that, and each year I cut back less, and each year I found that where I left the limbs I could get a better shaped tree, and I do not see why they do not live just as well, if not a little better. I have been wondering whether we were in the right track in cutting off the entire top of the tree because we cut the roots off. I would like to ask the Professor where the growth starts, at which end of the tree? The root or the top, which starts first?

Prof. Moore: The top starts first, because you have stored food in your plant. Take the fruit crop which you get next year, for the development of those buds the food is already in the plant tissue, just the same as there is enough food in those trees for the working of the tree to start at once after the tree



Apple trees twelve years old, set one rod apart each way. They are just beginning to crowd and it is already difficult to drive through with a power sprayer or to handle the spraying poles properly among the trees. The same condition would prevail at twenty feet apart with the orchard sixteen years old. The proper spraying and management of such orchards becomes more and more difficult with each added year after they have reached the stage illustrated.—A. R. Kohler.

is set. Now, you remove from that three-fourths of the root system, leave all the top, it is like a man going on a one-third ration, just exactly, so we have got to cut down the top in order to equalize the roots and the top.

A Member: I would like to ask what the accepted practice is in regard to the distance that standard apples and cherries should be planted apart.

Mr. Bingham: I think from the opinions that have been expressed here that 25 feet for apples in Wisconsin is about right and for cherry we are planting 20 feet square. We find that is plenty of room for at least 13 to 14 years.

A Member: You do not say anything about fertilization. I would like to ask whether before setting out the trees you would give a good coat of manure and plow that under, and then the following spring set out the trees?

Mr. Bingham: I would not delay the planting because my land was poor. I believe all soils have enough fertility to produce fairly good wood growth the first year. I would plant my trees, putting in a cover crop, and getting what fertility I could after the trees are planted. A gentleman had a farm that he got hold of that was rather poor, and he said, "Now, shall I delay my planting one year and put in a crop of oats, seed that land down and cut a crop of hay?" I said, "I don't believe I would, because the trees will get a good growth the first year, get your trees out and fertilize afterwards, and you can keep them growing right along." If you are growing potatoes I would supply enough fertility to make a good crop of tubers.

A Member: In a dry season, would you plant potatoes?

Mr. Bingham: If you keep a good dust mulch you can grow a good crop of potatoes in your orchard. In planting cherry trees, fall planted trees taken from the nursery row, buried in a trench at our place, taken up in the spring, we made 3463 out of 3475 live. We planted 100 spring handled stock, and we lost 5 out of 100, and we cultivated that orchard with a potato crop and beans along the rows.

THE IMPROVEMENT OF RURAL SCHOOL GROUNDS.

By Mr. W. E. LARSEN.

I wish that this society might have a portion of its time, if that were possible, set aside every year to discuss the school problem, because this society can do a great deal, and it can do more than it realizes in this respect. We want to keep this in mind, that one of the big things that we are working for is the making of happy and beautiful homes, that is really what we are working for, is it not? Now, do you realize what part the school plays in this matter? Remember that the boys and girls who are going to the schools are going to be the home makers of the future. We are trying to instill into the minds of these children ideals that will make them have beautiful homes. They spend six hours of the day in the school room, and it makes a vast difference whether that school room, that school house has an elevating influence, an esthetic influence, or whether things are bare.

There are a few things we want to keep in mind. First, that some of our school grounds are not fit for decoration; they are too small. Do not try to plant things if the children have not enough ground to play on. We must have playgrounds first of all. And so in many localities the first thing that ought to be done is to get a larger school ground. Then, do not try to plant trees or shrubs or vines if the cattle are running on the school ground. We must have a fence of some kind around it in case conditions demand. Then another thing, many of our schoolhouses are situated in such places that it is not really worth doing much, in other words, the school site is the most worthless place in the whole community. Where we cannot raise anything else, we put the schoolhouse, not always, but there are such places. We must have conditions such that we can fix things up. Then another thing, we ought to have some definite plan in improving school grounds. We ought to put brains into this work as well as into all other work. We ought to look forward ten to fifteen years, how these things are going to be after that. You have got to have the imagination that has been spoken of, you have got to see in your mind's eye

how that thing is going to look after those trees and shrubs are growing. I think that you as a body of men and women perhaps have better ideas as to how things ought to be than most other people, because you have had experience in planting trees, you are specialists, and so you can be of value in a community in doing this kind of work.

There are a few principles that ought to be kept in mind in planting school grounds. You want to get as close to Nature as possible, and Nature does not set things out in squares or in fives, and then you have got to study the surroundings. Landscape gardening is an art; it is different from orchard planting, and so in planting trees and shrubs in the school grounds you want to get as close to nature as possible, and the same thing applies to planting in the yard, you do not want the plants in line.

Much can be done to improve the looks of the school grounds by fixing up the outbuildings and planting vines. Another thing that has to be counted on before we go very much further, and that is, what is going to happen to these things during the summer time. It is all right to get together on Arbor Day and be enthusiastic, but what are you going to plant? By summer time, when school is not in session, who is going to look after those things? Now, that has got to be planned on. I am not going to suggest how to go at that, but some provision must be made so that those trees be looked after during the summer. Then in the fall again somebody ought to be on the school-grounds and fix them up. The grounds ought to be mowed and things cleaned up.

I want to call your attention to two things from a teacher's standpoint why we ought to have good schoolgrounds, beautiful schoolgrounds. There are several reasons, but I will mention two. First because of the esthetic value that comes from having them, that is, if you have things beautiful you are instilling into the minds of the children during those years ideals of the beautiful. They are going to have more beautiful homes in the future, if they have beautiful surroundings in school.

There is another reason. Those surroundings in the school have themselves an educational value. If you have school grounds, for instance, on which you will have say a dozen different varieties of trees and shrubs, the children get acquainted with those things, and the more we get acquainted with in life the

better educated we are. It is not enough that we learn books in school, we ought to learn things, and if we can put on the school ground real things and get the children acquainted with them, we are adding to the educational facilities by so doing.

I want to say a word in regard to school gardens. That is a subject that is brought forward a great deal. As a general proposition I do not advocate school gardens. I will tell you why; it is pretty hard to make a success of it, the conditions are not such that we can make a success of it at the present time. The school gardens can be made a great thing, but in the first place we lack teachers who can do the work, and in so many places we have not the educational interest back of it in the community, but I do suggest this,—I believe that it would be a good thing for the children to have a home garden. If each one were encouraged to have a little garden of his own at home, a small bed, and raise something for the purpose of selling the products, that is a splendid idea and that is something that is practical, but of course that lies largely with the home, although the teacher can do a great deal in stimulating an interest in that direction. I want to tell an experience that will illustrate in a great measure what can be done, if you will get the right kind of a teacher.

Up in Sauk County there is a young fellow who has an unusual amount of ambition, who took hold of a school at \$35 a month, that is about what we pay for teachers. He started to build himself up professionally, and he went in and did excellent work, he was an excellent teacher, and he got those children interested in the school grounds, began to fix up the ditch in front of the school; the children brought implements to school and they were working during the recess and noon hours fixing things up. They caught the inspiration that he had for cleaning up the yard, cut down the brush, that is of course the first thing to be done, and they got that school in fine shape. They sodded it down where it was necessary, got things growing and everybody was interested. Last year when they came to hire a new teacher they offered him \$50 a month, he did not have to go around and ask for the school, they had found out that they had somebody that was worth more than \$35 a month. He is now teaching there for \$50 a month and he goes on with the good work. Now, then, the effect is that every time a parent goes by that school he is proud of it, he feels a pride in that

school, not only that, but every time a parent goes by that school he gets suggestions for improving his own home. We have no idea of the influence we have in our community if we live a beautiful life, if we surround ourselves with beautiful things. Much can be done in every community wherever the conditions are such that anything can be done, and you, being in this work, can do much by giving your ideas and suggestions, and especially if you are on the school board, and if you have men on the school board who will do nothing in your district, go to the school meeting next year and vote them out and get those in who will do something. We have got to get men and women into this work who believe in the school, who believe in the influence of the beautiful.

That is about all I have to say. I would like to have a few give a little testimony here. As you know that the Horticultural Society has taken charge of a few schools throughout the state, and I would like to get a little testimony here as to what has been done in your community, if anything has been done. I am here to get suggestions and ideas, just as much as to give, because I am meeting schoolboards every day, practically, and they are asking questions, and if I can tell them of things that have been done, I am making myself very much more useful. One of these schools is located in Door county, and I would like to ask Mr. Craneheld to tell us about it.

The Secretary: The hour is rather late to enter into any extended discussion of this work. I outlined it briefly in my annual report which I read to you yesterday morning. There are seven schools located in different parts of the state, one each in the counties of Sauk, Grant, Door, Manitowoc, Dane, Fond du Lac and Waukesha. The work is progressing very slowly, it is an immense field, it will take us ten years before we will make any great impression upon the school grounds of the state. That is no reason for discouragement, and I feel absolutely certain that if we continue along the lines suggested by Prof. Larsen, that we will win out in time. But it takes time, slow and careful work is necessary; it is quite possible that we have scarcely begun on the right lines, but if we find we have not we will back up and begin over. We are not afraid or ashamed to admit where we are wrong. It is not as if an individual were working, it is not as though a schoolboard were working, it is the State Horticultural Society that is back of it with its prestige

and experience gained through fifty years, and I know we will be able to accomplish a great deal in time. I do not care to go into details at this time as to the work, I hope to be able to inform you through the pages of Wisconsin Horticulture in regard to the work more in detail.

The President: I think Mr. Craneheld has allowed himself to dwell on one side and not on the other, and I wish that he would tell what he has told some of us about other districts who have taken up that question and are acting independent of any action of the society any more than to look to the society for information and inspiration.

The Secretary: I would be pleased to do that if I had the data here. I said, I believe it is rather a slow process, I will stick to that. But I will say, although it apparently contradicts that statement, that the spirit is at work, it is moving in the state, and I feel certain that if we were to make any general announcement throughout the state that we would furnish help to all school districts that ask for help in this line, we would be overwhelmed with applications, it would simply take an other office force to take care of it. We cannot do that. I might mention that I have just completed a little plan for a school district which has applied for help, way up in Sawyer county in the Thornapple region. We are all more or less familiar with that region. They have a schoolhouse located 14 miles away from a railroad, and ask for aid in improving their school grounds, and we have made some suggestions and sent some plans. We had an application from a school district just over the line of Dane county, in Rock county, last spring, a consolidated school which has purchased, not four rods, or a quarter of an acre, but *four acres* of land for playgrounds for its children and placed on that a \$15,000 school building, and when it was done they called on us for aid to help improve their school grounds and we have given them such aid as we have been able to do with our limited office force. We have applications from all over the state, in spite of the fact that we have never made any general offer to furnish them help, so that I am certain the spirit is moving.

I am also reasonably certain, as I consider the work more fully, that we need to revise our original plan. The crying need of the rural schools of Wisconsin is not so much the planting of shade trees and flowering shrubs and roses and vines,

which after all more or less encumber the limited space which is allowed for the children,—it is more extensive playgrounds, it is space where the children can go out and run and play that we need more than we do really the decoration of the school grounds. I dare to say, and without fear of successful contradiction, that on the average the school children of Madison, where real estate is worth anywhere from \$25 to \$1,000 a front foot, have more extensive playgrounds per pupil than the average rural school of Wisconsin. According to my observation, the rural schoolgrounds will average considerably less than one-half acre in extent. It is disgraceful, it is a reproach to the people of the state of Wisconsin. It is not necessary for me to go further into that, or say more. Prof. Larsen said it better than I could hope to say it.

A Member: One question I would like to ask Prof. Larsen is this,—what would he consider a model schoolground, I mean now, how much land? What do you consider, under ordinary circumstances, a model size?

Mr. Larsen: Well, there is no specific amount. The recommendation of the state department is that the school ground ought to be at least an acre, and there are a great many school districts in the state, I am glad to say, during the past two or three years especially, have been adding to their school grounds.

The President: In our own district we have now more than two acres, and we want still more. We have plenty of room for decoration, but not quite enough for playground.

Mr. Larsen: I should think an acre ought to be the least. Of course if you can get more you should do it, because the land is increasing in value all the time, the time will come when the next generation will want more; very likely you can buy it cheaper now than any other time, and the schools are going to improve in the future. We are going to do some great things during the next twenty-five years, there is no question about it. I want to call attention to one thing right here, we might as well face it now as well as any other time, the time is coming when some of these smaller schools will have to be abandoned. The governor in his message today made mention of the fact that there are 97 schools in the state of Wisconsin with an enrollment of five children or less, and there are nearly 400 that have an enrollment of less than ten. Now, of course, we love these little schoolhouses, but we all love our children

more, and in some of the thinly settled districts of the state, where real estate has a good price and where people can afford to give their children a good education, the time is coming when that sort of thing must be done away with, and we have got to have consolidation of some kind. Now, we are not preaching consolidation promiscuously, saying, consolidate here and there and everywhere. I know enough about the state of Wisconsin to know that that is entirely impractical and unwise, but there are places where we ought to close up our schools and make provisions to send our children to some other place where we can afford to have a good teacher, because you cannot get the teacher who will be a good teacher who would be satisfied to stay with half a dozen children, and so in places of that kind we ought to consider not so much the fixing up of the grounds that we have, but the best interests of the pupils along educational lines.

SOIL MOISTURE AND PLANT FEEDING.

By PROF. F. H. KING.

The higher value of a crop per acre the more important become intensive cultural methods and the more essential it is that every factor of growth be made to exert its maximum influence on the crop.

The greater the acreage cost of maturing and marketing the crop the greater should be the attention paid to every factor which influences yield in quality and quantity.

The more capital there is permanently invested in appliances, and the more labor and other expenses are necessary to secure and market a crop, the more important it becomes that all soil conditions be maintained continuously at the best, and that a good crop shall be positively assured.

Horticulturists as a class are engaged with crops having a high acreage value, which require relatively large acre costs; a large permanent investment and a large current expense. To them, therefore, the best possible growth conditions must be peculiarly advantageous and poor growth conditions correspondingly unfortunate.

Soil moisture in abundance, continuously maintained, is an indispensable factor in the growth of any crop. It constitutes from 70 to 90 per cent of the actively growing part of every plant. Through the action of light in the green of leaf, water, entering from the soil, and carbon dioxide entering from the air, react to produce the largest part of all the substances of plants. No plant food in the soil is available to the crop until it is dissolved in the soil moisture, and through its solvent action and its movement through the plant, water conveys all plant food to the tissues and distributes it to the growing parts. It is not strange, therefore, that the right amount of water in the soil is so important a factor in the production of large yields.

But important and large as is the part water plays in crop production, it is powerless to produce results if other essential factors are absent or are not sufficiently abundant. When phosphorus, potassium, nitrogen or any other essential plant food element is deficient in the soil, an abundance of soil moisture will make the crop the largest possible under such conditions, but not as large as it could have been had other plant foods been abundant. On the other hand, it matters not how plentiful other plant food substances may be in the soil, the crop must be limited by the amount of available water. When all plant food substances are continuously abundant the size of the crop is limited by the number of plants and their ability to feed and grow.

In our ten-year measurements of the amount of water used by crops it was found that, in average round numbers, about 450 pounds of water must be taken from the soil and most of it passed through the crop for each pound of dry substance produced above ground. With good soil conditions and an abundance of plant food it was possible to secure yields from ordinary crops of six tons of dry substance per acre. Six tons of dry substance means 24 tons of sugar beets, with tops; it means 7 tons of hay containing 15 per cent moisture; 92 bushels of wheat with straw, and 756 bushels of potatoes, with vines, per acre. These are large yields but nevertheless possible and practical under intensive cultural methods when there is an abundance of plant food and soil moisture maintained. But the right amount of moisture means about 4 inches of effective

rainfall for each ton of dry substance produced, or 24 inches during the growing season. We get less than this and it is not distributed so as to be most effective.

In China and Japan, where they must raise large crops every year or starve, they have been compelled to irrigate although they have a larger summer rainfall than we. More than half of the cultivated lands of Japan are irrigated every year, but they also fertilize high, applying, on the average, from 3 to 5 tons of manure in some form, per acre, every year.

We do not sufficiently appreciate in our practice that to double the crop on the ground we must at the same time double the crop feeding. This means that the soil must turn over to the crop double the amount of nitrogen, phosphorus and potassium, and that double the amount of soil moisture must be taken up and passed through the crop. Abundant harvests occur only where there is abundant moisture and abundant food at the time when the crop does its most rapid feeding and most rapid growing. If either soil moisture or accessible plant food or both be deficient at the critical period a reduced harvest is inevitable. The Chinese and Japanese, always working small areas, watch these critical periods with the greatest care and whatever may be deficient they make a desperate effort to supply at just the right time.

Then where large yields are expected it is very important to understand that less water is required for a crop, in proportion to the yield, when the soil is abundantly rich. We found that when in abundantly rich soils, corn, oats and potatoes used an average of 355 pounds of water for each pound of dry product, on the same soils, after they had become impoverished by repeated cropping, the same crops used an average of 625 pounds of water for each pound of dry produce.

It is also true that a continuous abundance of soil moisture will permit a soil poor in other plant food to produce the largest possible yields for such conditions, and from this it follows that where there is an especially rich soil an abundance of soil moisture is extremely desirable, and that where the soil is poor it is doubly important that the soil moisture should be kept at the best amount.

Where all plant food substances are in great abundance in the soil yields are almost exactly in proportion to the amount of moisture which can be supplied to the soil without making

it too wet. Thus, we found, in our trials, that corn gave a yield of 11,000 pounds of dry substance; oats 8,000, and potatoes 7,000 pounds per acre when about two inches of water more than that contained in the surface four feet of soil at planting time, when it contained the best amount for growth, was given; but under identically the same soil conditions except that the soil moisture was kept constantly at the quantity for best growth, the corn produced 16,000 pounds per acre, instead of 11,000; the oats produced 18,000 pounds, instead of 8,000; and the potatoes produced 12,000 instead of 7,000. But the amount of water used per each pound of dry substance produced was very nearly the same in both cases.

With a combination of high fertilization and complete control of soil moisture it is practicable for market gardeners to increase their yields per acre by planting closer on the ground than is the usual practice, and this has long been regularly done in China and Japan. We found potatoes for the early market planted in rows one foot apart and with the hills in the row less than this distance. String beans are similarly planted, and cucumbers are grown in rows 28 inches apart with a plant every 8 to 12 inches in the row, the vines being trained on trellises. But these practices would be entirely impossible without high fertilization and a complete control of soil moisture.

In our trials with cabbage, only moderately fertilized, where the plants were set 30 inches apart each way, the yield per acre of dressed heads was 15.3 tons; but where planted 30 inches by 15 inches, the yield was 23.3 tons per acre of marketable heads, and the total green weight of the crop in the two cases exceeded 39 and 59 tons respectively.

There is still another great possibility of increasing the annual returns in market gardening where there is a complete control of soil moisture, and this is in the growing of multiple crops, a practice also long and generally observed in China and Japan.

We found, in the province of Nara, Japan, the farmers following a rotation practice covering five or six years in which they grow four or five consecutive crops of rice, yielding 59 bushels per acre, worth \$90. After harvesting the rice the ground is fitted and planted with barley in November, always in rows and usually in hills in the row. Early the next spring soy beans are planted between the barley rows. When the barley is harvested its usual yield is 55 bushels per acre, worth \$36,

The soy beans are cut green as a fertilizer for the following rice crop, the usual yield being 5 and 6 tons per acre. After the fourth or fifth year of this rotation the ground is planted to melons or some other garden vegetable, from which they realize \$160 per acre. They are thus realizing from a general farm practice a yearly earning of between \$126 and \$160 per acre, but this would be impossible without their practice of high fertilization and irrigation, notwithstanding they have a larger summer rainfall than occurs in the eastern United States.

These lines of advance in agricultural practice must become more and more important in the United States as the country grows older and more populous, and hence it is very important that our nation, in laying plans for the development and conservation of our water resources, should include agricultural interests in the policy, with a view to securing perfect land drainage and supplemental irrigation in the eastern part of the United States where the questions will come to be of far greater importance to the nation as a whole than they ever can be in the west where water for irrigation is so limited.

When we shall have learned and acquired the habit of maintaining in our soils all of the plant food a maximum stand of the crop on the ground can utilize, then water, if only supplied in the form of direct rainfall, will always be the limiting factor of yield and we shall never be able to reap, year by year, the largest harvests until we arrange to supplement the rainfall at critical periods.

There is, however, great room for improvement in the methods of soil management aiming to better conserve and utilize the rainfall we do get. Here is where growers must begin and must continue where water to supplement the rainfall is not available. Let us consider the orchard feeding problem. It is by no means a simple matter to plan the practice which shall prove best for a given orchard. Suppose it is an apple orchard brought to the age where it should produce 400 to 500 bushels of apples per acre each year. What will be its probable needs for water? Four hundred or five hundred bushels of apples would contain 4,440 to 5,500 pounds of dry substance and there would probably be produced at least an equal weight of leaf and twig, making in all 4.44 to 5.55 tons of dry product, which would require not less than 18 to 22 inches of rainfall to mature it, at

the rate of 450 pounds of water per pound of dry substance, or at the rate of 4 inches of rainfall per ton.

We receive at Madison, between May 1st and October 1st, an average of nearly 18 inches, so that during about one-half the years there may be sufficient rain to produce 400 bushels of apples per acre, provided there is no loss of water by drainage, no unnecessary loss by surface evaporation from the soil, and provided the soil carries an abundance of other plant food easily within reach of the roots of the trees.

What are the comparative merits and efficiency of (1) clean cultivation alone; (2) clean cultivation and mineral fertilizers; (3) clean cultivation with animal manure; (4) cultivation and cover crop plowed under; (5) sod with grass cut and left where it grew; and (6) sod with grass cut and used as a mulch around the trees, on the physical condition of the soil; on the maintenance of plant food, and on available soil moisture?

In our field studies in four states we found, for each of 8 soil types, that the amount of moisture at the end of the growing season, under clean tillage, was less than the equivalent of half an inch of rainfall greater than it was under a crop of corn growing on one side, and under a crop of potatoes growing on the other. The soil had received the same cultivation in the three conditions, a three-inch mulch being developed after every rain until the corn and potatoes were laid by, and often enough to keep the land clean, continuing the cultivation on the fallow ground until near the end of August. We also found that the evaporation of moisture from uncultivated, continuously moist soil was but 1.7 inches less, during 100 days, than it was from the same area of soil bearing a crop of corn which yielded at the average rate of 13,881 pounds of dry substance per acre.

These results may seem to contradict the general teaching regarding the efficiency of earth mulches and the value of cultivation to conserve soil moisture. They do not, however, and they have a very important bearing upon the practices of orchard management which have been specified. So soon as soil becomes very dry it is extremely effective as a mulch but so long as it remains moist it conducts water rapidly and the evaporation from it may be much faster than from a free water surface. The year of the experiments cited was one of even distribution of rainfall in the four states, which amounted to between 18 and 22 inches for the growing season, so that although the fields were

repeatedly cultivated to restore the mulch, and after each rain, the mulch effect was destroyed often enough to permit the total loss of water by evaporation to be nearly as great as it was where the crops were growing. The crops dried the surface soil, so much more than the fallow ground did, that under the crops the mulch was more quickly restored and more effective than that on the fallow ground.

From these facts it follows that growing of a crop in the orchard does not deplete the soil of its moisture so much more than the losses from naked cultivation would, during those years when the rainfall is good and well distributed, as might at first be expected. But in regions of small rainfall, and during seasons of drought in humid climates, and especially when the intervals between rains are long, the growing of a crop in the orchard must have a very pronounced effect upon the moisture left available to the trees, because the crop must take not less than 2 to 4 inches of rain for each ton of dry produce per acre. The average amount of water carried in the surface four feet of the soils we have cited was only about 13 inches, and less than half of this can be used by the crop, and still leave the moisture content sufficient for rapid growth.

If, however, the orchard is in sod and the grass is cut three or four times during the season and left where it falls, there occurs a week to ten days between each cutting when the soil is under a very effective mulch and when the evaporation from the crop is relatively small, so that we need not be surprised to find a critical test of the question to show that this type of orchard management, may really conserve quite as much or even more moisture, in humid climates, than does naked tillage, and there are other very great advantages associated with this method. Whenever rains come, even though they be heavy, and where the surface may be far from level, the rain is compelled to enter the soil where it falls, causing it to be uniformly wet and no washing or injury to texture can result, as may be the case with naked tillage. Besides this, the water is likely to enter the soil more deeply and the cut grass provides an effective mulch the moment the rain ceases, except in so far as the growing crop uses moisture.

But the loss of moisture through the crop cannot be counted entirely a loss to the orchard for the reason that it is helping

the grass collect from as deep in the soil as its roots grow, soluble plant food, bringing it up where a large part of it will ultimately be returned to the surface soil, placing it where the most active feeding roots of the trees are located. We have found the sap of most plants, in their succulent stage of growth, extremely rich in all of the essential soluble plant food materials, and that this is very readily and quickly washed out. All are familiar with the great injury done to hay by a drenching rain, which washes out its soluble organic products and with them nitrates, sulphates, and carbonates of lime, potash and magnesia, together with phosphates. With the repeated cuttings, therefore, of the cover crop, whatever they may be, the leaching of the rain must return to the soil a part of the food which the crop has gathered, and this is turned over to the tree roots in the most available form and place. Even the nitrogen, potash and phosphorus which have become fixed for the time being begin at once to be liberated and gradually turned back into the soil, so that the grass cover, repeatedly cut and left where it falls, exercises a continuous pumping process, bringing plant food into the surface 6 inches from depths as great as four feet, placing it in pre-eminently the best place to serve as food so long as the soil is sufficiently moist for strong feeding.

The experiments of Professors Green and Ballou, of the Ohio Experiment Station, along these lines, are extremely illuminating, fundamental and important, and particularly so are the results they obtained from the sod mulch treatment where the grass, when cut, was placed about the trees year after year and permitted to leach and rot there. By this treatment the grass gathered food from all over the orchard and from a depth of 3 to four feet, and this was concentrated in the soil near the surface and immediately about the trunks, widening the area as the tops and roots spread. It was found that the fine fibrous roots of the apple trees even developed strongly above the ground, forming a dense mat at the bottom of the mulch itself, where it was crumbling into mould and being transformed into humus, and where the leaching from every rain brought down added food. It was found also that in the surface 6 inches, and below to a depth of a foot, the root development was markedly stronger than it was under the cultivation and cover crop treatment. Undoubtedly the much larger root development under the mulch was the result of the habit of a plant to develop its

roots most strongly where there is the best feeding, and it is quite probable that in this case it was plant food substances other than soil moisture which determined the root concentration. Whether this concentration of the mulch about the trees is the best practice may be open to question. It is the general practice in China and Japan to fertilize chiefly under the tree tops, the Japanese rule being to apply fertilizers to a circle equal to two-thirds that covered by the top. The tea orchards, after the bushes become large, and especially on hillsides, are kept very heavily mulched with straw or litter of some kind, and we saw it a full foot in depth, covering all the ground. In China, too, mulberry orchards are fertilized most strongly directly under the tops. We saw cases where the soil had been entirely removed to a depth of 3 or 4 inches over a circle not quite equal to that covered by the top, and this covered with a layer of silk-worm droppings together with the bits of leaves not eaten and the moulted skins, thus returning to the soil all except the silk which had been removed, and this covered by replacing the soil. Indeed, in their general practice of "plant feeding" these people nearly always apply the food very close to the base of the stems rather than uniformly over the soil surface.

In case of clean tillage, if this is followed year after year, it must impoverish the soil of its organic matter and nitrogen; there would not be a large saving of moisture in humid climates except during long dry spells; bacterial action would be greatly reduced, so that relatively small amounts of phosphorus and potassium carried naturally in the soil could be rendered soluble and available to the trees. The texture of the soil would deteriorate and unless the surface was level there would be serious washing.

If mineral fertilizers were used to keep up the plant food there would still be a rapid loss of organic matter and the impairment of soil texture might be even more rapid and very serious on clayey soils if the nitrogen were supplied in the form of Chili-saltpeter, for the reason that the sodium of the nitrate becomes converted into the carbonate when the plant removes the nitric acid, and the carbonate is the "black alkali" of the west, which everywhere has the tendency to dissolve humus and puddle the soil. In this impaired condition a higher per cent of the soil moisture becomes unavailable to the crop, soil aeration is less



Gays Mills, Trial Orchard, Sept., 1910. Oats cover crop. Trees planted May, 1908.
Photo October, 1910.



perfect, rains penetrate the ground less readily, and there is greater danger of injury by washing.

Where an abundance of organic manure is used, with naked cultivation, and where the orchard is level, much better results will be secured and quite likely a higher available water content could be maintained if sufficient care were exercised in the cultivation.

Where the cover crop is used and this is turned under either late in the fall or early in the spring, and especially if the cover-crop is some legume, which under the conditions develops nodules strongly on its roots, nitrogen would be gathered from the air and organic matter in the soil would, through its decay, liberate the phosphorus and potassium present in the soil, and would render any rock phosphate applied as a fertilizer soluble and available to the orchard. In this treatment it should be remembered that thorough, frequent cultivation, especially in the spring when the soil is moist and until the new crop of fibrous feeding roots from the trees has developed into the surface soil, does much more than conserve soil moisture. Indeed, one of its main advantages is that of developing plant food through its stimulation of stronger bacterial action. The mulch also performs an important function in preventing the plant food from rising into the surface where the soil becomes dry and where it is beyond the reach of the roots.

Whenever the straw or litter mulch is practicable in market gardening and small fruit growing or in orcharding it has many desirable effects to recommend it as a rational treatment. It is a good method of fertilizing, adding both organic matter and ash ingredients, which gradually leach into the soil with the greatest uniformity of distribution. It conserves moisture most effectively, both by reducing evaporation and inducing even, deep penetration of the rainfall; it avoids soil washing and soil puddling and it helps to control weeds.

Thorough deep drainage and deep strong granular structure of the soil permitting deep complete aeration and easy effective drainage are indispensable conditions for permitting soil moisture to render its greatest service both in feeding the crop above ground and in feeding the crop of soil bacteria in the ground, which play so important a part in preparing plant food for the crop above ground, whatever that may be. To produce and maintain this structure there must be ample underdrainage and

the soil must be kept supplied with an abundance of organic matter and an abundance of lime carbonate, both of which help to maintain strong granular structure, as well as to contribute plant food, first by strongly favoring the solution of the insoluble potassium and phosphorus compounds in the soil, and by direct addition of plant food themselves.

The late plowing in of stable manure in the fall, leaving the surface rough and loose, and then the earliest thorough, and repeated stirring of the soil in the spring, is the best possible treatment to conserve winter rain and snow, to save moisture which comes early in the spring, and to enrich the soil with immediately available plant food such as will stimulate quick strong growth and deep rooting, and so condition the crop as to enable it to make the most possible out of the available soil moisture and other plant foods and so give the largest practicable returns.

Mr. Street: I would like to ask what has been the experience in those orchards with the roots just under this mulch, when there comes an extra hard winter later on, will not these roots be injured?

Prof. King: Prof. Green has made a very careful study of that question, learning what the actual distribution of the root is under the mulching and under the naked tillage, and the cover crop. He cut out a cubic foot of soil at different places in the orchard and then sliced off the surface two inches, then the next four inches, then the last six inches and put them on a screen and pumped water on these soils and washed the soil away and photographed the roots left on the screen. He found there were most roots in the surface two inches, more roots in the next four inches and least roots in the bottom six inches of the foot. The larger roots were in the bottom six inches of the soil, but the small, fibrous roots were up in the four inches and in the surface two inches. Where the mulch lay thick on the ground so that it decayed and kept the ground continuously moist, the fine fibrous roots came up into the mulch in by far the largest amount. What the facts are in regard to the life of those delicate feeding roots, I do not know. But I fancy

their life is very much the same as the life of the leaves; that is, they serve for one year and then new roots are formed as new leaves are formed. If that is the fact, it is not a matter of so great importance just where such roots happen to be at the end of the season.

We doubt the wisdom of continuing the concentration of the mulch long close about the tree, but to let the roots range through all the soil. When a tree gets to be large, if the roots are in too small a volume it can get neither sufficient moisture nor food, they do not travel rapidly in the soil and the roots must go out ultimately to larger areas.

Mr. Kellogg: I would like to ask the Professor how long after the application of finely ground phosphate rock will the effect be noticed in the growth of trees or other woody substance? Will it take one or two years?

Prof King: The response of the rock phosphate depends almost entirely on the amount of organic matter there is in the soil, and the amount of moisture there is present. If the organic matter decays rapidly and there are good moisture conditions, the acids that are liberated, the nitric acid which is formed in nitrification, and the carbonic acid which is formed in the decayed organic matter, both combine to act upon this phosphate and to render more or less of it soluble. Of course the finer it is ground, the more surface is presented and the more rapidly it is dissolved.

CONCENTRATED LIME-SULPHUR SOLUTION AS A SUMMER FUNGICIDE.

W. W. CLARK.

The value of the self-boiled lime-sulphur solution as a summer fungicide has been ably presented to you in the preceding sessions of this meeting. It will nevertheless occur to some, that, advantageous as its use may be in point of effectiveness, it requires about as much time and labor and possibly more skill in preparation and application, as does the Bordeaux mixture.

A spray solution which is as effective as these two sprays, and

yet which can be prepared, stored and handled in a concentrated form, and prepared for use merely by diluting with water, would be welcomed by the commercial fruit grower, as well as by the amateur. Such a preparation seems to have been found in the concentrated lime-sulphur solution, prepared by boiling with artificial heat.

This spray was first used as a summer fungicide by Professor Cordley of the Oregon Experiment station in 1907. It is my purpose to outline the present practice and opinion regarding its use as based on experimental evidence.

Bulletin 99 of the Pa. State College Experiment Station describes the preparation of solution as follows:

For fifty gallons of concentrate, use the following: 50 lbs. stone lime (testing over 90 per cent CaO . and less than 3% magnesia) 100 lbs. sulphur (either flour, flowers or "powdered commercial," 99.5 per cent pure, water to make up to 50 gallons, total product.

Put 10 gallons of water in kettle and start fire. Place lime in kettle. When slaking is well started add the dry sulphur and mix thoroughly, adding water enough to maintain a thin paste, which requires about five gallons. After the slaking and mixing are completed, add water to make up to about fifty gallons. Bring to a boil and stir until the sulphury scum practically disappears. Add about ten gallons more of water and boil down to fifty gallons. Keep material well stirred during the entire process.

Boiling should be continued only until the sulphur granules are evidently dissolved. This requires fifty or sixty minutes of actual vigorous boiling usually, and boiling should always be vigorous. Too much or too little boiling is objectionable.

The finished product may be immediately poured or strained into a barrel or tank for storage. When properly made the sediment left in the strainer is insignificant and may be thrown away.

When properly handled, such lime-sulphur solutions apparently can be preserved indefinitely. Continued exposure to the air results in the formation of a thick crust. Covering the surface with paraffin oil or any other heavy oil before the concentrate cools will prevent this. Storage in tight closed vessels, entirely full, is satisfactory.

The question of the effective strength of dilute solution for

spraying is one upon which there is naturally considerable variation. A strength of one gallon of concentrate to twenty-five of water is recommended by the U. S. Bulletin on lime-sulphur. One to forty has been used by the Cornell station with success. Since, however, the strength of the concentrate will vary according to the exact amount of water used, purity of lime, etc., it is recommended that dilution be based upon the specific gravity of the concentrate as determined by a hydrometer. The exact strength of the spray may then be determined very easily by a simple arithmetical calculation from furnished tables.

Since the first trial of this spray in 1907, experiments to determine its effectiveness as a summer fungicide have been carried on by a number of observers. I will cite their conclusions briefly.

On potatoes and truck crops, two years' experiments by the Bureau of Plant Industry at Washington have apparently resulted in favor of the Bordeaux mixture where the two were compared. Mr. Orton, in charge of the investigations, states that since such crops are not particularly subject to spray injury by the Bordeaux, they see no reason at present for abandoning it.

Two years of experiments on fruit by the same bureau lead Mr. Scott to recommend Lime sulphur as a substitute for Bordeaux for the control of apple scab, leaf-spot, cedar rust and some other minor troubles. It controlled these diseases fully as well as Bordeaux and left the fruit in much better condition, according to a letter written the last of November, 1910. Some slight scorching of the foliage was observed with one gallon of concentrate to 33 of water. 1 to 40 gave good results with the cherry.

A letter from the experiment station at Geneva, N. Y. says, "There has been a large amount of spraying done in this state the past season with the lime sulphur. and it is the opinion of the orchardists and experts that it is likely to supersede Bordeaux for spraying apples." Injury to fruit and burning of foliage was apparently less than with Bordeaux.

Prof. A. B. Cordley of Oregon has used the spray for four summers, as mentioned before. He says, writing about a month ago, that lime sulphur has been found to control scab better in the Willamette valley than does Bordeaux. It also

caused no injury whatever to fruit, whereas it was almost impossible to use Bordeaux under their conditions without causing serious russetting. In the Hood River valley results were as good in control of scab. Several days of extremely hot weather immediately following one application resulted in some injury to trees and fruit. After the hot weather, sun-scald appeared on the south and west sides of treated trees. Severe russetting also occurred as the season advanced and the fruit began to ripen, upon the side of the fruit exposed to the sunlight. This fruit was however, usually graded as "choice," indicating that the damage was not extremely serious.

Two years of experiments by the Cornell, N. Y., experiment station have indicated the following conclusions.

1. Lime sulphur plus arsenate of lead is equally as effective against apple scab as is Bordeaux mixture plus arsenate of lead.

2. Lime sulphur plus arsenate of lead is less dangerous than Bordeaux plus arsenate, both as to fruit and foliage injury.

3. Lime sulphur causes little or no russetting of fruit. Apparently there was less russetting on sprayed trees than on unsprayed trees beside them. There is much natural russetting in New York.

Other results from this station will be quoted later.

At present the exact nature of the fungicidal action of lime sulphur is in doubt. It is held by many investigators that the higher compounds of calcium and sulphur have the most value in this respect, probably owing to their decomposition and action of the resulting free sulphur. Chemical analysis has shown that the greater portion of the combined sulphur in solution is in the form of tetrasulphide and pentasulphide of calcium. To these the golden brown or amber color of the solution is due. Calcium thiosulphate and calcium sulphite and sulphate are present in smaller amounts, the last two in the sediment, their presence being undesirable since they indicate reduction or oxidation of the compounds higher in sulphur and the liberation of free sulphur.

Upon drying on the trees, the chemical composition of the sulphur compounds begins to change; the sulphides are gradually oxidized to thiosulphate, to sulphite and eventually entirely to calcium sulphate and free sulphur. The sulphate is inactive and has no value as a fungicide. The soluble com-

pounds are removed to a greater or less extent by rain, the duration of their effect being thus somewhat dependent upon weather conditions. It is variously estimated at three or four weeks and four or five months.

In the sediment are found impurities from the lime, lumps of sulphur, free sulphur, and calcium sulphate and sulphite. Magnesium oxide may be present, if the lime used contained this compound. The Corvell experiment station is of the opinion that the sediment has very little fungicidal value, except in the case of magnesium oxide, which is valuable. It is therefore best disposed of by straining or settling from the clear solution.

Since the highest content of combined sulphur in solution is assured by the greatest possible proportion of calcium pentasulphide in solution, it is important to determine what practices produce the sulphides in largest amount in making the concentrate and what effect various practices have on them afterward.

Investigation shows that a proportion of one pound of lime to two pounds of sulphur gives most favorable results. The formula most often recommended for treating scale insects is 2 lbs. of lime, 15 lbs. of sulphur and 40 gallons of water, an excess of lime of 175 per cent. This may be justified in this particular case, however, by the loosening effect of lime upon the scale coverings. The effect of an excess of lime in concentrate to be stored is to cause the formation of orange-red crystals of sulphides, upon standing. This weakens the solution, although the crystals may be dissolved by heating. Excess lime also results in the reduction of some of the higher sulphur compounds to insoluble sulphites and sulphate. Lime with considerable magnesium in it may be used, but apparently with a waste of sulphur. Magnesium oxide attacks the calcium sulphides with resultant liberation of sulphur. There is considerable conflict in results of investigations of this question. At least it is not claimed by anyone that the presence of magnesium is particularly beneficial.

Boiling much less than fifty minutes, or anything but vigorous boiling results in a weak solution. Boiling longer than fifty or sixty minutes has been found to actually lessen the amount of sulphur in combination with the lime by oxidation of the higher sulphur compounds.

The naturally dark color of the lime sulphur spray is some-

times objected to because of difficulty in assuring complete covering of the trees. From four to six pounds of lime is sometimes added to a barrel of spray mixture, to serve as a marker. The Pennsylvania State College Exp. Sta. says, "The addition of extra lime as a marker is objectionable mechanically and apparently also chemically. Its addition seems to break down the higher sulphur compounds, and is especially bad where much magnesia is present in the lime."

Prof. Whetzel of the Cornell station says on the contrary, "Our experiments indicate that the addition of lime to lime sulphur, as a marker or for any other reason, using it at the rate of 4 lbs. to 50 gallons, does not materially affect the efficiency of the lime sulphur as a fungicide or its burning qualities to the foliage." Of course spray solution with lime added must not be allowed to stand for any length of time before applying because of danger of crystallization.

The addition of arsenical poisons to lime sulphur for the control of the codling moth has also raised the question as to whether the breaking up of the higher sulphur compounds reduced the value of the spray as a fungicide. The Ontario experiment station made quantitative chemical tests and reports that lead arsenate and calcium arsenite remove an insignificant amount of sulphur from solution, while Paris green has an appreciable action. The Cornell station finds that "With our present knowledge we do not regard it as safe to use any other insecticide with lime sulphure except the arsenate of lead." To our great surprise they also report that "The addition of lead arsenate to lime sulphur increases its efficiency as a fungicide at least 50 per cent. and at the same time reduces its tendency to burn the foliage." We shall await further confirmation of this finding with interest.

Bulletin 99 of the Pa. station makes the statement: "The use of paris green in the lime sulphur solution we believe to be undesirable. It is unsafe, unstable and uneconomical." Arsenite of lime is recommended.

Prof. Cordley of the Oregon station, quoted before, asserts that injury to trees or weakening of the lime sulphur spray by the use of lead arsenate in combination with it, occurs only when acid arsenates are used. He recommends the use of the neutral or ortho arsenates, of which he names for commercial brands used in that state, viz., "Star," "Grasselli's," "Beans's"





North.

South.

Sun-scald of horse chestnut tree. This same sort of injury occurs on various fruit and ornamental trees especially on the south and southwest sides of the trunk.



Body Blight or Canker.

1. Upper left, started from the large pruning wound has spread down and up. 2. Upper right, started from a blighting twig of which the dead stub shows at center of cankered spot. 3. Lower left, started from crotch seam. 4. Lower right, old ease of crotch canker, tree nearly girdled.

and "Sherwin-Williams." The acid arsenates are not to be condemned without further experimental evidence against them, however.

This completes the brief survey of the more important recent developments in the use of concentrated lime sulphur as a summer spray. The general opinion is distinctly favorable to its use on apples, plums, pears and cherries. For peaches extreme care must be used to avoid burning the foliage. During the next few weeks or months much of value will doubtless be published on the use of this spray but sufficient work seems to have been done to definitely establish its value.

APPLE TREE CANKER.

Professor L. R. JONES, Madison.

Your secretary has asked me to open the discussion of some phase of orchard diseases. As I have renewed acquaintance with the orchard conditions in Wisconsin during the last year I have come to realize that you are making gratifying progress in the solution of some of your orchard disease problems. But a few years ago and the discussions along these lines dealt chiefly with the diseases of fruit, the scabs and rots, and how to prevent them. You now know well their nature and how to control them by spraying. Then leaf maladies claimed attention and there is now little need before such an audience as this of emphasizing the importance of healthy foliage for the production of a strong crop. Perhaps no one has shown more clearly than did Professor Goff how the nature of the bud and fruit of the next season are dependent upon the leafage of the last summer.

Now that you understand the nature and importance of fruit and foliage diseases and the methods of controlling them by spraying you are following the natural line of progress by turning attention to the diseases of the stems or trunks of your trees, as evidenced by the recent publications dealing with body blight and canker issued by your secretary. These maladies are as a

rule less obvious, slower in their development, and the damage done is not so immediately evident. In the end, however, the results are even more disastrous. The effect of the fruit disease is largely confined to the one crop; that of the foliage to two seasons; but injury to the tree trunk is likely to result in maiming and weakening for life if not in the early death of the tree itself.

But, as already suggested, the progress of disease in the branches or trunk of the tree is likely to be slow and the cause or causes obscure. My personal recollection of Wisconsin orchard conditions reaches back some thirty-five years. In the neighborhood with which I was then familiar were numerous fairly large and thrifty young orchards. "Winter Killing" and "Canker" began to trouble, however, and many of those orchards have now entirely disappeared. Others have continued either because of better location or hardier varieties, following the natural law of the "survival of the fittest," or else because of more careful attention to cultural methods, top grafting, and replanting with hardier varieties. The occurrence and cause of "winter killing" and "canker" were then, and still are, among the most important fundamental problems in Wisconsin orchard management. To these questions we have therefore been directing some attention the past season.

Before discussing the results let us consider briefly the structure and functions of the apple stem. As you well know, the stem consists of four distinct regions or zones. In the interior is the brown heart wood, surrounding this the light colored sap wood, at the outside is the bark and between the bark and the sap-wood is the growing layer or cambium. What are the purposes or functions of each in the life processes of the tree? The heart wood is dead. This has ceased to take any active part in the life or growth of the tree. It simply aids in a mechanical way by giving strength for the support of the living parts, and incidentally serves as a store-house for some reserve water or sap. If this is rotted away the trunk is weakened, but the life processes are not necessarily impaired. The sap wood, on the other hand, is the living wood tissue. Through this practically all of the upward movement of the sap occurs, which means the ascent from root to branch and leaf of the water and food materials absorbed from the soil. Anything that affects this sap wood therefore checks the supply of soil food and water.

Even more important are the tissues outside this, the cambium and inner bark. The cambium is the zone of growth. It adds to the layers of living wood and increases the thickness of the bark year by year. In case of wounds, it is the most active layer in the healing process resulting in callus formation. Such cambium growth is necessarily dependent upon abundant supplies both of water and of elaborated food. The water, as already explained, is brought through the sap wood from below. The starches, sugars, and proteids, which are the essential foods, come from the foliage above, and their descent is through the living inner bark. Hence we see that injury to this soft inner bark means immediate interference with the normal growth and healing processes of the stem. The brown outer bark or corky layer, which is also dead, therefore serves an important function as the natural protection to this living interior tissue. The protection thus afforded is two fold in its nature; first, this corky layer is water proof and so holds the moisture and prevents the soft inner tissues from the drying out which would be fatal to them; second, it is germ proof and prevents the various external parasites from attacking and destroying these inner tissues. Any injury to or disturbance of this dead protective corky layer is therefore dangerous. Some years ago travelling "tree doctors" of the "quack" type went through the region in New England where I was then living, and persuaded many orchardists to permit them to treat their trees to protect them from getting "bark bound" and "blighting." Their methods consisted in general of boring holes into the sap wood and filling these with salt or other chemicals, and scraping or slitting the bark. Of course, it is evident that every one of these operations is positively injurious to the living tissues, and I trust that no imposition of this sort will be tolerated in Wisconsin.

Studies in recent years by plant pathologists in the various orchard sections of the United States have shown that there are several types of apple canker differing as to specific cause. With the cooperation of one of our students, Mr. H. D. White, we have been this last summer examining various Wisconsin orchards to learn the extent of the occurrence of apple cankers, what types are present, and the probable causes of these. As a result we have found that canker of one or another kind is common and serious in the orchards of the state. In most cases, but not all, the canker starts from some point where the corky bark

was broken through. This bark rupture may have resulted from whiffle-tree bruises, tree climbing, or other accident; from hail stone bruises,, the breaking of limbs by wind and ice-storms; from crotch splitting; from pruning; from borers or other insects; from frost cracks or from sun scald. Any one of these might in extreme cases be a serious thing in itself, but as a rule the branch or trunk will recover from such injuries without danger to the life of the tree, providing there is no parasitic invasion. As a matter of fact, however, two parasites are very common in Wisconsin orchards which invade such injured places. Of these the one is bacterial, *Bacillus amylovorus*, and the other fungus, *Sphaeropsis malorum*.

The first, the bacterial parasite *B. amylovorus*, is the cause of the common fire blight and twig blight of apples and pears and is also capable of blighting plums and some other related fruits. This is the more destructive of the two and is the cause of the most serious blighting and cankering of Wisconsin apples, especially that in younger trees. It may appear as body blight or canker involving only small more or less circular patches or spreading irregularly over quite large areas of the bark. It is recognized by the slight discoloration of the bark, which later dies, and becomes depressed or sunken and darker colored as it dries out. The surface, at first, is not broken or otherwise changed except in color, but as the dying proceeds cracks appear, especially at the outer borders of the blighted area. In some cases these blighting spots enlarge year by year but as a rule their enlargement continues only during one summer. If one cuts into the bark on such areas, it is found to be dead nearly or quite to the cambium, the dead portion being quite sharply delimited from the healthy. Such blighted or cankered areas commonly appear, as already stated, where the bark has been broken, either through bruising or at pruning wounds. They are also frequent at the crotches of the trees causing "crotch canker," where they start from the crotch seams. Occasionally they originate from frost cracks, in some cases extending on both sides of such a crack throughout its length. Some of the most destructive cankers observed occur on the south side of the tree, oftenest tending to the southwest side and near the ground. In such cases the original injury to the bark which gave the germs a point of entry was unquestionably sun scald. This is a common injury to various shade and ornamental trees, e. g.,

horse chestnut, as well as to fruit trees. It is naturally worse on younger trees while the bark is still thin and tender. After the rough corky layer is well developed the danger is lessened. For this reason, the partial shading of the south side of young fruit trees is especially to be commended. A case came to our attention recently, however, where tar paper wrapped about the base of young trees, primarily as a rabbit guard, and allowed to remain the year around, had increased the injury. This was partly due to the caustic nature of the tar, but was worst on the south side, indicating that the sun's heat had accentuated the trouble. In all of the cases thus far discussed the blight germs gained entrance through wounds. Many cases like this occur, however, (specimen exhibited) in which a dead bud or fruit spur stands at the center of the blighted area. In such the trouble started as flower, fruit or twig blight and spread down the twig to the parent branch.

The fungus parasite, *Sphaeropsis malorum*, is the same which causes the black rot of fruit and also some leaf spots of the apple. Its relation to the black rot as well as the dark color of the cankered area justify the name Black Canker for this disease. The worst injuries in Wisconsin from this black canker fungus are when it appears on the branches. It gains entrance to these through wounds or fruit spurs in much the same ways as have just been described for the bacterial blight. Moreover, it may appear on the areas which were evidently killed by the bacterial blight thus causing a complication of disorders. It is slower in its progress than the bacterial blight and much less aggressive as a parasite. It is, however, worse in one respect, viz., that the fungus lives over winter and the cankered area enlarges year after year. Where it gains entry at a point originally blighted by the bacteria it may therefore carry the cankering to a more serious point than would the bacteria alone. The black canker is to be distinguished from the bacterial canker by two characters. In the first place the surface of the bark on the spots is soon thickly covered with minute black pustules, whereas the bacterial blight never causes such eruptions. The second difference is that the slow invasion of the bark by the fungus and its continued growth stimulate the underlying living cells to increased growth so that the cankered part of a branch becomes slightly swollen. This is more pronounced if the canker encircles the limb as it not infrequently does, when the cankered

area becomes conspicuous from its larger diameter and more roughened, darker colored bark. This latter type of canker is especially liable to occur on partially shaded branches of the interior of poorly pruned old trees.

In connection with the preceding discussion numerous specimens and a series of lantern slides were exhibited illustrating the points discussed. In conclusion the speaker summed up the practical recommendations as follows:

1. Protect young trees against sun scald by straw or other shades on the south side.

2. Avoid so far as practicable all bruising and wounding of the bark of apple trees.

3. Where wounds are made, as in pruning, disinfect the freshly cut surface, brushing it over with a solution of corrosive sublimate or formalin¹ and also as soon as this is dry cover with white lead paint.

4. Keep the orchard free from Fire Blight by persistent pruning out of all blighting twigs. This should be done with especial thoroughness in the autumn so as to have no cases of "hold over" blight wintering in the orchard. It is a wise precaution to burn all such prunings promptly.

5. Branches showing black canker should also be pruned out and burned.

6. The surfaces of the trees should be disinfected in late winter or early spring, before the foliage appears, by a thorough spray. For this copper sulphate alone may be used (1 lb. sulphate in 15 gals. water) but strong bordeaux mixture or lime-sulphur solution is preferable.

7. Where the body canker or crotch canker has killed the bark so as to form an open wound the dead and diseased bark should be cut away clean to the healthy bark, and the surface disinfected and painted as advised for wounds in pruning.²

The President. We will take a few minutes for discussion of this important subject.

Mr. Soverhill: Isn't it a fact that we should be very careful in the use of our tools when we are pruning our orchards that we do not transfer this poison from one tree to another?

¹ A solution of 1 oz. of corrosive sublimate in 2 gals. of water or of 1 part of formalin in 50 parts of water.

² See discussion of the beneficial effects of this treatment in Wis. Hort. Soc. Bul., by F. C. Cranefield.

Professor Jones: Yes, that is an important point. Especially when we are pruning out blighting limbs we may easily carry the germs on tools from diseased to healthy tissues. We should not only aim to cut well below the infected tissue, but should carry along a can of disinfecting solution so that we may cleanse them as needed either by dipping or wiping the surface. For this purpose use either formalin, 1 part to 50 of water, or corrosive sublimate, 1 oz. in 2 gals. of water.

The President: We are assured that further investigations will be carried on by the department of plant pathology of the experiment station. You have an invitation to cooperate with Professor Jones in this, at least to the extent of observing and asking questions, or by sending in samples which may be helpful in calling attention to things you may not understand, or which may be of possible help to the Professor.

THE POSSIBILITIES OF THE ONE-EIGHTH ACRE GARDEN OR OF 75 FEET SQUARE.

IRVING C. SMITH.

It is a very difficult problem to say what the possibilities of such a garden are.

The fact is we know very little about that. We know what we have done and can see that there are still long lines of improvement yet to be attained. We will, therefore, in this talk, try to keep within what we have accomplished in various places, and bring all together into the small space of our square garden. At the same time we ask you to keep in mind the fact that for every 100 miles of latitude there is about one week difference in the season, other things being equal. So if you are located in a short season or a long season latitude, make proper allowance.

A model kitchen garden should contain about all the varieties of vegetables in common use in that locality, and also the common small fruit.

As we must know what is to be planted to be able to give the best preparation we will plan first.

We will begin by setting a row of raspberries on one side at three feet from the edge, two varieties red. Six feet distant set a row of about four hills early pieplant, eight currant bushes, red and white, four gooseberry bushes, and finish with black cap raspberries.

Next to the pieplant is a good place for the asparagus bed, first rows, three feet apart and twenty-five feet long. Finish the asparagus strip with four rows of strawberries.

Next we will have the small seeds. This section should occupy about six feet, and be cut out by a walk of one and one-half feet on each side, and a cross walk in the middle. These walks are needed to get around and for drainage.

On this section, plant two rows of extra early carrots next the path on one end, and two rows of onions on the other half. Then one row of larger carrots the whole length. We want the carrots handy for the children, and enough so they may eat all they want and still have plenty left for the kitchen. Then we want the onions on the edge, because they would get too much shade if between the carrots and beets.

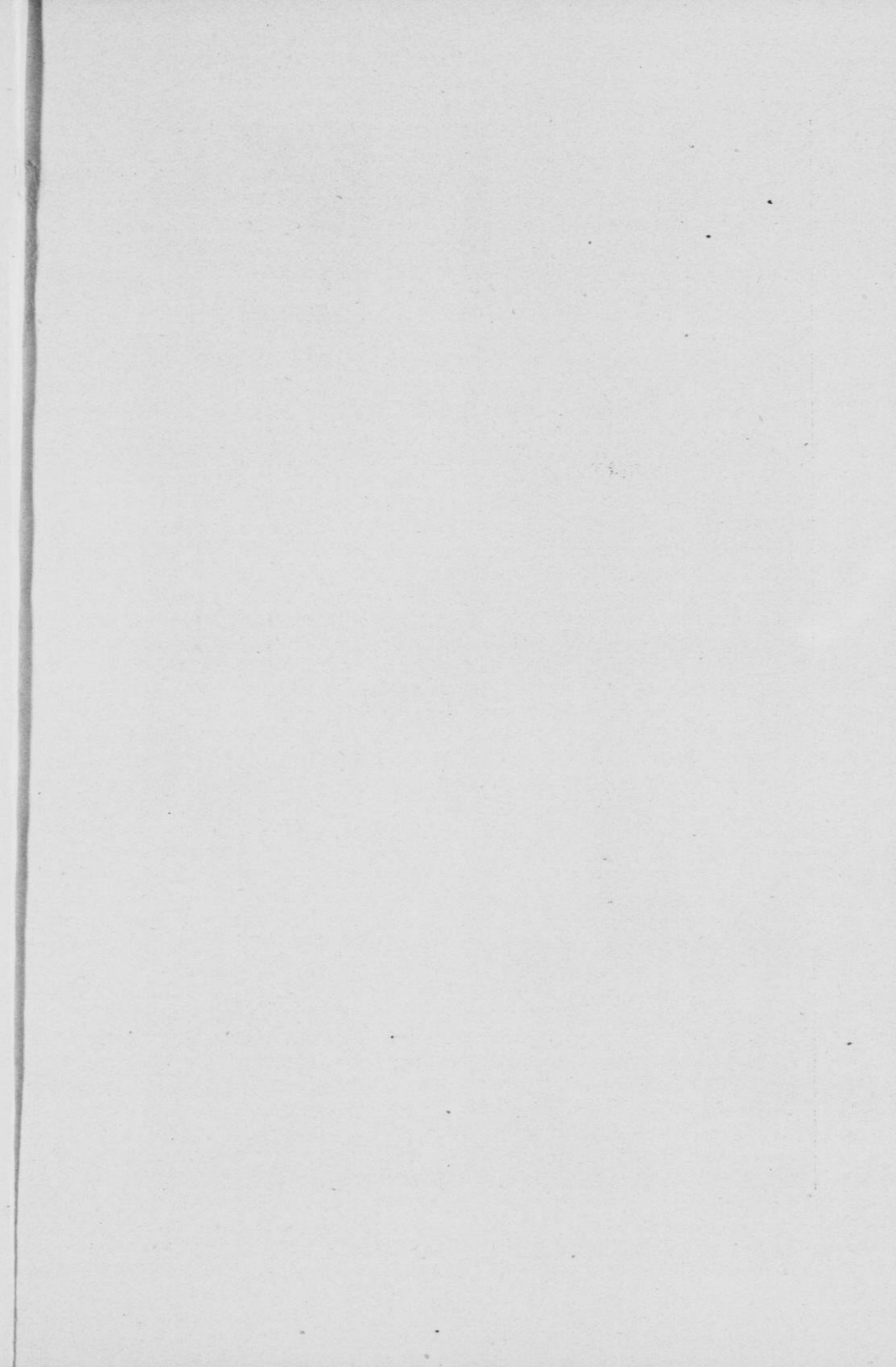
One row of beets, one row of turnips and one row of parsnips will finish this section.

Across the walk is a convenient place for a half row of first early peas and a half row of late peas, to occupy about three feet; while a row of cucumbers and melons follow and need about six feet.

Here we want another walk of one and one-half feet. Tomatoes next this walk, with a few peppers and egg plant will use one row of four feet. Three rows of early potatoes occupy eight feet. By leaving the potato rows a few feet short we will have room for early celery, at the end of each potato row.

On a seven-foot strip we will have a row of squash and pumpkins; then to finish the remaining twelve and one-half feet plant four rows of corn.

Now we seem to have our garden full, with lots of things still to make room for. Let us look back again. The early set onions, early radish and lettuce may be grown between the rows of asparagus, for the first two or three years. Early cabbages, cauliflower, spinach, wax beans, and dwarf peas go between the newly set strawberry plants. A row of Lima beans go nicely





Bacterial or Fungus Canker Commonly Start at Some wound.

1. Upper left. Whittle-tree injury, early stages of canker bordering. 2. Upper right, Frost crack, early stages of canker. 3 and 4. Lower figures, Canker starting from sun scald on south side of tree.



Apple Tree killed by the black rot fungus which gained entrance at the pruning wounds and girdled the tree.

between the raspberry and currant bushes. Parsley, sage, dill, etc., as also cabbage and lettuce plants, and kohlrabbi will do well along the edge of the currant row.

For second crops, follow early peas with late cabbages or celery. For a succession of radish and lettuce, the borders and space between bushes answer. Late spinach, turnips and rutabagas will follow early potatoes.

While the writer has never planted mushrooms under the shade of the pie plant leaves, he has found very fine large ones growing there, so we might reasonably say they will grow there if planted.

Now we know just where each variety is to grow, there is no excuse for not preparing for that particular sort of crop. If we are to come anywhere near the possibilities of our garden, we must not forget small details in preparation or after care.

First, the ground must be well manured and plowed. If it is inclined to be wet we must open good, clean drainage ways in all walks and at outside edges. Remember that when we have gotten our ground thoroughly well prepared the battle is half won.

For the bushes and asparagus coarse manure is preferable. Pieplant is a gross feeder and revels in coarse cow manure where the corn stalks have been thrown out with other litter. Asparagus roots run deep and endure a long time. There is little danger of getting the soil too rich. Plow in lots of heavy manure and then it is well to put coarse manure in the bottom of the furrows before setting the plants. Do not fear of getting ground too rich, only don't have roots come into direct contact with green manure when set, as such conditions will kill almost any tender plant.

For the small seed section old manure is to be preferred. Be sure to use extra care to get a good fine seed bed, so the young plants get a good start.

The cabbage and cauliflower would be pushed if hen manure is mixed with equal parts of dry soil or sawdust and a small handful put where each plant is to grow, then mix with the soil by two or three strokes with a common potato hook. Melons and cucumbers are also helped by hill manuring in addition to the manure which was plowed in over the whole garden. If you are as far north as central Wisconsin, it will pay you to use glass covered boxes over the hills of melons and cucumbers. This

gives the plants an early start, protects from the cold winds and storms of the early growing season and also give considerable protection against the ubiquitous striped squash bug. The squash and pumpkin need not be put in quite so early, but will respond readily to hill manuring. It helps if the hills are raised a little above the level, gives deeper soil, gets more warmth from the sun and prevents too great drenching in time of heavy rain.

Tomatoes and egg plant need not be very heavily manured, and the peppers will fruit much better if on a rather light or weak soil. If too rich they are likely to go to bush and foliage with but little fruit. On the other hand, with celery we want a vegetative growth, so it will give big rewards for a sprinkle of hen manure along the row.

It is not enough that we prepare well and plant well; we must cultivate well. To attain high results we must keep the soil in the best condition all the time. Cultivate the heavy crops with the horse cultivator and the finer ones with the wheel hoe. Weed by hand where necessary, and remember that every weed you allow to grow takes from the soil what should go to your crops. The time to kill weeds is before they are up or just as they come up. Don't wait for weeds; cultivate and hoe, keep at it.

Brush or trellis the peas. Trellis the tomatoes. Set plants two feet and trim to two stems. Cut tips when about four feet high. Clip ends of squash and melon vines when well grown, to throw the growth into the fruits. Pull up cabbage stumps soon as heads are cut, the strawberry plants need the moisture and cultivation. Keep some crop growing on every available space as long as weather will permit.

Regarding varieties we can only say, choose the best for the purpose. We have allowed two or more for most things. Buy the best regardless of cost.

In the time allowed we can give only a very brief outline, but if you follow out somewhat as outlined, varying to suit taste or conditions; you will get a great deal more from your 75 feet square garden than you thought possible to produce on the given space.

This book may be kept

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