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ANNUAL REPORT

OF THE

Wisconsin State Horticultural Society

For the Year 1913

VOL. XLIII

PART I.

F. CRANEFIELD, Editor.

MADISON, WIS.

MADISON

DEMOCRAT PRINTING COMPANY, STATE PRINTER

1913

LETTER OF TRANSMITTAL

MADISON, WIS., MARCH 1, 1913

To His Excellency, FRANCIS E. McGOVERN,

Governor of Wisconsin.

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

Respectfully,

FREDERIC CRANEFIELD,

Secretary.

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OFFICERS AND COMMITTEES, 1913.

OFFICERS.

J. S. Palmer, President ..... Baraboo
F. Kern, Vice President ..... Bayfield
L. G. Kellogg, Treasurer ..... Ripon
F. Cranefield, Secretary ..... Madison

EXECUTIVE COMMITTEE.

J. S. Palmer, Chairman ..... Ex Officio
F. Kern ..... Ex Officio
L. G. Kellogg ..... Ex Officio
F. Cranefield ..... Ex Officio
1st District, M. S. Kellogg ..... Janesville
2nd District, R. J. Coe ..... Ft. Atkinson
3rd District, Lewis Post ..... Madison
4th District, C. D. MacGilfrey ..... Milwaukee
5th District, Henry Wilke ..... Milwaukee
6th District, N. A. Rasmussen ..... Oshkosh
7th District, Wm. Toole ..... Baraboo
8th District, A. D. Barnes ..... Waupaca
9th District, A. W. Lawrence ..... Sturgeon Bay
10th District, J. Ewald ..... Cumberland
11th District, G. F. Morgan ..... Washburn

BOARD OF MANAGERS.

J. S. Palmer L. G. Kellogg F. Cranefield

COMMITTEE ON TRIAL ORCHARDS.

J. A. Hays, term expires .....Jan. 1916.
N. A. Rasmussen, term expires .....Jan. 1915.
A. W. Lawrence, term expires .....Jan. 1914.

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.
Manitowoc, Manitowoc county, 6 acres .....Established 1907.
Gays Mills, Crawford county, 8 acres, (1 A Grapes)..Established 1907.
Whitehall, Trempealeau county, 5 acres .....Established 1908.
Lake Geneva, Walworth county, 8 acres .....Established 1908.
Sparta, Monroe county, 1 acre (Grape Station) .....Established 1908.
Pewaukee, Waukesha county, 3 acres .....Established 1912.
Baraboo, Sauk county, 3 acres .....Established 1912.

The Improvement of Rural School Grounds.

Dist. No. 6. Town of Baraboo, Sauk county.
Dist. No. 5. Town of South Lancaster, Grant county.
Dist. No. 10. Town of Manitowoc Rapids, Manitowoc county.
Dist. No. 3. Town of Sevastopol, Door county.
Dist. No. 2. Town of Fond du Lac, Fond du Lac county.
Dist. No. 1. Town of Genesee, Waukesha, county.

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, Hibernal, 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 southern part of the state in the counties bordering on Lake Michigan, **Baldwin Eureka, Fallawater, Gano, King, Northern Spy, Pewaukee, Willow Twig, 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, Astrachan.

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, Burbank.**

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.

Aroma, Bederwood, *Crescent, Clyde, Dunlap, Enhance, Gandy, Glen Mary, *Haverland, Lovett, *Sample, Splendid, *Warfield.

TWO VARIETIES SRAWBERRIES FOR FARM GARDEN.

Dunlap, *Warfield.

RASPBERRIES.

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

CURRANTS.

Red: **Red Cross, Red Dutch, Long Branch 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 south-eastern part of the state. The following list includes both early and late varieties.

Anjou, Bartlett, Clairgeau, Clapp Favorite, Early Bergamot, 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.*

Common Name.	Scientific Name.
Thunberg's Barberry	Berberis Thunbergii
Common Barberry	Berberids vulgaris
Purple-leaved Barberry	Barberis vulgaris var. atropurpurea
Purple Filbert	Corylus maxima var. purpurea
Weigela (rose)	Diervilla florida
Weigela (white)	Diervilla candida
Weigela (Eva Rathke)	Diervilla hybrida
Desbois Weigela	Diervilla hybridia var. Desboisii
Silver Berry	Eleagnus argenta

Strawberry Tree	Euonymus Europaeus
Althea	Hibiscus Syriacus
Sea Buckthorn	Hippophae rhamnoides
Garden Hydrangea	Hydrangea paniculata gr.
Ruprecht's Honeysuckle	Lonicera Ruprechtiana
Tartarian Honeysuckle	Lonicera Tartarica
Tea's Weeping Mulberry	Morus Alba var.
Mock Orange	Philadelphus coronarius
Golden Mock Orange	Philadelphus coronarius var. aurea
Mock Orange, large fl	Philadelphus inodorus
Shrubby Cinque Foil	Pontentilla fruticosa
Russian Almond	Prunus nana
Rhodotypos	Rhodotypos kerrioides
Smoke Bush	Rhus Cotinus
Missouri Flowering Currant	Ribes aureum
Rose Acacia	Robinia hispida
Japanese Rose	Rosa rugosa
Golden Elder	Sambucus nigra var. aurea
Buffalo Berry	Shepherdia argentea
Bumalda Spiraea	Spiraea Bumalda
Anthony Waterer Spiraea	Spiraea Bumalda var.
Billard's Spiraea	Spiraea Billardii
Douglas' Spiraea	Spiraea Douglassi
Japanese Spiraea	Spiraea Japonica
Meadow Sweet Spiraea	Spiraea salicifolia
Van Houten's Spiraea	Spiraea Van Houtte
Persian Lilac	Syringa Persica
Chinese Lilac	Syringa villosa
Common Lilac	Syringa vulgaris
Amur. Tamarix	Tamarix Pallassi Desv. (Tamarix Amurense Hort.)
Snowball	Viburnum Opulus vr. sterile

* 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, Dorothy Perkins.

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

COMPARATIVE HEIGHT AT MATURITY OF DIFFERENT SHRURS.

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)
Wiegelas

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.

Common Name.	Scientific Name.
Bearberry	Arctostaphylos Uva-ursi
New Jersey Tea	Ceanothus Americanus
Button Bush	Cephalanthus occidentalis
Prince's Pine	Cimaphila umbellata
Round-leaved Dogwood	Comptonia asplenifiora
Red Oiser Dogwood	Cornus stolinifera
Leatherwood (Wickopy)	Dirca palustris
Trailing Arbutus	Epigaea repens
Wahoo	Euonymus atropurpureus
St. John's Wort	Hypericum pyramidatum
Winterberry (Holly)	Ilex verticillata
Trailing Juniper	Juniperus procumbens
Sweet Gale	Myrica Gale
Ninebark	Physocarpos' opulifolia
Buckthorn	Rhamnus catharticus
Staghorn Sumac	Rhus Typhina
Smooth Sumac	Rhus Glabra
Dwarf Sumac	Rhus copallina
Wild Red Currant	Ribes Rubrum

Wild Black Currant .....Ribes floridum
Wild Rose (tall) .....Rosa lucida
Wild Rose (dwarf) .....Rosa blanda
Purple-flowered Raspberry .....Rubus odoratus
White-Flowered Raspberry .....Rubus Nutkanus
Common Elder .....Sambucus Canadensis
Scarlet Elder.....Sambucus pubens
Snowberry .....Symphoricarpus racemosus
Coral Berry .....Symphoricarpus vulgaris
Ground Hemlock .....Taxus baccata
Sheepberry ..... Viburnum lentago
Black Haw .....Viburnum dentatum
———.....Viburnum acerifolium
Bush Cranberry .....Viburnum opulus
Prickly Ash .....Zantoxylum Americanum

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.

SPRING FLOWERING BULBS.

Tulips, Single dwarf; Duc van Tholl pink, scarlet, white.
Tulip medium; red Artus, yellow Chrysolora pink Cottage Maid.
Hyacinth single: pink Charles Dickens, white Baroness von Thuyll, blue Baron von Thuyll.
Narcissus (daffodil), Von Lion.
Crocus: Mixed.
Tulips and other Holland bulbs must be planted in September or October and bloom early in spring.

BLACK LIST

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

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

The plants of certain of the above named varieties made a good growth each year but have not blossomed unless given thorough 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 (unslacked) 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 ½ lb. of 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 2½ 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 sulphate ..... 4 lbs.
Fresh (unslacked) lime ..... 5 lbs.
Water ..... 50 gals.

Dissolve the copper sulphate 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, earthware 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 100 lbs. sulphate in 50 gals. water.

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

Then use the following formula:

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

LIME SULPHUR COMPOUND.

Used to destroy San Jose Scale, Oyster Shell Bark Louse and other insects; also used as a substitute for Bordeaux mixture.

Commercial Lime Sulphur.

Lime sulphur in commercial form is generally more desirable than the homemade product, particularly that made in Wisconsin since our lime does not generally contain a high percentage of Calcium. In fact commercial lime sulphur can be purchased for very little more than the cost of the ingredients which are used in the homemade wash.—*Prof. J. G. Sanders.*

Homemade Lime Sulphur

(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 completely 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."

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 ½ 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 59 acres and 5,945 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 or 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. 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 wants to know 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.

J. S. PALMER,
President W. S. H. S.,
Baraboo.

FREDERIC CRANEFIELD,
Secretary W. S. H. S.,
Madison.

TRANSACTIONS

OF THE

Wisconsin State Horticultural Society

SUMMER MEETING

BAYFIELD, AUGUST 21–22, 1912.

MORNING SESSION—August 21.

The meeting was called to order at 9:30 a. m. by Vice President C. L. Richardson, who introduced the Mayor of Bayfield, Mr. William Knight, as the man who, while others were caviling and arguing as to whether or not the northern rim of Wisconsin could grow apples, dared to set forty acres of apple trees.

Mr. Knight: I extend to you the hand of fellowship on behalf of the people of the Bayfield Peninsula. We are pleased to have you here, for we feel that we are going to be benefited a great deal from the experience and knowledge that you can impart to us. Remember that we are only just beginning the development of the fruit proposition in the Bayfield Peninsula. It is only about six years ago since commercial planting commenced, but in the home orchard we have from 25 to 30 years' experience. It is not necessary for me to say much, but we want to prove to you by our acts that we appreciate your coming and that our welcome is sincere.

TRANSPLANTING HERBACEOUS PLANTS.

MR. W. A. TOOLE, Baraboo.

Transplanting is the process of removing a plant from a place where you do not want it to grow, to a place where you do want it to grow.

With many herbaceous plants it is a saving of time and space if seedlings or small plants may be planted on a small area of well prepared and well tended soil, later to be transplanted to a more permanent location.

This talk might well be prefaced by some remarks on the preparation of the seed bed, and seed sowing. I will only say: when it is known that the small plants or seedlings are to be transplanted later, a better root system will be formed if the soil is not too rich, and contains a moderate amount of sand. It should also be well worked up so as to be in the best of condition or tilth.

Before transplanting, the soil to which the plants are to be removed should be thoroughly prepared. Experience in transplanting several millions of plants has taught me that this previous preparation of the soil is very important, not only for the better future growth of the plants but also for greater speed of transplanting. For small or delicate plants that are to be transplanted into flats or greenhouse benches the soil should be sifted through a sieve with a medium sized mesh. With outdoor planting if the area is not large, or the plants are small, the soil should be well spaded or forked over, raked, firmed with a roller or by tramping, and if necessary to obtain results, again forked, rolled and raked. In field planting, trashy stuff or manure should be plowed under, or well disked in. After plowing the soil should be well disked, harrowed and rolled or planked as may be required to put it in the best condition. If the planting is to be done some time later, the ground should be harrowed weekly to conserve the moisture and preserve the texture of the soil.

If the ground is in ideal condition for planting it will be moist enough to hold its form when squeezed in the hand but not wet enough to pack or bake. During dry weather this may be accomplished on small areas by watering and stirring the soil until the right condition is reached. On larger plots of ground where it is not practical to water the whole surface it may be possible to water the rows or hills that are to be planted. If only the surface soil is dry, with plenty of moisture beneath, there is danger that the dry dust will drop into the opening and absorb the moisture from the roots. If not practical to water along the row the dry soil may be scraped aside before making the hole for the roots.

The plants to be transplanted should be thoroughly watered some hours before being dug so that they will be well filled with water when moved, and so that they will separate with better roots. We find it a great help with most plants to lay them out in a row on the ground, as they are dug, and sprinkle the roots with a Scollay sprinkler or small force pump and then scatter soil over them. The soil sticks to the roots and holds the surplus moisture that will keep them from drying out as quickly. We prefer this method of puddling as it leaves the roots spread out and in a better condition to handle.

If the plants have become drawn from crowding, or if the tops are out of proportion to the size of the roots the tops should be cut back.

If the roots are too large to handle easily it may be well to trim them back.

Plants that have been received from a distance should be unpacked at once. Lay them out in rows and sprinkle the roots with water and soil as described before. In case they cannot be planted out at once, heel them in until they can be planted. If the plants come with the roots encased in a hard ball of earth, as small potted plants are often received, loosen the soil somewhat by squeezing with the fingers, and then sprinkle the roots thoroughly several times, or set them to soak in water before potting up or planting out. If this dry ball of earth is not thoroughly moistened before planting, new roots will be very slow to form and the plants will be slow to start into active growth. The following rules should be observed with plants that are to be packed for shipping. Pack so as to keep the tops dry and the roots moist. In warm weather allow access of light and air to the tops if possible. Pack tightly enough that the plants cannot shake about in the package.

There are a few general principles to be observed in the process of transplanting: The soil should be pressed firmly enough about the roots that they are in close contact with the soil and soil moisture; the hole should be of such size and shape that the roots are not doubled up or bunched in a wad. Most plants should be set to about the same depth that they were before being moved.

Most of my experience in transplanting has been with a trowel. This should be strong enough at the neck to prevent breaking or bending in hard ground. I also flatten out a new trowel and change the "hang" or angle between the blade and handle, to suit my own ideas. Be sure that the edge is sharp and the blade well polished, as this makes a very great difference in the speed and ease of planting. In making the hole, drive the trowel well into the soil, slanting it but slightly. Do not pry the trowel over to make the opening, but draw tre whole blade toward you so that the bottom of the opening will be nearly as wide as the top. This allows the roots to drop their full length in the opening. Then take up a plant with the other hand, holding it just above the neck or place where the root and top join, drop the roots into the opening and hold the plant at the right height while the trowel is being withdrawn. Then with the handle of the trowel or knuckles press the soil up firmly about the roots, giving a slanting pressure that will close the opening the whole depth. If the pressure is placed too close to the plant, only the surface will be firmed and the plant may be snapped off at the neck by the downward pressure. The amount of pressure necessary depends very much on the variety of plant and the condition of the soil.

Many planters prefer the dibber or some modification. A dibber is of a heavier build than a trowel. Instead of a thin blade, as with a

trowel, the dibber is round and pointed, or flat and much thickened at the center. The size varies with the plants, and they may be made of wood or polished steel or iron. This is thrust into the ground to the proper depth, given a twist to firm the soil about the opening, enough to prevent loose soil filling the hole, and the plant inserted as the dibber is removed. The soil is then firmed about the roots of the plant by thrusting the dibber into the ground a short distance from the plant and prying the soil over against the roots. I have not used a dibber much except when transplanting small seedling lettuce plants into flats. For this purpose we use a round blunt pointed stick a little larger than a lead pencil. Our secretary, Mr. Cranefield, taught me this method of planting while he was at the College of Agriculture.

A market gardener near Baraboo uses another way of planting large quantities of seedling plants. When planting into flats a furrow is made with a straight edged piece of metal of convenient length. The plants are laid against the edge of this furrow the proper distance apart and the roots covered by pressing over the soil with the straight edge, which partially makes the furrow for a new row. He uses the same idea in planting onions, early beets, etc., in the field. The furrow is here made with a plow attachment to a hand cultivator. The furrow is run partly full of water and then the plants are laid against one side of the furrow and soil thrown back against the roots with the hand plow. I have tried this method and it works well but I have not had enough experience to do either very rapid or very smooth work.

Every planter has some special way of doing some of the processes, and methods differ largely with different sections and with the character of the plant. Often in loose soil, the fingers are the only tools used to make the opening for the roots. For larger plants a spade is often used. Practice and common sense are most needed if large quantities of plants are to be set by hand.

Planting machines are often used to transplant strawberries, cabbage, tobacco, and tomatoes when method and extent of culture make their use possible. They seem entirely practical under certain conditions and are a great labor saver. I cannot give detailed information about their use because I have never had experience with them.

After transplanting, further care is necessary to insure a good start. Where it is possible to do so, watering and shading help to establish the plants, unless cloudy or rainy weather prevails. If watering is done at all it should be enough to really reach the roots. A light sprinkle does little but form a crust on the surface of the ground which allows more rapid drying out of the soil. If watering is done, stir the soil well as soon as dry enough. When the plant is once established, cultivation is much more important than watering except in times of extreme drought.

I should like to call attention to an implement to be used in transplanting that I have found very convenient and that is the point of a lead pencil. Perhaps some of you like to experiment with some of the very small seeds like begonia, and after you have had success in starting them, it may become necessary to transfer them to boxes of fresh soil. In such case having put the soil in good shape, take them up with the point of a lead pencil and press them carefully into the loose soil, and it is surprising how they will improve after being removed.

The Chairman: I think Mr. Toole raised one very good point in his paper when he spoke of transplanting at the time the roots were sufficiently moist so that the ground does not cling too tightly to them, causing the tearing off of all the fine fibrous roots that there are on the plants. Under those conditions you can leave the main root system of one of these small plants apparently, to the view of the naked eye, almost intact and yet you can have it so stripped of the minute, fine fibers of roots that you have cut down the root surface of the plant immensely.

The Chairman: Have any members ever used the sharp-pointed, so-called mason's trowel with success in setting strawberry plants?

Mr. Sullivan: I have used the trowel for the last ten years in preference to any other tool. It is the best tool I can get hold of. A thin blade, worn-out trowel is better than a thick one. If you get a new one it had better be cut off an inch and rounded a little at the sides and sharpened, and it makes a very nice tool.

The Chairman: I had very good success setting 5,000 strawberry plants using one of the old-fashioned mason's trowels.

Mr. Irving Smith: What is commonly known as the garden trowel is, to my notion, a great deal too much curved for most plant setting. If you can get one of them that is only a little curved, it adds very materially to the strength of the trowel. It will not bend like the brick-layer's trowel and at the same time is not sufficiently curved to make the dirt stick to it much. If you can get that kind of a trowel, which is not very common on the market, I admit, though we find them sometimes, I think it is very good in that line.

Mr. W. A. Toole: The kind of trowel that you are apt to find in the hardware store is not suited for the purpose, but in one of our local hardware stores I noticed, looking over the catalog, they had what I thought would just about suit me and had them send for some. They cost about ten to fiftfeen cents apiece, made of a pressed steel, and the handle is driven into the curve. They are in such shape that they are almost straight as far as length is concerned and curved more than one needs. Possibly it is very easy to hammer them into the shape you wish and grind them sharp. They make an ideal tool for the

purpose. I am going to ask Mr. Longland how many leaves a plant ought to have when transplanted.

Mr. Longland: Plant them when the third leaf shows, that is, the first leaf that shows after the two seedling leaves.

The Chairman: What rule would you lay down as to the amount of moisture?

Mr. Irving Smith: Give them what they want. When you water them, water them good, and then stop.

The Chairman: What would your rule be as to the amount of water in the soil for best transplanting condition, how wet should the ground be from which you take a plant?

Mr. Smith: I would just as soon take them from dry soil, so that the soil would drop from it. If the soil is heavy you might break the roots. Of course you water them after transplanting, and in 24 hours, almost, the seedling will start again in fair shape.

Mr. Hildeman: At what time should strawberry plants be set out, after they start growing, or as early as possible?

Mr. Smith: We have set out strawberries for a good many years, and we notice habitually, we might say, unless there are some counteracting circumstances, that the plants that were set earliest were the best. I set out some plants this year the latest that I ever set them out for any bed at all, it was in June, owing to excessive rainfall the ground was simply mud, we could not get at them any sooner. Quite a good many of them died and for no apparent reason other than that they were too far along to set. When they start the first new growth, let it be in their new location, then there is no disturbing of the growth. That has been the experience of a good many this year.

BIRDS.

PROF. A. C. BURRILL, Dept. of Entomology.

I have been considerably interested in my trips about the state in the great problem of the fruit and grain growers as to how much the birds eat or injure the small fruits and the grain. However much we may deplore this loss, we are bound to take note and contrast with this loss, the examination of more than 35,000 bird stomachs by the experts of the United States Biological Survey and others. We need to remember that this very taste for seed-bearing fruits as the raspberry and cherry, has caused these same bird-species to eat the mulberry, nut, ash and juniper berries and later in dropping their excrement, scatter their seeds in barren places, doing incalculable good in reforesting areas old and new. Greater than this good is their power to check insect pests. How many of you have become sufficiently im-

pressed with the enormity of this insect menace? In these later years of farm decline, the annual loss seems to increase, despite many efforts to reduce it. The danger is made worse by a great decrease in the number of our insectivorous birds just when we need them most.

I believe the annual loss is now over a billion and a half dollars, and as far as entomologists are concerned, we should add the loss through insects spreading diseases about $400,000,000. So the whole insect problem with which birds have much to do approaches the two billion dollar limit. Against this I must array the best obtainable figures, that in the last forty years our native birds have decreased in numbers from 20 to 40 per cent, and during the same time that miserable English sparrow has increased nearly 40 per cent of the total bird population, ousting our native birds from our farms and gardens, and does not do the job of insect destruction half as well as the birds he has displaced. I do not say that he does not eat insects, he does, he feeds his young the first two weeks almost entirely on insects.

Let me remind you that birds are only one of the five chief checks to this insect loss, and, as I will try to show you, are by all odds the one most easily controlled and that at the least expense. These five checks are the weather conditions, fungous or bacterial diseases, parasites, predators and good farm management, especially clean cultivation. Of these five great checks to insect pests the bird is the only one which offers relief at least expense.

The English sparrow, which was introduced into North America in 1850, refused to do the work for which he was imported. He is an unmitigated pest. After Michigan and Illinois have spent $100,000 in one-cent-a-head bounties, they have just as many sparrows left at the end of that time as before. The pugnacious little scamp drives out our native birds, pitches their young out of the nest, preëmpts our bird houses and musses up our eaves.

To protect birds by law, to tolerate them, merely, and reduce hunting and unnecessary disturbance of their nests, to muzzle our cats or otherwise dispose of our feline peril (for each cat catches on the average 50 birds a year) is not nearly enough. We must wage active warfare against their enemies, especially the tramp cats and English sparrows. It is a case of conservation; we have to do definite things to make the birds come back. Where people are willing it is more easy to take care of the English sparrow in some country towns than in the big cities where it is hard to get coöperation over large areas. There is one formula of one dr. strychnine dissolved in three quarts of water, put in native wheat to soak it up, dry it and save it for the winter, then make some feeding station in a back yard or town grove, or some good place to collect birds, feed them good grain for a little while during the winter season; then you ought to have somebody in-

terested in the work who knows something about birds to make sure that the birds that come to the banquet at the time are not our native birds, then after some snow storm put out the banquet of poisoned grain, and you will get a large share of the local population of sparrows. That is the only way that the present offers of controlling the English sparrows at little expense.

But we must attract our native birds by choice nesting sites, food and building materials. One of the nicest ways of attracting birds is to plant on your town property, or about your farms, such fruit trees and wild berry bushes as you know the birds like. Then I am sure all of you enjoy building bird houses and taking care of them. You have to show the wild birds where they can come, have the apartments ready for them, and then you have to be on the watch that the English sparrow does not come first.

The bluebird can be attracted, if you have no natural cavity in your orchard or shade trees, by putting up a little bark box beside an orchard tree. Arrange the box so the whole side will come off when we want to clean it annually, or drive out sparrow nests. The bluebird is one of the birds whose food is mostly insects, 76 per cent, of which 28 per cent is beetles and 22 per cent is grasshoppers. Of beetles he often gets the flat-headed apple tree borer which does so much harm to orchards and shade trees, killing hundreds of trees every year, and that, with the horned beetle, causes more loss to the trees of this state than any other one insect. I do not say loss to the fruit, but the tree itself. We are glad to have the bluebird with us then, because he eats such things. He comes earliest on the job and he sticks through the season.

The robin is another early arrival which every grower is more interested in from the damage standpoint than the bluebird. For instance, one-half of all that he eats is made up of insects, and the other half of grain and fruits. I can talk about the robin all morning, because there are a great many things we know about Mr. Robin, and most of them are good things. It is an interesting thing to remember that a young robin will eat 20 feet of cutworms a day, that he eats his own weight every twenty-four hours, and it is fortunate for us that we have such a bird as the robin to be here at spring plowing to clean those things up. The only people who can do anything better than to have the robins and blackbirds to follow the plow are those who train the chickens to follow the plow. The robin is death on cutworms and also death on raspberries. One of the growers at Baraboo told me that during that heavy rain that we had one Saturday the end of July, when it was said over two inches fell in eight hours, that the picking of their raspberries had to be postponed until Monday morning. They started bright and early, but the robins had been there first, and they

reckoned they had lost between six and eight crates on account of stopping and letting the robins get their innings first. That meant a loss, probably, of twenty dollars, but I think where you may lose one dollar a day from the birds during the ripening season, they have been giving you five dollars a day in the process of cleaning up. It is still an open question how many sound cherries the robin eats. Dr. Hodge, of Clark University, Worcester, Mass., thinks they peck largely the wormy cherries. Of course, the robins steal many of the earliest to ripen, but these ripen ahead of time frequently just because worms and decay have started in them. Unfortunately the robin is not holding his own, despite protective laws throughout the northern tier of states, for he is slaughtered in numbers and by methods similar to those by which we lost our famous passenger pigeons. It is only about three years ago that Mrs. Russell Sage gave $15,000 for a campaign of education to see if they would not enact protective laws, but without avail, so we must try to get Congress to pass a national law for the protection of our useful migratory birds. We must not only use our local influence, but the state and national influence in the protection of some of these birds. What applies to the robin applies to many other birds that go south.

The Baltimore oriole, with the orange body and black wings, is another bird that needs greater consideration. He lives largely in the tree tops, eating the worms that defoliate trees. He, with few others, is willing to eat the hairy caterpillars which make large nests in trees in spring, and the tent worm, making tents in trees in the autumn. When you see rents have been made in the web worm's nest, you can feel sure that the Baltimore oriole has been there.

Another bird that destroys the same insects is the cuckoo. That bird is such a glutton on the hairy caterpillars that if he starts on a web he usually does not stop until the whole nest is finished. Every farmer on the edge of a forest should see that he keeps Baltimore orioles and cuckoos on his farm. Set out strings of colored worsted; do not make the mistake of putting out a long strand of it, because the bird often gets tied up in it. If you put it in short lengths the bird may have to do a little more weaving, but he will not get tangled up. The red headed woodpecker with the black and white body, sometimes called the tri-colored bird, is often blamed for stealing fruit, and he often does, but he likes nothing better than to take a June bug, the one that lays the eggs that make the white grub, and crack him open like a nut. We need to have the red-headed woodpecker, the crow and the blackbird on hand to look after the white grub, and the June-bug stage is where the red-headed woodpecker comes in.

The downy woodpecker is perhaps the most common one. The U. S. Government has just completed a survey in Virginia, published in this

year's book of the Department of Agriculture, showing that the downy woodpecker is responsible for killing 50 per cent of the codling moth or apple worm as it rests over winter under the bark, sometimes even 85 per cent of the orchards were cleaned out by the downy woodpecker. The worm makes a little cell for itself under the scales of the bark. Downy does not always stop to rip off the bark, but sometimes pierces right through and catches the fellow inside.

Some people, including some good entomologists, still say that the power of insects to multiply is so great that we never can expect to get the birds to be an important check in holding them down. The late Prof. Smith, of New Jersey, published such a statement. But here is one point on the parasite business, you cannot have parasites enough without pests enough for them to live on. The pest, or host, is a necessity. And you cannot have predators like ladybird beetles and lacewing flies without the pests on which they live. On the contrary, the birds are ready for attack without having necessarily to feed on the given pest in the past in order to grow to a stage where they are ready for attack. The birds are always ready. The predators and pests come in after the pest is becoming epidemic. The birds are the "minute men," the predators and parasites the reserve forces for support in the last attack.

Of all birds which belong rightfully in the home orchard or the home grounds I can think of none to whom I would yield the palm sooner than to little "Bob White." Some of us looking at the beautiful colored birds often forget that birds in plain colors, drab or white, are frequently the best home birds to have, they do not have to wear fancy clothes, it does not cost them much to be kept up. "Bob White" eats 5 lbs. insect matter per year and 8¾ lbs. weed seeds. He will eat 10,000 weed seeds at one clip, he will eat 5,000 plant lice at one meal. They are today raised by hand from the egg, can be kept as chickens around the place, and if they have a proper breeding place, away from cat and dog, can be kept around the house. Chickens or "Bob Whites" are among the best ways to keep your plums from being stung by the plum curculio, unless you want to go through the daily process of jarring them off.

We need to have small houses in greater numbers; we should leave some holes in the barn where the barn swallows can come in, and purple martins must be given colonial houses, you cannot keep a single pair very long, they are very sociable. We must suit the birds according to the type of birds involved. At Warrensburg, Pa., they have two martin houses set by a tree, and that tree has never been sprayed and has no wormy apples, where other trees that have not been sprayed have been wormy, so it appears that birds have an important part to play.

Another useful bird of the air for whom we should provide room by open barn gables or shelves under the eaves is the barn swallow, who protects the horses and cattle from horse flies, eating stable flies and the botfly, whose eggs an animal licks off and swallows, and the eggs hatch and canker in the poor beast's stomach with hundreds of maggots.

The brown thrasher, like the robin, also steals fruit, but 63 per cent of all its food is insects. If we would plant more wild fruits they would forget our cultivated ones to a large extent. In laying out estates or landscape effects, more attention could be given to combining bird fruit trees with highly ornamental effects. Thus the mountain ash tree and sumachs, especially the stag horn, will tide birds through the unexpected and heavy late spring snows. Wild cherries and raspberries are all good, and the birds clean up all fruit tree pests while they eat.

Both man and bird can occupy the same territory without much difficulty. The ancient law forbade a muzzle to the ox that threshed out the grain. Some of the birds will demand toll for their work and this should cheerfully be paid. Others will demand more toll than their work is worth, and these must give way.

WEDNESDAY EVENING.

The meeting was called to order by President Bingham at 8 P. M., the members having spent the afternoon on an excursion to the Bayfield fruit farms, guests of the Bayfield Horticultural Society.

The President announced the following judges: Fruit, L. G. Kellogg and A. W. Lawrence. Vegetables, Mr. Irving Smith. Flowers, Mr. William Toole and Mr. Longland.

WHY WE SHOULD BEAUTIFY OUR HOME SURROUNDINGS.

MRS. E. C. CARVER, BAYFIELD.

Thirty years ago a small town in Southern Wisconsin was in need of thorough renovation. Its lawns were surrounded by the old-fashioned fences of the day; they were grown up with grass and tangles of shrubbery. Trees were untrimmed and the town though beautifully located presented a dilapidated appearance. This was the condition of things when a patriotic citizen, the pastor of the Congregational church, determined to appeal to public pride and awaken the citizens if possible to the necessity and advantages of beautifying their homes and

the town generally. He therefore secured the town hall and called a public meeting of the citizens of the town to discuss its improvement. Since he was an influential man, the citizens attended this meeting in large numbers and listened to an address on town improvement. As a result of this meeting a day was set apart for tearing down the old fences, cleaning lawns and streets, trimming trees and shrubbery.

This practice was kept up for a number of years until the desire for cleanliness and for beautiful surroundings became a habit with the people of this town.

The town became, and is today, famous in its region for its fine homes, its oiled and paved streets and its beautiful trees and lawns. Any one who has visited Delavan, Wisconsin, in recent years and who saw it thirty years ago will realize what can be done when public pride is once awakened to the importance of beautiful surroundings for its people and especially its children.

I speak of this town in particular as it was my home town for several years. What is true of this town, can be made true of Bayfield.

Our schools and public libraries are endeavoring to create in our children love for literature and nature and our churches a love for religion and spiritual things. A town or a city should see to it that its streets, its homes and its public buildings aid and not hinder this education which is being worked out for the children of our generation. In this matter the citizens and the public school must work together.

Professor Bailey, the well known horticulturalist and lecturer said once that the farmer of the future must be educated, and that his education would furnish a background for his appreciation of the natural objects by which he was surrounded. He must know the botany of his grain, grass and trees. He must know the science of his animals, and then he would understand and appreciate his surroundings. This is true of all men and women and must be true of our children in the cities and towns of Wisconsin. They are the builders of the cities and towns of this new north Wisconsin for the next generation. How are they to build them? What shall be their model? The public schools of Bayfield, its fathers, mothers and the citizens must start them along the right path by furnishing education and beautiful surroundings which will create habits of pride and an appreciation of beautiful things.

It is only necessary for the citizens and parents to aid and foster the principles instilled in the schools to secure results from the children.

Interest the children in the home grounds and garden. Give them a little patch of ground and some flower or garden seeds and let them

have it for their own. They will enjoy it immensely and it will help to keep them interested. The interest and even affection which children acquire for trees and animals is a striking illustration of what may be done toward their education in these matters.

A little girl who had been trained in the public schools and at home to love natural objects and to study their habits came home from school and found a tree cut down in her father's lawn. She burst into tears and said she liked that tree and thought it was beautiful and she liked to see it on the lawn. This particular tree was not a very beautiful one, and was not properly placed in the lawn, but the little girl had invested it with beauty and interest, because she had been taught to appreciate and love natural things.

The child was asked if she would not like to make a collection of butterflies. "Shall I collect dead butterflies?" she said. When it was explained how she could collect and kill the live butterflies, she said she wanted them to live and would not kill one of them any more than she would her pet cat or dog. This is an illustration of the fact that the school and the home education and surroundings are wonderful forces in training the sympathies and ideas of children with reference to the natural objects which go to make up their surroundings.

It is the business of every community to see to it that the streets and roads along which their children go to school shall aid the schools in their attempt to educate the children to be town and city builders of the right kind, for the future.

No region of our country has more natural beauty than northern Wisconsin. Nature has done her best for us. We must do what we can as citizens to educate our children to an appreciation for, and an intelligent interest in this, their favorable environment.

THE CHERRY TREE.

MR. R. J. COE.

A few years ago there was very little interest taken in the cherry tree, we find that true in most parts of the state even to-day, but with the crops they have had in Sturgeon Bay the last few years, and the wonderful crops they are bound to get the next two years in Bayfield, an awakened interest in cherry-growing is apparent, and if we grow cherries, of course we must have trees to grow them on.

A good many of us have an idea that cherry trees are grown as apple trees are grown. They differ in this way, that apple trees are usually planted from root grafts planted in the spring and taken care of two or three years, as the case may be. Cherry trees are grown

from buds. Little seedling trees are planted in the spring and along in July they are budded. Now, I suppose some of us do not know just exactly what budded trees are, or just exactly how trees are grown by budding. Seedlings are planted in the spring and when they start to get a nice growth the trees that we want to propagate from the branches that are grown this year, are cut off and the buds taken from them. The little buds that grow in the angle of each leaf are the ones that are used for propagating. The budder takes the bud sticks from the leaf and before they go into the field the leaves are cut off, leaving a little stem about a quarter of an inch long. When the bark will loosen from the tree is the time to insert the buds, and these bud sticks are taken into the field and cut as they are used. In a short time this bud will grow to the body of the tree. Of course that bud does not grow this year, it just simply grows on to the tree. We do not know exactly why it does this, but it is one of nature's processes of healing. It will grow to the tree and next year is when it starts to grow. These trees usually grow in the first season, two, three, four or five feet high and from ⅝ to ¾ inch in diameter. This is the one year old tree, and that is the one that is planted very largely. I think that is all that is necessary to say about the tree and I shall be glad to have questions asked.

A Member: Does the budded tree branch the first year?

Mr. Coe: Yes, considerably.

Mr. Toole: Does it make any difference on which side the stock is inserted, whether next to the sun or not?

Mr. Coe: It does not make any difference with reference to the sun, but you will find you had better bud it on the side toward the prevailing wind. In other words, in Wisconsin, in our part of the state, the prevailing winds are from the southwest, it is better to bud on the south or southwest side, they are not so likely to break off by the wind.

A Member: Something was said just now about the appearance of a tree seven or eight years old. I noticed in the state orchard to-day some of the trees seemed to have long splits down the side of the tree. I am sure those trees are going to die. I lost over 100 trees that same way. I should like to know something about the cause of that split.

Mr. Coe: There might be two or three causes. Probably the greatest cause is the severe freezing last winter. The freezing of the sap in the tree expands it and splits the tree open. Probably that is the cause.

A Member: Is there any way of preventing it?

Mr. Coe: Last summer we had a very dry summer and a very wet fall, and the trees went into winter green. In other words, the growth cells of the tree were not well filled with starch or plant food.

The trees were green with sap and with plenty of moisture for the cold weather to expand.

A Member: Would you cut as large a limb off a cherry as an apple?

Mr. Coe: I think I would rather risk the apple in cutting off large limbs. However, you will find cherry trees heal over almost as rapidly as the apple.

A Member: What size do you prefer for the stock?

Mr. Coe: One that would be about 3/16 of an inch.

A Member: What stock?

Mr. Coe: I think I would prefer the Mahaleb. There has been a great deal said of late years about the Mazzard stock, but I have made quite a little inquiry, and the general opinion is that Mahaleb stock is much better.

A Member: In planting the tree, would you plant it below where it was budded?

Mr. Coe: I would plant it pretty deep, but that depends on your soil. If you have a heavy soil, likely to be tamped down well, I would not plant the tree much below the bud.

CULTIVATION AND COVER CROPS.

THOS. W. BOYCE, MILWAUKEE.

The speaker does not pretend to be a horticulturalist. He was born and brought up a common farmer, but deserted the farm before he attained his majority to enter one of the professions. But the call of the land has been insistent and he has finally returned as part owner of a young cherry and apple orchard. Charged with the responsibility of overseeing the planting and care of some 17,000 trees, he has been busy during the last two years learning the A B C's of orchard care. The remarks that follow are prompted by his experiences, costly and bitter as some of them necessarily were.

CULTIVATION.

The proper cultivation of your cherry orchard will begin some time before the trees are planted. Land must be in good tilth to grow trees successfully. Trees will live and sometimes grow in sod or in hard, lumpy or baked soil; but a passing glance at any two trees or lots of trees—the one planted in well worked land, the other in soil equally suitable for orchard purposes, but in poor physical condition—will convince even the beginner that trees will not prosper in any old place and that it pays to get your land in good condition before planting.

If possible, raise a cultivated crop on the area you intend to plant to trees the following spring and then see that this crop gets cultivated. If this is not possible, deep plowing with thorough cross disking and harrowing will probably secure the required fineness and depth of soil.

This preliminary preparation of the soil will show results in the orchard as the years go by. One effect will be to deepen the soil, thereby creating greater foraging and roothold area for the trees. The roots of a tree will follow the lines of least resistance. If the soil is shallow, the roots will radiate close to the surface of the ground where every passing of plow and harrow will injure them and where drought first affects the soil. If the soil is in good tilth the roots get started right at the proper depth, forever out of the way of injury from plow, cultivator or drought.

Another result of this preliminary preparation will be to fine the soil, thus presenting greater feeding surface for the roots and creating greater moisture holding capacity. All practical moisture in this state comes from the rains and snows of the seasons. The soil must act as a sponge to absorb this moisture when it falls and hold it until needed. A soil in poor physical condition absorbs but little moisture as it falls, is soon streaked with cuts and gullies from the wash, and soon suffers from lack of moisture, even if a dust mulch is secured at once. It is surprising how much water a soil in good tilth will absorb before it becomes saturated. This difference in moisture holding capacity of the two soils may nicely be illustrated as follows:

Take two pails—bore a hole in the bottom of each—fill one with sand, the other with good sized pebbles—pour slowly a gallon of water into each pail—then measure the amount of water that runs from the bottom of each. There will be precious little in the one instance and almost the entire gallon in the other. Yet a particle of sand does not absorb moisture in a greater degree than a pebble.

The rains and snows provide ample moisture for the orchard. The business of the orchardist is to prepare his soil so that the moisture may be conserved for use as needed.

Now that your preliminary cultivation has received attention and your orchard planted, *what follows?* Cultivate. Begin as soon as the orchard is planted. Cultivate to improve the texture of the soil. Rocks may contain abundant plant food, yet very few plants are able to get their food from rocks. Hard, lumpy soil certainly contains the chemical elements necessary to support trees, yet the physical condition of the soil is such that trees will not thrive there. Cultivate to fine the soil, to keep it mellow so that your trees, through their roots, may avail themselves of the quantities of plant food stored there.

Cultivate the entire surface of the orchard. At first, of course, the roots extend through but a small area. If the entire soil between the trees is kept in good physical condition the extension of the roots is fa-

Rosa Rubifolia with border of Rubus Oderatus

Clematis recta

cilitated. In any healthy cherry tree the area of the root system is as great or even greater than the area of the top. A fine root system is essential to the success of the tree. A glance at the tops of the trees in any healthy cherry orchard a few years old will indicate that the roots penetrate to all parts of the area between the trees. Keep all the soil in good condition to accommodate the roots and nourish the tree.

Cultivate to conserve the moisture with which the snows of winter and rains of spring have saturated the ground. Remember, there is sufficient moisture in the soil to last the tree the entire growing season, if this moisture is properly husbanded for use as the tree needs it. Every child of the farm knows or should know that the dry, soft soil on the top of the ground created by the passage of harrow or cultivator acts as a nonconductor of moisture and thus prevents the evaporation of the moisture already in the soil.

Do not wait until the ground is dry and baked before you start your harrow or cultivator. It will do no good at that time. Cultivation never puts a drop of moisture into the soil—it merely conserves what is there. When once the soil becomes dry, rains must supply moisture. If there is a season of drought the trees are sure to suffer.

Cultivate about every ten days, so as to preserve this dry mulch on the surface of the ground. Cultivate also after every rain so as to renew this mulch. Never let the surface of the ground in your orchard become hard or crusty during the growing season.

Continue this cultivation as long as you wish the trees to grow, or as long as they may safely be permitted to grow. If the season is unusually moist, July 1 should mark the end of active operations. In an average or dry season cultivation may continue with safety to July 15 or even August 1. Watch the growth of your trees and your season and govern yourself accordingly.

This growing season has been unusually rainy in the Door county region. Trees planted in sod or among uncultivated crop, such as peas or rye, have apparently prospered this year. They do not look as thrifty as trees that received clean cultivation, but they have maintained themselves. This exception, however, does not invalidate the rule that *cultivate, cultivate, cultivate* spells success in a cherry orchard. A tree may maintain itself for a time in sod or among uncultivated crops if moisture conditions happen to be favorable; some one may point to an odd tree growing under such conditions and bearing fruit; but the wise orchardist will not be misled by these exceptions. He will bear in mind that a modern commercial orchard is an artificial product in that he is endeavoring to secure an abnormal product in the way of fruit. He will maintain the artificial condition of the orchard, not the natural conditions of the forest.

COVER CROPS.

Before going into this important topic it may be well to answer the question, "What crops, if any, may properly be grown in the young cherry orchard?" The answer will depend upon the condition of the soil in your orchard. If the soil is not mellow, keep to clean cultivation, followed by a cover crop which will eventually be worked into the soil to add humus. If the physical condition of the soil is good any crop requiring clean and thorough cultivation may safely be grown for a few years, providing the plants are not placed too close to the young trees. Hay, grain or strawberries should never be grown, for cultivation will surely be omitted and then these crops make great demands upon the moisture in the soil that should go to the trees. Potatoes, beans, sugar beets or other low growing crops that begin to demand moisture from the soil *after* the trees have made their growth have been successfully grown between the tree rows and the trees have also thrived because of the intense cultivation necessarily given. A three foot space should be left around each tree the first year. It should be increased at least a foot each succeeding year. After the third year the root system will have become so extended that no crop is advised where trees are planted twenty feet apart.

The danger in growing a cultivated crop lies in the likelihood of the orchardist to neglect the sowing of a cover crop in the spaces around the trees. In our region cultivated crops are the rule in young orchards and cover crops are rarely sown in the tree spaces. Last winter's severity levied a heavy toll upon the young orchards and hundreds of dead trees this spring bore silent testimony to the necessity for cover crops.

A cover crop may be defined as any sown crop used in an orchard between the normal periods of cultivation, not for the purpose of the crop itself, but to secure mulching and maintain proper physical conditions. The ends to be attained may briefly be stated as follows:

First.—A cover crop hastens the ripening of late wood growth and thus prevents top-killing.

Trees should have made their growth by July 15—they need the balance of the season to ripen the wood. Climatic conditions, however, may be such that growth may tend to continue after that date. If this be permitted, the wood will not ripen and will be killed back during the winter. As stated previously, any crop grown among the trees will use moisture that would otherwise go to the tree. Take the moisture away from the tree by growing a cover crop and the growth will discontinue and the wood ripen into condition to withstand the cold of winter.

A remarkable illustration of injury to late growth occurred with us last year. About July 15 a severe hailstorm visited one of our or-

chards, stripping the major portion of the foliage from the trees. Nature set to work at once to renew the foliage and the trees continued to put forth new growth until early fall. A casual observer would have thought that the trees would survive the effects of the hailstorm. But we were obliged this spring to replace about 4,700 of the 5,000 damaged trees. Mute testimony to the futility of late growth.

Second.—A cover crop prevents deep freezing of the ground, thus preventing root injury.

If the orchard has been properly cultivated during the growing, there will be few weeds to catch and hold the snow. Snow is a great protection to the ground, keeping the cold from penetrating to any great depth. If snow would only fall gently upon the earth in early winter and lie there until spring, possibly a cover crop would not be necessary. But the blizzards of winter sweep the snow from the open stretches and pile drifts in the roads and along the fences. A mat of vegetation is of inestimable value to catch and hold some covering of snow.

Third.—Where land is at all hilly the rains of fall and spring will tend to wash the soil down to the lower levels, leaving the hillside streaked with gullies. It is surprising how little washing will be found upon this same hillside if a good cover crop is upon the ground.

Fourth.—There is more or less sap movement in trees during the winter. If the ground has little or no cover of snow, the cold dry winds of winter will subtract much moisture from the soil. When the ground is dry the tree top does not get sufficient moisture and top-killing results. A good cover crop will afford some protection to the soil during such a season.

Fifth.—A cover crop will add vegetable matter to the soil. It is well known that orcharding is a method of cropping that returns little to the soil. Only the leaves fall to the ground. Any rank vegetation grown during the late summer and fall and plowed under the succeeding spring will add humus and tend to keep the soil in good physical condition.

Sixth.—A cover crop will keep down weeds. Weeds are of little value for cover. One of the objects of cultivation is to eradicate them. When cultivation ceases, as it should, in July, the weeds will surely grow unless there is some stronger and better crop to take their place.

The proper time to sow your cover crop will depend upon the amount of moisture in the soil. If your trees have made their normal growth by July 10, your cover crop may be sown at once. If the season has been dry, August 15 will not be too late. Bear in mind that one of the objects of your cover crop is to discourage further growth and thus ripen new wood by diverting the moisture to this crop, that would otherwise go to the tree.

Your choice of a cover crop will depend somewhat upon the physical condition of the soil. Where young trees are making all the wood growth they should, some crop like rye, oats or buckwheat for cover purposes only will answer very well. On the other hand, it may be necessary to add fertility to the soil so that proper growth may be secured; in which event a crop of field peas, vetch or clover may be grown and plowed under.

Rye will grow in poor soil and can be used when a proper stand of some better fertility adding crop might not be secured.

Oats, if sown thickly, cover the ground well.

Buckwheat produces a rank growth for cover, but should not be used persistently.

Field peas and oats are a good combination for cover and for humus.

Buckwheat and vetch seem to be ideal for the young orchard. The buckwheat makes a rank growth for cover. The vetch grows until late in the fall. In the spring it forms a green mat which, plowed under around June 1, adds unmeasured fertility to the soil.

Clover is the ideal crop for increasing fertility. When sown, however, at this time, a cover crop should be sown. The catch is not at all certain. If sown in the spring, cultivation must be omitted in order to secure a catch, and for this reason its use is not recommended.

In closing, permit this statement: It requires good sense, intense care, unlimited patience, time and money to grow cherry trees. A successful cherry orchard is not an accident.

THURSDAY MORNING.

PLANTING AND PRUNING THE FIRST SEASON.

A. W. LAWRENCE.

I am going to presume in this paper that the tree has been selected, age, size, variety, etc., so that all there is to do is to begin planting. The ground being prepared for me, which ought to be free from roots, stumps or stones as far as possible, so that the planting can be done right.

There are many theories and ideas about tree planting, in order to get a good stand, but after superintending the work of planting a good many hundred acres, I find that there are a good many theories that are only theories, and that tree planting is only the exercise of good clear common sense, well applied.

The getting down on your knees and working the dirt among the roots of a tree, as shown in illustrations, looks all right on paper, but doesn't work out in the field, with the busy man. He must plant right, he must plant in season, and if he has much to do, he must accomplish

something. Therefore he begins to use his head, and we find that when he begins to think that something is going to be done, unless he is naturally careless—in that case, he will never have an orchard any way.

I have seen people let trees lay around exposed to the sun and wind for several hours, then spend five times the amount of labor necessary to plant a tree and the tree would die. Perhaps in the time he spent planting the tree by his methods he killed it. Trees are like all other plants that are transplanted, a little neglect here, and a little there, is what causes their death.

Of course this sometimes happens before we get the trees, but never in our experience have trees, that were in good condition when received and that did not get some unavoidable injury, shown anything but a very slight loss, oftentimes planting thousands of cherry trees and not losing 1 per cent, while the same trees grown by the same man, packed by same party, loaded in same car and handled the same, until getting into the hands of the planter, show a loss of 20 per cent.

Now how do we plant a tree? We simply dig a hole large enough to receive the roots and deep enough to place the tree down to the bud union, throw in some good surface dirt, then fill the hole half full or more and tramp it firmly. If the ground will permit thorough tramping, otherwise we are careful about tramping too much on wet soil. The hole is filled up and tramped again, then a shovel full put over the tramped surface.

Now when I say tramped, I mean tramped down firm, using your heel instead of a little pressure with your flat foot. Often we find trees are not tramped firm enough when planted and they do not live—proving the work of a careless planter. This we usually watch for when pruning, which is done after planting, and all such trees are tramped firm again.

Now I have the tree planted without pruning the roots, but I will let it go, it will live anyway, and besides it was a fall dug tree and I didn't intend to prune the roots. If it had been a spring dug tree, I would have pruned the bruised ends some, providing it had not been dug long enough for the healing or callousing to start. Pruning the roots can be done in several ways. If you have lots to do, and many to prune, I find a good sharp hand axe and good block makes quick work, otherwise you could use a sharp knife.

Pruning of the top is a small job and ten, twenty or forty acres should be accomplished in short order and done well.

Here is where the mistakes are made. Some prune while others only cut back. The cutting back method, without doing much pruning, may not be so bad, if followed up in after years with some system of pruning. However, it is better at the start to prune with reference

to placing or establishing a form to the tree, relieving as much as possible close clustering of limbs, and giving some care as to location of buds.

About three-fourths of the top should be removed on the average one and two year tree.

For example, take a well grown, well branched one year tree, as it comes from the nursery. This tree usually has too many branches, and too many heavy branches, several of the lower ones being nearly as large as the body of the tree. The head of the tree ought to be started about 16 or 18 inches from the ground, and in pruning for this two or three of these large branches will usually have to be removed.

We leave a leader on our trees, and as the one year tree is generally pretty well shaped, there is not very much pruning to be done.

The two-year-old tree is usually a different proposition, it will invariably be found with two or three limbs of about the same size at the top of the tree. One or two of these must be removed so as to add strength and vigor to the one most upright, which should be cut back and left as a leader. Every limb on a transplanted tree should be cut back, the heavier ones from one to three buds and even those which are very small and short, though left for their desirable position, should have the terminal bud removed.

DISCUSSION.

A Member: What objection do you have to pruning?

Mr. Lawrence: We have no objection if the tree is small, if you do not make too much of a scar. There would be no advantage in cutting if the limbs were evenly divided on the tree, I do not think there would be any advantage in pruning them all off. In the care of the one year tree, the limbs are small, light, come out very uniformly, make nice shaped heads.

A Member: Will you treat all varieties of cherry trees of different habits of growth the same way with reference to leaving the leader? Take the Morello and some other varieties that naturally have a higher habit of growth, do you treat them the same way?

Mr. Lawrence: I think I would. We have had little experience with the Morello. I know of no reason why they should be bobbed off. We find in pruning the cherry we have a different proposition than we have with the apple. In the cherry the limbs come out in clusters, to form the head. If cut off abruptly it would tend to weaken that head. We find they decay much more rapidly with the head or cluster trim than they do with the limbs more evenly distribut-

ed with a larger trunk. We strive to get a longer trunk, the limbs more evenly distributed.

A Member: Do you ever cut the leader from the tree?

Mr. Lawrence: We do not now, we used to, in former years. We find on the older trees we have a great deal of trouble where the leader has been cut out.

A Member: Do you not cut the leader back at all?

Mr. Lawrence: Certainly we cut it back but leave it longer than the side branches.

A Member: Do you advise trimming apples the same way?

Mr. Bingham: On most varieties of apples we cut them back more severely than the cherry.

A Member: You mean the second year?

Mr. Lawrence: No, the first year. Never cut them back after the first year. Cut out limbs, but never cut back the growth.

A Member. Do you cut any off at all after the first year?

Mr. Lawrence: Not unless it happens to be growing in the wrong direction, unless too many side branches come out. We might cut out some of the new growth, but not if it is in the right direction. In our locality we do not get too much growth. I hardly think, from anything I have seen here, you will get too much growth. There are sections of very rich soil where possibly there is more growth than should be left.

Mr. Smith: In pruning, do you leave just two buds on the leader?

Mr. Lawrence: That would be plenty.

PRUNING THE SECOND SEASON.

PRESIDENT D. E. BINGHAM.

Pruning the second season is a short job. After pruning the first year, as Mr. Lawrence has told you, heading back and thinning out, then the tree is left to grow that season. The next year you will find that all the buds that were left on the tree do not start. Perhaps you have not been careful enough in pruning, because it is necessary to go over your work rapidly and you do not get the limbs cut back to the best buds, therefore perhaps the tree is a little bit out of shape after growing one season; the terminal bud may not start; or may have been brushed off by your sleeve in pruning, all those things have to be watched. In pruning the tree the first year it is necessary to watch that you do not knock off the end bud that you have cut back to, because if you do it is the next bud that is going to make the growth. If that bud is an outside bud, or running in the side direction, it will make a growth in that direction, but it may be that the

last bud that you left on that tree would be a bud making a shoot upward or toward the center of the tree. Going over the second season we attempt to cut out those limbs in the center that are not in position to make the proper form of tree. It is a small matter, under the supervision of a man who knows what to cut out, to do the pruning for the second season, giving the top an outward spread rather than allowing it to cluster in towards the body and making a dense top. The tendency of all cherry trees is toward a dense head and naturally the pruning the second year is to avoid that clustering at the center, and of course, remedying defects we have overlooked the year before, taking out some more of the limbs that we find have a tendency to throw the tree out of balance and to get them properly distributed around the tree. We like to have limbs alternating around the tree, so our pruning the second year is merely to give the tree good form, cutting out the little branches that grow through the center.

DISCUSSION.

A Member: At what time of the year would you prune the second season?

Mr. Bingham: This pruning is all done in the spring of the year. We figure on pruning before any growth starts, say along in March or April. All this work is done with a good pruning knife. We may use a saw on the cherry after about the fourth year, before that time all the pruning can be done with a knife. I do not like shears, they are too slow. You cannot get down close to the body without bruising more or less, and a curved blade pruning knife is best. You take hold of the limb, bend the limb just a little, and when you get used to cutting, cut at the proper point and never cut into the limb above or hack into the body of the tree, and the limb heals over much better and does not leave a crushed stub, like the pruning shear does.

A Member: Do you advise cutting back any after two years?

Mr. Bingham: No, we do not cut after we get them pruned and headed back. You can head back an apple tree, but not a cherry with good results. If a tree is growing very rank, long and sprawly, it will be advisable to cut back, but usually we have plenty of thick top, so we do not have to cut back to form the dense head. We aim to get an outside bud, or a bud on the bottom side of the limb, or a side bud, and avoid as much as possible the buds on the top of the limb that will grow toward the center of the tree, or spread out.

A Member: You aim to cut close to that bud?

Mr. Bingham: Yes, if you do not you will have a long stub that looks dead the second year.

A Member: What effect would it have on the cherry tree to trim now?

Mr. Bingham: Well, you would remove some of the leaf surface which is helping to build up the root system at this time, and I hardly think it would be advisable to cut off many of the leaves now. I cannot see any advantage in doing it now. Then, of course, the scars are not properly healed over, and you will perhaps have more winter-killing with fall pruning.

A Member: Would you trim in June?

Mr. Bingham: No, I would not, unless I had a reason for it. If I had a tree I wanted to experiment with to produce fruit buds, I would perhaps do a little summer pruning to remove some of the leaf surface, but I would not prune a bearing tree in June, because at that time the fruit is on the tree, there would be no object in pruning at that season of the year.

Mr. Richardson: You spoke of four large limbs below intercepting the flow of sap to the leader. Do you find in the same way that they intercept the flow to other limbs above?

Mr. Bingham: Yes, directly above. In pruning we avoid two limbs coming out on the body of the tree, one directly above the other, because the bottom limb is going to take the growth and the other will be dwarfed. That is why the spiral arrangement of the branches when one is not directly above another, is better.

A Member: Three limbs, as a rule, would not affect the leader?

Mr. Bingham: Well no, not usually, if they are evenly distributed. We have very good trees of that type now. The first one year trees that I planted are of that type. I did not cut them all off, and I found I had trouble in those limbs getting so large, one season's limb would be almost as large as the balance of the tree and split down with the heavy load of fruit later on. I left those limbs too closely clustered at one point. We are avoiding that and seeing much better results.

PRUNING THE BEARING TREE.

MR. A. L. HATCH. (Read by Mr. Ulsberger).

Bearing fruit modifies a cherry tree very materially. The most important modification, is in the vigor of different branches, as well as that of the entire tree. Those branches bearing the most fruit may become less vigorous than those bearing none. Sometimes excessive cropping produces complete exhaustion of a branch and it may fail to grow at all the next season. In the early spring pruning, these exhausted limbs should be removed.

Cherry trees now planted for commercial purposes in Wisconsin produce fruit upon spurs borne upon branches of one or more years growth. Hence it is easy at pruning time to see the probable crop of the coming season. This gives opportunity to thin or lessen the crop of the tree by pruning away the fruiting branches when they appear in excess.

Bearing trees produce many small lateral or side branches of but one or two season's growth. These often die because poorly nourished, because the larger branch from which they emanate monopolizes the growth. These slender branches usually show no enlargement or swelling of bark at their base, while vigorous laterals always do. The removal of these slender limbs is desirable.

The tendency of growth in a fruit tree is upward and outward, along and through the most direct and thrifty limbs. This tendency often causes one part of a branch to absorb more than its share of strength, very much to the disadvantage of the other part. These over vigorous limbs sometimes need removal, cutting back or shortening in, and surely so if much in excess of the average vigor of the entire tree.

While neglected and weak trees can be made more vigorous by pruning the important thing in managing bearing trees is to maintain an even growth of all branches, and this can be done by pruning along the lines already indicated. Properly done, at the right time, pruning tends to develop fruit buds the following season. The right time is early spring before the sap flows and after severe cold occurs.

THE SEASON OF 1912 IN BUGLAND.

PROFESSOR J. G. SANDERS.

Possibly some of you know that I have charge of state orchard inspection in addition to the entomological work of the station, and in that connection I want to call your attention to a few things which apply locally and to conditions which I think you ought to take to heart as much as possible.

This is a new country from a horticultural standpoint and naturally you have few fruit insect pests; less than are found in old orchard localities. You have that advantage, as well as some disadvantages that confront one in planting in a new country, but certainly a distinct advantage exists and there is an opportunity for you to exercise great caution in the stock that you bring in here. You should be very careful where you buy young trees which are produced in various parts of the country, and be sure that they bear inspection tags, which in a cer-

tain measure will insure that they are free from insect diseases and pests.

As I said, there are many insect pests in various parts of the country which are not represented here and which will be introduced if you do not use great caution.

Prof. L. R. Jones, from the College of Agriculture, is our plant pathologist; he unfortunately is not able to be here this morning. His line of work is the study of fungous diseases, and he coöperates very effectively with me in this inspection work.

I think it has been pretty thoroughly instilled into the minds of all of you that spraying is an absolute necessity if you wish to produce perfect fruit. The orchardists and fruit growers here are of a progressive type who have made it their business to read up on these problems and put them into practice. There are a few things I want to mention this morning in regard to spraying. I have heard here and there several say that they spray while the tree is in full bloom. That is a mistake. Do not under any circumstances spray a tree for insect pests while it is in full bloom, because you are very likely to ruin your setting fruit. Wait until the petals have fallen, it does not matter even if five or eight days elapse, so you do not go beyond the twelve-day limit, you can spray with any arsenical poison, preferably arsenate of lead. That insecticide s not so well known to you as Paris green, but it is a far better material, because it will not burn the foliage, and you can apply it even stronger than the formula calls for without danger. It has another side in its favor, and that is, that it will adhere to the foliage much longer than Paris green in case of heavy rains, in fact, it will remain on for a month or six weeks, if rightly applied.

The all-important thing in controlling the apple worm is getting arsenate of lead down into the calyx cup of the apple. If you will examine an apple flower carefully, you will find five large petals, and within a bunch of yellow stamens, in the center of which are long filaments and those filaments form a roof over the calyx cup; almost a solid roof when the flower is young. Now, if you wait till the petals fall and then wait another three or four days, you will find those stamen filaments which cover up the calyx cup have dried and opened up, so the poison can be forced into the calyx cup. Here is the important thing to remember in controlling the apple worm. Eighty-five to ninety per cent of the codling moth larvae enter the apple through that calyx cup; if you have that cup filled with poison, you will kill them as they take their first meal. The second brood, which come out the last week in July in this country, I should judge, depending upon the season, will enter the apple just as well from the side or stem end and also at the blossom end; where two apples are joined: or where the apple is against a leaf or limb of any kind. About the 25th

to the 31st of July you should spray your apple trees again for the second brood of codling moth, for this second brood really does the greatest damage to the marketable crop. The first brood causes what we call the June drop, but frequently they do not do as much damage as one would think, because they frequently prevent the overloading of the tree. The second brood infests the apple that we want to put upon the market, therefore we should be on our guard against it about the 25th or 31st of July.

The plum curculio will do some damage, but I have not seen effects of very serious injury in the orchards so far. A thorough spraying of arsenate of lead just as the buds are swelling in early spring, in conjunction with lime sulphur which will control fungous diseases, is very desirable. This will kill the plum curculio which hibernate around fences, under grass, in debris of various kinds, around forests, or wherever there is a large gathering of leaves. They come out in the early spring and feed on the green bark of the twigs, and if you have them coated with arsenate of lead you will kill many hundreds.

Right now you have in your midst a quite serious pest, the apple aphis, which is very abundant in some places and which curls the leaves. The best remedy is some contact wash like kerosene emulsion, nicotine spray or tobacco wash, but you will get better results in using the nicotine spray and tobacco wash if you will use it combined with whale oil soap suds. It seems to do more efficient work and is more effective. Somebody asked me about making a tobacco decoction. They said they had been told by some tree agent that had come in recently to make it by taking a pound of tobacco stems and putting it in two gallons of water and boiling it for two hours. The fact is that if you allow your tobacco stems to boil you lose the nicotine. Never allow tobacco stems to boil, just let them simmer and steep in a covered vessel, because the nicotine passes out with the steam and you lose the strength. Use one pound to two gallons of water, then dilute it and use it in connection with whale oil soap.

The cutworm has been abundant in various parts of the state, but I understand has not been very abundant here, nor very destructive.

The white grub has been with you at various points. We know of no remedy for this pest but we have to use preventive measures against it. Thorough cultivation of a field in the late fall, or summer plowing; continued cultivation of infested fields will check it by simple starvation methods.

The house fly I want to speak of, although no horticultural pest, yet it is necessary to call attention to it on account of the great danger in permitting the house fly to enter your house and attack the food. It has been thoroughly established that the house fly carries a multitude of diseases, especially those affecting the alimentary

tracts, including typhoid fever, dysentery, summer complaint, cholera infantum and many other children's diseases. House flies will breed in various kinds of matter which is allowed to decay, particularly in horse manure about the stables. That is one thing that should be removed and spread out on land at least once a week. It is perfectly obnoxious to see the amount of various kinds of stable manure that is allowed to lie around and decay and attract house flies. Not four blocks from this building are at least forty loads of manure decaying, and I venture to say that as high as 100,000 flies may breed out of that place every week. The fly is the filthiest insect that we have, throughout its entire life history, and I want to impress upon you the importance of keeping that fellow out of the house by means of traps and poisons, more particularly by cleaning up all kinds of filthy places. When we know that typhoid fever is carried quickly and rapidly by the house fly, we should be extremely careful. You have had a great deal of typhoid fever in this city in the past, and I am quite sure that it does not all come from the water, but if there is one case of typhoid fever in the town and the offal of that place is not taken care of properly, the house fly will visit it and carry it to other homes at some distance.

Coming to another important point; I know of several land companies, not only in this state but in other states, that are selling a great deal of your land around here that is not fit for horticultural purposes. Many of you know, as well as I, that not all of the land in this county or in some adjoining counties, is fit for horticultural purposes. Four or five miles from the lake is the limit. If you permit companies to advertise and sell a lot of that land as Bayfield fruit land to people who invest a lot of money and make a total failure, your country will get a "black eye." The best thing you can do is to publish in your papers and spread broadcast the fact that there are certain lands being advertised that are not horticultural lands. I know of certain companies that are advertising land 10, 15 to 20 miles from the lake, representing it as Bayfield land, which is not Bayfield land in the true sense of the word.

There are at various times during the season various agents coming in here making misrepresentations of their stock. That is the very thing we have been trying to drive out of this state. We have succeeded to a remarkable degree, even beyond our fondest hopes, yet here and there some fellow creeps in and causes some mischief. You had an agent here during the last few months who made some remarkable representations in regard to his stock, and induced people to buy stock at two or three times the normal price. He represented to many people that he was selling cherry trees grafted on pin cherry roots; said they were hardier than any other, and you should buy only of him. That statement was entirely erroneous. I wrote

to his company to determine whether they used any pin cherry in cherry growing. They informed me that they used the Mahaleb stock that other nurserymen use. If any one is dissatisfied with the contracts made with that agent through misrepresentation, the contract is null and void and you are not required to take the stock at all; he cannot force you to take it if he has misrepresented the stock to you in any way, particularly with reference to cherry trees. His cherry trees are no different from any others, and representations that they were grafted on pin cherry roots are entirely wrong. One of the duties that I have been trying to perform in the state is to eliminate those concerns and agents that are trying to impose upon the grower. We are trying to keep out the insect pests as far as possible, including the dangerous San Jose scale. We are also inspecting all importations of stock from Europe, because we are afraid of introducing browntail moth and gypsy moth, and many other insect pests known in Europe that have not yet been imported here. If there are any questions along these lines, I shall be glad to answer them.

The President: I should like to have you give the formula for fifty gallons of tobacco and whale oil soap for the aphis.

Professor Sanders: In using the nicotine preparations I think it is generally advisable to purchase that which is prepared by the companies in commercial quantities, although you can prepare it from tobacco stems, but so frequently failure follows efforts on the part of people to use the tobacco stem decoction, I think it is better to use the commercial nicotine preparations and make a reasonably strong whale oil soap solution, perhaps using three or four pounds of whale oil soap to a barrel of water, rainwater or soft water, and then use about a pint of "Black Leaf 40," or perhaps a quart of some of the weaker decoctions. Follow the formulas on the different preparations, some are stronger than others, but about one part of nicotine to 500 parts of the soapsuds solution is advisable. You must be governed by the strength of the nicotine, or directions on the can.

Mr. Richardson: How do you fight strawberry leaf roller?

Professor Sanders: That has been a serious pest in some localities and is best fought by spraying. Arsenate of lead has been very successfully used this year, and is the generally advisable method of fighting the pest but you must start early in the spring and keep at it, if the infestation is at all serious. Spray every new set of leaves that comes up, every ten to twelve days until the leaf roller has been eliminated from the field.

Mr. Richardson: You would have to follow up until the second crop matures.

Professor Sanders: Yes, you have to follow right along, because every new set of leaves affords an opportunity for the leaf roller to

work, and after he has gotten in his work to a certain degree and folded the leaf over, it is hopeless to try to reach it, because they fold the edge of the leaf and fasten it down with silk so you cannot get the poison inside. They never come outside of that folded leaf but feed from the inside.

Mr. Richardson: Is it not true that there is only a period of 48 to 70 hours from the time they come out until they have that leaf sufficiently folded to be protected?

Professor Sanders: I am not certain as to the exact time, but they are pretty fair sized before they fold the leaf over, four to six days old.

Mr. Richardson: If a man has four or five days, he can get at it with the arsenate.

Professor Sanders: Yes, he has fully that time, even after the egg is laid, I think a week elapses after the egg is laid and the larva turns the leaf over, you will find most of the larva as large as a knitting needle or perhaps as large as the lead in the pencil before it turns the leaf over.

A Member: What strength of arsenate solution do you find advisable?

Professor Sanders: Not less than 3 lbs. to 50 gallons, four is better on any of the low growing crops. I think four pounds of arsenate to 50 gallons is more satisfactory than weaker solutions.

A Member: Then do you run your Bordeaux mixture right in with it?

Prof. Sanders: Well, you could do that, but those two do not work so well together as Paris green and Bordeaux.

Mr. Richardson: Is there any chemical reaction that you can see?

Prof. Sanders: Sometimes there is and sometimes there is not; sometimes good results have been obtained and again it has turned to a dark solution. I have seen it both ways.

Mr. Richardson: Normally, should there be any chemical reaction?

Professor Sanders: Generally there is some chemical reaction, but it is seldom sufficient to cause any harm.

Mr. Richardson: If you are going to mix the two, do you use the attenuated solution instead of the concentrated?

Prof. Sanders: Always. It is better to mix anything like that in the attenuated form. You should not mix arsenicals with the stock solution of Bordeaux.

A Member: Would arsenate of lead, four pounds to fifty gallons of water, burn the leaves without lime?

Prof. Sanders: No, that is one of the advantages of arsenate of lead; it will not burn the foliage if it is a good brand. If it con-

forms to the state law passed a couple of years ago, arsenate of lead will not burn foliage. Paris green has a certain portion of soluble acid which will burn the foliage if you do not use lime with it.

Mr. Holstein: Has it been your observation that the bull wasp, or hornet, plays upon the aphis?

Professor Sanders: I do not know the exact one to which you refer, but there are a number of smaller bees which do kill aphids and store them away. Sometimes you will find on the common sumac twigs cells filled with fifteen to twenty aphids and an egg of the bee, that will be capped over with cut leaves, then there will be another cell, until you have ten or a dozen frequently, and perhaps 500 or 1,000 aphids collected in one twig.

The President: Is there some chemical action in mixing lime-sulphur with arsenate?

Professor Sanders: There is sometimes chemical action.

The President: Is it considered a good mixture to use? Is it not almost impossible to keep the mixture sufficiently agitated to spray it out on the tree? We find considerable trouble.

Professor Sanders: Sometimes a precipitate forms which may prevent your getting the best results in the use of the combined spray of lead arsenate and lime-sulphur unless severe agitation of the material is kept up and that is not always prepared for in the manufacture of many pumps.

A Member: Would it be possible to find an insect enemy that would control any of these pests?

Professor Sanders: No, I do not think that is a feasible plan with any of our insects.

A Member: Can the beetle that produces the white grub be attracted to the light and destroyed?

Professor Sanders: Yes, it can be attracted to the light quite readily, and I do not know but finally we may have to resort to some such plan to control the white grub, but it is not best to try any such method on our leaf rollers or any small moths, because they can be controlled with spraying and the spraying is efficient, not only for those, but any other leaf eating insects. There are two or three weevils that affect the strawberry that can be controlled by spraying. I think it is always safer to spray the crops; it controls a number of insects, and prevents them from multiplying.

A Member: Are strawberry plants inspected before selling?

Professor Sanders: Our state laws require that all strawberry plants offered for sale must be officially inspected for insects and diseases. There is a root louse introduced into our state at various points from Michigan, Illinois and adjoining states. We have found it in a number of places, and in several places we have been able to eliminate it entirely by plowing up the old beds and starting new

Pink Lady Slipper

A Daisy Field

beds. The presence of the root louse is best indicated by many ants which work around the base of the plant, attracted by the aphids, and often carry the plant lice from plant to plant and take care of them. We find the infested plants by watching the ants, then by pulling up the plants we will frequently find the roots of the plant covered with dark green plant lice. They are most abundant and do the greatest damage in sandy soil. We rarely find them in any quantity in clay soil.

A Member: How would you protect trees against the rabbits?

Professor Sanders: The best plan would be to repeal the present state law protecting them. The best protection is to cover the trunks of your trees with wood veneer or something of that sort. Corn stalks can be tied around. There is nothing that has been found which is a thorough protection in the way of a wash that can be applied to the trees, although many companies advertise some bitter preparation that they will sell you at a good profit.

A Member: How do you protect against mice?

Professor Sanders: I wish I knew. Mulching the trees with any kind of grass or hay or straw is more likely to cause damage by mice than with clean cultivation. The old method of whitewashing trees is not as foolish as it seems to many people. It protects the trees from borers to a certain degree. It does not hurt the trees at all.

A Member: Does tramping the snow help against mice?

Professor Sanders: Yes, that will help to a considerable degree if the snow is damp, piled around the base of the tree. That would be a considerable job with a large orchard, but would be worth while if you found damage was being done.

The President: Last night we had a paper here on the absolute necessity of cover crops in the orchard. Now the question comes up here about the mice and you say mice are not very apt to affect an orchard that is in clean cultivation. Those two do not work together.

Professor Sanders: They do not work well together.

The President: We have heard a great many people advocate mounding trees to protect them from mice. Usually it is alright. Once in a while the mice will work up in the snow.

Mrs. Howlett: In case the trees are girdled, is there any way of saving them?

Professor Sanders: There is a method by which you can save them known as bridge grafting. It is rather tedious, but if the tree is valuable and is not too severely girdled, it may be worth while. Make a clean cut around the girdled place; take small twigs, cut them down to a knife edge and insert them above and below the wound, carefully bringing the bark in contact at the end of each twig. You could put in a number of those and perhaps whitewash

over the spot, or give it a coat of paint, covering up the exposed wood and wrap it. Sometimes the trees will recover and the bark grow over it, but it is rather tedious to go over a lot of trees that way. Sometimes it may be worth while.

The question is asked why only a portion of this Bayfield peninsula land is available for horticultural purposes. If it were not for Lake Superior you would not be able to grow fruit up here at all, that is, many of our larger fruits. It is the influence of the water controlling the frost in both spring and fall which enables you to grow fruit here. Now, the influence of the water which is strong enough to affect apple growing or larger fruit growing does not extend very far back from the lake. In some places the area that is affected is broader than in other places and that must be taken into account. For instance, you may find a place where it extends only a mile or two up some high ridge and back of that sharp ridge you may get frost a week earlier than on the water front. In other places that region may extend back six or eight miles, but rarely. It is not safe to count on any more than five or six miles at best in many places. Of course when you get out on one of the islands about here, where you are surrounded by water, then you have a tremendous influence exerted by the water both in the spring and fall. Many people cannot understand why water has influence on fruit growing. As I came up from Marshfield the other day I saw many places where they have had heavy frosts many miles south of Ashland but there has not been any frost here and perhaps will not be for three or four weeks. That is the controlling influence of the proximity of water.

A Member: Can you get too close?

Professor Sanders: No, you cannot get too close to the water. If you are reasonably close to the water, on soil that is adaptable to fruit growing, you will be perfectly safe.

A Member: On low land, too?

Professor Sanders: No, not exactly low land. You must choose your soil every time for fruit growing, and good air drainage is highly desirable.

A Member: Going back to the subject of mice, would lime-sulphur applied heavily to the base of a tree have a tendency to discourage the mice?

Professor Sanders: I think lime-sulphur used pretty strong in connection with a heavy whitewash would be more effective than whitewash alone. It could be painted on the trees and would have a tendency to discourage the mice. But when mice get very hungry in the winter they will attack almost any tree or plant.

A Member: How would heavy tar paper do for protecting the tree body in the winter?

Professor Sanders: I would never apply tar paper to a tree, especially closely to the tree. There seem to be chemicals in tarred papers that frequently cause burning of the bark. If you take the common felt paper something like that used for deadening floors under carpets, it might be applicable, but I would not put a tar paper immediately against a tree, because sometimes serious injury results.

Mr. Richardson: Then the untarred building paper would be all right?

Professor Sanders: That would be all right to a certain degree, but I like wood veener, or something like that that will not apply tightly to the bark. We do not want anything that will lie absolutely against the bark. Better have it loose.

A Lady: We have had good success with burlap, tying it rather loosely, spraying over the burlap, leaving it there till the burlap decays.

Professor Sanders: It is possible that the burlap permeated with the spray has been a protection to a large degree.

A Member: Do you injure the tree by leaving the wood veneer for several years?

Professor Sanders: Not unless you get it too tight, so that it cuts into the tree.

A Member: What about the flat-headed borer?

Professor Sanders: You can protect your trees from the flat-headed borer, which is perhaps your most dangerous enemy to young trees in this country, by a thorough application of thick whitewash in spring and keep it well whitewashed each year.

A Lady: We have had good success in killing mice by soaking wheat in strychnine and placing it around the trees where the mice will get it.

A Member: Do mice bother cherry trees very much in the winter?

Professor Sanders: They do not seem to bother cherries as much as apples, on account of the bitter bark of the cherry.

TRANSACTIONS

OF THE

Wisconsin State Horticultural Society

WINTER MEETING

January 8, 9 and 10, 1913.

WEDNESDAY MORNING, January 8.

The meeting was called to order by President Bingham at 2 p. m. in the Madison Free Library, Madison, Wisconsin. The President introduced C. P. Cary, State Supt. of Public Instruction.

ADDRESS BY MR. CARY.

Mr. President, Ladies and Gentlemen:—I do not know why I have been called upon to-day, unless it is for one of two or three reasons. One is, my ignorance of the subject, so that those who come after me may appear more brilliant. Another is the general good will of the people who are kind enough to wish to do me an honor now and then.

While I know very little about the subject that you people are chiefly interested in, I do know something about its results, something about its outcome. I no not know a great deal about the process, but it is the outcome that a great many people are interested in, in other words, the fruits, both figuratively and literally, that come from your study and labor.

I am especially under obligation to your society and the officers for the attempt in the last few years to help us in the matter of decorating school grounds. It was very kind indeed of you to undertake to do something in that line. We have been trying in Wisconsin

for a long time to improve the school grounds of our country schools. In the first place, those grounds are entirely too small as a rule. Every year we send out an Arbor Day Annual, as it is called, indicating how trees may be planted, and what kind of trees and shrubs and various kinds of plants are good for school grounds, and yet the thing moves very, very slowly.

You will agree with me, I am sure, that most country school grounds are exceedingly barren and uninviting places. I speak of your interest in this because I am more familiar with this perhaps than any other phases of the work which you have undertaken, although I am aware that this is just a minor and side issue with you. It is not so with us. But the grounds in our country schools are anything but beautiful at present and anything you can do to help will be appreciated.

There is a county superintendent over the state line, by the way, who has done a great deal in the way of stirring up his people to look after the planting of trees. He has an illustrated lecture, stereopticon, and as he goes about and delivers that lecture he throws upon the screen the school grounds, and then alongside of that he often throws on a screen the yards of some of the more prosperous and thrifty and painstaking farmers and the contrast is really something very painful, something very much to the discredit of the school grounds. He will take a stretch of road with some beautiful trees, perhaps, or a little grove and throw that on the screen for the admiration of everybody, and then he will throw on the screen another school ground barren of trees, or an old scrub of a tree, perhaps, not a thing growing on the ground, and in that way he has been able to educate his people. To some extent we have been doing some such things in this state. We have in that particular a rather difficult problem, which I think your experience and your ability in tree growing will help us a great deal in solving. Our children ought to have the beautiful around them.

One thing a child goes to school for is to come in contact with superior personalities. I say, "superior personalities," you understand what I mean, I do not mean that the teacher is superior, necessarily, to the parent. Many times the teacher is sadly inferior to the parent. But on the whole, according to our theory of the way things ought to be, the teacher is more thoroughly trained in the use of language, she is more careful in her personal appearance, she is more courteous than the average run of people. If she is not, she is scarcely the sort of person that ought to be brought in contact with pupils. You will understand, of course, that I do not mean a teacher should be an extremest in fashion, or a man should be a fop, anything of that sort at all. I believe in womanliness and manliness and character.

If we could make our surroundings of the school grounds beautiful, it will remain in the minds of our children as long as they live as one of the pleasant things in their early childhood, the school with all its beautiful surroundings and its appropriate setting. But the memory that many of our children are likely to bear about their country schools is very different from that.

Now, coming a little closer to this subject in which you are immediately concerned, I am telling you nothing that you are not aware of when I say that the people of this state credit to this Society a great deal of excellent work in the way of increasing the amount of fruit grown, and improving the quality of the fruit grown in the state. I think your Society began some fifty years ago and with various ups and downs it has continued up to this time, perhaps never very large, but none the less efficient.

There is one respect in which we are reaping the reward or benefit of your labors. As time goes by, more and more the medical profession is going to say to people that it is necessary for them to put into their diet more and more fruit. They are coming to that point of view, that the acids of the fruit, the various juices of the fruit are excellent for the health. It is becoming a necessity, not merely a luxury, to have an abundance of excellent fruit. Your labors, I suppose, are largely in the direction of showing people what can be done in the way of growing fruit here commercially, and of course your labors in that direction are not over. You have a great work, it seems to me, to get the average farmer who does not grow fruit for profit, but merely for his own use, to do more and more in the direction of having proper fruit trees and small fruits than has been done up to date. I am very sure that the great majority of farmers are not doing what they might do in the way of raising choice fruits for their own table use.

There is another phase of this question that I think perhaps your Society has not yet given any great amount of attention to, but I think as time goes on you probably will, and that is the growth of vegetables. You may have given more attention to that than I am aware of, but there is a great field here, both in the direction of profit and use, more particularly in the direction of the farm gardens and the gardens around the smaller towns and cities. Many people might raise a splendid little garden patch in Madison, for instance, which they fail to do. They might derive health and profit by reason of producing their own supply of garden vegetables.

Another thing is the flower side, all three things come under horticulture, but I think, with the exception of the gentleman who sits before me, who is known the country over as a raiser of pansies of the most splendid varieties, and a few others like him, I think the matter of careful growing of flowers is rather neglected in our

state. It seems to me that those two features of horticultural work should be in future much emphasized by your Society.

You know far better than I that we have in the main here a splendid state for the raising of fruits. I think one of the things that becomes evident as we think about the products of the soil, one of the things that must impress us all is this fact, and I will explain what I have to say by a little story of an actual occurrence. Down near the Atlantic shore there was a tract of ground that was quite level and very fertile, but just back of it on the bench or upland there was a tract of land that was unfertile, nobody could do anything with it to amount to anything. One day a man came along and he saw that soil and he said to himself, "I think that we could raise the kind of melons here that they raise out at Rocky Ford in Colorado." You remember what a splendid melon was developed out there that was found in our first-class cafes all over the United States a few years ago, sold at high price and was an excellent article. So, this gentleman started on this piece of land that never had been able to produce anything and raised Rocky Ford melons of the same kind. It was close to the East, no end of market, he was able to make splendid money out of that land, and that became more or less of an industry there.

Take our own state, here around Chequamegon Bay they are beginning to raise splendid strawberries, and they are going to ripen at a time of year when strawberries elsewhere are passing away, an excellent quality they are raising there, and around Ashland they are developing lands for the purpose of raising strawberries. You know how it is in Door county; land regarded as practically worthless in many cases makes the best cherry orchards, and as time goes on I think we shall find that all over the face of this earth there are to be found spots that up to this time are considered practically worthless that will be of splendid usefulness in some one direction when we learn what that direction is, something that is immediately marketable and profitable. We do not know yet what to do with old Mother Earth. We know in a way, that is, within certain limitations but we do not know fully.

I will close my remarks by just one illustration, and what was true in this particular thing is true in fruits, no doubt. I lived for some years in Nebraska, and while living in that place along about 1890, I had as one of my best friends a physician who had a great deal of practice out in the country, and when I was not teaching school, that is, on Saturdays and sometimes on Sundays, sometimes at night, he would invite me to drive out with him into the country while on his professional trips. I was very glad to do it, fresh air, good company, and so on, but there was one thing that was a distressing fact to me, namely, that the farmers were exceedingly poor,

they had seemingly very little to live on. They could not pay their debts, could not pay their doctor's bills, could not pay their grocery bills, they had poor stock and poor houses, their children were ragged and their schools were poor, everything was in a run-down condition. Now, that was not because the country was old and had been worn out, or anything of that kind. It was a comparatively dry climate and they did not know what to raise out there with success. Some years they would have very good crops, some years they would not. When I left there about 1893 they had had several years of exceedingly bad luck and everybody nearly starved to death. Some people moved away, could not stand it at all, but those who remained started in very soon after that to raise alfalfa, and they found they could produce several crops a year—splendid, heavy crops, and the hay sold at a high price. A few years ago I was back in that same community, and I went with that same doctor on a drive out in the country again, and I was amazed at the change. The farms were in the finest shape; here was a barn that had the most modern improvements, here were fine cows and good stock of all sorts, and these men had their automobiles and they had their bank accounts and they were sending their children to college and they were doing all sorts of things that they never could have dreamed of doing before, and the whole secret was that they had learned what they could bring forth out of their soil. That was the whole story.

Now, you people have done a great deal of that sort of thing, and I have no doubt you could do much more of it. I suppose if I were to ask you; you would tell me there are portions of Wisconsin that will never produce fruit to any great extent. I presume you would tell me that, and yet it may be that in ten years from now you would laugh at that idea. I cannot tell what may happen, you cannot tell what may happen, but when we come to this matter of raising fruit, or whatever it may be, that the soil is adapted to and that the climate is adapted to, we shall be successfully producing crops. Until we do do this, until we do find out what is the crop that is suited, or the fruit that is suited, we are going to fall short of the largest success.

Now, there is one thing about this fruit production that a famous gentleman in California has pointed out to us, that is; that we can rapidly change our fruits and various kinds of vegetables, any kind of growth, for that matter, we can change it almost at will. We can change, as time goes on, our fruits just as they are changing the corn and just as they are changing their various farm crops, we can change it to suit our climate, our soil and all these matters. I am sure in this respect the people of the state regard you as public benefactors when you are working largely unselfishly, incidentally getting profit out of it yourselves, but you show the spirit

of caring for the welfare of the state; and you have accomplished an immense amount of good. The state is helping you, and I hope it will help you as liberally as your needs may be, and I know of nothing that is of more benefit to the state than this work that you are doing.

REMARKS BY DELEGATES FROM OTHER STATES.

Mr. R. A. Wright, (Minnesota).—I am pleased to be here, and I am free to say that I hope to receive some good from this meeting. If you people have the start of us in Minnesota, if you have got ahead of us in any way in raising fruits or marketing the same, I am here to gain on those points and take them home to our Society, and yet I trust that I will be able to do something that will help to make these meetings pleasant and beneficial to all present.

Mr. H. G. Street, (Northern Illinois).—I do not feel as if I needed very much introduction to this Society. This is the first Society I ever belonged to, I live only a mile and a half from your southern line, just south of Lake Geneva, and being chiefly interested in securing hardiness in fruit trees, I joined your society before I did our own, also the Minnesota Society. I always like to come up and see you people up this way, especially after a hard winter like last winter. We suffered quite severely down there, not having very much snow on the ground, and the frost getting three and a half to five and a half feet deep, according to exposure. Consequently this spring the tops started out in nice shape and when the roots followed up they were dead on many trees, consequently it showed root killing. So I wrote up to your Secretary before our northern meeting and tried to get some man that he thought would do us as much good as any one could, so he arranged for Professor Moore to come down. I was surprised in reading over your last Wisconsin Horticulture that so many apparently thought that one root was as hardy as another, and it was not necessary to secure hardy roots, but I found that in the southern part of the state they had the same experience. I expect before we leave we will hear some one that will solve the question of hardy roots.

BY-PRODUCT OF THE APPLE ORCHARD—EVAPORATED APPLES.

MR. E. W. CATCHPOLE, North Rose, N. Y.

I bring you the greetings of the fruit organizations of the Empire State. While some of our organizations are somewhat larger than this, possibly they are not doing any better work. I myself feel that

our very best work has been done under adverse conditions, when our membership was very much smaller than at the present time. Conditions have favored us. Some of the members have been making money in large quantities in very short periods of time, and they are spending it very freely indeed and indulging in some of the luxuries and are not devoting as much time to the development of the fruit industry. I think there is danger of failing to realize our position in regard to competition in certain quarters. For instance, the Northwest with its enormous production of box fruit, the greater competition from Southern Pennsylvania and the Virginias, which are strong competitors in the line of exportation.

Taking up the topic assigned me, I think it just as well to analyze some conditions in the apple-growing industry before going into the by-products. Many of you know the enormous plantings in the Northwest, with only 10 or 12 per cent of the plantings now in bearing. You have a general idea of what that crop is worth now, there is hardly money enough left after paying all charges f. o. b. This great expansion is true of Western New York, it is true of Southern Pennsylvania, it is true of the Virginias, way down through to the Western Carolinas. Fruit trees are worth more money in North Carolina than they are in the Virginias or New York State. Then too, the sections referred to, especially those from New York State south, I think are giving better care to their orchards than are the people in Western New York. They are giving more attention to packing, the states themselves are spending more money, sending out more men to instruct in the profitable growing and packing of fruits than is New York State or any of the Mid-West States at the present time. These things must be considered in the very near future. To-day the price of barrel apples is very close to the cost of production under the present methods as adopted by the up-to-date apple growers in Western New York and the sections referred to further south. These things are valuable to you people here in this state, as I understand your conditions where your orchards are comparatively small, where there is comparatively little commercial growing, where your overhead charges are not as great as in these specialized sections and chances to produce a fair grade of apples for less money than some others perhaps are producing them. This is one viewpoint, the opposite viewpoint, the argument generally used in regard to growing better fruit, being able to grow more fruit of which a large per cent will go into the barrel. (As to methods there is quite a difference of opinion among prominent growers, one very large grower in New Jersey taking the view that weeds are nothing more than a cover crop and it does not cost $15 a bushel for seed as is the case with clover. With high prices for barrel apples, the argument that one should use the very best care, the best

orchard methods, liberal fertilizing, spraying, proper pruning, cultivation, if necessary, and the growing of this high grade fruit followed up in many cases now in the orchard sections with hand-thinning, removing of the lower grade of fruit, that would otherwise be used up in the evaporator or cider mill many feel that that is the ideal method of growing apples at the present day. Personally, I feel that hand-picking should be considered as a regular orchard operation. I think it is a good investment, that is, if you are going to play the game, play it to the limit. But we have men in Western New York, as there are in other sections, who are growing just a fair grade of fruit which is not good enough to barrel, which goes to the canning factory, or the surplus goes to the cider mill or evaporator. Some of those men I must admit, although I am a large grower, have been making a fair amount of money upon their investment and not doing any worrying over it. They do not feel a hail storm, it only means a little less money to them out of their money invested there.

Now, in regard to the amount of the product of the evaporator, the value of the fruit handled in Western New York by the Western New York Fruit Dealers' Association was, in round numbers, $9,000,000. A large part of this was exported, 50 per cent of the exportation goes to Germany, about 33 per cent to the Netherlands and the remainder is scattered widely. The price of evaporator fruit has its cycles of ups and downs. Unfortunately just at this time we are on the down cycle, the cost going down to four cents per pound. The last period of low prices occurred in 1896, when the lowest price went down to three cents per pound. During the intervening period prices have been such as to warrant a fair product and sometimes a large one. Last year the price jumped to an advance of over two cents per pound. The unfortunate condition right now is this, the product of the evaporator has been used as is the stock market in New York City, for gambling. The fever started in a small way among local producers and growers back in the early '90s, and they had a lot of fun out of this game, it extended to the large dealers, to the jobbers of New York, and last year our German friends took up this form of amusement, with the result that at the end of the season there were 300 cars of evaporated fruit in Germany beyond their needs, quality none too good, they were carried over in improper storage, and a very small portion of them fit for human food when the spring campaign opened, leaving a surplus there and our German friends very much prejudiced against the entire business of evaporation. Naturally, in the course of trade these conditions will right themselves, the element of speculation is being eliminated to a large extent in this country, and the influence of the organizations is toward a better grade and increased consumption. In 1896 and a few years following, the product was very low in grade and consumption was materially less-

ened which resulted in the state of New York passing a law decreasing the amount of moisture which was permitted in the evaporated product, 27 per cent, which at that time was supposed to be low enough so that the product would keep reasonably well through one season, and other conditions were also changed somewhat to improve the product to the end that consumption was again stimulated and the trade was going along very nicely until this unexpected drop in prices occurred last fall. I think those who have been in the industry longest, especially the dealers, believe that there is still a fairly good future for the process of evaporation.

The matter of evaporating should be considered in relation to the disposal of other products of the orchard, or the other methods, the first and easiest of course being the cider mill; next in order the evaporator, and the canning factory and the barrel. To give you an idea of the range of prices in the commercial sections in Western New York in the past fall, the bulk of the cider apples were sold from the orchard at 25 cents per 100 pounds, the product of the evaporators, 25 and 30 cents per 100 pounds, and the canning factory paid from 40 to 60 or 70 cents per 100 pounds, the highest price being for big apples. In grading the cider apples, there were to be no knots, but no limit on the size. The evaporators and the canning factories are both insisting on nothing less than 2 inches in diameter. This will give you a rough idea of commercial values under the existing conditions of the past season. I think the safer way where the product is sufficient, is to combine either a cider mill with an evaporator, or with the canning factory. The canning factory people, as far as grade is concerned, have lowered their grade, so that there is very little difference between the grade of the canning factory and the evaporators. While the drop in the canning factory has been greater than the drop in dried fruit, yet I think the greater surplus will be carried over from the canned goods. You will naturally infer from the lower price conditions in Germany, that the tendency has been to reduce this season the total amount of the evaporated product. Evaporators were very slow starting at the beginning of the fall campaign, bought very conservatively and in some cases closed early, made a very short run as against the old plan of making heavy contracts, selling futures and buying freely. The labor problem I think is fully more serious with canning factories than it is with evaporators. Conditions in the canning factory are not as desirable for the operators as in the evaporator. Perhaps some of you may know that those matters have been stirred up lately in our own state in the way of legislation during the past four months, articles have appeared in the magazines as to the condition of the canning industry in the state on account of the canning factories being exempt from the law passed a year ago as to the employment of women oper-

ators for more than sixty hours per week, and allowing the employment of child labor with no restriction clause.

Taking up the matter of the process of evaporation first, it dates to my early boyhood. I happened to live in one of the fruit countries of Western New York between Rochester and Syracuse. So far as history goes, the first commercial transaction in this product occurred by sending on a wagonload of dried fruit from my own county eastward into Jefferson county, a dairy section, a distance of something like sixty miles, and a team bringing back a load of cheese, purely a barter proposition in those early days. That fruit probably was a sun-dried proposition, stringing those apples in quarters around the kitchen stove. Then soon followed the making of those very small evaporators with a capacity of from 5 to 15 bushels per day, which was usually operated out-of-doors, occasionally in the summer kitchen or woodshed, the labor performed as a rule by members of the household for probably twelve to sixteen hours; each farm perhaps had one of those and the members of the household as time permitted kept these driers going and brought in some extra money for buying a winter supply of clothing and some of the pleasures of life. This style of evaporator was used for some little time, but was gradually replaced by two distinct types of plants. The one a long horizontal box, four feet in width on the inside by six feet in height and from 16 to 20 feet in length, a furnace underneath one end, a very large furnace with the pipes running back through the entire length. The fruit was placed upon wire racks upon horizontal runs in this box, first placing this rack, the width probably two and one-half feet, on the lower run directly over the furnace, thus getting a high heat at the start, and each rack was inserted and these were pulled along and each one in turn was exposed to the heat and came back and the racks were kept going back and forth on these runs until sufficiently dry for the racks to be removed. That was called the box drier. It was cheaply built and quite easily operated. Its great drawback was that under certain damp conditions of the air, the entire apparatus would be just one mass of super-saturated air, and it was practically impossible to do anything, only keep the racks moving. The other type which came in about the same time was the brick tower, composed entirely of brick four feet square on the inside, with the furnace at the bottom. Into this, racks were introduced at the bottom directly over the furnace and raised and room made for the introduction of another rack by the system of either a ratchet wheel or long lever and the fruit taken off when it got dry enough further up in the tower. The tower plan was far more expensive, it was necessary to have a building two stories in height and all that brick work and it was really harder to manage in this damp weather than the box.

Then shortly after came the third type of evaporator, the hop kiln. I have here, if you are able to see them, a plan of the hop kiln. The hop kiln plants are made in units, in the kiln itself the unit being 16 by 16 feet, 18 by 18, or 20 by 20, or certain modifications. The 20 by 20 square is now considered to be the best type. These plans represent the three-kiln outfit which has now been standardized for being the best of its size when worked down. This represents on the left the three kilns in the row, with a large furnace in the center below in the cellar ten feet at least from the bottom. The floor on which the fruit is placed consists of a series of slats, V-shaped, one-half inch on top, one-quarter inch below, which allows the hot air to come up through the slatted floor, up through the ventilator and out through the opening. This represents the three furnaces in a row and this side arrangement represents the furnace with the pipe.

DISCUSSION.

Mr. Toole: I take it for granted that whether any particular locality engages in disposing of its products in this way depends on the amount of products which they have that they wish to work up in such way, making cider or drying apples. I should like to ask in regard to one of these commercial concerns, what is the smallest amount in bushels that they can make use of and they think it worth while.

Mr. Catchpole. There is a very wide range there, because it depends largely upon how the furnace is fired and how fast apples are placed in there, how much it is crowded. The maximum capacity of an 18-foot box drier I think is about 60 bushels, a 60-foot box, old style box. Of course we regard that as a little bit out of date now. In the power driers, under favorable conditions they were able to put 200 bushels through one of those 4x4 driers, with crowding, under very favorable weather conditions. Coming to the matter of the hop kiln, the standard outfit as diagramed here, the capacity of a four-machine plant is about 250 bushels per day. I would not build anything smaller than that, 50 bushels. As to the cost, the diagram represents a cost of about $2,000. That can be increased to four kilns with only an additional expenditure of $500. The gasoline engine runs it, the same working room is sufficient, it is only necessary to have a longer working table and two extra paring machines and the one extra kiln. But the best thing for you would be the single kiln, 16x16x20; that would be the easiest for your conditions here in certain localities. Some localities might take two kilns, hop kiln style, some three. There have been more evaporator fires in Western New

York this year than ever before, simply have been cleaning them out in a wholesale way. Up until about three years ago very few reliable companies would carry that insurance. After a lot of losses and unable to get insurance, two or three companies were found which were reliable and responsible and would pay losses, but there is a general feeling among evaporator men that it would be absolutely impossible to get more insurance unless it be on an up-to-date construction with either hollow tiles or cement block construction.

A Member: You speak of evaporated parings; what becomes of that product?

Mr. Catchpole: Those have been exported to France in very large quantities. As we understand, those are manufactured into a high grade, high-toned champagne, returned here and some one pays a good price for it. During the past three years, with the very high price for the lower grade apples, quite a quantity of waste products have been used for vinegar, but at the present time we have a state law passed, possibly a federal law, against the using of that for that purpose.

A Member: What is the weight of the evaporated fruit from a bushel of apples?

Mr. Catchpole: With the winter fruit in Western New York, a conservative estimate would be 6½ pounds of the white apples, and about three pounds of the waste product. That would be an average for a season's run. Different varieties vary somewhat. It was supposed for a long time that the Ben Davis would not make as many pounds per bushel by weight as some other varieties. Now the evaporator men are eager to get Ben Davis for two reasons; they really think they get as many pounds per bushel, it is a better keeping variety, makes whiter stock and is liked very much by the dealers.

Mr. Rasmussen: Are the evaporators used for any other fruits than apples?

Mr. Catchpole: Not commercially. The large plant referred to, the De-hydrator, is said to evaporate any product heard of almost without exception. I saw their exhibit at New York four weeks ago. It was a very comprehensive exhibit of fruits, pineapples and all sorts of products. Their argument is that their plants are available for other commodities, other things are available. It might be possible to operate it twelve months in the year as against the few weeks in a year under the old plan of evaporator.

Mr. Toole: I think we are all very sorry that we could not have a man to talk to us about cider and cider products. My neighbor insists that there is no market for vinegar, and they say they do not dare to make it and sell it, because some day some inspector will come along and, no matter how good it was, so far as being good

cider is concerned, if it does not meet some acid test they are liable to a fine. I should like to ask Mr. Bassett if he knows of any such difficulty, that we are likely not to find any market for good cider vinegar unless it is up to standard?

Mr. Bassett: The law requires 40 per cent test. I find a little money on the cider the way I make it. I have got to peddle it to get rid of it. No storekeeper will buy any in our locality, but that is just an excuse that they will send their money somewhere else for other stock. I have no trouble with it. I test all mine, a test only costs three dollars, you can soon test it if you have 15 to 20 barrels, and sell it to the farmers in very little time.

Mr. Toole: Is the test required just a test of strength?

Mr. Bassett: Just a test of strength. The evaporation on the cider is too great where they make it commercially, they have one-third water, have the same strength that we get with the pure stuff.

OUR IDEALS AND AIMS.

WILLIAM TOOLE, Baraboo.

If we would reach to any high standard of attainment, whether as individuals, organized communities, or associations, we need to have definite ideals of conceptions of what we would reach up to. The name Horticultural—adopted by our society—covers much broader ground than the mere definition of garden culture. In looking over the published proceedings of our society we realize that in the past we have given attention to all the various phases of horticultural knowledge, whether in fruit culture, raising culinary vegetables, or decorative horticulture—including indoor planting—and also the broader work of landscape art. We have striven for the preservation of Nature's beauties and encouraged the establishing and beautifying of drives and parks. In recollection we do not forget that our society has looked for men of character and high ideals to lead in our work. In one respect we have improved on our ways of the past. Some of our older members remember the time when discussions were not always courteous. Some in their earnestness to debate were not always considerate of others. Perhaps the removal of business discussions from the general proceedings of the society has been some cause for improvement, but we note that business, in these days is carried on in executive meetings, without jar, or friction, at any time.

Some changes have been made in our methods that may be for the better but time has not fully proven such to be the case. The time was when we thought we were doing much to promote the interests of horticulture by encouraging the formation of local societies. The

Yellow Lady Slipper

Trillium

strength of our parent society seemed, at one time, very much sustained by the membership of these local societies, now the older societies seem to be passing away, but we have many of the workers that were derived from them, yet we miss their delegates to our meetings. There are so many organizations of various sorts in rural communities that perhaps it would be more difficult now than formerly to find localities where any considerable number of persons would care to give leading thought to considerations of horticulture.

Perhaps what is now needed to adapt our useful activities to changed conditions, is the establishment of auxiliary societies, in special lines of horticulture, as was indicated in last year's discussions following the charge that some special interests have not received fair attention by our State Horticultural Society. Might we not with advantage have a state society, which would give special attention to the culture and disposal of culinary vegetables? Ornamental Horticulture is of great interest to our state, and a society for its promotion might include both professional and amateur lovers of flowers and ornamental planting. I am sure that the fruit men do not receive as much consideration as their interests need, even though they are so prominent in the affairs of the society. A fruit growers' association might give closer consideration than can be afforded by the state society, to questions of distribution of products, form of fruit packages, and purchase of supplies, with many other subjects of vital interest to fruit growers. These several societies might receive assistance from the state society, through speakers furnished, with even more beneficial results than are accomplished by presenting fruit talks at the Farmers' Institutes. I would not, by any means, wish to withdraw the good work done at Farmers' Institutes by our society, as by this means many are given new light on Wisconsin's fruit growing possibilities. These special societies would strengthen the interest of those who have become awakened.

It has taken many years of struggle in testing varieties, aspects, locations, and methods to prove, as has been done, that apples can be successfully and profitably grown in Wisconsin. We are glad to be able to say to the world, that Wisconsin's fruit possibilities are so good that they should be a strong attraction to home makers in our state. We are proud to be able to say that Wisconsin's fruit products materially save and add to the wealth of the state. Our society proclaims this to the world, has indicated the conditions required for success, and has sought out the localities where conditions show adaptation to orcharding. From these circumstances have arisen problems that must be carefully considered by the society. The question arises as to what extent a promoter has the right to demand the endorsement of our society for such claims as they may set up for their locality. We believe in spraying and the use of

spraying machinery and the officers of the society may have individual preferences, yet they would not think, for a moment of giving out any opinions which could be rightfully construed as the society's endorsement of any particular line of manufacture. In like manner we must have it plainly understood that as a State Horticultural Society we do not endorse the claims of any commercial enterprise, whether of lands, nurseries or manufactures.

Our members of the Executive Committee should feel that it is due from them to do something in return for the honors and emoluments of their office. Each should come to the executive meeting prepared to present ideas for the good of the society, thus helping our Secretary and the Board of Managers, that they also may do the best that can be for the general good. Time was when we had reports from delegates to other State Societies. Who were the delegates for 1911? I have seen no record of them either in the annual report of the society or of our magazine, "Wisconsin Horticulture." I think that the sending of delegates to neighbor states, and receiving delegates from them, is of great benefit to the cause of horticulture, and their reports in the past have been well worthy of being placed on record. For various reasons it has seemed as if our annual reports are not large enough. Cannot our legislature committee which we will probably have, see to it that we will have space granted by legislative enactment for the cream of the discussion? We value our horticultural paper for its usefulness in presenting subjects timely, and giving space for overflow. Being as good as it is, we feel that it is not large enough. We can afford more space by paying expenses with increasing quantity and rates of advertising. It is for us, as members, to so increase the circulation of the paper that advertising space will be more valuable, and to cause increase in use of space even to the extent of doing a little advertising ourselves. We can afford to offset each increased page of advertising with a like amount of reading matter, and when we have our greater paper, let us see to it that the editor is not short of copy.

Like the veterans of the Civil War, the old pioneers in Wisconsin horticulture are passing away. Soon such work as they have done will be forgotten unless it is placed on record. Could we not have space in our paper for local horticultural history? These records, in time, would furnish material for a general history of horticultural progress in Wisconsin.

HARDY STOCKS.

J. G. MOORE, Associate Horticulturist, U. W.

Ever since fruit growing began in the middle northwestern states one of the questions which has been foremost in the minds of the growers is the matter of hardiness. The fact that most of the varieties which were grown in the former homes of the pioneers were unable to withstand the more rigorous climate of their new location made it necessary to develop varieties which would endure these conditions. The early fruit growers of these states are to be complimented for the success which they attained in this direction, for through their efforts they have not only given the middle northwest a fruit list, but have added varieties to our pomology which have become important in other sections of the country as well.

Although much has been accomplished in bringing out hardy varieties there is another phase of the question of hardiness which has been largely neglected in the past and has not therefore advanced as rapidly toward a solution. This is the matter of hardiness of the stock. The importance of this factor in fruit growing in those regions where climatic conditions are unfavorable is brought forcibly to the attention of the fruit grower at less frequent intervals than hardiness of trunk and branches. When a season with particularly unfavorable conditions has passed, however, its devastating effects become apparent in the death of many trees which have seemingly been hardy. While this may at times be attributed to variety characteristics, not infrequently such an explanation does not conform to the facts in the case. Let me illustrate. The winter of 1911—1912 will stand out in the history of fruit growing of the section mentioned as one particularly disastrous to fruit trees. In orchards in which but one variety was grown and in which all the conditions were seemingly the same, one tree in a row would be killed while the one next to it might not even be injured. Surely variety characteristics could not be given as the cause of this condition. Neither could the environmental conditions have produced such an effect as the environmental conditions were the same for both trees.

An examination of the trees which died showed clearly that in the majority of these cases death was due to injury of the roots which had occurred during the previously winter. That root injury and not top injury was responsible for death was evident from the fact that leaf and twig growth started in the spring, but later stopped, the amount of growth being inversely proportional to the extent of injury found upon the roots. What then, could account for the facts that with the same variety, under the same environmental conditions

one tree was killed, while the other was uninjured? To the writer's mind there is but one answer—the difference in hardiness of the roots upon which the two trees were growing. Root hardiness then becomes as important as trunk and top hardiness if we are to have hardy trees in the broadest sense of the term, for no tree is hardy unless it be on a hardy stock.

Our problem, therefore, is to investigate the methods and conditions under which our trees are furnished with their root systems and devise means, if possible, which will not give us a lot of 100 trees propagated on 100 roots of varying degrees of hardiness, but on roots of approximately the same degree of hardiness. Let us observe the methods by which our trees are now propagated in an endeavor to determine how much chance we have of getting trees on roots of equal hardiness at the present time. Owing to the fact that our cultivated fruit trees do not come true to the variety when propagated from seed, it is necessary that they be propagated artificially. In doing this one of two methods is commonly used; budding, or root grafting. The principles upon which these operations are based are the same, the difference in the two being merely one of manipulation. In either case the operation consists in placing a cion of the desired variety on another plant in such a way that the two unite, forming a new individual. In budding, the plant is not moved from its original position and the cion is always dependent upon the roots produced by the stock. In root grafting the stock plants are moved and later replaced. The depth to which the grafts are set is of great importance in the future development of the tree. If planted with only the root or stock portion below the surface, the plant is dependent upon the stock for the development of the root system. If, however, the graft is set so that a considerable portion of the cion is below the surface the cion throws out roots and the tree becomes what is known as an "own" or "self-rooted" tree.

Occasionally another method is used to secure hardiness. This is known as stem or top grafting. It consists in first propagating a hardy variety in the usual way and then later on removing the top and grafting on to it the desired variety. By this method we may have either of two sets of conditions. (1) A top of the desired variety growing on the trunk of a known hardy variety which is dependent upon an unknown stock the hardiness of whose roots is not known. Or (2), the desired variety growing on a trunk of a known hardy variety which has become "own-rooted" and therefore has part of its root system from a known source, and part of it from an unknown source. It is necessary that we should get these methods of propagation of our fruits in mind so as to be able to understand the relation which the roots of our trees bear to their tops.

If the roots of our trees bear so important a relation to the tree's ability to withstand unfavorable climatic conditions, is it not desirable that we should know something about the hardiness of the roots upon which they are growing? Do we at the present time know much about the hardiness of the root system of our trees or are we possessed of the knowledge which will help us to secure uniformity in the hardiness of their root systems? I believe that a study of propagation methods will show that we are following for the most part very slipshod methods in this respect.

Let us consider first the two most common methods of propagation,—budding and root grafting; the latter developing roots only from the stock. What is the source of the root-producing portion of the plant so propagated? An investigation shows three sources of stocks for the apple, imported or French seed, Vermont seed, and home seed. These are named in the order of their importance as judged by the extent of their use. How is the imported or French seed secured? The best information available states that it is secured for the most part as a by-product of cider manufacture and the seeds therefore, of any lot may be widely variable in character. This seed has been grown in a country where the factor of hardiness as regarding cold does not enter into consideration; in a country where the pear and other tender fruits thrive, yet probably three-fourths of the trees which we grow in our rigorous climate are propagated on this kind of stock. A large proportion of stocks produced from such seed may be capable of producing hardy roots, but there is no way of foretelling how many or what stocks will prove so when the test comes.

A few of our trees, but a rapidly decreasing number, may be propagated on stocks grown from Vermont seed. Some claims of superiority might be made for such stocks, but we do not know any more about them than we do about stocks from imported seed? The Vermont seed is secured in much the same way as the French seed, while there may be some which will produce stocks of suitable root hardiness, we never know until it is too late whether the stock is hardy or not.

Does our home produced seed, which is practically a negligible factor give us a stock of known hardiness? It does not for we have yet to determine what varieties will produce hardy roots and even if we did know the fact that we allow our plants to cross pollinate freely would practically eliminate any definite data relative to the character of the stock produced. Evidently there is nothing in these methods which argues for improvement in uniformity of hardiness of root in our trees for future use.

Of the common methods of propagation in the northwest we have only that of the "own-rooted" tree left to consider. At first thought it would seem that here we have the solution of the problem. Fur-

ther consideration of the matter, however, makes us doubt whether this be true. In the usual way of handling "own-rooted" trees only part of the root system arises from the cion. We have already found that the hardiness of any root system arising from the stock is problematical. If this portion is not hardy, then it is evident that severe climatic conditions may materially reduce the root area of the tree, and must therefore, effect vitally the vigor of the tree if it does not render it unable to recover and finally result in its death. Our tree is not safe therefore if part of its root system is of questionable hardiness. It may be argued that this difficulty may be overcome by reducing, or even removing at planting time, the portion of the root system arising from the stock so that practically the whole root system is produced by the cion. Would this obviate the difficulty? Some will say that it does, but when called upon to give reliable data in substantiation of such a statement, I believe none will be available which will tell us just which of our common varieties of apples produce hardy roots and which do not. We have been working upon the assumption that because a variety is hardy above the surface, therefore the roots which it produces are hardy, but so far as the writer has been able to determine there is no body of facts to warrant this assertion, as applying in all cases or possibly even in a majority of them. Manifestly we have been jumping at conclusions and not basing our claims upon experimental or authentic data.

In recent years we have heard much about the practice of top-working or stem grafting trees to insure hardiness. The effect that such a practice may have upon the hardiness of the stem lies outside this discussion, but we are concerned with the effect it may have upon the hardiness of the roots. We have already seen that by this method either one of two sets of conditions may obtain. The first of these is a desired variety on a known hardy variety which was propagated on an unknown root. Certainly we have gained nothing for hardiness by this method as we know nothing about the hardiness of the root. The other is a desired variety on a known variety which has produced a greater or lesser portion of the root system, but this does not solve the problem for we have yet to determine the ability of the variety used as a stock to produce hardy roots. Even were the roots hardy we encounter other difficulties in this method of propagation as we find that even our hardy varieties do not always make good stocks because of their inability to make a good union with the cion, because of inadaptibility to the section where the tree is to be grown or because the cion outgrows the stock or the stock the cion.

One grower tells us that Virginia crab is the only stock which gives satisfaction and another says that Virginia is worthless, but that Hibernal is the panacea of all ills due to lack of hardiness. Probably

both are right but is it not quite as likely that a third grower will find that both are wrong and that for his conditions some other variety is preferable?

If you have followed this discussion closely and believe that the arguments presented are correct, then you will agree that instead of solving the matter of hardy stocks I have only knocked out the props by which we have been supporting ourselves, but is it not time we were discovering the flimsy structure upon which we have been building our horticulture relative to hardiness and attempt to do something to solve this most important problem?

What remedy can be offered to correct these difficulties? I regret to say that our Experiment Station men are unable to give you any immediate remedy. Some years ago the Siberian crab or Malus baccata was suggested as a remedy, but it has not gained in favor and is now little used for stocks. Evidently it has not met the demands of the nurseryman and so has fallen into disrepute.

Experiment Station men would not be living up to their opportunity or duty if they were not doing something to solve this problem. The solution gives promise of requiring considerable time so the fruit grower must not be too impatient for the answer. Two possible solutions present themselves for consideration. The first step in each is the same. We must investigate the hardiness of the root systems produced by our hardiest varieties so as to determine which may be depended upon to give us hardy stocks. A method whereby these stocks may be propagated commercially must then be found. Either vegetative propagation or propagation by means of seed must be employed and both present difficulties. The ability of these stocks to form good unions with the cions and their effect upon their growth must be determined. It is no light task that the fruit grower has placed upon his servant, the Experiment Station worker, in asking him to solve this problem.

What is the grower to do while the solution is being found? There is but one course open,—follow the best approved methods now available. Buy trees which are own rooted or top work on hardy varieties which are "own-rooted" and fervently hope these varieties are such as will produce hardy root systems.

DISCUSSION.

A Member: I should like to ask what is the action of frost on fibrous roots?

Professor Moore: It is a drying action, it dries out the roots and therefore kills the living tissue, causing it to become dessicated to an extent where the life process cannot be carried on. We usually

think of trees being dormant in the winter; that is not true, the life process is going on in the dormant tree just the same as in the tree in the summer, although not so rapidly. It is just like the bear which hibernates, he is not dead, he is simply asleep, the life process is going on. So it is with the tree. Freezing is a drying process which brings about this change.

Mr. Barnes: What is the best remedy to prevent the freezing and drying?

Professor Moore: We believe that the best remedy so far as root freezing is concerned is a mulch, and the kind of mulch we believe in is a cover crop, which not only forms a mulch in itself, but it provides the right kinds of a cover; also has the tendency to hold the snow on the ground. Not only that, but this mulch, in preventing deep freezing, it also prevents, in case you do not have snow, the drying out of the soil, which is another direct factor in drying out the root system, producing death. We use a cover crop to take the excessive moisture out of the soil, so that our tree will not keep on growing too late and go into the winter immature and thus be more subject to winter-killing.

Mr. Barnes: Would you not add a little fertilizer on top of the cover crop?

Professor Moore: No, I would not.

Mr. Street: We had quite a little experience all through our section. My first impression was that the farther north we went the more root freezing and root killing there would be, but on talking with these men I found that on account of having some snow there that they did not get the heavy freezing in the ground that we got further south. We are just a trifle south of the southern line of Wisconsin, and the frost there went from 3½ to 5½ feet deep in many places. I had opportunity to travel around considerable last year, and I kept an eye out on the places where the trees suffered the worst, and wherever I found an orchard that did not suffer I tried to study out and see what the cause was, and I found four or five orchards a little south of us, down at Princeton, where they did not lose any trees, but they had a good cover crop. One was cultivated early in the season and then sown with oats, and the oats came up well and held the snow; it also had a wind break, and in that orchard of about 20 acres they had about 2500 bushels of apples this year. In another one of about 25 acres they had about 4,000 bushels, while the farmers all around there where the orchard was either pastured close or was cultivated without a cover crop, lost perhaps half of their trees, so that the cover crop in that place made a great deal of difference.

Mr. Gonzenbach: In talking with a nurseryman lately he made the statement that certain stocks had a tendency to grow tap roots

and that the tap roots promoted the growth of the tree to the exclusion of the fruit, and if that is so, what is the method of preventing such tap roots?

Prof. Moore: Most of the tap roots are destroyed when they are taken from the nursery, if they have that tendency, and I think that that gentleman would have difficulty, probably, in maintaining his first proposition. It is true that we get different root systems on different kinds of varieties, and you will find, I think, the nurserymen without exception will tell you that at least to a degree they can distinguish the kind of variety by the character of the root system regardless of the stock upon which it is propagated.

Mr. Coe: I think so. In many ways we find this fact, that the root is very similar to the top. Take a Tetofsky tree, for instance, which grows very upright and with but two branches. When you come to dig that tree, the roots come down straight, very few fibers. On the other hand, where the tree is broad and spreading, it is likely to have roots of the same character.

Mr. Kellogg: I should like to ask Professor Moore if they have any data regarding the destruction during the winter of 1888 to '89?

Prof. Moore: I cannot answer that question. So far as I know there is no data; that was before my time in Wisconsin, and my predecessors, so far as I know, left no data on that.

Mr. Kellogg: I should like to state that our experience in growing trees in the nursery in 1898–99 was that we lost our entire plantation without regard to age or hardiness of stock, with the exception of those varieties that were freely rooted from the scion, among these Hyslop and Sweet Russett, and some other variety that I do not call to mind just now, but those two varieties I recall distinctly showed vigor and life following that destructive freeze; also the native plums that we were propagating at that time on their own roots. All the plum stocks we had in our plantations that were grafted on European or Japanese stocks were so dead that they were not worth burning up.

Mr. Barnes: I have a sad recollection of having to plow up 6,000 trees that spring that were winter-killed absolutely. I used promiscuous apple seedlings at that time, and I changed my system of grafting to crab roots and succeeded rather better since. In the winter-killing of '88–9, however, I had two short rows of two seedling varieties that originated in Waupaca county. Those trees came through in perfect condition, there are only a few of the two varieties and they stand in the nursery rows yet. I left them there for practical demonstration.

Prof. Moore: Tell us what we have got to strive for.

Mr. Barnes: The best system I know of is to procure the best crab seedlings you can get, cut your roots short and scions long and

plant them in such shape that each scion can send out roots of its own.

Mr. Moyle: What is a French crab?

Prof. Moore: So far as we have been able to determine, French stock is the same thing as what we call seedling apple stock here, that is, they grow apples in France primarily for cider, the kind that will give them the most fruit and these cross indiscriminately in the orchard and that fruit goes to the mills. Those apples from those crossed seeds go to the mill and that seed is sold to us as French crab stock, about which we know absolutely nothing.

Mr. Moyle: I beg to say that I know something about it, I grow it. Now, I am in the business for the dollars and cents, and I want to say right here that the French crab will grow a nicer tree and grow it quicker than anything else that is growing. They are imported very largely by Southwestern nurserymen in Kansas and Nebraska, where most of us get our grafting stocks. The Minnesota nurserymen found out long ago that the French crab is not as hardy as the native seed from the East and they recommend growing seed from the East, Vermont seed they call it. French stock is the most tender stock; last spring we had 8,000 dead on the French crab.

The Secretary: I had a long talk with Professor Hansen, of South Dakota at the Minnesota meeting recently and he said, "It is time you people in Wisconsin quit lying to yourselves on this hardy root question." He said, "You are lying to yourselves; you know the hardy root is what you want and what you have got to have, but you will not admit it."

Mr. Coe: Prof. Hansen is growing hardy plums in Dakota, and half of the parents of the plums are the Japan plums, is not that a fact?

The Secretary: Yes, that is true. You can tell Professor Hansen he is lying to himself, too, if you want to.

THURSDAY MORNING.

PRESIDENT'S ADDRESS.

The year just past since our last winter's meeting of this Society is notable in several ways, being one of the most severe winters we have had in many years, and still there have been noted advancements in Horticulture.

The largest acreage of tree fruits being planted in the history of Horticultural advancement in the state. Thousands of acres of fruit being planted in the past year. A great portion of the planting is in

large commercial orchards. Bayfield county planting approximately 300 acres; Door county planting approximately 2,000 acres; Crawford county 100 acres; and numerous other large plantings, indicates that there is a growing interest in Horticulture in Wisconsin and by men of intelligence and faith in the State as a fruit producing State.

Our Society has done much to assist in this awakening of interest and we must continue to assist in the carrying on of the good work by help and guidance along all lines of development.

Now that the planting has begun, the work of growing fruit is only started, for without proper methods of culture and pruning many will fail.

We must ever advocate improved methods and advance as other states have done. We must ever be on the alert for better methods of culture and protection against severe winter conditions such as the past winter.

We must begin experiments in fertilization and thinning, to put on the market only the best fruit, for with the increased planting unless this is followed closely there will be a quantity of inferior fruit that will find no market.

There should be an organization of fruit growers in this State for studying out improved methods of handling the fruit so that a better distribution can be secured and avoid the congestion of any one market. Other states are doing these things, why can't Wisconsin?

Our Horticultural Department of the University is ready to start experiments in fertilization and thinning of fruit and we should assist them to formulate some plan for the coming season.

In a few years the question will be asked and has been asked to some extent now: Can our old orchards be fertilized and how heavy can we fertilize without fear of injury, and produce superior fruit to that we are growing now?

Our Society has in the past year established to be planted in the spring of 1913 new trial orchards for the listing of some of the most promising of the winter varieties of apples and these will in time prove whether they can be grown successfully or not.

ANNUAL REPORT OF SECRETARY.

The close of the year 1912 and the beginning of 1913 may well be a season of congratulation for all connected in any way with the horticultural development of Wisconsin.

Since 1907 the planting of commercial orchards has progressed steadily and rapidly, until we have at the present time more than 6,000 acres of apple orchards, 3,500 acres of sour cherries and 10,000

acres of small fruits. These figures of course do not include the farm or home orchards.

Over 1,000 acres each of apples and cherries were planted last year in purely commercial orchards. We have within the state the largest cherry orchard in the world, the Coöperative Orchard Co.'s plantation at Sturgeon Bay consisting of six hundred and seventy acres, 67,000 trees, of cherries in one solid block. It is reported that the company plans to plant one hundred and twenty acres more next season, making 800 acres in all.

The second largest orchard in the state is also in Door county, the Ellison Bay Orchard Co.'s orchard at Ellison Bay consisting of 25 acres of plums, 55 acres of cherries and 125 acres of apples or 205 acres in all.

The acreage of tree fruits as well as small fruits set out in the Bayfield and Washburn districts exceeded that of 1911. Carefully compiled data submitted by Secretary Flanders shows that the Bayfield Peninsula now has 638 acres apples; 600 of cherries; 366 of strawberries; 29 of blackberries; 43 of raspberries and 48 of currants or a total of 1,238 acres of tree fruits and 486 acres of small fruits.

In the Kickapoo region planting has proceeded at a steady rate although not so extensively as at the other places mentioned. These three points, Door county, the Bayfield peninsula and the Kickapoo are clearly in the lead in orchard planting and are bound to stay in the front.

This is as it should be: The best results will be had in centralizing the fruit growing business of the state in a few places. Questions of marketing and transportation will be more easily solved and cultural methods will be better controlled from a few central points than if the business is scattered over a wider area.

In fact I am of the opinion that the efforts of this Society should be directed almost wholly to the development of commercial orcharding in but a few places where the conditions are most favorable rather than indiscriminate effort.

It does not follow by any means that the three places mentioned are the only ones in the state where orcharding may be made successful nor must it be inferred that these are the *best* sections for that is a matter open to argument but in these places the people believe in Wisconsin and have backed their confidence with their cash.

It is to be hoped that Manitowoc and Sheboygan counties will soon learn to fully appreciate their unsurpassed advantages for certain lines of fruit growing and get actively into the game.

Certain limited portions of Eau Claire and Chippewa counties have soils and elevations splendidly suited to apple growing.

The Baraboo and Reedsburg sections have produced apples of the highest color and quality of any section in the world for over fifty years and all that Sauk county needs today to make of it one of the biggest apple producing centers in the state and the United States is the full and complete confidence of its people in the possibilities of its clay hillsides.

And so with many other sections of the state, Winnebago, Calumet, Waukesha, Walworth, Vernon and Waupaca counties, faith in the land. faith in the future, a deaf ear to the Pacific Coast Siren, is all that is needed to place them on the map as commercial orchard sections along with Bayfield, Sturgeon Bay and the Kickapoo, Western New York and the Ozarks.

While extensive commercial orcharding is now an established fact, while there is no longer any doubt that Wisconsin is soon to be a great fruit producing state, and while we need more trees and more acres of berries the extension of planting is not by any means our greatest need.

We need first of all better methods. We must produce a higher grade of fruit. Less than a dozen orchards in Wisconsin at the present time produce apples that can demand the best price. The berries that we send out of the state are only indifferently good as a rule.

We spend much time at our conventions and elsewhere talking coöperation, studying coöperative methods of marketing and too little time studying how we may produce *quality* fruit, fruit that is really *worth* marketing. When we can offer apples free from worms and scab and berries of high quality the marketing problem will be more than half solved. Door county cherries are the best in the world, the *quality* of these cherries is unquestioned. This is not due to any large extent to the soil or climate, but to cultural methods. Feeding, pruning and spraying gives them their size and quality. Let us then pray and spray, let devotion to Wisconsin be coupled with an abiding faith in the orchard cultivator and success will be ours.

Coöperative Movements:—The fruit growers of this state are now fairly well organized as to selling and buying. The six coöperative associations; Sparta, Sturgeon Bay, Bayfield, Alma Center, Merrillan and Washburn all report a successful season.

Warrens, Eau Claire and Baraboo each urgently need an association. The next step should be a state wide organization to include every local association in the state. Such associations have recently been organized in Minnesota and Iowa.

Taking an even wider view of the coöperative movement, something near at hand is the union of all the coöperative associations in the states from Arkansas and Missouri on the south to Minnesota and Wisconsin on the north into a "Lakes to Gulf" confederation.

By-Products:—The time is at hand when we must provide for the disposal of the cheaper grades of apples in some other way than packing in barrels or boxes. In the big apple belts of New York and Pennsylvania the cider mills and apple evaporators provide a ready market for cull stock. Wisconsin now needs both of these industries.

THE SOCIETY.

ITS ACTIVITIES AND AFFAIRS IN 1912.

The amendment of the Constitution at the 1912 convention placed the authority to fix the membership fees with the Executive committee and following this action the fee for annual membership was raised by the committee from 50 cents to $1.00 and the life membership fee to $10.00 from $5.00.

The total membership at the date of my last annual report was 1,779, consisting of 1,572 annual and 207 life members which was an increase over 1911 of 360 members.

The total paid membership on the first of January, 1913, was 1,693, consisting of 1,480 annual and 213 life, a decrease of 92 annual and an increase of 6 life.

Evidently there is a very decided difference between the size of a fifty cent piece and a dollar in the minds of 92 of our ex-members. Let us hope that during the coming year the dollar may be measured by a different standard.

FIELD WORK.

As in the past the trial orchards work has occupied the larger part of our time and funds.

The school grounds improvement work has progressed slowly. A brief report upon these two subjects will be presented separately.

STATE FAIR.

The attitude of the State Fair Board toward the Society has materially changed during the past two years and our efforts toward making a bigger and better fair are now fully appreciated.

Through the united efforts of the new Superintendent of Horticulture, President Bingham and his assistant, N. A. Rasmussen, the old historical horticultural building at the fair was completely remodeled so as to show all fruit on flat top tables, the flowers and ornamental plants occupying the middle portion of the building. In the rear a few vegetables could be found which we hope will not be the case next year.

Everything possible should be done by this Society to maintain the cordial relations that now exist and it should be our policy to

assume the responsibility of making the exhibit of fruits and flowers at the State Fair worthy of our orchards and gardens.

We should also use our utmost efforts to secure a new building at the Fair that shall be devoted exclusively to horticulture. Fifty thousand dollars is the least amount that should be expended for this purpose and if the State Fair Board needs help in getting an appropriation for this purpose we should be willing to use our best efforts in that direction.

The conventions during the year, the annual at Madison one year ago and the summer meeting at Bayfield were both well attended and were enjoyed by every one in attendance. This is especially true of the summer meeting at Bayfield where we were royally entertained.

The office work grows with each succeeding year until it now taxes to the utmost the time of the Secretary. With any material increase in the work must come a material increase in the office force.

LOCAL SOCIETIES.

Of the locals only eight have reported; Oshkosh, Lake Geneva, Bayfield, Madison, Manitowoc, Poy Sippi, Waupaca, and Washburn.

The secretary therefore has no means of knowing how many others may be in existence and entitled to such privileges as are now accorded to locals by the state Society.

Oshkosh reports 16 members, 8 meetings during the year and no exhibitions.

Lake Geneva, 30 members, 52 meetings and 5 exhibitions, consisting of Peony, Sweet Peas, General Midsummer Meeting, Dahlia, and Chrysanthemum Shows. Secretary Martinii in his report says: "The Society maintains a commodious exhibition hall and club rooms; has given to the school children of Lake Geneva over $300.00 in prize moneys during the last five years for growing chrysanthemum plants. Will try and get the school board to donate prizes this year, association to furnish sweet pea seeds as a new departure. Exhibitions are well patronized by the public. The Society has installed a reference library of selected books costing over $100.00 to date.

The Bayfield Society leads in membership, now having 157 paid members, held 3 meetings and 3 exhibitions. Secretary Flanders says: "We made an exhibit at the Wisconsin State Fair at Milwaukee, at the County Fair at Iron River and at Bayfield on the occasion of the Summer Meeting of the State Society. At the Bayfield County Fair we took 101 premiums amounting to about $175.00. In addition to these exhibits we have had an almost continuous exhibit of fruits at the rooms of the Bayfield Peninsula Fruit Association and minor exhibits in store windows."

The Waupaca local has 25 members, held one meeting and no exhibitions.

Manitowoc, 35 members, 3 meetings and one exhibition.

Washburn, 31 members, 6 meetings, no exhibitions.

Our official organ, WISCONSIN HORTICULTURE, while not by any means as good as it ought to be, seems to be fairly well received and it is probable that it will continue to at least hold its own.

ABSTRACT OF REPORTS FROM LOCAL HORTICULTURAL SOCIETIES FOR 1912.

Name.	Number of members.	Fee charged.	Number of meetings during year.	Average attendance.	Number of exhibitions.
Poy Sippi Horticultural Society	22	$0 25	4	40	2
Bayfield Peninsula Horticultural Soc.	157	50	3	50	3
Lake Geneva Gardener's and Foremen's Association	30	2 00	52	12	5
Waupaca County Horticultural Soc.	25	50	1	100	.....
Manitowoc County Horticultural Soc.	54	75	3	30	1
Washburn Horticultural Society	31	1 00	6	12	0
Oshkosh Horticultural Society	16	1 00	8	35	0
Madison Horticultural Society	28	1 00	6	20	0

NEW WORK.

On November 15th and 16th there was held at Bayfield a fruit growers institute that was highly successful. This institute points the way to an entirely new line of work, and it rests entirely with the members of this Society whether such work shall be enlarged and continued to cover every point in the state where fruit growing is or may be an important business.

These institutes would not take the place of the farm institutes, but be supplementary thereto. It would seem that no one could question either the right of the Society to engage in such work or the value of it. The Agricultural College, the County Schools of Agriculture with the different extension bureaus of the University are now and always will be the main and central forces in agricultural education and their field of influence will be steadily enlarged, but no matter how far or wide this system of education, academic as it must be, may extend, it will never cover the whole field.

The success of the farm institute work in this and other states has demonstrated its usefulness. The State Society has for four years contributed annually from three hundred to three hundred and fifty dollars to the Farm Institute fund and this year will double that sum which will be applied on the payment of the salaries and expenses of two special lecturers on fruit growing. Our worthy president, D. E. Bingham, has served alone in the past, covering about one-third of the institutes and this year will be assisted by our vice-president, C. L. Richardson.

As the Farm Institute plans to reach the towns farthest back from the main lines of travel this work may well be continued and in addition regular two-day fruit institutes may be held at fruit centers. All of this will cost money, but there need be no concern felt on that point.

It will not be sufficient for us to rest content with the work we have done and are doing; we must move at least one notch ahead every year. Will it be fruit growers' institutes? The answer to this question rests entirely with the members of this Society.

In the line of new legislation we may reasonably concern ourselves with the following:

(1). A change in the Weights and Measures law fixing the weight of a bushel of apples at 44 pounds.

(2). Provisions for the payment to owners of orchards and gardens for damage done by protected game.

In conclusion I will but repeat the introduction to this report:—the present time should be one of congratulation to every member of the Society. Harmony prevails, the same unselfish spirit that has placed us in the front rank of horticultural societies is still in evidence.

There is no reason why we should not continue in the future as in the past to be the most influential and helpful body of its kind in the state.

REPORT ON FIELD WORK.

Following the usual custom the report on these matters will be brief as the report of the chairman of the trial orchard committee which follows will no doubt give fully the facts concerning the different orchards visited by the committee.

The following points of general interest are taken from the records in the Secretary's office.

We now have nine trial orchards and stations as follows:

Gays Mills, 7 acres apples, 1 acre cherries, 1 acre grapes.

Sparta, 1 acre grapes.

Poplar, 6 acres apples, 1 acre plums.

Wausau, 7 acres apples, 3 acres cherries and plums.

Medford, 3½ acres apples, ⅓ acre plums.

Lake Geneva, 7 acres apples, 1 acre cherries.

Manitowoc, 5 acres apples, one acre cherries.

Whitehall, 5 acres apples.

Total 53 acres.

In addition, two more of 5 acres each are to be planted next spring, one at Baraboo and one at Pewaukee.

Two orchards were dropped from our rolls the past year and the books closed, Barron and Sturgeon Bay.

After five years trial the committee concluded that it was not practical to raise apples at Barron and the lease was relinquished. The entire cost of the Barron orchard, exclusive of traveling expenses was $448.27.

At Sturgeon Bay the period of expiration of our 5 year lease seemed to be a good time to quit.

The Poplar orchard was first planted in 1904 and replanted many times since. The cost to date exclusive of traveling expenses is as follows:

Nursery stock	$ 440 22
Tile draining	708 16
Rent and labor	1,511 31
Miscellaneous expense	130 68
Total	$2,790 37

The returns to date amount to $106.20.

While the Poplar orchard has absorbed nearly three thousand dollars of our funds in eight years it has been worth all it has cost. It has demonstrated clearly that only the very hardiest varieties of apples may be grown there and that tile draining is absolutely essential to raise even these successfully.

The orchard, consisting almost wholly of Patten Greening, Duchess and Hibernal, besides an acre of native plums, is now in a thrifty condition and promises some returns on our investment during the remainder of our lease.

Since March 1904 the Wausau orchard has cost $2,020.04 and yielded an income of $2,198.53, or a balance on the right side of $178.49.

As our lease has five years more to run we also stand a chance here to come out even and if we do this it will be a remarkable record as all who have had charge of similar experimental work can testify. If the accounts of the Wausau, Maple, Poplar and Medford orchards balance at the expiration of the leases, if in other words the experiments shall have been conducted without cost to the taxpayers we may indeed be proud of the record.

In the case of Gays Mills, Manitowoc, Lake Geneva and possibly Whitehall we expect a profit.

The growing of grapes at Sparta does not appear to be a successful undertaking. The acre of Worden and Moore's Early, planted in 1908 has cost for vines, labor, trellis, spray pump, etc., $220.66 and the returns amount to $28.39. There have been some unavoidable setbacks, but even allowing for these there does not seem to be a very wide margin of profit.

The conduct of the other orchards presents no facts of interest that will not be covered by the report of the trial orchard committee.

SCHOOL GROUNDS.

There is nothing cheerful to report in this field of work. There has been no progress during the year, in fact we have barely held our own.

We have 15-year contracts with six different schools as follows: Branch, Fond du Lac, Lancaster, Baraboo, Waukesha and Sturgeon Bay.

These have cost for nursery stock, transportation, etc., a total of $548.67 as follows:

Branch, $82.52; Baraboo, $106.99; Lancaster, $179.39; Sturgeon Bay, $125.67; Fond du Lac, $26.75; Waukesha, $27.35.

In not a single case has the result been such as to warrant a continuation of the work.

The almost universal lack of interest on the part of the school officers, lack of coöperation on the part of the teachers, the long summer vacation when the school grounds are wholly deserted and the shrubs left to the ravages of drought and weeds all conspire to discouragement.

The blame, however, must not all be placed on the schools and in fact it is doubtful if any of it should be so fixed. We are evidently trying to do something for which there was no demand, trying to give the schools something that they do not want.

It will be necessary to start at the beginning and by a long and patient course of education create a demand for the beautification of rural school premises and then set out to fill that want.

It is also probable that we have begun at the wrong end of the problem. The great need of the children and teachers in rural schools is playgrounds rather than trees and shrubs.

The boy or girl in the average rural school is far more restricted as to playground privileges than the child in the village or city school. The site of the average school in the country seems to have been selected because it was entirely unfit for any other purpose.

Less than one-half acre is the allotment and the school building set in the middle of the plat. This leaves mighty little room even for a respectable game of tag and we in our mighty wisdom come along and take up most of this little room with trees, walks and shrubs.

If we have started wrong we should back up and take a fresh start as there is no good reason for quitting. I suggest: that the contracts now in force be continued, following the plans already adopted; that a sum of money be set aside to be used in coöperation with two or more of these schools to secure larger playgrounds and a limited amount of play apparatus; that our campaign of education be continued as in the past but directed more fully to the playground idea.

Horticulturists are home builders and next to the home and the church the school should command our best interest and attention. Let us make our schools the most attractive outside, as they are bound to be the best inside, of any in the United States.

REPORT OF TRIAL ORCHARD COMMITTEE.

J. S. PALMER, CHAIRMAN.

The orchard at Gays Mills still shows the vigor and thriftiness that has been characteristic of that orchard since it was started. A few trees were bearing and the fruit was absolutely free from defects or blemishes.

Some Wisconsin rabbits trespassed in this orchard last winter and destroyed a few trees and badly injured several more; an argument convincing us that we must protect the trees up to several years old. The vineyard was in fine condition and the vines were well laden with fruit.

At Whitehall the orchard shows some blight and also some winter injury. Trees were in better condition on the north slope than on the top of the hill, probably owing to better soil on the slope. Cherries were in fair condition, some foliage injured by fungus and a few trees dead.

At Manitowoc the orchard is blighting somewhat, but otherwise is making a fair growth and looks promising. Some trees have split down. The cherries are now doing fairly well, making some growth and seem well established.

At Lake Geneva the orchard is in fine condition and making a very good growth. The trees all look thrifty, some trees were bearing. The Talman Sweet trees were bearing Price's Sweet apples, which shows that things are not always just what they seem. The cherry trees were badly affected with fungus, in some cases foliage nearly all gone.

The Poplar orchard has improved somewhat in recent years since the soil was tile drained. Some trees were badly blighted and the orchard was infected with aphis. In some cases the new growth was almost all killed from this cause. Hibernal, Duchess, Wealthy and some other varieties were bearing. The native plums were in good condition and were loaded with fruit.

At Maple the orchard is in fair condition. Some trees were badly infested with aphis and a few were dead from winter injury, borers and other causes.

The Medford orchard is in a good state of cultivation but the trees have made almost no growth this season. These trees show the effects

of the severe winter more than any other of the trial orchards. Sixty-one trees are dead, and several more are in bad condition. Duchess, Wolf River, Hibernal and Longfield have survived. Of the native plums, many are dead and more are badly injured.

The experimental plat in the Wausau orchard originally contained 138 varieties of apples besides cherry and plum trees. The Newell, Thompson's 29, Flushing, Spitzenberg, Murray, American Codling, Longfield and Eureka have all been sickly and are nearly dead now. Cherries are all dead. In this plat Mr. Phillips and Mr. Kellogg started several experiments, one of which is quite striking. The following varieties were planted in threes, 1 ordinary nursery tree, then three root grafts in a group and the best one eventually selected, and one Virginia crab, which was top-worked the following year—Wolf River, McMahon, Dominion, Northwestern Greening, Okabena, Peerless, Wealthy and Patten's Greening. In the case of the McMahon, Northwestern Greening and Patten's Greening the top-worked tree is decidedly the best in every case, much larger, better branched, foliage darker, and evidently more productive.

Of the two remaining the root graft is usually better but not always. There seems to be no great difference in these two and both far behind the top-worked trees. In the commercial plat the Hibernal, Duchess, McMahon, Dudley, Peerless, Patten's Greening and Avista are in good condition. Longfield, Newell's Winter, Repka, Okabena and Dominion Winter are dead or badly injured. The Northwestern Greening also badly injured.

THURSDAY EVENING.

"The Best Session."

PROGRAM.

MRS. L. H. PALMER, Presiding.

FIRST AID TO THE HOUSEWIFE.....MISS ABBY MARLATT, U. W.
FUNDAMENTALS OF COÖPERATION.....MISS FLORA RICH, Baraboo.
THE HOME AS A SOCIAL CENTER.....MRS. L. H. PALMER.
COLOR, ITS VALUE TO HORTICULTURISTS.....MISS BERNICE HATCH.....
Sturgeon Bay.

FIRST AID TO THE HOUSEWIFE.

PROF. ABBY MARLATT, University of Wisconsin.

Usually "first aids" implies that there is to come, sometime in the near future, the skilled physician who will apply the proper remedy, or at least leave the assurance that all has been done that human power can do.

With our present changing ideals what may seem now a serious ill may eventually prove to be only a slight disturbance of the social body adjusting to changing environment.

With our individualistic tendencies the old order of the served and the servitor in household affairs has become so upset that there may be a doubt as to which is which.

To arrive at such a point that the one served may in his place assume the duties of the serf is but in line with the evolutions in national history.

It may not have been pleasant for the aristocrat to become the citoyenne in the French Revolution but unless history tells us false she did her part with grace and courage. The intimate French Memoirs of that day tell no more striking truth.

The housewife of to-day must meet her French Revolution with equal courage, tact, grace and savoir faire. We confront the age when the individual service of one or more houseworkers, always ready to answer demands, will be replaced by mechanically applied energy in the form of the so-called "labor saving devices."

We need to become skilled not only in physics but to become mechanical engineers so as to use and readjust these "first aids" which are the half scientific treatment for what may prove to be a serious ill necessitating the surgical skill which shall excise the offending part even to the major operation of cutting out the separate home from our midst.

Like the wise doctor some of us are letting nature do her best while others are treating the condition with a liberal diet of patented articles, most of which prove of little service. What we need is not more apparatus which like most drugs will make us work harder but a simpler, saner form of life which will allow us as housekeepers to readjust to meet the new conditions.

Frankfort has a museum of "horribles" in house decoration. Would that there were more in museums.

A casual journey through the house with critical glasses even charitably clouded will convince the open-minded that each has the beginning of such a museum. We may argue with our saner self that these ornaments and dust collecting articles of furniture are dear to us through wealth of sentiment and association but in the last analysis are we not paying a very heavy price in energy, time, health, and intellectual loneliness for what we can remember in our mental museum where neither moth nor dust doth corrupt nor, better yet, neighbors break in and deride. Yes, I know it is "our own business" but, really, is it? We cannot live to ourselves alone. We set a standard which may enslave our friend or the stranger within our gates.

It may be soul uplifting to be forever pursuing the misplaced dust and I am open to conviction but warn the defender that weighty arguments are necessary.

Why give the germ laden dust of our cities so many changes of scene? Dust sitting tight is harming no one. We do not know that it is a charitable act to give it a moving day as often as we do.

Eliminate projecting surfaces around doors and windows. Discard the ugly mantel for the decorative tile or brick fireplace without shelves. Choose woods for their beauty of grain and texture and then eliminate decorative details which add to labor but do not enhance the artistic effect.

In furniture make the salient factors quality in material, beauty in line and harmony in mass. That which increases dust area should be reduced to a minimum. This does not confine the choice to the massive or the straight line but it does put material and harmony first as the determining factors in selection.

Those hangings which are heavy and rough are sources of labor and harborers of dust.

Smooth finish and ease in cleaning should be the first consideration in any textile material used in interior decoration. The vacuum cleaner will search out the dirt from even a chenille portiere but why have the chenille or its near relative?

Curtains at windows should exclude the person outside but not the light and air. They should add to the beauty but not materially to the labor problem in the home. Discard them if they do.

Floors were made to walk upon and that fact should be ever uppermost in the selection of coverings. Walking will tend to create air currents which carry dust. Therefore the floor covering should be either nonporous or easily moved into the open air to be cleaned and disinfected by the sun.

The vacuum cleaner is the panacea for rooms heavily hung and spread with rough textiles.

Pictures:—If one has no views from windows then one may substitute other views but remember we can study but one view at a time and copy the Japanese who keep their treasures in a fireproof "godown" using but one at a time. It is considered the highest compliment to give a friend one's undivided attention. Why not compliment inanimate things?

Forms of labor in the home are:—**Cleaning; Cooking; Care.**

The three C's we do for the sake of the fourth which justifies the home, the Children. Nothing else would warrant the archaic standards we maintain.

Sometimes we wonder if there is not some other way to provide that right environment for the child which will leave him free to develop all that is best and therefore justify his living in the world.

But this is a talk on "first aids" and is not a clinic.

Cleaning:

The problems may be grouped into: **(1) Floor; Floor covering, (2) Wall, Wall hangings, (3) Windows; Window curtains, (4) Furniture, (5) Textiles, (6) Dishes.**

The apparatus used in any case should meet the following conditions: **(1) Easily managed, (2) Successful, (3) Sanitary, (4) Not easily broken, (5) Easily repaired, (6) Moderate in expense.**

The first is most essential as the more nearly fool proof the utensil is the less is it in danger of failing in the other factors.

The second is very important as efficiency is our measure of success; we cannot spend time on half measure. The moderately good egg is never acceptable.

The third is the hardest test to apply as authorities differ as to modes of infection. But he who takes all precautions may escape infection.

The vacuum cleaner has been proved to be a sad offender on this third count. The stationary form where the dust is sucked eventually into the sewer is the least objectionable. The hand ones distribute bacteria while removing the coarser particles of matter. We may use them as the lesser of two evils but we should, like the old lady with her new broom "neither borrow or lend." That utensil which requires skilled workmen to repair is the one which soon finds its way to the junk shop or the storeroom.

Women spend in small amounts at a time and though the totals are often startlingly large yet the habit of paying ten, twenty, fifty, one hundred dollars for one piece of apparatus is not ours, however much we may spend on clothes, books, art. Hence, the very expensive and perhaps more nearly perfect utensil has not a ready sale. "Something just as good" is taken under the skilled psychology of suggestion of the salesman. The carpet sweeper is better than the broom, the dustless mop is better than the floor brush but the vacuum cleaner is better than all for it in a measure removes the dust rather than disturbs it.

The window cleaning problem is easy or difficult according to the form of window.The window is primarily to let in air and light and yet we seldom build it to meet the first perfectly. The casement window to-day with its adjustable hardware is easy to clean and gives the maximum amount of air. It should be of unleaded glass if labor is a factor.

That furniture which allows of long sweeping movements of the dustless dust cloth is a labor saving device. It should also be good to look upon. Built-in furniture tends to lessen labor in that it prevents the moving to secure the dust which will lodge behind or under the non-stationary article. Bookcases, sideboards, cupboards, wood

tables, settles, ice-boxes, ranges, should be a part of the house and carry out the wood treatment, color scheme and design.

The tendency to have the furniture of a house designed for it is a step toward a better house decoration and if care is taken may simplify the expense and later the cost of labor.

For ease in work all beds, sinks, work tables, laundry tubs, wash bowls, ranges, should be placed at such a height that the worker need not bend in doing the necessary work.

In any room, but most of all in the kitchen should the aids to labor be adjusted to conserve energy.

The worker should have all material ready for work, so placed that the fewest movements are required to complete the task. Sink, work table, range, cupboard, should be not more than a step apart. It can be arranged even in a large kitchen by shifting apparatus leaving the altogether uninhabited interior as an empty area to rest the eye upon but not to sprint across in vain endeavor to complete a task in a short time.

Discard an out of the way sink and use dish pans on a high table. Sit on a high stool but do not bend without you return to primitive attitude of walking on four feet as a physical training exercise. The physical poise is an exposure of the mental state but the mental state is affected by suggestions. A low sink suggests a stooped back—per see we acquire it.

The laundry apparatus sold for the household is all belated "first aids" as the laundry is one of the industries which should be taken from the home. Reform the public laundries and force them to be sanitary and to use precautions which will allow *us* to wear out our garments. A determined demand by woman usually has a result and in this man would help as he too is a victim.

But to return to the laundry apparatus. The set tubs are too low. The "Trust" reduces the initial cost in shortening standards and pipes. The power washers are also low to fit the tubs. The type may be the milk stool variety which in careless hands tears the clothes; it may be the oscillating type which is expensive, or the vacuum type which in many ways is more nearly scientific. The price will vary according to the commission given to the middle man: often one-third the amount asked.

The hand power is always moderate in price, the water motor is next, then comes the gas motor and last and most expensive is the electric motor type of power.

In selecting the machine the purchaser should ascertain if the initial cost will not be prohibitive for value received; if the cost of maintenance is not excessive; if the material can be made sanitary without too much use of brains, and last but not least, if it will work.

Wood is not satisfactory. Galvanized iron is cheap and for a time satisfactory. Copper is expensive but lasting.

A hand power milk stock type of washer may be secured for seven dollars. An electric power, copper oscillator for over a hundred. Wet or rough dry laundry work may be done for from 25 to 50 cents a pound.

In either case the ironing will disinfect the clothes. Which is cheaper—a mechanical washer, water, soap, bleachers, room rent, or rough dry or even wet laundry process in a public shop?

A motor may be used to aid in mechanical routine work. Run a sewing machine, mix bread, grind coffee, beat eggs, turn an ice cream freezer, polish silver as well as do the laundry work. The cost is not much considering the fun you may have, the patience you may cultivate. Few homes require so much of any of these forms of labor done that the expenditure seems justified. The question is, would you take the time to adjust, set up, supervise and replace a complicated piece of apparatus? Do you know how to adjust it when out of order? Is there a place where you can learn? Will the helper bother with it or will you find it later hidden away where it is safe?

I have found that in my own work I am willing to try but quickly discard most of the so-called "first aids". They are time consumers and time is what we cannot waste.

Electric cooking apparatus as toasters and hot plates are labor saving devices and not expensive to maintain but the electric ranges are an expensive luxury.

Fireless cookers are labor saving and when used with discrimination are economical.

Pressure cookers are for the scientifically trained. They are not for the ignorant or the absent-minded. Alcohol stoves have their place but even they may be a source of danger in careless hands. They are an excellent aid in the time of hurry.

With a fireless and an electric hot plate, and an alcohol burner plus a nearby bakery (which is supervised) the kitchen may be only a butler's pantry.

Cooking utensils may be judged by the following standards:—(1) **Conductivity (does not waste heat)**, (2) **Insolubility (not affected by acids or alkali)**, (3) **Durability (with ordinary care)**, (4) **Easily cleaned**, (5) **Not easily oxidized.**

Few metals or patent coatings meet these. Aluminum is an excellent conductor of heat, but it is not insoluble, neither is it durable in careless hands. It will burn to white powder if allowed to become dry over a gas flame. It is not easily cleaned. Iron is satisfactory as to conduction, durability and easily cleaned. With ordinary pre-

caution it is not soluble in food not containing acids. It will oxidize —(rust).

Enamel ware is insoluble, easily cleaned, does not oxidize but it is not durable and is only fairly good as a conducting medium. Porcelain is excellent in all but durability. Tin is excellent in heat conducting, is easily cleaned and not oxidized, but fails in that it is acted on by acids and is not durable. Silver answers all the counts, but alas! is too expensive. Copper, tin lined, is best, but alas! dear. Glass answers all but durability. It must be the annealed variety which makes it expensive. I would use porcelain and iron if I could afford the porcelain.

Dish washers for the home are not as yet satisfactory. Most of those I know are now stored as curiosities. The simple device of a large dish pan, a wire basket to fit, a soap shaker, and a mop, with plenty of boiling water is as yet the best solution.

The hotel dish washer is fairly successful but even in these breakage may be excessive and the dishes are not always clean. A hot water hose system is yet to be perfected. If hot water could be forced through a soap receptacle and then used without soap in rinsing, the dish washing problem would consist of arranging for the washing and draining dry and then replacing in shelves.

Knowledge of chemistry in house work will save many a mistake in purchase of apparatus and material as well as in use of method. For example, in the one item of electrolytic action of different metals in an alkaline solution as soda or even common salt, a chemist would understand that the essentials are two strips of metal—as tin and zinc —placed with the discolored silver in the hot soda or salt solution to accomplish the cleaning action claimed for the silver clean pan. The difference in cost and space occupied by apparatus is as ten cents to thirty times that.

In other words the essentials are knowledge of the fundamental sciences as physics, chemistry, biology and a sane judgment which will avoid the nonessentials in housekeeping, using the commercial products in food, utensils, laundry work when they meet the needs, not hesitating to spend wisely when such expenditure means health gained or conserved; means leisure to live with family and friends or even that leisure which allows us like the old darky who "was jus' serenading muh soul."

FUNDAMENTALS OF CO-OPERATION.

MISS FLORA RICH.

In every department of life there has been gradual awakening to a realization of the necessity for such compromise and adjustment of economic conditions as shall unify the various phases of human existence, strengthening, upbuilding, and by concentration, eliminating what has been wasted energy.

"The spirit of coöperation is the master spirit of the age," as has been said; and when united with the spirit of equity it must ultimately prove a solution of the existing evils.

Much has been done in nearly every branch of industry and commerce, organizing for a betterment of conditions.

The church, the trusts, civic associations and the unions are all organizations for either mutual or individual gain, and were I to enumerate even a small portion of the many industries and institutions of like spirit, all showing an awakening to the advantage of pulling together, it would weary you unnecessarily, as you in all probability are well acquainted with what is being done by the elimination of misdirected effort, and the conservation of resources, in the particular industry in which you are interested.

I choose, however, that special phase of the subject that is, or should be, of paramount interest to every earnest and intelligent man or woman, in consideration of its relation to the cause and reason for all our best endeavor—the home.

We find here the essential coöperation of the individual efforts of two or more persons, united for the furtherance of mutual interests.

When a man and woman unite their strength for the creation and maintenance of a home they form of their united interests a partnership, the success of which rests upon their personal coöperation.

Each does not do just what the other does, but, having a distinct individuality, the natural or acquired ability of one counteracts the deficiences of the other, creating thus a well rounded and harmonious whole.

Nowhere is copartnership more essential than on the farm, where the home interests are so much a part of the business.

In the division of effort the providing of financial support naturally is assumed by the man, while the woman should be prepared to employ such provision to its best advantage, for as has been said, "the value of the dollar a man earns is determined by the intelligence of the woman who uses it."

As many responsibilities which necessity formerly forced upon women have gradually slipped from their shoulders, they must assume the new responsibilities consequent upon the new conditions.

But, however the conditions may change, the highest calling of woman still is, and always will be, home-making.

Housekeeping and home making together constitute a profession, and there is no business more important or difficult known to modern times.

A woman, therefore, destined to become a home maker, must have adequate preparation for her business.

The problem of how to live within the income depends largely upon the executive ability of the woman, and on a farm, where the income may not always be determined in dollars and cents, this presents problems less easily defined.

Here, too, she must make discreet use of the raw materials as well as show judgment and foresight in the purchasing of various necessities. Utmost importance should be placed upon a proper understanding of the relative value of foodstuffs, and the care in their selection as well as preparation, for on this depends not alone the present health and pleasure of the family but the future welfare of the home and its interests, through the influence exerted upon the mental and physical condition of its various members.

Ingenuity and intelligence in utilizing materials and avoiding waste in all departments of the household should be given thoughtful consideration, especially the ability to satisfactorily perform the necessary duties of the housekeeper with the least waste of time and energy.

No understanding of the technique of home making is complete without a thoroughly worked out plan of scientific household management, with system in all its departments. This need not be so rigid as to disturb the equanimity of the entire home, but if properly arranged will prove, as in other business, a servant rather than a master.

If she cannot have the advantage of improvements which the modern domestic scientists consider necessary, she may cultivate her own inventive instinct and avail herself of many recent innovations and ideas.

Home Economics is not, however, only of interest to the woman, it should arouse the intelligent sympathy of the man. As home may be—

> "Just a wee cot—the cricket's chirr—
> Love and the smiling face of her,"

the business of home making upon a coöperative basis must bring an answering smile from him, for

> To make a happy fireside clime
> To weans and wife,
> That's the true pathos and sublime,
> Of human life.

With a realization of the need and economy of having convenient and up-to-date implements with which to work, the man should also recognize the equal importance of conserving the energy of his co-worker, and using ability to the best advantage.

Time and energy form the principal capital on which their business is based, and a careless use or waste of either is not only unwise but uneconomic.

Many appliances which have long been considered "conveniences" and "luxuries," the securing of which marks the goal of all their striving, may rightly become, rather, the means of attaining that end.

In what is usually classed as by-products of the farm, such as poultry-raising, gardening, and bee-culture, the woman has an opportunity to take an active interest; and here, too, the coöperative spirit should hold.

The proper housing of the poultry is quite as important as that of the other stock, and it is but just that the farm contribute as much to its support as to other sources of revenue.

We hear much concerning the respective rights of husband and wife to the "pocketbook," but in this business, wherein equal interests and resources, brought about by equal division of labor, is vested, the partners must have confidence enough in each other to accept the conditions of the firm.

There need be no division of the pocketbook, no allowance for household or personal expenses, but each should feel at liberty to use their own judgment in the expenditure of funds. If each respect the opinion and judgment of the other, satisfactory results must follow.

In this system of living there is no room for the young people who start their life together with the idea that the business is quite apart from the home, and is to be considered only when it fails to provide the home with the necessary support and required luxuries. The interests of the business and the home are synonomous, and as the one is disregarded the other suffers.

Most significant is the consequence of coöperation in the true business of the home, the production of efficient men and women, the citizens on whom will depend the future welfare of our country.

The best teachers of industry are men and women who have had years of practical experience. With the parents' influence and example they will learn the true meaning of "home," the importance of properly directed effort, and the value of knowledge in efficient home-building. Called upon at an early age to share the parents' activity they will be given an insight into the industrial processes and acquire habits of work.

The influence of the home life will act upon the school life, and with the parents' coöperation the public school system may become more adapted to the real needs of the children, and through it, too, a greater interest in the life of the country will be awakened. A well graded course of study, more competent teachers, and practical instructions in agriculture and home economics, added to the home training will not only keep the boys and girls on the farm but do much to solve the labor problem, for with their added respect for the farm they will have acquired the right attitude toward their work.

Another problem, which has long agitated the minds of men and women, that of their respective rights, will be solved, for equal responsibilities necessitate equal privileges.

The home will stand, the result of two endeavors, the visible expression of two natures, actuated by the same ideal, the "demands" of the one having been met by the "supplies" of the other; a peaceful, harmonious, miniature republic, united by the tenderest ties, whose government is its own, administered for the common interest.

Is this but the dream of a constructive idealist? I do not think so—

"Home is the resort
Of love, of joy, of peace, and plenty; where
Supporting and supported, polished friends
And dear relations mingle into bliss."

THE HOME SHOULD BE A SOCIAL CENTER.

MRS. L. H. PALMER.

The question is frequently asked, "What place does the home and home maker occupy in the economic world?"

There should be no attempt made to place a cash value on the influence of the home or home maker. Home means something too sacred to come into the commercial world. It means mother, father and the children. It stands for all that is lovable or worth living for. It is all that binds the human race together. The home maker has a work to do, a holy service to render to the world, that is far above a money value.

Every home should be a social center, where old and young can meet for a social hour, and children should be helped to feel that there is no place where they and their friends can have quite as good times as at home. If that spirit was fully lived up to it would do more to close the saloon doors than all the political "isms" together. There is an atmosphere of refinement, a feeling of cordial fellowship, about a home function that is never present at a public entertainment, however well conducted.

The home affairs should be so managed that each individual understands that he is a part of the whole, with specific duties and obligations. That the material and social life of the home depends on the willing coöperation of the members.

Parents should understand the necessity of training the children to willing obedience of home rule; that the home is a small republic in which all have an equal right to work, play and share what comes in the way of success, or the reverse, and as all know that "into each life some rain will fall" children should be taught to meet disappointment bravely, and feel that they can do much to comfort those who are in trouble.

The family life should be so regulated, that there will be stated times for work, study and social recreation; all holy days should be observed by having suitable entertainments, and children should be taught the significance of the day, especially Christmas.

Much of the discontent and dislike of work among children could be avoided if parents would go cheerfully about their own duties. Don't expect children to be willing workers when they constantly hear older people complain of the drudgery of work and wishing they might live without it, scrimping and denying themselves and families many pleasures that they may accumulate money enough to go into town to live where there is something doing.

Suppose you get something started in the country. There is the best of material in the bright boys and girls around you who ought to be kept busy and all they need, is to be guided by some one with mature judgment who has not forgotten how to be young. Invite the neighbors to help plan the work, so that there will be time and opportunity for parties, picnics and literary meetings. Organize clubs for culture and social purposes and when club evening comes don't imagine you are too tired to go. Take part in the entertainment and let the young people see that the old folks are *alive* and intend remaining so.

There is nothing that will spur on the mental activity of the young like a literary contest in which old and young meet in friendly rivalry.

We are too much given to cultivating that *tired feeling* as we draw near life's meridian and begin to think the new house with its fine furnishings is just a little too nice to give parties in, and that there is no sense in the young people wanting parties. The home should be as fine as can be afforded but there should be nothing too good for family use. There should be an abundance of good reading, music and games that the home life may be such that in after years, when the children look back to the dear old home their sweetest memories will be of the quiet evenings spent at home with the family.

The home should radiate a feeling of good fellowship, that expanding in ever widening circles, until meeting counter currents, the community will be united in a harmonious whole to foster and keep alive the sentiment so beautifully expressed long years ago, by the homeless, home loving John Howard Payne, in his immortal poem,

"Home, Sweet Home, be it ever so humble,
There is no place like home."

COLOR, ITS VALUE TO THE HORTICULTURIST.

MISS BERNICE HATCH.

It is not alone the artist, the painter or the cloth maker who, for both aesthetic and practical reasons must carefully select the colors they use in their products, but the horticulturist as well. It may be asserted that the color of the goods which the horticulturist produces is cared for by nature and so a study of color value would be useless to him. Civilized man has been educated beyond the stage where a string of bright beads, a piece of tinsel or bright cloth is prized highly for just its color as the Indians do; still, as we pass by the fruit stand, the grocer's or the florist's window, we realize that their success will depend largely on the color of the goods they display. It is a bit of irony perhaps that the reddest apples may not be of the best flavor or that the brightest flower may not have the sweetest perfume. Education does not, however, draw us away from love of color although it may teach us to discriminate between mere gaudiness and true brilliancy, and between a color which flashes but soon tires and one which though more subdued may satisfy by the softness and sweetness of its tones just as in music a nocturne may be restful after a brilliant military march.

So much has the value of color been recognized that prominent psychologists have made extensive study of its effect on the minds of school children and in many places lessons are given designed to teach the students chromatic harmonies. It is found that color may not only be attractive and produce a pleasing, restful or quieting effect but may serve the opposite purpose of exciting, irritating or wearying. Edgar Allen Poe in one of his noted tales, "The Fall of the House of Usher," used the color effect of the rooms and of the lighting to produce the wierd, ghostly effect of his story. Many color experiments have been tried on folks, sick and well; and while yellow proves merely cheering and sunny, colors that are strongly red have been found to be somewhat exciting and those that are strongly blue to be depressing. Consciously or otherwise we react to their influence and confess to this in such expressions as "red with anger" and "having the blues"; while a thoughtful mood we characterize as a "brown study."

The environment of a person may greatly influence the color sense. The amount of color which a place possesses varies, due largely to the location, the vegetation, and to the water. In our climate, nature moves in great shifting masses of green and brown and gold. We are favored above many places by the endless variety of shades and tints in our plants, trees, shrubs, flowers and fruit.

While passing through Arizona a year or so ago I was forcibly impressed by the colorlessness of the towns. We passed village after village where the only color was the grayish brown of the adobe. It called to mind a story I once read of a girl, to whom a friend sent a beautifully illustrated book. The girl, in thanking her, wrote, "I shall prize it highly for its beauty, for there isn't much color in our town." We accept the beauty and freshness of our vegetation without comment because we have always had it so. A man who has been out west in an irrigated country where the hills are brown nearly all the year with the sage brush and grease-wood, crossed the mountains and came down into the Mississippi valley. He said the freshness of the green vegetation was like a drink of cool water on a hot day. I think that often we do not appreciate the comfort which may be obtained from a strip of smooth green lawn or a group of shrubs or of a flower bed well cultivated. My earliest impression of childhood is of a place filled with fruits and flowers. I can close my eyes now and see all the brightness of those long summers. One of my earliest remembrances is of walking under rows of McMahon apple trees with their branches so filled with pink and white flowers that it was an enchanted world to me. I can never remember a day from the time the snow was gone until the frost came when I could not go out and pick flowers, great arms full of nature's color gifts. Children love color and much of their enjoyment of flowers is from mere love of it. They have not yet learned to look deep into the flower as Tennyson did and say,

> "Little flower in a crannied wall,
> I pluck you from your crannies,
> Hold you here in my hand,
> Little flower, if I could but know what you are
> Root and branch and all in all
> I could tell you what God and man is."

A long time ago I remember thinking that the nasturtiums were a gaudy flower, but we have come to prize them as highly as any of our flowers. They bloom so early and so freely and if you will go out even after the first frost you may find a few which have withstood the cold and are still bright. If the day is dark and cloudy try arranging a large bouquet, using both leaves and flowers in the living room and see if it does not bring in the effect of bright cheery sunshine. While on a trip down south with a party of friends we stopped at a

little town in Southern Georgia. While we were going through a park a negro lad of sixteen or seventeen came to one of the young ladies in the party and presented her with a large bouquet of flowers of perhaps ten varieties. It was brilliant beyond description for there were roses, daisies, heliotrope and many strange southern flowers. Just to show her appreciation the young lady said, "They are beautiful, but can you tell me the names of some of them?" The negro lad smiled and said, "Why Missus, I don't know the names of any of the flowers, but I just admiah their colah."

Out in California the poinsettias are admired so much and when you see them in great groups in the parks it is easy to understand why they are so popular. It is truly their color, for they are not overly graceful in shape and are lacking in perfume, but they are the brightest cheeriest red you ever saw.

It is not alone for aesthetic reasons that we should plant for color but often for purely practical and commercial reasons. The bright red apple is traditional with the schoolboy. I like to stop in front of a fruit store and admire the apples which the dealers used to tell us came from New York but now-a-days say come from Washington. I often wonder if some of them don't grow right here in Wisconsin. There is a beautiful apple, thought of little value to use, called the Lubsk Queen. It is very white with pink cheeks. My father happened to have several barrels of them one year when we lived in Richland county. He sent them to Minneapolis in a car of other apples. The merchant there took the entire carload to obtain those few barrels of Lubsk Queen, paying twenty-five cents per barrel more, for the balance of the car. There is no law now—though there may be before the legislature adjourns—which says we can't have beauty and quality in the same apple and the one which combines both will be the best seller. The color of fruits and vegetables has a value recognized in commerce and the household. There are certain standards and ideals of color to which fruits must conform more or less closely to be assured of popularity and this is equally true of vegetables. A beet that is blood red throughout will meet this ideal standard better than the red and white or yellow flesh varieties. A white sweet corn is most desired but a yellow may be tolerated if distinctly tender and succulent. Yellow fleshed rutabagas seem to be the popular kind and yet the white is quite preferable for table use. Yellow fleshed potatoes are hardly tolerable and red skinned ones are not so popular except for early markets in the city. There is no distinct reason why speckled or dark beans should not be as marketable as any except that fashion says their color should be white. Onions may be brilliantly white, red or yellow and yet be indifferently accepted by the cook. Perhaps this indiscriminate choice arises from the fact

that she tearfully removes the coating that covers the odorous bulb that is always white within. In fruits, too, we have some color vagaries that arise to even greater importance in the field of commerce and culinary art. Our first fruit of the season, the luscious strawberry, comes to us uniformly clad in red and we like it best if the red is full, deep and glossy and the flesh itself blood red to the core. The deep red flesh gives the best color when canned and a much more inviting look than the white fleshed sorts. The bright red or black of the cherry seems to fully satisfy for color. The ideal raspberry is bright red or coal black. Dull colors like that of the Shaffer or Columbian do not seem to meet our ideals as well, even when quite acceptable in quality and size. In currants the red are decidedly more marketable than white varieties, while gooseberries go to the market almost as green as grass. In blackberries no light colored sort has been profitably grown and we accept their blackness as just the right thing. In grapes we have many colors, white, yellow, red, pink, purple and black. If the quality is distinctly good none of these colors are barred from public favor.

The most important color for apples is red. If upon a clear light ground a blush will do but if suffused in bright carmine over an ivory white as in the Lubsk Queen, it becomes irresistibly lovely in the market. While green colored apples are sold in large quantities it is undeniable that all parties concerned would be better pleased if the fruit were full colored red. There is, however, a finish of glossing and coloring of well grown and well matured fruit that will make it very attractive when secured in the largest possible degree. To secure this brilliancy of finish that should be present when harvest comes is a part of the art of the fruit grower. Trees overloaded with fruit, those suffering from insect or fungous depredations, those underfed or choked with drought may not be able to color their crop. While nitrogen in the soil is essential to grow abundant foliage, a soft succulent growth caused by too much nitrogen will retard rather than produce color. Potash, lime, sulphur and phosphates are probably the coloring factors as far as soil elements are concerned. To thin the fruit, feed the tree a balanced ration and protect its foliage from insect and fungous foes, is to prepare for the full maturity, splendid finish and glorious coloring of autumn sunshine, without which the labor of the season becomes partly abortive.

So with fruits and flowers, though it may be only to charm the eye or to please the tastes of fashion, it is well to give some thought to their color. All that which aids nature to its fullest development will tend to give richer, better hues. Our summers are one long succession of colorful displays, beginning with the fresh delicate green of the springtime foliage through the deeper tints of summer to the rich

gold and browns of harvest time. As if wishing to end all this lavish beauty with one grand riot of chromatic effect the forests are changed into marvels of red, brown, yellow, crimson and gold, the hedges and roadsides are filled with golden rod and asters, the skies are a deeper blue. No matter how brilliant or numerous the color gifts of nature may be she always moves in one great blend of harmony, never in discord. When at last the leaves have fallen and winter comes with sparkling frost she spreads over all her mantle of snow, emblem of purity, triumph of harmony, the chromatic union of all colors that brings to the vegetable world the peace of sweet rest.

THURSDAY AFTERNOON.

The meeting was called to order by the President in the Horticultural Building of the University of Wisconsin at 2 p. m.

ADDRESS OF WELCOME.

BY PROFESSOR J. G. MOORE.

Mr. President, Ladies and Gentlemen:—I assure you that I am unable to find words to express the welcome to the State Horticultural Society in meeting here this afternoon. It has been the very great desire with those of the Horticultural Department as well as with Dean Russell, head of the College, to have the Horticultural Society hold its meeting at the College, but for reasons which seem to those who are in charge sufficient, it has not been deemed advisable or wise to hold the meeting here and this year, on our invitation to hold the meeting here, they voted this session this afternoon at the College.

The Horticultural Department has as its aim the advancement of horticulture in Wisconsin primarily, but not only in Wisconsin, but in other sections of the country as well, because we have here at the present time a group of young people who represent various states in the Union. We have them coming from the South and from the East and from the West as well as from Wisconsin and so in the work which we are attempting to do here, we not only see the horticultural problems in the horticultural development of Wisconsin, but more or less of all other parts of the country as well. Not only does the Department attempt to touch along teaching lines the development of horticulture, but also in its research work, and that is a less tangible thing in a great many ways, because like all experimental work, you sometimes start off on something that looks at the time as though you were going to get great results, and before you get to the end of

it it looks like the efforts of the fellow who thought he had a bee tree and after cutting it down found he was mistaken. You must remember this, that a Horticultural Department cannot stand alone, but needs support of the horticultural interests of the state. The Horticultural Department needs the support of every man who is growing fruit. While we are supposed, possibly, to know some things that because of study or research the average fruit grower does not know, nevertheless it is a pretty poor experiment station that cannot learn a great deal from fruit growers, and so we need not only the support, but we need also the advice.

The Experiment Station's part is to work out those problems which are confronting the fruit growers in this state, and in order to do that we have to know what the problems are, and in order to know what the problems are we have to have you tell us what your troubles are, and so we need the fruit grower just as much or more than the fruit grower needs us. We like to do anything which ties us up to the fruit grower, we like to have the Horticultural Society in such friendly relation to us, and it is for that reason that we are glad to see you here to-day, and glad to have the opportunity to welcome you, to look over the Horticultural Department.

There is not so very much to be seen in the lecture rooms and laboratories, and possibly not as much in the greenhouses as you might expect, but these are the tools with which we work. We have through the generosity of our state legislature and through the appropriation of the University officials, I believe, one of the best horticultural equipments anywhere in the country at the present time. While it is not so extensive as in some states, yet in this new building which we are now occupying, we have a chance for development along the lines of teaching and along the lines of research work which I believe is not surpassed now by any state in the Union. That is not anything for the members of the department, the professors and assistant professors and experimenters to brag of, because we get it from the state, but it means that if we are entitled to such consideration, that it is just that much more of a job for us to make good and to pay for what we have got. My excuse for not appearing before you yesterday when I was on the program was because I had this room full of students, and this very afternoon, downstairs in various parts of the building we have about 180 students taking work in horticulture, so we are teaching a great many boys in the state who are going to be horticulturists and after this meeting is over I shall be glad to have you look around through the greenhouses and get some idea of what we are trying to do, not only along the fruit line, but vegetable forcing lines, and I trust that you will find that this occasion has been one that has been sufficiently profitable so that at some future day

we may again have the pleasure of entertaining the members of the Horticultural Society in this building. Not only when you have a session in Madison of the State Horticultural Society, but whenever you are in Madison the Horticultural Department of the University should be at least one of the points that you should strive to visit and look over the work which we are doing. We are always glad to take the time to show people around. So I welcome you in behalf of the officials of the University and the members of the teaching staff of the Horticultural Department, and the students who are specializing along horticultural lines.

The President.—We appreciate this welcome from Professor Moore, and I feel that there is a growing interest among horticulturists in the state in the work of the University in the horticultural field, and I believe that there is going to be a strong coöperation with the department in trying to get at the vital things pertaining to horticulture.

EXHIBITING AND SCORING VEGETABLES.

MR. N. A. RASMUSSEN.

In preparing vegetables for the show room the greatest care should be exercised in putting them in the best possible condition, for a good judge will place a great deal of credit on general appearance.

Let us take for example the carrot; when going to the field to gather for exhibition, one must pull a great many more than are needed so as to have a large number from which to select. If they are to be shown in bunches great care should be taken that the tops are not bruised nor broken, they must be thoroughly washed so that any defects would plainly show. The first point to be considered is the type for they must be true to name. We will not select the largest unless we have them all of a uniform size, shape and color absolutely smooth, with a bright clear skin. Now after all these points have been considered we often find an exhibitor has overlooked a very important feature, the roots he has selected were grown partly above ground leaving this part green from exposure and he wonders why the judge did not consider his exhibit. The same laws should apply to beets, radishes, parsnips, turnips, salsify and other root-crops of this nature. In selecting cabbage many exhibitors pick for the largest heads regardless of type, uniformity in size and quality which should first be considered. In tomatoes we want size but as in all other cases type, color, uniformity of size should come first. They should be smooth, firm and ripe to the stem without a crack or blemish.

In squash, the winter varieties should be large, heavy, true to type and hard enough to resist the point of a knife; while the summer vari-

eties should not be hard as all vegetables should be shown in their best edible condition if possible.

Sweet corn when shown as a vegetable should not be ripe but in the milk stage with plump well-filled kernels, but it must have the type and characteristics of the matured ear.

Exhibiting muskmelons is a somewhat difficult problem for they should be ripe the day they are judged and must not be over-ripe; therefore they must be picked just before the stem loosens. A judge should consider flavor as well as type, size and thickness of flesh. Muskmelons are one of the few garden-products that should be cut when competition is close. Having seen a judge cut carrots, parsnips, cabbage, onions, peppers, squash, pumpkins, eggplant etc., the experienced grower will wonder what he was looking for and at once hustle to the swine department to see if the shoats have been cut up to determine which possesses the best ham or bacon. Unless competition is close anyone familiar with vegetables would not find it necessary to cut them and then melons, beets, rutabagas, and turnips ought to complete the list.

How should vegetables be exhibited to make the best show? In the old-fashioned square peck box, hens-nest rack or on the stair-steps in baskets, crates or other devices that will hide the vegetables from view, with a woven-wire fence in front thereby giving the superintendent in charge an opportunity to visit the race-track and let the public say the vegetable exhibit was a failure.

Let us put them on flat-topped tables where people can see them and you will see as big an improvement as you did in the apple show of our State Fair for 1912.

We used this method at our County Fair for vegetables and I think every one who attended the fair knew we had a vegetable show and it attracted as much attention as any part of our fair.

The writer has often tried to devise a plan for a score card to be used at county fairs and vegetable exhibits but with no success. Perhaps the only essential characteristic common to all vegetables is type, after that one would need to specialize and either have a dozen different score cards or one so complicated as to be of little or no value. This is not true of apples however as each one has characteristics essential and common to all and it would seem to me an apple score card would be of indispensable value to a judge as well as to an exhibitor.

Let us hope that in the near future this Society will see fit to create an apple score card and also if possible a vegetable score card to be used at all county fairs and vegetable exhibits within our state. Although the compensation derived from growing and exhibiting vegetables, from the premium standpoint is not always profitable the

schooling received and the encouragement to grow better goods to equal or out-class that of our competitor makes better growers of us all.

DISCUSSION.

Mr. Atkinson: What varieties of carrots are best for family use?

Mr. Rasmussen: We sow mostly the Chantenay. It is about the best quality of the short horn carrot; it is larger, we consider it the best.

Mr. Atkinson: How is the Danvers for family use?

Mr. Rasmussen: I do not think it is quite as good in all respects as the Chantenay, although it is of the same type.

Mr. Toole: You did not mention the Marblehead squash.

Mr. Rasmussen: The Hubbard squash is so much better than the Marblehead, that the Marblehead has dropped out of the race.

Mr. Barnes: In selecting a soil for a farm or market garden what quality of soil would you prefer, whether heavy clay loam soil, or a light surface soil with a clay subsoil?

Mr. Rasmussen: Light clay subsoil, light, black loam, or real light clay soil I think will produce the heaviest crop; on the other hand, I think for a farm garden a black loam soil is better, does not need as constant cultivation.

Mr. Barnes: What kind of fertilizer would you recommend for a light soil?

Mr. Rasmussen: Barnyard always, on any soil.

Mr. Barnes: Would you prefer well decomposed barnyard fertilizer to any of the commercial fertilizers for market gardening?

Mr. Rasmussen: Yes.

Mr. Barnes: Don't you find trouble with the weed seeds carried in the barnyard fertilizer?

Mr. Rasmussen: I think that is a good thing, it makes us cultivate more. We don't cultivate half enough anyhow.

Mr. Atkinson: Is it necessary to prune a squash after the first squash sets?

Mr. Rasmussen: I don't think so.

Mr. Atkinson: Would not they be larger?

Mr. Rasmussen: Yes, but then they get too big; we would rather have a large number of medium sized squash than to have a few large ones.

A Student: Do you plant your muskmelons in cold frames before setting them out?

Mr. Rasmussen: We do. We use both sod and berry boxes before planting, and I think I like the berry boxes best. It is hard to get a good sod.

A Student: How big do you let them get before setting them out?

Mr. Rasmussen: Six leaves, 4 to 6 leaves. I think it is one of the easiest ways in the small garden. You can take care of them and do away with the trouble of the striped bug.

Mr. Atkinson: What variety of sweet corn is best for family use? Is there anything better than Corey's Early?

Mr. Rasmussen: The Early Minnesota is better quality, but a little later. But if I were growing sweet corn for family use I would not confine it to one variety, I would want three. I would want the Early Corey, and something like the Early Minnesota for second, and Golden Bantam, although we consider the Black Mexican better for quality.

Mr. Atkinson: What variety of muskmelon do you recommend?

Mr. Rasmussen: The Milwaukee Market is taking the lead with us. We did grow the Morril Gem as a rule, but the Milwaukee Market is proving the best melon. I think it is the same melon as the Thomas Hybrid.

A Member: Does this melon stand shipment?

Mr. Rasmussen: Not very well, still we ship to Minneapolis, but it has got to be pretty carefully packed.

THE TRUTH ABOUT LIME-SULPHUR AS A SUMMER SPRAY.

The President: The Secretary is not here, so I am going to change the subject. The truth of the matter is, I do not know the truth about lime-sulphur, and I am going to call on Professor Moore as more of an expert along this line of use of spray materials.

Professor Moore: I am not going to tell you the truth about lime-sulphur either. I am going to try to state the proposition, then I am going to let the other fellows argue the matter.

You all know that it has been a comparatively short time since lime-sulphur, which was originally the old lime-salt-sulphur wash, was brought into use as a spray. Originally it was an insecticide for dormant spray, then later on with greater dilution, it developed into a summer spray, or a spray during the growing period. Now, the reason that lime-sulphur came in as a summer spray, contending the ground with Bordeaux mixture, was because Bordeaux mixture did cause some injury on fruit, and it was to obviate this russeting, or Bordeaux injury, as it is known, that lime-sulphur was brought in as a summer spray material.

There has been a very considerable amount of work done along experimental lines with lime-sulphur, it has probably been taken up by practically all of the experiment stations in the country, and a very considerable amount of work has been done by the U. S. Department

and its experts along the line of working out the formula, the preparation, and so on, in connection with lime-sulphur as a summer spray.

Almost at once when this material was brought in for summer spraying, it was found that upon certain plants it caused serious injury in the form in which it was originally used, and when the commercial product was brought out it was also found that this injured certain types of plants. As a result the U. S. Department officials developed a lime-sulphur which was known as self-boiled lime-sulphur, which was not a boiled lime-sulphur at all, which was not even a chemical combination, but simply a mechanical union of lime and sulphur for use upon peaches and those plants which were injured by the more concentrated, stronger, chemically united lime-sulphur.

Now, while it is true that upon these more tender foliage plants we got some injury, we have also come to find that lime-sulphur as a spray is not entirely what it purported to be at the beginning, that while we were seeking some material which would entirely eradicate the evil influence of Bordeaux injury, that we have found that lime-sulphur does not entirely fill the bill, that there is more or less injury occasioned under different conditions. Now, this discussion, as I understand it, is to be a sort of experience meeting of the different men who use lime-sulphur. We have been carrying on experimental work for some time, the work in the Department has been under the direction of Professor Milward, and also in connection with Professor Jones, of the Pathology Department. I have simply stated the question as to the merit of lime-sulphur as a summer spray and will leave the discussion to the other gentlemen.

J. G. Milward: In view of the limited experience available in Wisconsin relative to trials with Bordeaux mixture and lime-sulphur sprays it is best to make comparisons with reservation. Two years ago the fruit growers near Sturgeon Bay requested the Wisconsin Experiment Station to undertake a comparison trial with the above mentioned sprays, for the control of apple scab and the shot hole fungus on the cherry. It was also anticipated that results would throw some light on the occurrence or prevalence of spray injury. Two seasons' work (1911 and 1912) have been completed. The work has been in charge of the Horticultural Department of the University.

CONTROL OF THE SHOT HOLE FUNGUS ON THE CHERRY

1911.

Method.—A block of 210 cherry trees of the Early Richmond and Montmorency varieties was selected. The trees were about 12 years old, all in full bearing. The block of trees was divided into five plots and treated as follows:

Row 1 to 6 inclusive, sprayed with Bordeaux.

Row 7 to 8 inclusive not sprayed.

Row 9 to 14 inclusive sprayed with commercial lime-sulphur.

Row 15 to 20 inclusive sprayed with self-boiled lime-sulphur.

Row 21 not sprayed.

Formulas used.

1. Bordeaux mixture:—
   3 lbs. copper sulphate.
   4 lbs. lime.
   50 gals. water.
2. Commercial lime-sulphur. 1-40.
3. Self-boiled lime-sulphur. 8 lbs. lime, 8 lbs. sulphur and 50 gallons of water.
4. Arsenate of lead was added at the rate of 3 lbs. per 50 gallons.

Dates of application.

1. Just as buds begin to open. 2. Just after petals fall. 3. Two weeks later. 4. After fruit is picked.

CONTROL OF APPLE SCAB.

A block of 190 trees in full bearing of the following varieties was selected,—Northwestern Greening, McMahon, Fameuse. This block was treated as follows:—

Row 1, check. Not sprayed.

Row 2 to 7 inclusive, Bordeaux mixture.

Row 8 to 14 inclusive, commercial lime-sulphur.

Row 15 to 18 inclusive, self-boiled lime-sulphur.

Row 19, check. Not sprayed.

Dates of application.

1. May 17. Blossoms in pink just beginning to open.
2. June 1. Petals have just fallen.
3. June 20, July 8, July 25.

The same formulas were used on the apple as stated above for the cherry with the exception that the Bordeaux mixture was made according to the 4-5-50 formula.

1912 WORK.

The same formulas were used on the apple as stated above for the same general plan with the exception that the self-boiled lime-sulphur

was omitted. The work upon the cherry was transferred to another orchard of young thrifty trees, three years from planting. The apple spraying was also transferred to an orchard of Northwestern Greenings about 20 years old. This apple orchard during the course of the summer proved to be seriously injured, probably from freezing the winter previous. Practically no fruit set and the entire block of Northwestern Greenings apparently were slowly dying. On account of the lack of fruit and the condition of the trees no results on the apples were available from the 1912 work. The results on the cherries are indicated below.

In 1911 none of the lime-sulphur sprays showed a satisfactory control of the shot hole fungus on the cherry. Observations were made during the months of July and August. The shot hole fungus was exceptionally severe at Sturgeon Bay in 1911. The Bordeaux mixture held the disease in check completely. On August 15 the foliage on the Bordeaux mixture plot was green and healthy. Many trees on both the commercial lime-sulphur plots were partly defoliated and showed but slight advantage over the unsprayed trees. The self-boiled plot and unsprayed plots were apparently in the same condition as regards defoliation from the shot hole fungus.

Apple Spraying.—Apple scab did not begin to develop until about July 25. The disease was not as proportionately destructive on the apple as was the shot hole disease on the cherry. A very noticeable difference in health of foliage could be observed, however, in favor of the Bordeaux plot. Bordeaux injury was severe on the Fameuse variety and present to a less degree on the McMahon and Northwestern Greening. A distinct injury to the fruit was observed on the lime-sulphur plots which was not found either on the check or Bordeaux plots. This will be described by Prof. L. R. Jones during the discussion.

Cherry Spraying in 1912.—The shot hole fungus did not begin to develop seriously in 1912 until later than the season previous. In August the disease again proved serious and caused considerable defoliation on unsprayed cherries. Unlike the previous season's experience the commercial lime-sulphur proved very beneficial in holding the disease in check. Observations early in September showed that the Bordeaux plots were in best condition. The difference was slight as compared to results the season previous. The check or unsprayed rows were nearly defoliated.

CONCLUSIONS.

This work has just begun at Sturgeon Bay and will undoubtedly be continued on improved methods. The speaker can see no benefit in the substitution of lime-sulphur for Bordeaux mixture as a summer spray on the cherry in the control of the shot hole fungus. Bordeaux

mixture on account of its strong fungicidal properties, adhesive or sticking qualities has proven an excellent spray for the cherry in Door county, especially in view of the fact that there seems very little danger of any "Bordeaux injury" on the cherry in this region.

On the apple the spraying problem appears more complicated. During some seasons considerable Bordeaux injury on the fruit is prevalent. This type of injury is apparently obviated when lime-sulphur is used. The question arises, however, is there not more serious danger from other forms of injury with the use of lime-sulphur under field conditions and common orchard spraying practices? Is the method elsewhere recommended of using lime-sulphur on the early dates of spraying, a satisfactory means of avoiding Bordeaux injury? Under this system, will the lime-sulphur retain its fungicidal properties and control the scab until such date as Bordeaux mixture can be used without danger of injury to the fruit?

The above problems relating to summer spraying on the apple are as yet open questions in Wisconsin. Bordeaux mixture will control the shot hole fungus completely and in respect to the requirements of an orchard spray it is satisfactory on the cherry.

A Member. I want to ask you if you had any trouble with Bordeaux mixture in burning or defoliating the cherry trees?

Mr. Milward. I have not seen it.

A Member: I have had considerable experience both with the Bordeaux and the lime-sulphur, not, however, to any great extent with stone fruits. I speak of plums, and my first experience, I have something like ten acres, my brother and I, this was some seven or eight years ago, and the treatment we gave was very thorough. We got rid of the disease and we got rid of the leaves and from that day to this I have been afraid to put Bordeaux on stone fruits of every kind. We were trying to overcome the plum rot. The trees I had were Burbank and leaved out next year.

The President: We have found that Bordeaux used with the strength that Mr. Milward has given you will burn the foliage of the plum, that is, it will not bear as strong a mixture as the cherry. Of course when it comes to plum rot a man has to start early in the season to get ahead of that. If it is not controlled, if the rot starts in while the tree is in bearing, I think it will be difficult to get mixture strong enough to stop the rot, although burning of foliage from Bordeaux must be from lack of care in making the mixture, because you can use ten pounds of blue vitrol, and if you use enough lime you would not have any effect upon the foliage, except perhaps burning a leaf here and there, but not defoliating the tree.

A Member: We put this on when the plums were as large as a good sized pea, and we used six pounds of lime to four of bluestone. That is my experience with stone fruits. I am afraid of it. I will say

I have had considerable experience the last four years in applying Bordeaux and also lime-sulphur. I have put on a great many barrels of the lime-sulphur, both commercial and homemade, and I should like to say here that so far as controlling scab is concerned, I feel no hesitancy in saying that you can control the scab fully as well as you can with Bordeaux and with less injury from burning. We had in the state I came from; the state of Kansas, another disease that lime-sulphur failed to hold in check, that is the apple blotch, which I do not know whether you have in this territory or not. We have very little of it in northern Kansas, in the southern part it is the worst thing we have to contend with, consequently we are leaving the lime-sulphur alone and sticking pretty closely to the Bordeaux and getting pretty good results. I do not think there is any question, at least it is nearly solved in my mind, that apple scab can be held in check by the use of lime-sulphur properly applied.

Mr. Milward: What proportion did you say you used?

A Member: In that case we used 4-6-50, but the last year we used 3-4-50 on nearly all. I would say it was an experiment in which the U. S. Department coöperated with the Kansas Experiment Station and we treated eleven orchards, and in every block treated a given number with Bordeaux and a given number with lime-sulphur. The evidence, so far as we could find out, all things considered, was, with the exception of the blotch, in favor of the lime-sulphur.

Mr. Milward: Do you think the lime-sulphur spray will hold its fungicidal value on the trees over as long a period as Bordeaux mixture will?

Mr. ————: I would not say as to that; I know we get results. I have in mind just now one block in one of the largest orchards in the state, some 1,600 acres in that block, and we had about twenty acres that we handled in our own way, some varieties, of course, showed better results than others. Understand me, I am not saying that the Bordeaux will not do the work, but we have that disadvantage of burning the foliage and the fruit. Some seasons, as you have said, we do not have that trouble, but I believe it is fair to say that in fully fifty per cent of our work we have more or less burning and in four years' work I saw only one instance of burning of the leaves with the lime-sulphur, that was this summer in Milwaukee county. And I have seen so many trees, thousands of bushels of fruit burned with the use of Bordeaux that I will confess I am almost afraid to use it if we have something else that will take the place of it, and I feel absolutely sure that you will have it with the lime-sulphur in the orchard. Mr. Hoover, who is president of the Kansas State Horticultural Society, said he had sprayed his orchard year before last seven times, using Bordeaux to combat the blotch. By the way, the Department of Agriculture have two men in the field in that vi-

cinity and they use lime-sulphur. Mr. Hoover told me that they have very good results. I did not have a chance to go out and see the work, but they have there decided they get best results with the lime-sulphur.

Mr. Kellogg: In regard to spraying plum trees, you spoke of using Bordeaux of a lesser strength to escape the foliage injury. Now, do you intend to apply that to the native plums with the same strength as to European and Japanese varieties? We are growing plums more or less commercially, we are growing largely of the De Soto, Rollingstone, Surprise, and plums of that nature, and we so far have never seen any injury to the foliage on account of the strength of the Bordeaux, and we use the standard 4-4-50 and have never seen any injury to the foliage, and almost every year we have had a good crop.

The President: I had reference entirely to the Japanese plums. The Jap plums are tenderer in foliage than native or European.

Mr. Catchpole: As a grower of apples in Western New York I should like to ask a question. The Professor refers to lime-sulphur, 1 to 33 to control the scab. At what time was the application made and at what period was the scab first developed or shown upon the growth?

Mr. Milward: The applications were made just as the buds were in the pink, the first application was made at that time, and then the next application was made just as the petals were falling, I should judge fifteen or twenty days apart. As I stated, this was done as a sort of field system of spraying, it was not done as accurately as some tests are made. The next date of application was about two weeks after that. The question of course came up, and has come up and it is an important question, as to whether we struck the right time. Your questions suggest, did we strike the right time in relation to the life history of the development of the scab? I do not know. There is a chance that we did not. The work has not been done carefully enough to determine that. I should judge scab would begin here somewhere along from June 30th to July 4th.

Mr. Kellogg: How long after the bloom?

Mr. Milward: Oh, three weeks anyway, after the petals fall. As I stated, it seems to me that it is the important question that must be determined. It might be by repeated applications with lime-sulphur that we might hit that particular time in the development of the scab and do equally as good work as with the Bordeaux mixture, or if the lime-sulphur holds its fungicidal value through the period which the average orchardist must allow to intervene before he makes his other applications, those are the things we do not know.

Mr. Keitt: My work has been entirely away from Wisconsin. Thus, I have no Wisconsin experience to bring up. However, it may be of interest to compare and correlate the results that have been reported from Wisconsin with those obtained in other portions of the country.

Clean Fruit. Poplar Trial Orchard, 1912

De Soto Plum. Poplar Trial Orchard, 1912

A good crop. Poplar Trial Orchard

Eight year old Hibernal Poplar Orchard

My work for the last three seasons has been carried on with the U. S. Department of Agriculture. In 1910, I was in Georgia; in 1911, in Michigan; and, in 1912, in Georgia again. During that time, my own work has been concerned primarily with the diseases of the stone fruits, rather than with those of the apple; but during this period, and prior to it, the Department has been carrying on extensive work in testing out comparatively Bordeaux mixture and the lime-sulphur sprays. Therefore, I think that it may be well for me to run over, in a very brief way, the results that have been obtained in some other sections. First, however, a brief consideration of a few of the more striking advantages and disadvantages of these solutions.

As Professor Moore and others have suggested, the primary reason for the development of lime-sulphur spray is because of the injurious effects that Bordeaux mixture has shown on stone fruits, and to a less degree on pomaceous fruits, in many sections. Let us bear this in mind throughout all our considerations; because we know that, from the standpoint of fungicidal value, there are no spray solutions that are superior to the copper fungicides. None are better in their adhesive properties than Bordeaux mixture. Thus, none are more adequately fitted to control our fungous diseases. However, if the injury occasioned by the use of a spray solution seriously affects its beneficial results a change should be instituted. Thus, the problem of spraying then becomes one of finding a substitute, testing the sprays comparatively, weighing the good and the bad effects of each, and striking a balance. For many sections this work has been done with Bordeaux mixture and lime-sulphur. In others, as Wisconsin, the problem, though the same, is much more difficult, and much remains to be accomplished. With such aims in view, the Department has carried on extensive comparative tests with Bordeaux mixture and the lime-sulphurs. This work has naturally been carried on chiefly in those states where the injuries have been reported as being most serious.

As a rule, the more serious reports of Bordeaux injury have come from the southern, central and eastern sections, rather than from the northern extremities of the United States. Therefore, most of this work has been located in such states as Virginia, Missouri, Kansas, Arkansas and Nebraska. In all these states, as some of the gentlemen have already brought out, the lime-sulphur spray has proved to be as efficient as Bordeaux mixture in the control of apple scab. However, as Mr. Milward has suggested, as we go farther north, in northern Wisconsin and in northern Michigan, there seems to be in the minds of the fruit growers some question as to the efficiency of the lime-sulphur solution. Also, while in New York state, as one of the gentlemen has already told us, lime-sulphur has proved very satis-

factory and has generally replaced Bordeaux mixture, farther north in New Hampshire, numerous experiments by Dr. Brooks, formerly of the New Hampshire Experiment Station, and now of the Department of Agriculture, seem to show that there is quite a question as to which of these sprays is more profitable in that particular section. The results perhaps slightly favor Bordeaux mixture. Therefore, we must, in our consideration, take into account the section in which the work is carried out and the conditions under which it is done.

In my work in Michigan, I was stationed in Oceana county; and there, in the season of 1911, both Bordeaux mixture and lime-sulphur were quite extensively used comparatively by the growers. Although, working entirely on the stone fruits, I did not personally carry on any apple investigations, I had the opportunity of observing the general results of the section. The lime-sulphur proved quite satisfactory in the control of apple "scab," and enough Bordeaux injury resulted to warrant the growers of the vicinity in the opinion that, for that year, at least, lime-sulphur had proved the more desirable spray. It may be that in some other locality, or under the different conditions of other seasons, the results may have been different.

On stone fruits, I carried on a rather large number of experiments in Michigan. I had seventy or eighty plots of peaches, cherries and plums, which were sprayed with various concentrations of Bordeaux mixture and lime-sulphur. It may be of interest to bring up a few points relative to spray injuries.

About the middle of July, plots of sweet and sour cherry trees which had been sprayed three times with Bordeaux mixture, 2-4-50, suffered quite severe defoliation. Careful examinations showed that the defoliation was not due to the attack of fungi. The check trees were earlier badly attacked by "leaf-spot," but did not suffer defoliation at this particular time. The corresponding lime-sulphur plots did not suffer. The case was plainly one of Bordeaux injury. Other plats of different varieties showed varying results, but as a general thing that season, I got a considerable amount of Bordeaux injury on cherries.

As to the relative efficiency of lime-sulphur and Bordeaux mixture in controlling "leaf spot," of plum and cherry, there seemed to be very little difference. One solution seemed to control it about as well as the other. I used lime-sulphur at concentrations varying from 1 to 25, to 1 to 50. Very little injury resulted from concentrations as strong as 1 to 30 on sour cherries, and 1 to 40 on sweet varieties. I used 1 to 40 on the demonstration plats; and, on the sour cherries, had practically no foliage injury. The lime-sulphur gave very good results on both cherries and plums, while a certain amount of injury resulted from the Bordeaux mixture. However, in that same

locality, there were fruit growers who reported absolutely no injury from the Bordeaux mixture, and who are perfectly satisfied with the results they got. It is needless to say that my solutions were carefully prepared according to the recommendations of the Department.

Thus, it seems to me that all of the discussion that has been brought out tends to emphasize the fact that we cannot generalize from the results which are secured in one locality in one year, or even in a series of years. The conditions vary so much from state to state and from section to section that it is impossible for us to carry our work from one place to another and expect to get absolute duplication. The results of experiments repeated upon the same trees, and in as nearly as possible the same manner, may vary much from year to year. There are not now sufficient data available to justify any sweeping recommendation as to a choice between Bordeaux mixture and lime-sulphur for apples, plums and cherries, in certain limited doubtful sections. Therefore, it seems to me that, especially in those sections where it is most difficult to determine surely the relative values of these sprays, the only logical way for the fruit grower to secure the best results is for him to make a special and intelligent study of his own orchard and of the different varieties in that orchard. The men of a locality must coöperate, must work together, toward solving the individual problems of their community. It is impossible for the plant pathologists to go to every locality in the different states, and work out all of these questions. It is, therefore, necessary that the individual fruit growers coöperate with one another, and, with the aid of such institutions as the state experiment stations and the U. S. Department of Agriculture, work out together from year to year the details of their own problems.

A Member: Do you use arsenate of lead?

Mr. Keitt: Yes, in the case of the plum and cherry, we use arsenate of lead with the first two applications. The first application on the plum is made immediately after the falling of the petals, the second application about two weeks later, and the third about a month before the fruit ripens. In the first two applications, we use the arsenate of lead at the rate of 1½ lbs. to 50 gallons.

ASPARAGUS AND RHUBARB.

WARD B. DAVIS, Oshkosh.

The increasing popularity and demand for asparagus the past few years has made its growth more widespread than ever. Not only is it a "local" vegetable but it is shipped in large quantities from the Southern states during the late winter and early spring months.

Thus when we of Wisconsin put our asparagus on the market in April it is no longer the treat it once was at that season of the year.

Unlike many other vegetables, asparagus growing is not as likely to be overdone for it cannot be sown and harvested the same year, but must grow three years to yield a good crop.

To obtain a good asparagus bed the seed should be sown in the spring in drills but not too thickly, and allowed to grow until the following spring when they are taken up, sorted for size and quality, and set in the permanent rows. It is important that the plants be selected as it is well to have the rows uniform when the cutting time comes and they will be more likely to be so if selected.

The rows are marked off about 5 feet apart, and a plow run through where the plants are to be set. We set the asparagus about 2½ feet apart in the row taking care to spread the roots and setting deep enough to cover the crown with about two inches of earth. All that is needed after this is good cultivation and hoeing throughout the season.

We plant the Palmetto variety altogether as it is less subject to rust than the other kinds and still has the good qualities that the others possess. It is large in size if treated properly and very tender in taste.

Our soil is a black loam not very light, but the asparagus seems to give us very good results. We lay our land in narrow beds—wide enough to accommodate three rows of asparagus—so the drainage will be better and the plants kept more healthy.

As soon as the weeds begin to start in the spring we give the rows a thorough hoeing and cultivating, this being repeated several times during the season. Cutting begins as soon as the shoots appear above the ground two inches or more and continues until about the last week of June when we stop selling and the beds are allowed to rest until the spring following. To insure a good crop it is necessary to have a heavy growth of tops after cutting. This could not be obtained if the cutting was kept up too long.

Immediately after the last cutting we top-dress the beds with a good mulch of blacksmith manure if we can obtain it, otherwise some well rotted stable manure is used. Asparagus seems to respond the best to the manure obtained from the blacksmith shop, as the parings and hoof of the horses are very good fertilizers. We sometimes mulch again in the fall if the manure is well rotted. It is not advisable to use anything that is course for a mulch as it will hold the frost too late in the spring and it is the early asparagus that gives the dollars quickest.

We seldom cut the tops off in the fall but allow them to stand until early spring as the snow is held better and the plants more protected. When planting a new bed we usually set lettuce plants between each

asparagus plant in the rows. The shade afforded by the small top is just enough to produce excellent head or leaf lettuce.

An asparagus bed, if well taken care of is good for a great many years. We have at the present time one that is 20 years old and is still giving some excellent cuttings. It is advisable, however, to have a new bed coming on and is well to plant every few years.

The past season was remarkable in regard to the late growth of the asparagus plants. The late summer was very wet and so the plants grew rapidly and large. About the 20th of September we noticed quite a lot of new shoots coming up. We cut them as they would have frozen had we not, and sold thirty-five pounds at 25 cents per pound. In not many seasons is it possible to do this.

We do not ship any asparagus as the local demand is usually greater than the supply. We bunch it in half-pound bunches and tie with a red string. This makes a very attractive package. Last spring we received 33 cents per pound for the earliest and did not sell below 16 cents. The yield was also exceptionally good.

We have tried blanching some asparagus; that is, we have shoveled a few inches of earth over the rows and cut deep as soon as the heads appear above ground. The asparagus is excellent but the market does not wish to pay any extra for the added labor so we do not treat much in this way. We have been planting asparagus more heavily of late and in a few years expect to have a fine plantation. At present our cutting area consists of 9 rows each about 20 rods in length. The receipts from this acreage last season were $265.50.

Rhubarb is grown either from seed or by taking a part of an older plant and making a new one. If the market gardener has not a variety that is entirely satisfactory it is well to get seeds of some good kind and do some selecting until the proper kind is secured.

There are several kinds of rhubarb, large and small, and from a light green in color to one that is nearly crimson. For eating quality most of the varieties may be very good but they might not be salable. Nowadays looks and appearance count almost as much as quality and my experience is that a large wine pie-plant is the best seller. That is what we are looking for.

A rather light warm soil is the best for rhubarb as the early cuttings demand the highest price while the later cuttings are not always salable or if so the price is much lower.

The plants should be set about three to four feet apart as plenty of room is needed for cultivation. A hole is dug with a shovel or spade and if possible a shovel of manure put in the bottom. Then the plants are put deep enough so that the crown will be covered with about two inches of earth. When the seed stalks appear on the plant they should be cut off so that the strength will not be taken away from the plant unnecessarily.

During the cutting season I think it is best to allow the leaves that are trimmed off the salable stalks to remain around the plant, as they shade the ground and help to hold the moisture better. Especially is this advisable on heavy soil that is likely to dry out easily. In pulling the rhubarb care must be taken not to injure the center of the crown. A little side jerk will usually loosen the stalk sufficiently to pull.

In the fall the plants are given a manure mulch to furnish food for the following year. As rhubarb is hardy no protection is needed from the frost.

Prices received at Oshkosh vary from 8 cents per pound for the first on the market to 2 cents or even less later on in the season. While I do not think there is a big lot of money in growing rhubarb, still it is easily grown and with a little care can be made to pay. The varieties which we like best are the Mammoth Wine and the Victoria.

DISCUSSION.

Mr. Smith: There is one point in the paper that I cannot say I can agree with and that is the planting of the asparagus two inches beneath the surface of the ground. It has always been my experience that when the asparagus is planted so close to the surface it has a tendency to dry out in hot weather. Another thing, when planted six inches beneath the surface of the ground it is perfectly protected from winter, it makes a better crown and is better in every way.

Mr. Holsinger: I have had considerable experience, having had four acres of asparagus. I have followed the same system that the gentleman here suggested. Manure was no item other than hauling, as we were close enough to the city to get it and put it on abundantly. We worked this up as fine as we could with the disc or the cut-away harrow. We used the ordinary stirring plow, running it as deeply as we could for plowing. We planted in the row about 15 inches apart, used Palmetto largely, although I have used Bonvallet Giant and I have some of it left. The advantage in planting deeply is that in the first cultivation we barely cover it up, and as the asparagus comes through we can cultivate with the five-tooth cultivator and at cutting time, as it peeps through the ground, with a long knife you can get a long stalk, and many people in town prefer the white to the green. As suggested, it costs more to harvest it that way, and our growers nearly all do plant deeply, as I have suggested.

Mr. Street: It is a great advantage to plant deep. We do not go quite six, about four inches as a rule. I should like to say in regard to cultivating, that we plow early in the spring before the growth starts, so that we do not cut off the shoots, and cultivate until the

shoots begin to come up, then we discontinue that except in the row, but our time to cut is about the first of May. we cut until the 15th of June, or until strawberries commence, then we discontinue the cutting and plow a light furrow, about two or three inches deep over on each side on top of the row, then drag that down.

Mr. Holsinger: We harrow the ground just as carefully as we can until the asparagus commences to peep through the ground, and then in some cases we use the plow, run it shallow and mound up, in addition to having planted deep we mound up. Then as the weeds come through, when asparagus gets cheap, as it did last year, selling at 10 cents a bunch, then the labor problem is quite a problem, and we take a stirring plow and run it as deep as we can. We lose two or three cuttings, but the cost of hand labor to clean it out would be more than we can save.

Mr. Street: You cut when two years old?

Mr. Holsinger: Yes, that is after planting. I have cut in seasons when it is high priced as much as $100 the first year, that is, planting this year and then cut next year. Understand, we are very careful not to injure it. Manuring as I do, and planting as I do, we figure we get a full crop the second year, and we commence cutting sometimes as early as the first week in April, and generally run till the first of July. We have a longer growing season, perhaps, but that is the time to quit, ordinarily, I should say from the 15th of June to the first of July.

Mr. Street: There is one point that was spoken of I think should be emphasized. I find that a great many make mistakes in the planting of asparagus. It is almost impossible for the average farmer to get a good bed started, while it is really very simple. In making a furrow with the plow and putting asparagus from 4 to 6 inches deep, they must not cover it up fully 6 inches deep. If the plants are not extra strong plants, just cover them about two inches deep and then after the asparagus gets up, gradually fill in with the covering.

Mr. Smith: I have been forcing rhubarb ever since I was a boy, in the winter, and the varieties have been Victoria and Linnaeus, and while I have never forced it for market, it has always been for large private families, and I should say that rhubarb forced in winter would pay a man a great deal better than growing rhubarb for summer use. It is very easily forced. It needs a dark place, about 60 degrees, and there is no trouble at all. All you have to do is to throw your roots down, cover them up and give them a little water, about 60 degrees, and in a few weeks you will be cutting rhubarb, and by keeping a succession of roots you can have a good crop all the time. It brings a good price, two or three times what you can get in the summer time.

Mr. Holsinger: My experience is that Linnaeus is the better variety

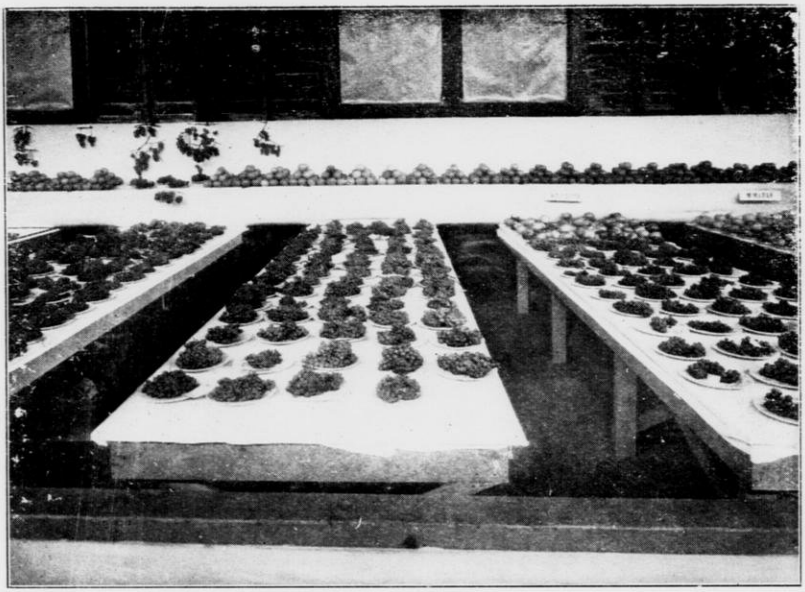
and I would not recommend anything else for home use. But my experience is that Victoria gives a larger stalk, and it is size rather than quality that the city market is looking for. I would not waste very much time with the outdoor growing, when it pays to grow it as we can, in a small space, ordinarily in what would be considered waste places. I have in mind a man in Kansas who had three of those houses, I cannot give you their dimensions, but in January and February they sold over $600 worth. This stuff was shipped about 140 miles to Kansas City, regardless of competition at that point, and the returns were over $600 from the commission man.

The Chairman: There are some points that have not been touched upon in regard to raising rhubarb indoors, especially those who have furnaces in our homes, and can just as well have a nice little treat ourselves, and we could simply take up from the garden any good sized roots. But if a man is in the business of forcing for the market, it makes some difference what kind of roots he has. Take a pretty big, healthy root, and it seems to be full of buds, it will give us a very small growth, and I will say the market does not care for any great extreme in size and something reasonably uniform. It is a disappointment to us if we undertake to raise it, if we have little pipe stems when we might have something of reasonable size. Color makes a great deal of difference, and I find people are discriminating as to quality. We must raise from seed if we want to get any given quality and any considerable quantity. But the seeds are somewhat variable, and therefore I would suggest to dig out some of your plants that suit you best in color and various ways and raise your own seed, sow that seed right away as soon as it ripens. You will be astonished to see how easily the first seed comes up, and from my experience I think you can safely say in one year following that fall you will have roots in good shape to dig up, ready for doing anything, and by all means do not forget to dig up these roots and see that they have had a freezing before they go in. If you would undertake to take them in in a warm place without the freezing you will not begin to have the success that you will have with the freezing.

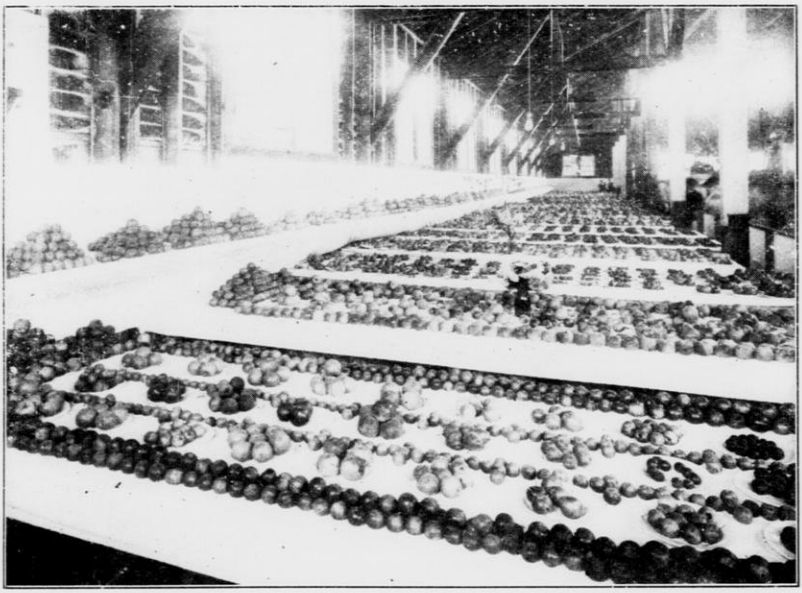
SUCCESSION OF CROPS IN THE GARDEN.

H. O. COOPER, Oshkosh.

The elimination of waste in every possible way is one of the principal features to be looked after in any line of business. For example: the manager of a manufacturing concern strives to have every man's time fully occupied, every machine run to its fullest capacity and above all find a use for all odds and ends of material. The entire profit of some companies is derived from the sale of by-products.

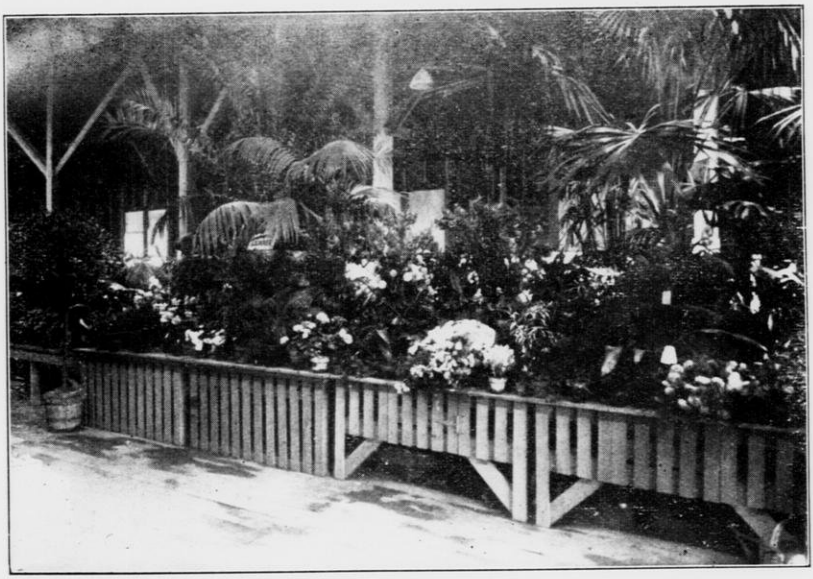


Some of the grapes at State Fair, 1912



A portion of fruit exhibit at State Fair, 1912

Bayfield County Exhibit, State Fair, 1912



State Fair, 1912

Thus our subject for discussion might be put this way 'how make available land do full duty'? 'what succession of crops for greatest profit'? In solving this problem local conditions must first be considered such as texture of soil; amount of moisture obtainable either from the heavens above, the earth beneath or the waters under the earth; also, what does your market demand?

I will attempt to make a few general suggestions which may be modified to suit occasions and perhaps form a basis for a profitable discussion. If, for instance, you have a field booked for a crop of melons, the texture of the soil is somewhat on the light order and you have a market that will take a large quantity of radishes, prepare the seed bed early and sow radish seed broadcast, and when time to plant melons mark and plant. There will be plenty of radishes between hills and if any are not marketed they may be given the cultivator treatment along with the weeds. On the other hand if the soil is inclined to be a little heavy I think it better to prepare a seed bed just before planting the melons and be on hand with the cultivator soon after.

Early plantings of radishes or spinach will be harvested in time to fit the ground for peppers, eggplant or late tomatoes. And right here I would emphasize the importance of having the soil thoroughly worked each time a crop is planted. Not that it is wise always to plough the ground for a second crop, though under some conditions it is better.

The early bunch-onions from sets may be grown between the rows of early peas and will be out of the way before the peas fully occupy the ground; the peas, in turn, are usually harvested in time for a late planting of beets, carrots or sweet corn. In fact I have known beets to do exceedingly well planted after taking off a crop of second early peas. The peas were picked for local market while the vines were utilized for cow feed.

Late cabbage plants are transferred to the field at about the right time for planting winter radishes or rutabaga. The white turnip may be planted after the later peas or early potatoes. I have in mind an instance when squashes were planted about the middle of June, in a patch of early potatoes planting an occasional hill of squash seeds in every fourth row of potatoes. A month later the potatoes were all dug and the ground thoroughly worked between the squash plants and turnip seeds planted. In spite of the fact that the squash vines made a large growth and produced a good crop of squashes, the turnips also did quite well yielding a profitable crop.

The old strawberry patch when plowed as soon as profitable picking is over may be utilized for rutabagas, buckwheat or corn for fodder. Late cabbage or celery will make good here if the supply of moisture is sufficient. Some grow celery after onions. This is done

by using every other row of onions for bunching and setting celery plants in these spaces as fast as the onions are taken out for market. I have known a very profitable crop of celery to be grown in cold frames after tomato plants had been transferred to the field. The celery plants were set about eight inches apart each way thus eliminating the expense of boarding or banking.

Rye and vetch may be sown in the cornfield at the last cultivation and will make a good growth after the corn is cut, providing an excellent cover crop during the fall and winter. In closing I would emphasize the importance of having the land covered with some growing crop in the latter part of the season. Plant corn, buckwheat or turnip seed; it is even better to let the weeds grow than to have the land bare.

Mr. Palmer: Do I understand you to say that you sow the celery in with the corn?

Mr. Cooper: No, that is the little vetch sown in with the corn.

Mr. Toole: I should like to ask if you find the garden itself a paying proposition?

Mr. Cooper: Yes, we do. We find a good market for a certain amount of garden peas and they do not stand alone, we always have another crop. Take them off, put in another crop. It is only half the season that they are on the land.

A Member: What varieties do you raise?

Mr. Cooper: We raise a few of the very early, the Alaska first, because the market demands an early pea, and then we go on with the Gradus for second.

Mr. Rasmussen: The Stratagem is about the best for a home pea.

FRIDAY MORNING.

CO-OPERATION.

B. H. HIBBARD, COLLEGE OF AGRICULTURE, U. W.

Wisconsin is not one of the greatest of the fruit growing states, yet more fruit is grown here than can be successfully and economically marketed with the present system for doing such work. Two-thirds of a century ago, one of the greatest of the English scholars, John Stuart Mill, declared that the great problems of production were solved, that what remained was the solution of the problems of distribution. Since that time, we have done wonders in solving again and again the recurring problems of production. Distribution, that is

the sharing of the products, is still confronting us with hard, knotty questions. Why does the producer get so little, why the merchant so much is baffling to the farmer and fruit grower.

We have developed all manner of efficient and even unique methods of manufacture and of transportation, and yet for some strange reason the gap between the producer and the consumer is as great now as it ever was. There are some good minds at work undertaking to solve this, and they get frequently very good solutions, very good, for one locality, but no one has yet hit upon any one process that has solved the whole riddle.

In the city of Des Moines, Iowa, a very much advertised city of late years, they have been undertaking to solve the question of marketing, and they have succeeded fairly well considering the amount of time and effort that they have put upon it, and yet in that city, during the past autumn apples were selling at the commission houses at $4.25 a barrel which had about one week before been purchased in the Ozark Mountains, not more than 250 miles away, at 75 cents a barrel. Des Moines has been heralded far and wide as the city that has as its motto, "Des Moines does things," but the Des Moines people are paying over five times as much for apples as the farmer in a neighboring state receives for them.

Down in Topeka, Kansas, apples were retailing,—various varieties and qualities,—at 25 to 50 cents a peck. Topeka is not a very large city, you know, but it is a little too large to be supplied with apples from the immediate growers right around the outskirts of the city. That was the price which the consumer was paying in Topeka, yet you need not ride very far out of Topeka to come to some pretty good orchards, where apples of the same quality were being sold at 10 cents a bushel. The distance was not great, the length of time which it would take to get the apples from the orchards to the retail dealers of Topeka was not great, it could be done almost by team, while by automobile and by railroad it was very simple. Blame is frequently centered on the railroad, but it is not the railroad that is primarily to blame. It is that intangible, that difficult gap, that chasm between the producer and the consumer which has so long existed. The bridging of that gap promises more to the producer and to the consumer than probably any other one thing.

Our Department of Agriculture has rendered magnificent service to the agricultural people for years past, and yet, the one burden of their song from the establishment of the Department almost to the present—they are just beginning to change a little—is, how to produce more, how to grow more corn, how to grow more cotton. Well, you know we grew more corn this last year, and the aggregate value of the corn grown in 1912 is appreciably less than that of 1911. Who profits by it? Possibly the eater but not the grower. He has less

out of his bumper crop than he had out of a very moderate crop of the preceding year. They have told the South how to grow more cotton, and in the year 1911 their crop was worth decidedly less than it was in the year 1909, when it was quite a poor crop. Making two blades of grass grow where one has grown before may be beautiful in sentiment, but finding a way of disposing of one blade is fully as necessary as the production of the second.

The best solutions of this difficult problem are those that have been made by the farmers themselves in the nature of coöperative movements. Some of the greatest of these are found in the grain growing districts. The farmers of Iowa and the Northwest, not so much in Wisconsin because Wisconsin is not a great grain selling state, sell vast quantities of grain. They have organized coöperative companies, and have been so successful that, with pardonable exaggeration it has been said over and over that of the 300 coöperative elevators in Iowa there has not been a single failure. As a matter of fact, there are a few that have gone out of business; they have never become bankrupt; it is almost impossible that they should. There are some 300 coöperative creameries in Iowa; they are almost uniformly successful, although many of them in the past for one reason or another have ceased to exist. The coöperative elevator grows up and flourishes in the district in which there is a great deal of grain for sale, in the districts in which farmers are interested in the grain business, in other words, in the district in which they think in terms of grain growing and grain selling, while in districts where this is not the case the coöperative company for the handling of grain does not flourish. The same is true of the coöperative creamery. Where men are primarily interested in cows and dairy products they can organize and can carry on successfully the coöperative company, because they are concerned about the prices of milk, butter and cheese. Where they have a farm with two or six cows, and where the sale of dairy products is incidental it is almost useless to ask those people to come together, form a coöperative dairy association and maintain it, because their interests are not sufficiently great in that line of business.

In view of these facts, is it any wonder that in states like California, Oregon, Washington, Idaho, Colorado, and so on, the coöperative fruit growers' associations are much more numerous and for the most part larger than they are in the middle states? Again, in the East they have learned their lesson from the West in this regard. Why is it that New York coöperative companies are learning of those in the West? No doubt because there are so many fruit growers who are general farmers, who are interested in grapes and apples and strawberries in a rather incidental way, few of whom make it their life business; but in the Basin country and on the Pacific Coast, is found

the fruit farm in its purity. There is where the fruit grower must have an income from fruit or nothing, and there is where whole communities are found growing perhaps the same kind, or at most a few kinds, of fruit, such as in the Hood River Valley country, and to a smaller degree in the raisin growing districts of the San Joaquin Valley, and there are found the very best, the very highest type of fruit growers' associations. We have a few in Wisconsin, of a high type, but it is in the West that they have reached the highest degree of perfection. The impression one gets in going amongst the western fruit growers is that so far as the material affairs of life are concerned, they are interested almost exclusively in fruit growing. They have very little live stock; they do little general farming, they grow fruit. Such men will go into a company, learn the fruit business, and comply with the requirements of the association to which they belong. Probably you happen to know that the Jonathan apple that took the first prize a year ago last fall at the great Denver Apple Exposition was grown in the State of Iowa, and it was the fruit of the Middle West put in competition with the western fruit. Michigan and Wisconsin fruit, Illinois and New York fruit will nearly always rank very favorably in almost everything with the exception of color, with the fruit of the West. The great drawback of the fruit grower of the Middle West is how to get it on the market. With us, it has to be put on the market within a few days. The market is not very far away in miles, but to the man with a very small amount of fruit, a hundred miles, or even fifty, is a long way.

Again, until the fruit business is developed further than it is through this section of country, there is the great lack of uniformity; the great lack of community of interest, whereas in the West whole neighborhoods go into the growing of one or two kinds of fruit. For example you can find whole valleys in the West where the main business is the Jonathan and Gano apples. The dealers say, "There is a market, the companies we are dealing with handle those kinds, and we know what they will bring. If we introduce others, our buyers do not know them so well, our coöperative companies do not know them."

If you have studied the census figures you will find that the quantity of fruit has hardly increased in ten years, in spite of the fact that we want more fruit, as evidenced by the prices we pay, and by the fact that there are 21 per cent more people in the United States than at the preceding census. These facts furnish a splendid outlook for the fruit grower. But no wonder that he mistrusts, knowing so well from bitter experience, the difficulties of the market.

Some Iowa farmers went to Utah a few years ago, went into a good fruit country, but they were pioneers in that valley. They planted excellent varieties of apples, particularly the Jonathan, and after a few years had some hundreds of bushels of apples for sale. They were,

however, farmers rather than fruit growers; they were growing at that time wheat and oats and barley as their main crops. There was no coöperative company in their valley, and they knew very little about the difficulties of the market. Hiring some expert packers they put their fruit into boxes and carried it to town and sold it for one dollar a box. At the very same time, on the very same day, in another valley only a little distance from there and by no means with any advantage over them so far as nearness to market was concerned, a coöperative company which had been in existence for four or five years and was well organized, was marketing the same kind of apples for $2.00 a box instead of for $1.00. The only visible difference was the difference in the method of getting them onto the market.

An interesting little instance happened in the Hood River country. Hood River apple orchards are not very old as yet. Some six or eight years ago, when they were quite new, they already had a company so well organized, as to require every apple grower to employ some one other than himself or his own family for packing apples. They graded and packed with such care, that almost before they knew it they had sold themselves short. They went over into another valley where the farmers were unorganized and brought apples back to sell to their own people in the little towns of Hood River county. And they bought the same kind of apples as they had sold and at a price low enough so that they could pay the freight and retail them in their home towns. The retailers could not buy of local orchardists because they had learned the lesson of the added value of the very same commodity graded and packed properly for the market and sold with as little friction, that is to say, as little expense as possible.

There are difficulties in running a fruit growers' coöperative company in this section of the country. The main difficulty is this, that we do not have as many exclusive apple growers, we do not have as many exclusive fruit producers, we do not have enough of the business concentrated around one town, in one county, to furnish the basis of organization for a company that can maintain permanent headquarters with a manager and pay him throughout a long season, as they can in those distinctive fruit growing sections. Nevertheless, with a little unselfishness, a little self-sacrifice, it can be done. In almost every instance where farmers have succeeded coöperatively, it has been because somebody was willing to do work for the good of the community and not for a pay check at the end of the month. It seems to be almost necessary that some one make of himself and his time a considerable sacrifice. And why? Because business on the competition basis is done for the money there is in it, ordinarily, to the man who is doing the work. For fifty or one hundred or two hundred farmers to get together and undertake to do business on a no-profit basis, and that is what a coöperative company does, it means

that you have either got to hire this work done, or somebody will have a large amount of work to do for a small remuneration.

The Grange a little less than forty years ago had this country dotted over with coöperative concerns. In the grain belt they had coöperative elevators, over half the elevators in the state of Iowa being owned by them. Almost every one of them failed, and the failure was due mostly to one thing, incompetent management. They did not understand that a man to run a business such as the grain business of the town or a store, requiring ability of special character and of high order, could not be had for the price of farm labor, plus the cost of boarding in town. They thought if they paid a man forty dollars a month, whereas a farm hand was worth $20 a month, that they were paying him well, but the fact was that he was in competition with a $100 man, and the result was a failure. So the coöperative company must have, first the self-sacrificing support of some of its own members, it must appreciate the fact that when a manager is hired he must be competent and must be paid adequate wages. Judging from the good examples of coöperation which you already have, there is every reason to believe that the fruit growers of Wisconsin can get their products upon the market and get a very much larger part of the prices paid by the consumer than they have ordinarily done heretofore.

Mrs. Turnbull: Can any one give any coöperative experience in the marketing of bush fruits, which are so very perishable?

Mr. Richardson: Our experience in Sparta has been extending over something like sixteen years. We started there in 1896, and we ran ten years under the original by-laws and constitution. Then we reorganized in 1906, and to tell of our ups and downs would take quite a time, but we have been quite successful, I think, in marketing our fruit and still retaining our membership in the association. We have now something over 300 members, stockholders in our association, it has been incorporated under the state laws of Wisconsin, and we handled this year something like $50,000 worth of small fruits. On the start we had quite hard work to get the growers interested in our association. We find this, that the difference between the producer and consumer could be much more readily decreased if the producer would have more confidence in this coöperative movement. We found, since we have been there, that there are some growers that are a little suspicious of us, and they would rather sell to us as an association, or sell to an outsider, than to turn their produce over to us and let us handle it and take what we get. In fact this year, on one carload of produce alone I made about $200 in buying it from the producer, because they wanted to sell and of course we were there to buy it; we would rather buy and we had to buy the product; we do not want to lose anything, and we bought it at their own figure; we made something over

$200. Now, if that same producer had delivered that carload of product to us, "Here, take it and give us what you can for it, allowing yourself a reasonable commission," they would have been at least $175 ahead. I think that that is one of the greatest troubles in these organizations, they do not have confidence enough in their organization or the management. I am quite enthusiastic upon this question of coöperation myself; it is a sort of hobby with me. I have been manager of the association for seven years, and we have been fairly successful.

Mrs. Turnbull: How long did it take you to get started? Did you accomplish anything the first year?

Mr. Richardson: The first year, in 1896, we had quite a hard time to get the growers interested. We first incorporated under the state laws with a capital stock of $200, and I took my horse and buggy and rode around five days trying to get members interested so that we could ship in carload lots. At that time our method of organization was very crude, and all we wanted was to get enough of them banded together so that we could ship in carload lots. We did quite a little business, but we did not restrict anybody from shipping to any place that they wanted; they became members practically in our organization, but it was an organization coöperative in name only, it gave the members the privilege of selling where they were a mind to but if they shipped to certain cities they were obliged to ship themselves. We charged at that time a certain per cent loading fee. Since 1906 everything is turned over by the producer to the manager of the association. The producer gets receipts for his produce, and the sale is prorated that day to the purchaser according to the grade which they bring in. In 1906 we started out with about 150 members of the whole association.

Mrs. Turnbull: How did you have a meeting, a mass meeting of farmers?

Mr. Richardson: We called a mass meeting to start with, notified all the growers to be at that meeting and then the organization was talked about and plans formulated, and our by-laws were formulated previous to this by certain enthusiastic parties and they were brought up and read article by article and section by section and adopted by those present. All those wishing to join signed the articles of incorporation. That was our first organization.

Mr. Palmer: What did you charge per share?

Mr. Richardson: Two dollars per share.

Mrs. Turnbull: At what time of year did you start this movement.

Mr. Richardson: The first year we started to agitate the question in the winter. We did not make any headway the first year, did not make any organization. Then people kept talking about it, getting

them interested. Next year we commenced a little earlier in the fall and agitated through the winter, so that in May we got our articles of incorporation.

Mr. Barnes: I should like to ask the speaker if in his opinion it would be possible for us to organize a coöperative market, farmers' market, in a town of say 4,000 people, where we are literally robbed by the middlemen? Would it be possible for us to organize a coöperative market whereby we could fetch in our live stock, have it slaughtered and turned back, sold to the citizens, and would it be possible to bring in our vegetables and fruits, everything of that kind, and have it sold directly to the consumer and save at least five commissions and in many cases two good long freight bills?

The Chairman: Let us not get too far away from horticulture.

Mr. Richardson: I think it is possible, it is feasible, it can be done, it is the proper thing to do, but you have got to get the confidence of the producer. The producer has got to risk his part, he has got to turn his stuff over to your manager and say, "Here, take it, I will take what you will give me."

Mr. Palmer: If you were going to organize a fruit growing association, would you recommend selling stock as low as $2 a share, now, with your experience?

Mr. Richardson: Why, yes I would. I would recommend selling stock in a fruit growers' association as low as $2 a share. We now are capitalized at $6,000, it is all paid in. We had a surplus the first day of January, 1912, of $9,000, besides the capital stock.

Mr. Cooper: Have you anything in your by-laws that holds the producer to you after he has signed?

Mr. Richardson: We have this clause: "All fruit and produce must be delivered to the association as the board of directors may direct." Then we have another clause, that upon violation of any of the rules or by-laws laid down by the association the member forfeits his stock in the association and it shall revert to and become the property of the association upon the payment of all moneys advanced by him on the existing par value of the stock.

The Chairman: I should like to make a little comparison, and perhaps other communities may have experienced something along the same lines. It does not seem like so very many years ago when we raised at Baraboo more strawberries than they did at Sparta, probably a dozen years ago we raised several times as many strawberries about Baraboo as we do now. But we have lacked organization and production has decreased, not because of the ability to raise good strawberries in quantities at Baraboo, but because of the ups and downs and uncertainties of the market; therefore, comparing their experience with ours, it seems to me it is up to us at Baraboo to have a coöperative association. We can raise apples there, and we can raise strawberries, and it

seems there is a good chance for a coöperative organization. Other places the same way. The question of distribution is not only the middleman, but the fruit often goes in the wrong direction. The story is told of a man who sold his fruit; I could mention his name, I know the man well; he shipped to Chicago. Then it occurred to him he wanted some choice fruit for somebody, he sent to the commission merchant at Chicago for some choice fruit, and this particular fruit turned out to be a barrel of his own apples. So you see the uncertainties of the present way of distribution. Things go into Chicago and then back into Wisconsin. It seems to me there are many other places in the state besides Baraboo that not only should furnish a better market, but also would furnish a better market through this association and would place the fruit before the consumer with a good margin of profit at much less cost to the consumer, in that case causing many more apples to be used than are now used, with lower prices in many places.

Mrs. Turnbull: There is a great difficulty in knowing where to look for the manager of an association.

Mr. Harris: I think Professor Hibbard touched on a point that comes nearest to expressing the benefits of the association. Mr. Richardson is situated right in a community where their business is strawberry or berry growing, and in small sections, like ours, it is almost impossible to form an organization. We grow a half-acre of strawberries some years, other years we will not have any, another year five acres, and there must be enough to bring about the choice of the people to organize. There is not enough grown there, we have not over 1,000 cases at any one time.

The Chairman: In answer to this suggestion, is it not a fact, Mr. Richardson, that when you started your organization you did not have the number of growers that you now have? You could not have had an organization if you had waited for a sufficient number of growers.

Mr. Richardson: No, we could not. We do not confine ourselves to the small fruit. We handle everything. If one of our members comes there with more than a hundred pounds of cabbage, or a bushel of potatoes, or two bushels, he says, "Here, take it and sell it," and we sell it for him, give him everything we get out of it with the exception of a small percentage or commission, which we figure out will be the expense of running the institution. We have been buying clover seed; we take clover seed from our members, they will turn it over to us and we take it and get what we can for it. We do not confine ourselves to fruit, wholly. The original purpose was for the purpose of marketing fruit, but our business has grown so that we have incorporated a great many other things in there.

Mr. Palmer: Did you ever make an assessment on your stock?

Mr. Richardson: No, in fact, we have dividends right along.

CO-OPERATIVE MARKETING IN MINNESOTA.

R. A. WRIGHT, Excelsior, Minn.

I will give you just a little of our experience in our home association, for it seems to me the ground has been pretty thoroughly covered this morning, and it occurs to me that there is not much left for me to say, but what has been said touches upon our own experience in organizing and growing up.

I am president of our association, the first association in Minnesota, and have been ever since its organization and know its workings from the beginning up till now. We attempted to organize, in fact, some 22 years ago. At that time I was one of the largest small fruit growers and we organized for small fruit only. We were just growing berries. We were situated eighteen miles from the Minneapolis market, and in order to reach that we had either to drive by team, getting up each night at midnight, or ship by express, and in that way our fruit never got onto the market until nine or ten o'clock, so that we were very badly handicapped. I knew something of association work, and secured some copies of articles of incorporation and by-laws and made up my mind we would try and organize, and we began the first year in April. We called a meeting to discuss the matter. Of course many of them were afraid, a great many did not want to put their trust in one man to handle the business, they had many other things to talk over, but we finally did decide, and with the third meeting we organized and I was made president at that time. We had to employ a manager and we employed him in this way, that we would pay $100 a month for three months' service just for handling the small fruit, and with the understanding if the fruit was a failure, that there was no work, there was nothing doing. We hired a young college man that was preparing for work—you see it is hard to get a good man for three months in the summer. We had a little dry weather along in May and we lost our crop, I did not, but others did, so concluded we would not have fruit enough to pay the manager. We did not do any business that year. But we had a fair raspberry crop and we saw that we still had missed it, that we ought to have an association. We had our next annual meeting, which we held in January, elected officers again, and then we made up our minds that we would give it a thorough try out, and we began operations next year. That year we did $5,000 worth of business. That was our beginning. We have had all the trials and tribulations that the rest of you have had in your association work, because the fruit growers seem to be the hardest class of people to get to hang together and trust fully in one another and put their implicit trust in the capability of a manager that will give them the best returns for their fruit, so that we have had them drop out and come back again.

This lady over here asked the question about how we paid our manager and the expenses. That all goes into one expense account, and we only take out what it costs to run the management, we do not put any money by, only when we built our building, of course each person was assessed so much on the amount of business he did with us, and our expense has run from 5½ per cent of the total business to 10 per cent, different years. We have never been above 10 per cent. Now, saying you would market with us $300 worth of fruit, we would take 10 per cent out of that to pay the expense of our business. We adopted the plan of hiring college men as our managers because it was during their vacation after we got to work, and we would be able to get through the business and wind up probably the second or third week in September. It was not just really a success with that, but we tried out three managers in that way and every one of them was a college man. But we have grown out of that, and have grown considerably larger, the past year did a little over $100,000 worth of business. We have now one of our own growers who came from the city, was an expert accountant there, too, and had to give up the work owing to sickness brought on by too close attention to business; he had to get out into the country, so he is making us a thoroughly good manager and we are getting along in much better shape and are much better satisfied. We practically have everyone with us now. I have been kept in as president, probably much for my ability in keeping harmony in the association by talking with disgruntled members and showing them how it was possible to stay by the association, and it has been pretty trying at times. We had nothing to do with apples or anything outside of berries until four years ago, when we began to take up handling apples a little, but we did not make a success of the apples at all the first three years. The past season is the only year that we have done anything with apples that we might say was a success and people are being satisfied.

We started in with the apple growers packing their own apples, same as they did the berries, and we found that we could not guarantee any boxes of apples, or baskets or barrels. But we have used barrels very little out there, it is nearly all box work, use now boxes and baskets, and we would have people come in and we would show them how we wanted our fruit packed and what it must be and if they would put up apples as we wanted them to there would be nothing but No. 1 apples. But when we came to send them out there would come so many small wormy apples and knotty apples placed in the center of the boxes. Two years ago we got an order for a car of Wealthy apples to go to Fergus Falls, and they were bringing $1.25 F. O. B., packed in bushel boxes, all first-class apples. This merchant up there advertised through the whole town that he would get in Wealthys from the home of the Wealthy apple at Lake Minnetonka and made a great spread, and the manager and I put it up to the members, talked to them, explained to

them that they must be packed so and so and we would do the best we could with the second grade in the city. We shipped that car of apples out. The long and short of it was we had to discount $60 off the car for poor apples and the merchant sent us back some of the letters he had received from some people to whom he had sold 10 or 15 boxes of apples, showing there were small and inferior apples in the center of the box.

A year ago we put in one whole day discussing at our annual meeting what we were going to do with the apple question. I was firmly set that we must pack our own apples, a great many others thought that we could not possibly do that, that the best thing to do was to send out west and get an expert apple packer and go around from farm to farm to teach them how to pack apples. I do not believe that the farmer will pack his own apples without putting in apples that the grader or packer that had no interest would not think of putting in for first or second grade. So that finally I carried my point, that we would pack Wealthy apples only. We would try it out this year, packing Wealthy apples in boxes, and the farmers were to bring them in baskets and we to give them their receipt and we packed three grades, and we were fortunate in getting a man that happened to come in there that had been in Hood River Valley and packed apples. He stayed with us a week, showed us how to pack; also the State University sent out a man a couple of days that gave us some instructions, but in two weeks we were packing as good a pack of apples as in the West, and we have not had one complaint this year from a box of apples that we sent out in any way, shape or form, and we believe that we have struck the right track on handling apples, and our Wealthy apples, first grade, brought us $1.45 on an average this past season. You know that is pretty good, from the way apples have been. But from this on we shall pack all the apples that the association handles, I am certain of that. We have our meeting tomorrow and I am perfectly convinced in my own mind that we are going to adopt that plan entirely

Mrs. Turnbull: Do you pack them at the warehouse?

Mr. Wright: Yes, they are delivered at the warehouse, and on a long table running down there we pack our apples; we do it easily, there is no fuss about it and we know absolutely what is in those boxes. Now, first grade apple does not mean that all nice, smooth apples are in that one box, because you have got to have larger and smaller apples, but the 2½ inch apple that we pack in one pack brings just as much as the 3 or 3½ inch when they are all exactly the same.

A Member: What do you do with the culls?

Mr. Wright: Haul the culls to Minneapolis and sell them at about 90 cents a bushel, second grade, $1.25 a bushel. That is an average selling price. Of course, selling expenses had to come out of that, ex-

pense this year was close to 10 per cent of the whole because we still had some arrears on the building.

Mr. Barnes: That does not include the cost of the package?

Mr. Wright: Oh no, each one has to pay for his package outside of that. The association furnishes the package, but each grower has to pay outside of that.

A Member: As the berries come in, different varieties, different grades, where is the inspection of them done? Does that come from the Association?

Mr. Wright: Berries? Why, yes, surely. That question is a little hard to handle, but the manager and his assistant try to keep track of it in a small way, but the way we keep track of it is by the number that goes out on the box, and the invoice slip that goes out with a shipment that no discount will be allowed without the number of the box coming back and stating what was the trouble. When we started out we pooled, everybody's business was the same, they all got the same price. But we quit that in the last three seasons. A new manager came in. The old manager claimed it was impossible to charge back to each man, it was too much work, would not work, and of course the growers got so they knew this, and this farmer would say, "My berries are as good as yours." And we would have half-filled boxes, rotted fruit and all that sort of thing. But we have worked that differently since the new manager came in. When it is reported back here, a certain number in bad order, that is charged back to the man and he is told of it.

THE KANSAS WAY.

MR. W. R. MARTIN.

Mr. President, Ladies and Gentlemen: I am very glad of the opportunity of meeting with the Wisconsin State Horticultural Society to discuss the subject that to me seems the most important of all, before the people who deal with the fruit farm, with the orchard and with the garden. In behalf of my fellow Citizens and Brother Horticulturalists I bring you friendly greetings from the Wathena Fruit Growers Association and also from the Kansas State Horticultural Society.

It might be well to make clear to my hearers just where the body of fruit growers that I represent is located. Our shipping station, Wathena, which is in Doniphan county, Kansas, is just west of St. Joseph, Mo., at the foot of the Missouri river bluffs, on the Chicago, Rock Island and Pacific, and the St. Joseph and Grand Island railroads. These roads furnish our best shipping facilities as they give us access to the wealthy agricultural and grazing districts of the West, Northwest and Southwest districts where little fruit is grown.

The soil of our county seems naturally very rich for producing highly colored fruit of excellent quality and especially is this true of the small fruit and grapes. We believe it is well to be versed in and conversant with all the diseases and enemies that may attack the orchard and fruits of various kinds. We believe it is well that the fruit grower should understand something of the mysteries of soil elements, their digestion and assimilation by plant life, but we believe that it is of still greater importance that the fruit grower should understand how to inspect and properly pack his own fruit and to be familiar with the best markets that he may have a just remuneration for his fruits. These last clauses are the basis on which the Wathena Fruit Growers' Association was organized for instance, a better pack, higher grade fruit, and better returns. After some deliberation on February 18, 1895, twelve growers, of which I am pleased to say I am one, adopted a set of by-laws and applied to the secretary of state for a charter to organize a corporation to be known as the Wathena Fruit Growers Association.

The fruit shipping at Wathena, prior to our organization was in the hands of five or six firms, known as buyers or shippers. These firms sold the grower his crate material, grape and peach baskets, his barrels, etc., on which they made a good profit. The growers did not object to this profit so much, as to the tendency of the shipper to decline the market on the least evidence of a threatened oversupply.

Notwithstanding a hard struggle we lived through the season of 1905, handled the fruit of about thirty growers, and at the close of the year declared a good profit above all expenses.

The spring of 1906 we increased our capital stock and raised our membership to 100 strong, taking in the best growers in the community.

During this, our second year, we handled 33,000 cases of berries, 23 carloads of grapes, 6 carloads of peaches, 56 carloads of apples, making a net profit on the year's business of $5,000. In this net profit the fact is not considered, that all berries were held from 25 to 40 cents per case above the price of former years. It is also not considered that we saved to the growers on crate material and baskets, above $1,200. To illustrate, when blackberries were selling on the market at St. Joseph for 90 cents per case; on the same day, we receipted to our growers $1.25 per case, met our expenses and made a profit above this figure. Our peaches found ready market in Minnesota, Dakota and Colorado points. Our grapes were mostly handled in iced refrigerators, and were marketed as far away as Spokane, Washington.

Each kind of fruit bears its own expenses, its own losses, its own gains, that is, if we sell 10,000 cases of strawberries for $20,000, and make $2,000 above expenses, we will declare a profit of 10 per cent on strawberries.

It is very important that the fruit and truck growers be well located relative to transportation. If they are not located adjacent to some large city market, or unless they have good shipping facilities, such as train service, boat service, express service, the fruit and truck growers are at a great disadvantage. You can readily understand of what vital importance to a fruit and truck growers association it is to be in control of good transportation facilities.

To be successful fruit growers we must be acquainted with the best varieties, same as the stock raiser is familiar with the best breeds of cattle, of horses, of sheep and of hogs. We must also be informed on the enemies and diseases which attack our fruits, likewise, the remedies. In 1906 the grape crop marketed by the association at Wathena was 30 cars, in 1907 grapes were almost a failure, due to a disease known as black rot. It was still more manifest in 1908. Black rot is a fungous disease and may be controlled by proper spraying with the Bordeaux mixture or lime-sulphur solutions. These diseases and enemies come and go and must be studied. The raspberry is attacked by the anthracnose, the blackberry by rust and moth, the plum by fungus and curculis, the cherry by fungus and moth, the peach by the borers and yellows and fungus, and the apple by the moth and fungus and one thousand other things. The fruit grower must be on the alert for all of these pests and must know what to do and when to do it.

The soil elements, the various plant foods, what elements of the earth are essential to the strawberry, the grape, the apple, etc., all of these should have our attention.

You ask a fruit and truck grower of Florida what elements of the soil he must use for the growth of lettuce, for cabbage, for pineapple, or grapefruit, and he is posted. He not only knows what to use, but how much to use, and when to apply it. I believe the time is here when it will pay the fruit growers of the country to give this most interesting subject more of their study.

The cultivation of small fruit requires much attention and is tedious. To neglect it for any reason, even for a short time is often disastrous. For, the cost of cleaning out is not only greater, but the smothering effect often materially injures the plant. Sometimes, as in the strawberries, great injury is done by having to pull weeds, the strawberry plant coming out with the weeds, or being loosened in the ground. The old adage, "A stitch in time saves nine" expresses it pretty well, but it often happens that we cannot take the stitch. If there were no injury from neglect, it would still be cheaper to keep the ground free from weeds. It costs much more to clean out the weeds, than the necessary cultivation, if applied at the right time. There are more points of excellence in the strawberry, than in most other small fruits. The strawberry will adapt itself to a great variety of soils and locations.

We believe fruit growers should coöperate in selling their fruit. The cotton growers of Texas organized to sell their cotton. The truck growers of Florida organized to sell their truck. The fruit growers of the Northwest have organized. All these have found it to their advantage to do so. Through their organization they have both lowered their shipping expenses and raised the price of their product.

Craftsmen and tradesmen of many sorts and kinds have formed themselves into unions and federations. The fruit growers cannot afford to be behind. In the matter of concentration and organization, the more complete the organization the more complete the advantage. Our Wathena Fruit Growers' Association has been fairly successful in its business and has made a good reputation in all the markets where it has done business. We have an organization of about 150 members. The officers of our society consist of a president, vice president, secretary, treasurer and business manager. We have a board of directors of seven members from which we choose the above named officers. We put upon our board of directors men of good judgment, men of recognized business sense and ability. The board of directors holds meetings as often as they think necessary to look after the interests of the association. They provide the grower with box and package material, which by the way, is an item of great saving for the members. The Wathena Association at this writing, has placed orders for about 100,000 berry crate material to be shipped direct from the factory. Before our organization the crate material cost the grower from 3 to 5 cents per crate more. The association provides its members with stapling outfits, with stamps, with which to put their personal stamp on the end of the crate. It helps to provide its members with pickers. It arranges with the trade to handle the fruit the ensuing season, the business manager knows before the fruit is grown where the bulk of it is to be marketed. Arrangements are made for refrigerator cars, office help is employed as bookkeepers, stenographers, inspectors and billing clerks at the shipping station. The business manager and board of directors look after all details of the business having authority to attend to it as though it were their own. Our association is governed by constitution and by-laws. All fruit to be shipped must undergo a rigid inspection, must be sound, well shaped, well colored and clean. It is one thing to grow fruit, it is quite another thing to market it successfully. Fruit growing is a science. Fruit selling is a fine art. In growing fruit one must study climate, soils, locations, varieties, planting, cultivation, pests, remedies, picking, packing, storing and delivering and such things. Hence your directors must be wide-awake, thorough and capable. They must have their hands on the wires, their ear at the phone, their eye upon the market, and both feet in the business. They study the markets, get in touch with them and sell the fruit. An organization will command

more respect than single, individual shippers. An organization will be able to distribute the shipments to advantage, while, if left to separate individual shippers, some favorite market will be overloaded. Again the berry growers have neither the time nor the opportunity to attend to the shipments and keep posted on prices. Again, while many single shippers are working independently it is much harder to maintain a uniform price on fruit than when shipped and sold by the organization or association.

In dealing with transportation companies, you will find it very much like dealing with an individual. They appreciate kind and honest treatment, and will respond to your wants quickly. Never make claim of a railroad company unless you have a just and honest one to present to them. See that your cars are properly refrigerated before loading. See that your fruit is properly loaded and securely braced. Have the agent inspect the car before sealing. See that it is correctly routed. Make all icing and ventilation notations on B/L, and have it signed by the agent, and I will assure you that you will have very little trouble. Our association has never presented a claim for a car of fruit but what was paid.

Does it pay to handle fruit on a coöperative plan? We are realizing today almost 50% more money for our fruit than we were seven years ago when our association was organized, and in addition to that gain we are saving our growers an enormous amount of money in the purchasing of our crate material and other supplies. For example, will say, we paid 10 cts. per crate for berry crates complete, delivered to our station. We were informed by members of the St. Joseph, Mo., Horticulture Society that they paid 14 cts. per crate for the same grade material, shipped from the same mills. They bought theirs through a dealer, we bought ours direct on a cash basis. Since we organized we have handled about 500,000 berry crates. Just figure the difference please. $4.00 on the hundred, which would be $40.00 on the thousand, and 500,000 cases used. You readily see we have saved our growers the net sum of $200,000.00 in the past seven years on crate material alone. Our little city has also used about 600,000 grape baskets during those seven years, which we paid $18.00 to $20.00 per thousand for, while our brother growers on the Missouri side of the river were forced to pay $23.00 to $24.00 per thousand, which would represent another saving of about $24,000.00. Saying nothing of the money saved on barrels, spray material, etc., and in addition to the above savings, we have prorated back to our growers a dividend of about $25,000.00.

Our members own the largest, most modern, up-to-date office building in our city, known as the Fruit Growers Building, which cost $18,000.00. The ground floor is occupied by the Farmers State Bank, Stuart & Bowman Department Store, and our General Office. The second floor

is all offices. Our members have never received less than 7% on their investment. Besides the building stands as a monument to a worthy cause.

Our town is fast becoming a coöperative town. Besides our association, we have a coöperative elevator and a coöperative lumber yard. There is a move on hand now for a coöperative department store. Our banks were quick to realize that coöperation was the only way to reach the business tributary to their town, and keep it from going to competitive towns. In conversation with the cashier of one of the two banks we have in our town, he said that the success of the banks was largely due to the influence and support accorded their institutions by their stockholders, feeling that such interest and influence was for their personal benefit, and by such coöperative effort the banks are not only holding the business rightfully due them from their territory, but it has also had a tendency to place the banking business in many hands, and thereby elevate the business in more respects than one, as a number of stockholders will demand rigid examinations, courteous treatment, and conservative banking. Our banks are giving universal satisfaction, much more so than if their stock was held and controlled by one man, or a few men.

In conclusion; I will say that it should be our ambition to produce the best of fruit, and I know you will agree with me that there will probably never be produced too much No. 1 fruit, and that it is never the best fruit that gluts the market; so let us urge the necessity of packing none but the best. Competition is growing more fierce every year, and we are certainly approaching very near, if we have not already reached, the point where quality is the key of success. With fruit of first quality and carefully packed we need fear no unprofitable results.

APPLE RUST.

PROFESSOR L. R. JONES.

I wish in the first place to advise you that a question was raised last year by Mr. L. H. Palmer as to the possibilities of controlling the apple rust. Not going into the details at all, simply to advise you that through the courtesy of Mr. Palmer the experiment station went into that neighborhood and sprayed a fruit tree for this peculiar disease, apple rust, and succeeded fairly well in controlling it. However, there is no reason to change the general advice given last year, that is, that the apple rust is a disease which passes to the apple from the native red cedars and that the thing to do is to guard against bringing the apple and red cedar into proximity, and especially with reference to the Wealthy apple. I speak of this because of course the Wealthy is an apple which is being planted in many parts of the state, and

one should be very cautious not to attempt to start a Wealthy orchard in the neighborhood of red cedar which cannot be exterminated, or, the reverse, one should be careful not to introduce red cedar as an ornamental tree in the proximity of a Wealthy apple orchard. Understand, this apple rust is not the apple scab, it is a peculiar type of fungous disease which is giving very much trouble in certain limited localities like Baraboo, where the red cedar is an abundant native tree.

A Member: What do you mean by proximity?

Professor Jones: Well, I would rather not have it within half a mile; the rust will go that distance, but ordinarily the disease will not become serious unless it is somewhat nearer than that. I also wish to report another thing. While at Sturgeon Bay, with the large co-öperative association, Mr. Martin, who had charge of the work called my attention to the fact that in their young plantation of cherries a knot had appeared upon some of the young trees, and after I thought about it I told him it must be a black knot, which is a thing to be feared in bringing in cherries or plums from the older sections, and I advised him to exterminate it, cut it out very thoroughly. I did not have time to go over the orchard with him, so he brought down to me last evening some specimen knots. There were a few knots such as this developed on his young cherry trees which he cut out. The knot looks very much like the black knot, but I made a critical examination of it this morning and my conclusion is, from anything I can find, that it is not the black knot from examination, but it is an ugly looking thing, but there is nothing in the cherry trees that it came in to give him concern. Whatever it is, it should be eradicated promptly.

This is on a very few trees in a large plantation, it is not an epidemic, but I would say that it may be in the nature of the development of the crown gall type. But whatever it is, it should be exterminated. I should say regarding black knot that in my judgment the evidence is now that we will not have the trouble of black knot on cherries in Wisconsin unless we introduce it. Then if we are right in that, it is of the greatest importance to those putting out farm cherry orchards that they should inspect and eradicate the black knot. Sooner or later it will be brought in to us. It is very common in the East.

A Member: How does the arbor vitae compare with the red cedar?

Professor Jones: They are entirely different.

FRIDAY AFTERNOON.

SOMETHING NEW IN SMALL FRUITS.

H. B. BLACKMAN, Richland Center.

The longer one works among strawberries the more he becomes convinced that he cannot judge a variety by seeing it one or even two years.

Some kinds vary from season to season to such an extent that one can reach but few definite conclusions about them till he has watched them several years. This is especially true of new varieties. A grower in the East, who has had long experience in growing seedling strawberries, claims that a strawberry does not become fixed in its habits until it is a number of years old. From what little experience I have had, I believe there is much truth in the statement. I usually test a variety for three to four years, that is, if it shows any qualities worth keeping, as it takes that long to determine the actual value. Some of the varieties that I will mention may not be new, strictly speaking, but their value is so little known, that they are worthy of mention in this paper.

STRAWBERRIES.

Highland.

A midseason variety very productive, with dark red berries which hold their size well to the last picking. Similar in some respects to the old Crescent, except the berries are larger and the growth of plants is not excessive. Produced more than double the amount of fruit that Dunlap did under the same conditions.

St. Louis.

Extra early; the past season it was just a day or two earlier than Dunlap. It is a very healthy, vigorous grower, berries average extra large, but are soft and lack color and flavor.

July.

One of the latest and most productive strawberries that I have ever grown. We picked our last fruit from it the past season, July 24, which brought $2.00 per 16-quart case wholesale. The berries are only medium size, but they average up well the season through. Color, light, glossy red; quality, fair; where lateness and productiveness are wanted, this variety is in the lead.

Black Beauty and Grand.

Ripened some of the most beautiful berries which were nearly perfect in color, quality, size and shape. As to productiveness, it would

take nearly a one-acre field of them to supply an ordinary family with what berries they could use. When the berries were at their best the past season, one row ten rods long yielded at the rate of one full quart at a picking.

Meteor.

Plants are vigorous, healthy growers, make an excessive number of plants and should be restricted in their production. The size, color, and quality of the berry are very much like the Warfield. I think it will yield as much fruit too, but am not sure, as I have tested it only one year.

Giant Red Prof.

Season is medium to late. The plants are only moderately productive, berries are medium in size and run small at the end of the season; color, bright glossy red; soft and lacking in flavor.

Fern Dell.

The plant is strong and healthy, making a liberal but not excessive number of strong runners. Very productive, berries average medium to large the season through, color and quality fair to good. Valuable.

Fremont Williams.

Fully as late as July but not so productive. A strong, perfect flowering strawberry which I use to fertilize July. The fruit is large and nearly perfect in color, shape, and quality, while the plants are strong, healthy growers. Will produce twice as much fruit as the Gandy under the same treatment. I consider it one of the best in its class.

Iona Market.

Plants are weak growers, subject to rust; the past season it ripened a fair amount of choice dark shiny red berries. I would not advise planting it.

Baldwin's Pride of Michigan.

About as near a failure as any strawberry I ever tried to grow.

Iowa.

A new everbearing strawberry; a vigorous, healthy grower, making a fair number of strong plants, that is, if the fruit buds are removed as fast as they appear, otherwise the plants will fruit at the expense of making plants. Just as soon as the young plants are established they will commence to blossom and fruit and continue to fruit till freezing weather, not a few scattering berries but the plant seems to load itself with fruit. The fruit produced in the fall does not seem to affect the plant any when it comes to fruit the next season. The proper way is to remove all fruit buds until other varieties are about through fruiting and then let that commence. The color, quality, and size of the berries are about like Dunlap.

Americus.

With me it does not seem to prove as healthy or vigorous as the Iowa. Should not care to recommend or condemn it on one year's trial.

King Edward's and Ohio Bay.

Both were a disappointment.

RASPBERRIES.

Plum Farmer.

One of the best blackcaps ever introduced. Stood a test of 40° below zero last winter without any protection. Came through in the spring, alive to the tips. It is without a rival when it comes to vigor, hardiness and production.

Hoosier Blackcap.

About the same as the Kansas. Perhaps a better grower and hardier.

Munger.

A large late blackcap, not hardy and subject to disease.

Early King.

Stands in the lead among the red raspberries; went through the hard winter last season without any protection and ripened a fair crop of fruit while other varieties like Cuthbert were killed to the ground. For hardiness, productiveness, and freedom from disease it is hard to beat.

Eaton.

Canes, weak growers; fruit large, irregular, and seedy; fairly productive and quite hardy.

Idaho.

I can see no difference between this and Eaton.

Herbert.

A large, red raspberry introduced from Canada. I think it superior to Cuthbert in vigor, productiveness and hardiness. Has to be given some protection.

Shippers' Pride.

Very vigorous and hardy, but not productive. Berries small and soft.

Superlative.

Sent out by a firm in Holland, Michigan, as one of the very best. They also claimed to have imported it from England, but it was Ellwanger and Barry of New York who really imported it from that country. Worthless, don't plant it.

Sunbeam.

This new red raspberry comes from Dakota. One of Professor Hansen's selections out of the thousands of seedlings grown at the Experiment Station. The little I have seen of it impresses me that it is valuable. Berries, large, dark red, with a fine flavor; canes, hardy and vigorous.

GOOSEBERRIES.

Carrie.

The bush is a strong, healthy grower so far free from mildew and almost free from thorns. Size and color of the fruit about like the Pearl.

Carman and Portage.

Mildews so badly with me as to be worthless.

CURRANTS.

Perfection.

I have tested this grand new currant five years and the longer I grow it the better I like it. Extra large size and tremendous production. A crate of these can be picked as quickly as a crate of strawberries. Last season while other currants brought only $1.00 per 16-quart case Perfection brought $1.50 per case with a demand far greater than the supply.

Giant Red.

The bush is a more vigorous grower than Perfection, also holds its foliage better, and to all appearances, I think it will rival Perfection for first place.

The President: The paper is now open for discussion.

Mr. W. A. Toole: I should like to ask if the ever-bearing strawberries, or fall bearing, are a profitable proposition commercially?

Mr. Blackman: I cannot see any reason why they should not be. The important thing is if we could irrigate, because we generally have a dry spell just after the other varieties quit their fruiting. If we could plant them so that they could be irrigated, I know that they could be profitable, because their productiveness is equal and the quality is as good as the Dunlap.

Mr. Toole: In order to have the crop in the season when you want them, would you pick off the green fruit, or would you let them make a full crop all through the season?

Mr. Blackman: I would keep the fruit buds cut off in summer before other varieties quit fruiting. They could not very well stand three crops in a season.

Mr. Irving Smith: How large is the fruit?

Mr. Blackman: About like the Dunlap.

Mr. Toole: Those Iowa Ever-bearing that you recommended, are they self-fertilizing?

Mr. Blackman: Yes.

Mr. Toole: Do you know of any other good one that is ever bearing?

Mr. Blackman: I do not. I tested out the Pan American and the Autumn, and also have the Americus. The Pan American and the

Autumn I would not recommend, because they make no plants and the berries are too small, while the Americus I have not tested far enough.

Mr. Turnbull: Don't they ripen rather slowly, so that you will have to pay heavily for picking them?

Mr. Blackman: I think not.

Mr. Everett: What variety of red currants do you think is sweetest?

Mr. Blackman: I would name the Perfection.

Mr. Everett: What is the best variety of gooseberry, free from mildew?

Mr. Blackman: Well, the Downing and the Pearl.

Mr. Everett: How about the Joslyn?

Mr. Blackman: I would not recommend planting it because it mildews so badly.

A Lady: How about the Red Jacket?

Mr. Blackman: That is the same as the Joslyn; I would not recommend it. It is a poor grower and mildews. The Houghton is too small.

Mr. Harris: You mention the dry season between the regular picking of the strawberry and this fall bearing variety. Is it not the fact that the Enhance is equal in fall bearing, if you had that condition?

Mr. Blackman: I never found it so.

Mr. Harris: We have the Enhance, and lately the Warfield and Dunlap, they are very productive, profitable. When we have a dry season, followed by a wet season after the other harvest is done, we can get large pickings from them.

A Member: Do you find a decided difference between those that occasionally bear and those that are ever bearing?

Mr. Blackman: Yes, a decided difference. While in these that bear occasionally I question that we get a profitable crop unless we have a small plantation; not so with the Iowa, because they bear very heavily.

Mr. Harris: Is it more so the fall after planting than the following season, after they have borne one spring crop?

Mr. Blackman: I think not, because those plants that set so late, it is so late before they are established that you do not get much fruit out of them. Only those plants that are firmly established do the bearing while next season we have other plants.

Mr. Harris: Is it not a fact, Mr. Blackman, that the standard varieties, such as Dunlap, when they do produce a second crop, that there is a noticeable decrease in the next year's yield?

Mr. Blackman: I think so.

Mr. Turnbull: Is it possible that if you pick off the blossoms on these ordinary plants, they would be late bearing?

Mr. Harris: This second crop on certain standard varieties, means simply that we have produced one crop and this I understand is on the new runners and the fall after setting in the spring. The Everbearing, as I understand it, is picked in the fall after being set in the spring.

Mr. Blackman: Yes, the first setting we set out in the spring, and they commence to run at the proper time and begin to establish themselves. Just as quick as the young plant is established, it begins to send out fruit buds.

Mr. Harris: With the Dunlap and Enhance, it does not make any difference how good plants we have, provided the conditions are right, we get a second crop. I have not had any experience with the fall bearing, and my question is whether there is a decided advantage for the fall bearing kinds.

Mr. Blackman: There is a decided advantage.

A Member: Which do you consider the best commercial black raspberry?

Mr. Blackman: The Plumb Farmer; in every respect.

A Member: Do you find a marked difference in the matter of maturity? I have understood there was one feature that you get all the berries in one picking, whereas, some others string along.

Mr. Blackman: I do not think so. In our plantation we pick as long or longer than any variety that we ever had. I think perhaps there are half a dozen other varieties that are standard and the Plumb Farmer held up better than any of the rest.

A Lady: Where are those plants to be had?

Mr. Blackman: From any good nurseryman. I believe all nurserymen handle them.

Mr. W. A. Toole: What would you recommend for an early strawberry to get on the market real early?

Mr. Blackman: I do not know of anything better than the Dunlap. All the early varieties I tested out did not prove but a day or two earlier and on some other points they were not as good.

Mr. Toole: Does the Warfield come along about the same time as the Dunlap?

Mr. Blackman: Yes, but the Warfield is not profitable with me. Mine is a very heavy soil.

Mr. Harris: In our section everything has to pass in comparison with Dunlap, Warfield and Enhance.

A Member: With this ever bearing strawberry you find you get a good spring yield, same as Dunlap, and then a fall yield in addition?

Mr. Blackman: Well, if you let it fruit in the summer, as I understand your question, why, you would exhaust it so it would not be able to produce much of a crop in the fall.

A Member: If you put out a new bed each year, you could get a good spring crop and perhaps a considerable fall crop?

Mr. Blackman: Yes, that would be all right, it would outbear the Dunlap.

ALL THE HERBACEOUS PERENNIALS WORTH GROWING.

W. A. TOOLE.

Of late years there has been a steadily increasing interest in perennials for the home flower garden, or as an addition to the shrubbery border. While they do not give the showy bedding effects of geraniums for the whole summer, there is a wide variety in form and color and a succession of bloom may be had from early spring to late fall. Most of them are superior for cutting. Many of them are decorative in foliage before or after the blossoming time. All of them are desirable because they do not need replanting every year. It is a mistake to assume that because they live from year to year, that no further care is required after planting out. To get good results they need cultivation the same as any plant. To successfully winter many of them over it is necessary to prevent seed production. All are benefited by some winter protection.

The term hardy is a relative one, depending much on the climatic conditions of the region under consideration. Many plants that are hardy further east or but a little south of here are not so in southern and central Wisconsin, while in the northern part of the state where early snows which hold well into spring are the rule, varieties may be grown safely which are not hardy with us in the southern part.

There are three of the hardy perennials that are so popular and may be had in such wide variety that separate talks are needed for each of them. These are peonies, iris and perennial phlox.

Of peonies there are hundreds of varieties and I will not attempt to name the best. In general the culture is as follows: Prepare the ground thoroughly and unless it is rich soil, add well rotted stable manure, working it well into the soil. Plant the divisions or young field grown plants in the fall during September or October. Mulch heavily each fall with stable manure. Rake off the coarsest in the spring but leave the balance as fertilizer. When the plants get quite large and old, divide the roots and make a fresh start. Keep the grass from forming in a sod about the plants. While the glory of the peony is not for long, the foliage is ornamental all through the season, and it is an added feature in favor of this plant.

Many acres of peonies are grown to furnish the demand for cut flowers at Memorial Day and later. If the buds are cut just as they

are showing color they may be kept in storage for several weeks and will blossom out when brought to warmth. If desired for cut flowers they should always be cut when just showing color and allowed to expand later. Treated in this way they will last longer.

There are a number of classes of iris, of which we need to concern ourselves with the German and Japanese groups principally. The many varieties of flag or iris commonly found in our gardens are of the German class. They range in color through pale yellow, lavender, and blue or purple and chocolate. A selection of varieties will extend the blossoming period to about two months through spring and early summer. The German Iris does well on moderately rich, well drained soil. Old clumps may be divided and reset during August.

The Japanese Iris are not much grown in the ordinary garden. The flowers are very showy and beautiful and have rather a wider range of color and markings. They require a moister soil than the German Iris.

Every year when the perennial phlox are in bloom their great show of color attracts many people who resolve to have a bed of them, and what is rather remarkable, many of these people remember their good resolutions, and later set out some of the plants. Perennial phlox are easy to grow, doing fairly well in partial shade as well as in the sun. They may be moved during late September or early October or early in the spring. They do not reproduce true from seed although seedlings are not hard to grow. Propagation is by division of the older clumps or preferably from cuttings. Cuttings taken early in the spring are not hard to root in the greenhouse. After the first crop of blossoms have withered the bunches will usually produce another crop of flowers on the same heads if supplied with sufficient water. If it is desired to hold the flowering period till late, the first flower stalks may be pinched off before they blossom and they will throw up branches which will flower later.

To many, the Hollyhock is symbolical of the old-fashioned garden because of its prim stateliness. Like several of the perennials it will often die after blossoming one season if seeds are allowed to form. Seeds sown in June or July will form strong plants for the next summer's blossoming. They may be sown where they are to blossom but I would prefer to sow in a frame and transplant to the permanent location as soon as large enough. They are especially suited as backgrounds to other shorter growing plants, in gaps in the shrubbery border, or along the sides of the house or in front of other buildings. The Hollyhock self sows readily and therefore many people think a few plants have lived for years when in reality they have renewed themselves yearly. They are subject to a rust disease which sometimes damages greatly. This may be controlled by frequent and thorough applications of Bordeaux mixture. As a usual thing they

are strictly a garden flower, though sometimes the whole stalk is cut and used for room decorations. They may be had with both double and single flowers. I prefer the single, although many like the double flowered ones. The Allegheny Hollyhocks are single or semi-double and are beautifully fringed and ruffled.

Aquilegias, or Columbines are popular while they last though their season seems rather short. I like the long spurred Colorado blue and white columbine (a coerlea) and the long spurred yellow varieties (a chrysanthea) best but many like the red, blue, and purple European kinds, both single and double. I have never yet found anyone who admired the spurless kind which Burbank claims to have bred up, or down. The columbines are propagated from seed, and it is hard to get the colors true as they hybridize with other species so easily if growing anywhere near together. The seed is slow to germinate if at all old, but will grow quite readily if they can be sown as soon as they ripen. Sow the seed in frames in May or June if older seed must be used, and lay pieces of unbleached sheeting over the soil to prevent drying out. Remove the covering as soon as the seeds begin to come up. Keep the seeds well watered, watering on top of the cloth. Transplant as soon as the first character leaves appear. Achillea ptarmica, The Pearl, has a double button shaped white flower and is very fine for cutting. It is extremely hardy. It may be propagated from seeds, easily, or by division.

Anchusa Italica, Dropmore variety, seems hardy here and is a desirable kind to grow as it adds variety to the color. It blossoms in June on bushy plants four or five feet tall, the color being a clear dark blue.

Canterbury Bells (Campanula media) are worth while trying to grow although they cannot be called hardy with us as they will often winter kill. Campanula persicifolia seems hardier and is very pretty, especially the white flowered variety. A great many of both the white and the blue ones are sold each year as cut flowers on the Madison market.

Coreopsis lanceolata is another of the perennials which should not be allowed to seed after blossoming. It produces a greater abundance of clear yellow flowers on long wiry stems which are unexcelled for cutting. It will blossom all through the summer if cultivated and supplied with sufficient water. Coreopsis lanceolata is very easily grown from seed.

The Delphiniums or larkspurs are quite well known. There are several species that are hardy. The Chinese larkspur grows to about three feet high. The leaves are finely divided and smooth. This kind ranges in color from pure white through light blue to deep purple, and is quite desirable for cutting as well as a border plant. When cut they will often throw out branches and blossom again later. If

the seed is sown early in the spring the Chinese larkspur will blossom the same season, and if sown later they will blossom by the fourth of July the next summer. Delphinium Formosum grows to five or six feet tall and has coarser downy leaves. This variety is offered in both celestial or light blue, and dark blue or purple shades. This kind is not so suitable for cutting as the Chinese larkspur but is very fine for the shrub and perennial border. Those offered as hybrid Delphiniums resemble the Formosum in general form and color and are adapted to the same uses. Delphinium elatior or bee larkspur is an old-fashioned kind not offered much now. It greatly resembles the Delphinium Formosum but has a brownish black center instead of a white center. It is this fuzzy brownish center which greatly resembles a bumblebee which gives it the name of bee larkspur. There are a number of other varieties of hardy Delphiniums with which I have not had experience as yet. These, like the Aquilegias are somewhat slow to germinate and the soil where the seed is planted should not be allowed to become dry.

The Digitalis or foxglove is rather uncertain as to hardiness but it makes a desirable addition to the list and is worth trying.

Gaillardia grandiflora makes a great show in the garden, blossoming from June till late fall if it has enough water. It is another kind which should not be allowed to go to seed as seed bearing will reduce the flower production as well as lessening the vitality for resisting the winter. In color it varies from clear yellow to nearly all red, and in form from quilled petals to broad flat ones. It is excellent as a cut flower. It is not hard to raise from seed. Some time the main stem or bud of the plant will winterkill, but usually sprouts will come up from bits of the root which remain alive down in the ground.

The Oriental poppy with its great scarlet flowers is probably the showiest of our hardy perennials. It is easy to start from seed but is very hard to transplant. Probably the easiest way for the amateur would be to sow the seed where the plants are to grow permanently. The seed is small and must not be sown too deeply. With some care in shading the young plants after transplanting they may be moved successfully. Old plants are very easy to move if transplanted in August. At this time, just after blossoming, the plants are dormant. A little later they send out a fresh lot of leaves to store food for the next spring's use. We were never successful in using the Oriental poppy as a cut flower because they would wilt down so quickly until we were told to sear the ends of the cut stems with a hot iron or coal or plunge an inch of the stems into boiling water. This hardens the milky juice which seems to prevent the water going up into the plant.

Pyrethrum roseum is the plant from which Persian insect powder is made. It is one of the hardiest of our perennials, and one of the

prettiest in its season. The flowers are daisy like in form and the color varies from blush white to deep red. There are also double and semi-double forms of the variety. It is very fine for cutting as well as making a beautiful show in the garden. It is not difficult to propagate from seed, and if a particularly fine plant is produced it may be increased by dividing the old plant in the spring or fall. This seems to be one plant that is able to hold its own fairly well against blue grass. We have had a few plants that have been in blue grass sod for 15 years.

Pyrethrum uliginosum or giant daisy is a tall growing, branching plant with white daisy flowers an inch and a half across. It is very desirable because it gives a touch of white in the gardens during September when nearly everything is yellow or purple. We have found it hard to propagate from seeds as but few of the seeds seem to germinate, but it may be easily increased from divisions if taken up early in the spring.

Sweet William is another old garden flower that I have always been fond of. There is a wide variety of colors and markings, indeed, no two plants seem to bear flowers alike, and they always remind me of a kaleidoscope by the form and changing variety of their markings.

When the Rudbeckia "Golden Glow" first came to my attention I admired it very much. It is so easy to grow, that while still admiring it, I am inclined to take it as a matter of course like dandelions, and not give it the attention it deserves. There have been different varieties of daisies belonging to the class of our wild ox-eye daisy existing for some time, some of them equal or superior to the Shasta Daisy, but the Shasta Daisy has had so much free advertising in connection with Burbank that it is now well known. It is very showy, the enormous white flowers, measuring several inches across. It is easily started from seed, but the plants vary a great deal and a specially good one may be increased by division.

Another good one of this class is sent out as Chrysanthemum latifolium. It is grown extensively by Turvill Brothers at Madison for the cut flowers and seems to be perfectly hardy. It grows considerably taller than the Shasta daisy, and with a longer stem. The size of the flower is about the same.

The Shasta daisy starts to blossom in June and where given a good opportunity will continue through the summer. The latifolium starts to blossom a couple of weeks later.

Another variety related to these two daisies is known simply as the early daisy. Many years it will be in blossom by Memorial Day. It is not so large flowered as the other kinds mentioned, but is of a pleasing form, makes a very durable cut flower, and blossoms very freely while in season. It only lasts for a month or six weeks.

Boltonia asteroides, white or lavender white, and Boltonia latisquama, delicate pink, are two very desirable perennials that very much

resemble some of our wild asters in general appearance. They make large bushy plants and during September they are a showy mass of color. We have never been able to get the seed to grow, but they may be propagated from cutting.

Gypsophila paniculata, or Baby's Breath, with its fine white flowers is fine to mix with other flowers in bouquets. Combined with some of the daisies it makes a beautiful bouquet, as it takes the look of stiffness off the larger flowers.

On the program the title reads "All the Perennials Worth Growing." I have not attempted to name all that are hardy here, simply those that I think it would pay the average flower lover to grow. There are many varieties that are hardy but which seem best suited to large plantings, and there are others that are beautiful, and which are occasionally hardy through the winter, but are not the best for the ordinary flower lover to attempt.

Among our native perennials there are a number that are well worth growing, but I will not treat of them here. Many of them are listed in the catalogs. Among them are Lobelia cardinalis, the shooting star, the various wild asters, the wild phloxes, Eupatorium and a whole host of others.

There are many more things that might be said about perennials. In fact a good sized book might well be written about those suited to Wisconsin. But this is all I will attempt at present.

Mr. Harris: In regard to the peony, where the ground is quite rich, what is your plan to make them stand up?

Mr. Toole: We only grow peonies in rather an amateur way, but they can be very easily staked when growing them in a commercial way. You could run some wire on either side of a row very easily to hold up the heavy heads of flowers from going over into the dirt.

Mr. W. Toole: The fact is they do go down after every storm and it would be very easy with a stake and wire to hold them up.

Mr. Harris: We have a large one that always grows up about two feet and a half tall and when it is heavily laden with blossoms they always go over on the ground in a wet spell.

Mr. Holsinger: One suggestion in regard to the peony, I think it is the finest plant to grow in this country. I wonder how many have practiced the system of disbudding, taking off all buds except one, in order to get a fine one? How many have tried it? Those who have not tried it, you will enlarge them and at the same time you do not draw on the plant for as many flowers. It acts in the same way as if you were to thin out fruit trees and it greatly increases the size of the blossom.

A Member: In tying them up I have often taken a bit of binding twine, wrapped it around rather loosely and in that way you can keep it from swinging clear over.

Very nice crop of Malinda. Poplar Trial Orchard, August, 1912

A Duchess Tree. Poplar Trial Orchard, August, 1912

MUSHROOM CULTURE.

A. J. SMITH, Lake Geneva.

The mushroom is one of our most highly prized delicacies and can be grown as easily as many other products of the soil, and when grown successfully is a money maker. The cultivation of the mushroom was first recorded in Paris in the sixteenth century. At the present time there are several distinct types of mushrooms which have been cultivated the last five or six years. There has been produced by Professor Duggar of the Cornell University, later with the Department of Agriculture, three or four types distinct from any others under cultivation. The principal features of these types is the quicker action of the mycelium, and consequently will produce a crop of mushrooms two weeks earlier than the English Milltrack spawn. This spawn is placed on the market under the name of Pure Culture by the Lambert American Spawn Company. The different varieties are named as follows: Alaska, Pure White Columbian, Brown or Tan color, Bohemian and Holland Creamy, Brown. These varieties are all Pure Culture, specified because each variety is pure in itself. The production of this spawn has made the mushroom a safer crop. Where conditions are adaptable for the product, the comfort of the mushroom must always be considered. The conditions upon which failure will result, no matter how perfect your bed may be, depend upon atmospheric conditions, dry atmosphere, cold draughts, stagnant air, lack of moisture and sudden changes in temperature. The mushroom house should be erected purposely for mushroom culture. There are many different methods used for building mushroom houses. In my opinion, the ideal house is the house that is built beneath the surface of the ground, or partly so. Dig out six feet deep, ten feet wide, build concrete walls one foot above the level of the ground. Place an equal span roof on these walls. This will give you two beds on each side four feet wide with a two foot center walk, leaving an aperture in the roof two feet square for the purpose of conveniently handling the manure. The spawn, of course, is an important cause of failure or success, but is not nearly so much worry to the grower as when the English Milltrack was used exclusively, as our dealers are now getting a fresh supply monthly, whereas with the Milltrack spawn it received so many places of storage before it received the final call to its natural condition that the word "luck" was generally used where a grower was successful. At the same time I do not believe that under improved spawn conditions, the statements of many writers on mushroom culture, "mushrooms can be grown successfully in any hole or place." Mushrooms need a suitable and comfortable place to grow in, and where the condi-

tions are right and the beds are made right, there is no reason why you should not have a good crop of mushrooms.

A fair crop of mushrooms is three-quarters of a pound to one square foot. I have seen places where the beds were made in the corner of a large cellar, the bed being well made and spawned with good spawn. The result of these conditions is that you will get a few mushrooms from the strongest mycelium threads, but the fact that the large body of cold air floating through the cellar and falling on your bed, preventing the weaker mycelium threads to head or knob, they will spread flat over the surface of the bed, indicating fungus.

Preparing the manure for the beds is done in a number of different ways. The reason for this, as a rule, is the quantity of manure you can collect at one time. It takes me ten days to get enough manure for a bed thirty feet long, four feet wide and one foot deep. I spread this manure rather thinly in an open shed until I have enough, and then turn it all into a pile about eighteen inches deep and keep it turned every day for twelve days, always having the pile eighteen inches deep. I use three wheelbarrow loads of good soil to every load of manure and by mixing the soil with the manure every day it obtains an even temperature.

I find sawdust, baled shavings, and short straw, that has been used for bedding the horses, not objectionable when used in small quantities, as these commodities have a tendency of retaining the urine and ammonia. The depth of the mushroom bed varies among different growers, but I believe beds twelve inches deep cover all arguments. In making up the beds, they should be made firm by treading the manure until the required depth has been attained. The temperature should run up to 110 to 120 degrees, and when it cools down and returns to 90 degrees it is safe to spawn. It is good practice to lay the spawn bricks on the bed three or four days before the bed is ready for spawning, the reason for this being that it starts the mycelium into action, and also softens your bricks of spawn and saves a good deal of waste when cutting them into small pieces. I cut a brick of spawn into twelve pieces and insert these in the manure one inch below the surface and ten inches apart. The bed should be covered with soil one and one-half inches thick about a week after the bed is spawned; this gives the mycelium a chance to get into action. Before the bed is cased over, the soil should be pressed down even all over the surface of the bed with the back of the shovel. Cover the bed over with a thin layer of clean straw until the mushrooms appear, and then remove it. By using Pure Culture spawn, mushrooms will appear in four weeks under proper conditions, and in six weeks you will be gathering your first mushrooms.

The temperature of the house should be kept around 58 degrees. Ventilation is an important point. A small circulation of fresh air is

necessary. The watering of the bed, when necessary, should be done thoroughly with warm rain water at 80 degrees. Watering too often will cause black spot and fogging-off of the pin-head mushrooms. Be careful to avoid over watering.

The question of feeding mushrooms with manure water does not always appeal to the average grower, but from experience I find it to be a great help, especially on heavy cropped beds. I use half sheep manure and half horse manure soaked together for several days, and then drained off, adding 100 per cent clear water, and put into the whole amount one pound of saltpetre. Do not water the bed when it it moist; wait until it shows signs of dryness. Do not allow the manure water to touch the mushroom, as it discolors them.

Mr. W. A. Toole: Have you tried to grow mushrooms in house cellars for home use?

Mr. Smith: That all depends on the cellars. I would not advocate cellars. I would advocate growing mushrooms in a house built purposely. You might get a few mushrooms in your cellar. Many people have started and got some mushrooms, a good many have not got any.

Mr. Toole: With the house which you referred to, is that just for summer culture?

Mr. Smith: No, I would not advocate anybody growing mushrooms in the summer. You can get as many in the summer as winter, but you cannot use them.

Mr. Toole: You have to do some heating in the winter?

Mr. Smith: So far I have not used any heat at all. You can cover your roof so that hardly any cold can penetrate. With the roof so close to the ground you can easily cover that up so that no cold will penetrate. Cover with straw and hay, or anything you want, to keep the frost out, and keep your house warm. We do not use any light at all, perfect darkness.

A Member: What is the average bearing period?

Mr. Smith: The best period for bearing is the first month, then you will get another good run of mycelium and they will yield three or four crops during the next month. You can figure on six weeks good crop of mushrooms. I have two small beds now, one of them is 30 feet and the other is 25 feet, since the 13th of December I have picked 65 pounds of mushrooms.

Mr. Toole: Then you renew that again?

Mr. Smith: No, it has been tried so many times growing mushrooms during the summer time, most people have dropped it, because mushrooms get wormy. Even in the caves of Paris, they get wormy in the summer time. I prefer to get the soil ready in August and by the middle of September you can make up a bed. That is as soon as I would recommend any one starting, and keep on until about the middle of April.

CO-OPERATIVE MARKETING OF FRUIT IN WISCONSIN.

BY JOHN WILLIAM BRANN.

A Thesis Submitted for the Degree of Bachelor of Science in Agriculture, University of Wisconsin, 1913.

Great strides have been made during the past decade in educating the farmer in the production of larger and better crops. At present, national and state governments are turning their attention strongly to the training of the farmer in the problem of the economical disposal of his products. The problem for solution is, how shall these products be distributed and placed in the hands of the consumer in the most economical manner. It is evident that the farmer must show better business ability, and keep pace with changing conditions. He must get away from the feeling of individual selfishness and relinquish the idea that some of his privileges will be infringed upon by acting in coöperation with his fellow workers. Individual effort has accomplished much and will achieve great things in the future, but greater and more vital accomplishments have been effected when men have worked in coöperation.

In the early days there was but little buying and selling. The farmer had but few, if any speculators, middlemen or railroads to deal with; hence more or less of the spirit of independence predominated among the tillers of the soil. Before farming can be on an equality with other business, farmers must learn to finance and govern undertakings more intelligently than they have done in the past. Organization has been difficult with the farmer, but with growing intelligence and denser population, it can now be more readily accomplished. The world's producers have allowed the control of their industry to gradually slip out of their hands, and if they are to retain their just share of the profits and make farming as profitable as other occupations, the spirit of closer business relationship and coöperation must be promulgated.

The future progress of the farmers and their industry must be along lines of coöperation in such a manner as will result in fairer prices to producers and at the same time get products into the hands of consumers at a reasonable figure. Investigations regarding comparative prices received by farmers, and those paid by consumers show a great margin in the transfer from one to the other. The farmers have in the past been building a system of distribution that is both expensive and unsatisfactory and this is the primary cause of the large number of difficulties that now present themselves. The imperfect system of marketing in the past may be illustrated by the frequent liability of fruit growers to sell products for which the con-

sumer would gladly pay a good price. The producer loses in not being able to market his crop at a fair price, the transportation companies lose because they do not handle the business and the consumer loses because he is not able to get the product at a reasonable figure. For every dollar the consumer pays, the farmer seldom gets more than forty cents, the balance goes to the railroad companies and middlemen. In manufacturing and other lines of business we find results not as disastrous as a smaller number of middlemen intervene between the producer and consumer.

Gov. McGovern of Wisconsin, in a message to the Legislature emphasizes the fact that in many cases potatoes selling for ninety cents in the larger cities, brought the farmer only thirty to forty cents. Of the amount paid, the retailer takes 20%, the wholesaler 10%, the jobber 5%, freight 10% and further losses 5%, leaving only 50% to the producer. We see many instances where carloads of apples are sold to wholesalers at 50 cents per bushel which in turn sell to retailers at 95 cents who furnish them to the public at $1.25. Thus the consumer pays 75 cents more than the producer gets. This condition of affairs is grossly unjust to both producer and consumer. With perishable goods we note hundreds of instances of extreme wastefulness in which the producer not only sustains a total loss of product, but as an added loss, has freight to pay.

Retailers often prefer to maintain existing retail prices on fruit of which there is an abundant supply, by resorting to smaller sales. Under such conditions large quantities of fruit may rot, when the people, especially the poorer classes would have been glad to get the product had a reasonable price been charged. Situations like the above are common, vast quantities of good fruit become a total loss and yet prices for such products in the cities are relatively high. Such conditions, coupled with desire for a ready market, better distribution and more equitable prices have stimulated the organization of coöperative marketing associations.

Until about twenty years ago the need for organization, among the producers of deciduous fruit was not apparent, but conditions in this industry soon become as bad as those in marketing other products. The need for organization is becoming more and more apparent each year and many growers will be forced to desert their orchards or organize to secure economical distribution of their products.

The western growers of citrus fruits were the first to organize. Their industry is now highly specialized and is founded on sound business principles. The California Fruit Growers Exchange, with headquarters at Los Angeles, represents a high development in the perfection of fruit organizations. High cost of culture, distant markets, solution of problems of production, transportation, distribution, market-

ing and legislation are some of the factors which induced these growers to organize. As a result of their coöperation, they are able to successfully meet the varying conditions which their product encounters at every step from orchard to consumer.

In the eastern part of the United States the fruit industry is not as specialized as in the west. Fruit growing is largely incidental, markets are closer and, in general, the existing conditions that prevail in the west do not present themselves. These conditions have existed to a large degree in Wisconsin, and to these we may attribute the rather slow development of marketing associations in this state. Wisconsin, however, has two fruit organizations which have been operating for a number of years and are based on firm business principles. These organizations are the Sparta Fruit Growers' Association and the Wisconsin Cranberry Sales Co. These, with others of more recent origin, are discussed in detail in the following pages. The Wisconsin organizations are founded on the strict fundamental principles of coöperation. So far as stock is concerned, all are non-profit-sharing associations in which members have equal voice. All are operated at cost and the profits are distributed pro rata after interest on investment, depreciation, salaries, and cost of equipment are deducted.

The Wisconsin associations realize that good management is the prime factor in the success of fruit organization. The association should select a manager possessing thorough business ability and one in whom utmost confidence, as to competency and honesty can be placed. In fruit selling, one must study new transportation facilities, the condition of markets, the standing of commission men, industrial conditions and supply and demand. These duties all fall upon the manager and the efficient fulfillment of these is the chief essential of the success of the association.

Loyalty to the association is also a prerequisite of success. It is when the organization is subject to the severe criticism of those opposing it, that the true test of loyal membership presents itself. Unless the members are loyal at such a time, the enterprise is doomed to failure.

Another element of success that the Wisconsin associations are coming to realize is that it is necessary to maintain a high standard of product. It is to the interest of every one to give his best product and induce others to do the same.

In order to further the interests of fruit growers and farmers in general in Wisconsin and to fulfill the aims of good management, loyalty and high product, the Governor of Wisconsin recently submitted a bill to the Wisconsin Legislature which had as its object the creation of a state commission whose duty would be to investigate

and inform itself on all matters relating to the organization of coöperative enterprises, give instruction by correspondence relative to coöperative production and distribution and furnish a news-service for disseminating information regarding crops, freight rates, commission men and consumers. Had it been carried into effect, this law would have been of vast benefit to all fruit organizations in the state and also to those growers who contemplate organization.

WISCONSIN FRUIT ORGANIZATIONS.

As previously stated, there are a number of coöperative fruit organizations in Wisconsin. The greater number of these are but recently organized. Two, however, the Wisconsin Cranberry Sales Co. and the Sparta Fruit Growers' Association have been in operation for a number of years. Both have attained marked success but the cranberry association is probably better known over the state as it operates over a larger area and practically controls the cranberry crop of Wisconsin. It has gained further prominence in that it was the first cranberry selling organization and largely through its efforts, cranberry growers of other states were induced to organize.

WISCONSIN CRANBERRY SALES CO.

This organization, the leading fruit association in the state, may be justly accorded equal rank with the great citrus and apple associations of the Pacific Slope. Farmers in the counties of Wood, Juneau and Jackson had been engaged in individual growing and marketing of cranberries for some time previous to the organization of the Wisconsin Cranberry Sales Co. With increased production, it became necessary to secure a wider distribution of product to lessen waste in marketing and to secure a medium through which the economic handling of fruit could be effected.

The Wisconsin Cranberry Sales Co. organized in 1908 at Grand Rapids, with a capital stock of $3500, divided into shares of $50.00 each. Every member is required to own at least one share of stock. Originally every member had one vote for each one-hundred barrels of cranberries sold through the Association, but later all members were given equal voice in the government of the Association. The officers are a president, secretary, or manager and treasurer.

The operation of the Association is not confined to the vicinity of Grand Rapids, but any grower living in the state may become a member by fulfilling the conditions as set forth in the constitution. Mr. J. A. Gaynor is secretary of the organization and it is largely due to his organizing genius that the Association commands its present high rank.

Soon after the Wisconsin association was organized, others were formed, one each in New Jersey and Massachusetts. Later the Wisconsin Cranberry Sales Co., the New Jersey Cranberry Sales Co., and the New England Cranberry Sales Co. united to form the American Cranberry Exchange with headquarters in New York City. These associations united to secure more uniform distribution of cranberries and to stimulate demand for cranberries by advertising. Each of the associations retains its own individual existence. The Wisconsin Sales Co. has no control over the New Jersey Co. should they put in poor berries, but it has control over the output of its own members. The central exchange sells only for the members of the Sales companies. It is possible, through a large central exchange like this, to get a better survey of market conditions, to prevent gluts and in short to effect a more economical means of distribution.

This Exchange was capitalized at $9000 and is managed by nine directors, four of whom are chosen by the New England Association, three by the New Jersey Association and two by the Wisconsin Association. All the business is handled by the Exchange which at present controls the sales of 80% of the cranberries grown in the United States. The Exchange remits 80% of the returns of the sales to each association, the remaining 20% being kept by the Exchange until the end of the season when, after deducting expenses and a small amount for a sinking fund, it is properly divided.

The manager and sales agent, A. U. Chaney, is hired from year to year at a salary of $12,000 and expenses. The Exchange did business amounting to $2,000,000 in 1912 and the product which is only cranberries, found markets in all portions of the United States.

Owing to the increase in business, it was found necessary to establish a sub-exchange at Chicago, which has advisory control over the Wisconsin Sales Co. The Wisconsin Sales Co. has handled over 85% of the cranberry crop of Wisconsin. Thirty thousand barrels of cranberries which returned to the fifty-odd growers an average of $6 per barrel, were marketed in 1911.

The individual growers deliver the product to the association warehouse where it is carefully graded and packed in barrels of uniform size, containing 100 qts. dry measure. Several inspectors are appointed to supervise the work in different sections of the state. The barrelled fruit is stored until the point of distribution is known, information regarding which is received from the Central Exchange. Car lots only are sent out and all business is on a strictly cash basis. No business is done with retailers, but the Association interferes in preventing retailers selling at exorbitant profits.

To facilitate tracing of irregularities in shipments, the following data is placed on the envelope that accompanies each car shipped:

Order No. ..... Car No. .....
Order Date ..... Car Initial .....
Car Ordered Date ..... Loading Date .....
Shipping Date ..... Date Inspected .....
Shipped From .....
Shipped To .....
Destination .....
Route .....
Condition of Car ..... Kind of Car .....

Shipped By
Wisconsin Cranberry Sales Co.
Grand Rapids, Wisconsin.

Bbls. *Brand Cranberries* *Packer No.*

Temperature loading point.

(a) Storage
(b) Berries in storage
(c) Car
(d) Berries in car
(e) Outside air when loaded
(f) Dew point

Weather conditions at destination.

Temperature of air
Temperature of car
Temperature of berries
Number of berries to cup
Weather at destination
Weather at time of harvesting
Weather at time of packing
Weather at time of shipping
Condition on arrival
Remarks

In a limited way, the Company controls the price, but it has found by experience that if the price is too high and is kept too high, a large part of the crop will remain unsold at the close of the marketing season, and the gain through the higher price on the part sold is less than the loss at the close of the season on account of the unsold berries. If, on the other hand, the organization puts the price too low and keeps it low, the berries may all be consumed before the marketing season is half over and later purchases cannot be supplied,

or if supplied, only at exorbitant prices. The Association has made both of these mistakes in the past and the problem that presents itself at the opening of each marketing season is: What price (a gradually advancing one) will distribute the crop over the whole marketing season so as to leave none unsold and cause no marked scarcity of this fruit near the close of the marketing season? A mistake either way results in loss to the growers and an injustice to the public. The question has often been asked, "How can the Association ascertain the effect of price on the quantity of cranberries that will be consumed?" J. A. Gaynor, the manager, has been endeavoring to solve this question by getting the opinions of a large number of cranberry retailers in the state. The Association intends to make and keep a record and an estimate of everything that has an influence on the demand for cranberries and at the close of the season, they propose to review and reëstimate the elements that influence demand. They will again estimate a price, a gradually advancing one; that would, had it been used, have distributed the supply over the entire marketing season of that year. The Association does not believe in fixing the price so low that speculators will be induced to take shipments to hold. The berries should go as directly as possible from grower to consumer and at least possible expense so that the consumer will get cheaper berries and the grower better prices.

The Association has had but little trouble with railroad companies, and demand a square deal in all transactions. It has reached a stage where dishonest brokers, commission men, and railroad companies can dictate but little. Through the united efforts of the Central Exchange at New York City and the Wisconsin Cranberry Sales Co., the following reductions in railroad rates have been secured on every car of 200 bushels.

$40 to California.
$72 to all northern Pacific points.
$60 to Winnipeg.
$12 to Minneapolis.
$24 to Milwaukee and Chicago.

This decided reduction has helped to open new territory for sale of Wisconsin cranberries.

An excellent feature of the Association is that different varieties and different priced berries can be shipped in the same car regardless of who raised them. Each barrel bears the number of the grower and as soon as a lot is loaded, the business of the grower ends. In this way small lots can be shipped at car-load rates and the jobbers get a variety in prices and quality to suit the trade.

SPARTA FRUIT GROWERS' ASSOCIATION.

The growers of small fruits in the vicinity of Sparta had for a long time been marketing their fruit at home or in the near-by towns. The increased production soon led to an over supply for the home trade and it was realized that outside markets were needed. Independent action could not accomplish much in this respect, and it became evident that coöperation would be the logical solution of the problem. Through the efforts of five or six of the leading growers of this section, the Sparta Fruit Growers' Association was organized in 1896, with headquarters at Sparta. This Association is one of the most typical and successful fruit growers' marketing organization in the state. Seventy-five farmers joined at the outset and 500 shares at $2 par value were sold. In 1909, there were 250 stockholders with $6,000 capital-stock, divided into 3000 shares. At present the Association has 285 members, all of whom own one or more shares.

As first organized, the Association had a rather crude constitution and by-laws. The members were given the privilege of selling fruit on the streets, and to any buyer who would make an offer. Besides, the grower could dictate as to what place his fruit should be shipped. The only restriction placed on the shipment was that in shipping to a city where the Association had an agent, the grower was to ship to the agent only. In 1906, a better constitution embodying better business principles was adopted. Since this change, shipments and yearly profits have been steadily increasing.

The receipts for four years beginning with 1906 were as follows:

1906	$32,000
1907	42,000
1908	55,000
1909	60,000

In four years, under the coöperative plan, the receipts had been doubled and the price of berries had advanced 100% due to splendid methods of grading and distribution.

The total receipts for 1909, which was a banner year, were $58,940.00, with only $3,156 for running expenses. During this year the Association shipped:

29,164	crates	strawberries at $1.21	$35,391.90
1,819	"	blueberries at $1.36	3,122.99
3,389	"	red raspberries at $1.86	6,336.12
1,633	"	black raspberries at $2.05	3,348.95
29	"	purple raspberries at $1.65	48.07
5,722	"	blackberries at $1.54	8,853.01
36	"	currants	49.57
4	"	huckle-berries at $1.21	4.88
37	"	plums at $.73	22.99

51	" cabbages at $.77	39.40
78	" tomatoes at $.46	35.88
1,314	baskets tomatoes at $.11	140.31
47	" canteloupes at $.44	21.09
3,153	bu. apples at $.49	1,560.84

In 1911, the Association shipped sixteen carloads of ungraded apples from Monroe county. Low prices were received, but the manager states that with proper grading and sorting, these apples would have netted far greater returns. The value of fruit marketed in 1911 was $50,000, and the expense was $2,900.

The officers of the organization are president, vice president, manager, treasurer, and six directors, all of whom are leading growers of the section. All members are pledged to obey the Association rules and disobedience results in suspension. The "one man, one vote" rule is upheld and strict adherence to this is followed.

It is through the efforts of the energetic and competent business manager that this Association has been brought to its present high standard. He keeps in touch with the leading markets and by a little careful advertising is able to let the buyers know that orders will be promptly filled. He receives quotations from different cities, knows conditions as to supply and demand, and is thereby able to profit by any change that may occur in any market to which the Association is shipping. He sends daily quotations to regular customers, and is in touch with other associations as to probable shipment, destinations and daily price.

Each grower delivers the fruit to the manager and gets a receipt for same after it is properly graded and inspected. If a person delivers 30 to 40 cases, the grader takes out 5 or 6 cases at random and grades these on the quality of the fruit in each case. Strawberries are graded into Choice, Extra Choice, Fancy and are designated by B, A and X respectively. The directors prescribe that each grower must stamp his number on the case. Each day's sales are treated as a unit and proceeds are distributed among the members according to the amount and quality of produce furnished. The Association has power to reject, at any time, all fruit in a bad condition.

A percentage of the receipts of all sales is withheld to meet the operating expenses and uncollected accounts. At the close of the season, any surplus money is paid to the members as pro rata dividend on their season's sales. The fruit is either sold on the open market, shipped out on standing orders to local dealers throughout the state or is consigned to reliable commission houses.

That the Association is operated on an economical basis is evinced by the fact that early in the season the number of acres of berries and probable yield is carefully estimated, and all fruit packages are ordered accordingly. It also furnishes other supplies to its members at a minimum cost.

The Association has had but little trouble with railroads and commission men, and the attitude of these agencies at present is a very important factor in the success of the organization. Good shipping facilities on both the Chicago and Northwestern and Chicago, Milwaukee and St. Paul railroads are offered.

The members of the Association feel that coöperative methods give them better distribution of products and a more equitable return than would be possible through independent action.

DOOR COUNTY FRUIT EXCHANGE.

That good fruit, especially apples and cherries, could be grown in Door county had been proved by farmers upwards of twenty-five years ago. Attention was first directed to the possibilities of Door county along commercial horticultural lines in 1892 when A. L. Hatch, a veteran fruit grower from Richland county and Prof. E. S. Goff of Madison visited the county for purposes of investigating the adaptability of soil and climate to the successful production of apples, cherries and small fruits. They were convinced that this was an ideal location for the growing of the above named fruits. Mr. Hatch planted extensively and induced other people to enter into fruit growing on a commercial scale.

It was found that conditions for cherry growing were especially favorable and during the last five yeafs, extensive plantings of the cherry have been made. The soil is a warm, strong, clay loam, underlaid with limestone rock and has good air and water drainage. Favorable climate is the important factor in making it the successful cherry region that it is. In the spring, the cold winds from Lake Michigan retard development of the buds until all danger of frosts has passed. In the southern portion of the state this condition does not prevail, and the tender growth stimulated by warm weather, often succumbs to the late spring frosts. These favorable conditions for fruit culture induced many people to enter this business and soon the crops produced were greater than could be disposed of locally at remunerative prices. Individual selling in distant markets proved disastrous and it became evident that better means of marketing were necessary. In 1910, a number of energetic growers organized and incorporated the Door County Fruit Exchange with headquarters at Sturgeon Bay. That this was a wise move, has been evinced by the rapid growth and marked success of the organization in handling fruit.

The Association has a president, vice president, secretary, treasurer and a board of nine directors, three of whom are elected each year for a term of three years. The directors for the most part are the leading fruit growers. The capital is $1,000, the par value being

$50 per share. The by-laws limit the number of shares that each grower may hold. Each member has one vote and this assures equality of voice in administration. The organization declares no dividends, making only sufficient charge for handling the fruit to meet the operating expenses and provide a small sinking fund. If losses are sustained in marketing any fruit, the entire amount of that particular fruit handled during the year, bears the loss pro rata, thus rendering the loss of any one grower small. The Association handles the fruit of its members only.

Cherries, strawberries, plums, apples, currants, gooseberries and raspberries are handled. The Early Richmond cherry is grown most extensively and a ready market is secured as this variety is used largely for culinary and canning purposes.

The Association sold the following amounts of fruit during the season of 1912.

Cherries, 17,663 cases	$27,487.36
Strawberries, 16,017 cases	17,989.03
Currants, 1,914 cases	1,491.90
Gooseberries, 672 cases	726.25
Raspberries, 68 cases	112.20
Plums, 1,000 baskets	250.00
Apples, 942 barrels	2,000.00

The total receipts were over $50,000.

The past year was the best in the history of the organization. The yield of cherries was about double that of the preceding year, considering the larger sized crates and boxes and brought the grower an average price of $1.55 per case, the best in the history of the Exchange. The Door County Fruit Exchange marketed more fruit in 1912 than any other exchange in the state and at better average prices, with less expense in marketing.

The fruit is packed by the grower, except the apples which are handled at the warehouse. The fruit is delivered to the warehouse or to the dock, as the manager may direct, and the grower receives a receipt for the number of cases delivered. Each day's sales are closed by themselves and payments are made on the prices received the day on which the fruit is delivered. No attempt has been made to grade fruit, but steps to this end, no doubt, will soon be taken. If a poor lot is received, the grower is docked accordingly. Each grower is obliged to have his number stamped on each case of fruit delivered. If a complaint, referring to this number, is entered by the buyer, the grower is docked whatever the Association is docked by the buyer.

Markets are secured by the manager by a liberal use of the telephone and the telegraph, although some buyers come to the Association and buy direct. Markets are found throughout Wisconsin and

Minnesota. The larger shipments go to Minneapolis, St. Paul, Milwaukee and Chicago. Little advertising has been done by the organization, but it has found no trouble in disposing of its products. The Association has experienced but little difficulty with railroads and commission men.

The members are satisfied that the exchange is securing better results for them than could be secured by individual selling. There has been some slight dissatisfaction which was largely due to minor differences and in no wise does it menace the success of the Exchange. The prospects for a successful continuation and increase in size of the organization are very bright.

BAYFIELD PENINSULA FRUIT SHIPPERS' ASSOCIATION.

Although fruit has been grown in home orchards in the Bayfield section for a long time, its commercial culture has developed only in recent years. Like Door county, this region is favorably located for the production of cherries, strawberries, apples and cane fruits. The late spring, induced by proximity to Lake Superior, retards bud development and hence there is but little danger of late spring frosts. As more growers entered the fruit industry, more fruit was put upon the home market than could be consumed. This led to low prices, and to general discouragement among the growers. It became evident that outside markets must be found and this could be affected only through a fruit association. This led to the organization of the Bayfield Fruit Shippers' Association in 1910 at Bayfield. The capital was $4,000, but this was increased to $10,000 at the annual meeting in 1912. The par value of stock is $1 per share. $5,000 worth of stock has been sold up to the present time.

Mr. Kern, the manager of the Association, gives the following statement regarding the early history of the organization. "I found 66 men banded together by articles of coöperation at Bayfield, known as the Bayfield Fruit Shippers' Association with a working capital of $203.00 with which to pay office rent, salary of manager, to buy books, stationery, office furniture and pay other incidental expenses. Regardless of this I went into the work with heart and soul although at a great disadvantage for a considerable time." Much credit is due Mr. Kern for the efficient manner in which he brought the Association from a weak organization to what is now one of the best organized, best equipped, and most prosperous in Wisconsin.

The first crop shipped by the Association was in 1910. In 1911, 12,532 cases of strawberries at $1.51 per case were marketed. The members paid 10% of the receipts to the Association, which stimulated a feeling of prosperity and financial success.

The Association had a most prosperous season in 1912, handling:

26,974	cases strawberries	$30,000.00
510	" raspberries	775.00
233	" black raspberries	340.00
635	" blackberries	540.00
464	" cherries	685.00
110	" gooseberries	130.00
920	" currants	785.00
113	" plums	105.00
2,315	" blueberries	3,616.00
74	crates green tomatoes	35.00
84	" ripe tomatoes	48.00
32	baskets cauliflower	32.00
104	boxes string beans	41.00
1,510	" (stand bu.) apples	1,330.00
	Potatoes	7,000.00

The manager holds office for the entire year and thus is better able to attend to the minor details of the working machinery which would be overlooked if a part-time manager were appointed. The Association has a president, vice president, secretary and treasurer. Nine directors are chosen for a term of three years, three being elected at each annual meeting.

In addition to handling apples, strawberries, cherries and small fruits, the Association handles all kinds of produce, including grain, hay, feed, seeds and potatoes. Strawberries have been most profitable, but tree fruits, especially cherries, will soon hold a prominent place in the shipments.

The growers deliver the fruit to the Association warehouse or car. Here it is graded by a competent inspector who issues a receipt showing the amount and grade. No label is used except the association stamp bearing the grower's number. Packing is supervised by the grower or some one whom he designates. Each grower is obliged to have his name or number stenciled, printed or marked on each shipping package delivered to the Association. Each day's sales are treated as an entirety and are prorated according to grade. The fruit or produce of any member may be rejected at any time if found to be in an unmarketable condition, or packed with an intent to defraud.

The Association has endeavored to establish a retail trade, but up to the present time this has been only by correspondence. The manager calls on the wholesale trade after the crop is assured, and arranges with different houses to handle as much of the product as their trade requires. The plan is to sell outright as much as possible. There is some conflict between the retail trade and the wholesale dealers' market. This the Association tries to guard against as much as possible, but caters to the retail trade as better prices are forthcoming from this source. The Association sells for non-members, charging a commission, but does not buy fruit outright either from members or non-members.

The only advertising done by the Association is with stationery and with the quality of fruit put on the market. The "B" grades have been, up to this time, loaded in cars and consigned to commission men, who give returns based on the grade delivered. The organization has been rather well satisfied with this method, but during the coming season will be more rigid and will make a wider difference in the value of grades.

The Association has fairly good freight service to St. Paul, Minneapolis and Duluth, to which points most of the fruit is shipped. Serious trouble has occasionally resulted on connecting lines, due to delay at terminals. The Omaha railroad and American Express furnish transportation facilities, but the Association has arranged with the Western Express Co. for boat service to Ashland which will greatly increase shipping facilities.

ALMA CENTER FRUIT GROWERS' ASSOCIATION.

Previous to the organization of this Association, there were not more than four or five commercial growers of strawberries in the vicinity of Alma Center. One of these had been growing truck crops and berries for the local markets for a number of years. Others entered the business, and it was soon realized that all would lose money unless markets were extended. Coöperation seemed, to all except the one original grower, who because of narrowness of mind, insisted that the whole business belonged to himself, to be the only solution.

The Association was incorporated under the laws of Wisconsin in the spring of 1910 with a capitalization of $500, comprised of 250 shares at $2 each. The Association at present has 91 members holding 216 shares of stock. Included in this number is the obstinate member who was given the privilege of selling as many berries as he could in his own name. In making this agreement, the Association made a mistake. It has now the difficult task of changing its by-laws and compelling all members to be loyal to the Association.

When the Association first started, it was recommended that it join with Merrillan, four miles away, since that point was a railroad junction and could furnish better shipping facilities. Organizations, however, were started at each place and experience is proving the wisdom of such action. The two associations are on the most friendly terms and work together. The Alma Center Association has the advantage of better territory west of it, and the good resulting from it reaches a larger number. In addition, it is a benefit to the village and territory surrounding it.

Mr. G. M. Breakey, manager of the Association, believes in a larger number of local organizations with a large central selling exchange to govern the locals, prevent glutting and assist in distribution. Mr.

Breakey further contends that methods of distribution in the United States are deplorable and will not be much better so long as express and railroad companies continue to dictate. The following is an example of their unjust discrimination which the Alma Center Association has to meet.

The rate on refrigerator cars from Alma Center to Duluth is $88.00 while the rate from Merrillan Junction, only four miles distant, is $56.00. The rate from Alma Center to Merrillan is $9.00; hence the Association is compelled to bill a car twice and besides, the manager must be present to do the rebilling. Express companies will not furnish a refrigerator car to ship off this line, but advise the Association to consign to the commission house at St. Paul which can obtain service to any point on or off the line. Under existing conditions, the organization has had best results in consigning car lots to one reliable commission firm and in keeping them informed regarding all shipments.

The following is the amount of fruit marketed and price received since the organization was perfected:

1910, 2,000 cases strawberries at $1.15 net.

1911, 8,347 cases of strawberries at $1.00 net.

1912, 5,442 cases of strawberries at $.97½ net.

The first year's operating expense was 7% of receipts, while that of the last two years was 5%. Net receipts, less percentage for operating expenses, are prorated to growers.

The grower delivers his berries to the car and receives a receipt showing number of cases and grade. Whenever the pay for all sales in any lot is received, the total net amount less 5% for expenses is prorated to the grower's account. Each grower may, according to the by-laws, draw out his full amount less 10%, which is held back for emergencies, until the end of the season, when all expenses are figured and charged to growers. The balance is paid to him at time of final settlement of accounts. The by-laws provide for three grades of berries which are X, A and B and in prorating, a difference of 25 cents per grade is made. A certain standard for "A" grade for each lot is determined by the inspector. Mr. C. may deliver 30 cases averaging a little better, in which case the inspector will allow him enough "X" grade to equalize the difference. Mr. E. may have 20 cases averaging under "A" grade. His receipt will show enough "B" grade to equalize. If there is any fruit offered which the inspector considers unfit for shipment, it is consigned totally as a special lot and the grower accepts actual returns less expenses.

The association has not used labels on their cases, but use a stamp, giving name and address of the Association as well as the grower's number which greatly facilitates the tracing of irregularities. The

organization furnishes crates to the members at net cost. Although not very old, this Association has been instrumental in securing reasonable profits to growers, increased business for local merchants and better distribution of products.

BAYFIELD COUNTY FARMERS' AND FRUIT GROWERS' ASSOCIATION.

The Bayfield County Farmers' and Fruit Growers' Association was organized at Washburn, March 9, 1912, with a capitalization of $10,000. Stock is sold at $1 par value and purchases are limited to $100. No business was done during 1912 with the exception of building a warehouse at a cost of $500. In addition to handling the fruit crop, the Association will handle all kinds of farm produce as well as flour, feed, seed grains and farm machinery.

Mr. Morgan, the manager, states that the Association expects to buy outright from the stockholders but will sell on commission for others, recharging a light rental above the cost of handling. Growers will receive their pay when the Association receives remittances for the goods sold. Rebates will be determined at the end of the year after paying a dividend of 6% on the stock. All expenses of operation will be deducted and if there is any money left, it will be divided pro rata among the stockholders who have purchased goods from the Association during the year, in proportion to the amount of business that each contributes. The Association expects to assist the growers greatly in effecting better means of fruit distribution and to instill a general spirit of coöperation among its members.

MERRILLAN FRUIT GROWERS' ASSOCIATION.

The growers of Merrillan faced to a large extent, the same problems of transportation, distribution and economical handling of fruits which confronted the Alma Center growers. To better meet these conditions, the Merrillan Fruit Growers' Association was organized in 1910.

Strawberries comprise the bulk of the fruit handled by the Association. All berries are delivered by the growers, to the Association warehouse where each package is stamped with the Association stamp and also the number of the grower. In this way poor quality stock can be traced to the grower who brought it in. This method is an incentive to good packing. A small amount is retained from the grower's receipts, to constitute a sinking fund.

Markets are secured by letters, telegraphs, telephone and personal visits by the manager. Best results were obtained when this work was carried on throughout the year. Car lots go mostly to the larger cities in Wisconsin and Minnesota. Advertising is done by distributing cards and letters to dealers before the season opens.

The manager holds office for the entire year, attends to the collecting and shipping of fruit, secures markets, and fulfills any other duties that the board of directors may require. The Association has suffered but little trouble with commission men and railroads.

The organization is in good standing with the merchants but not entirely so with a few citizens, who, previous to the establishment of the Association, could buy berries on the street for 50 cents per case. No grower now peddles berries and the citizens are compelled to pay the market price. The Association buys crates in car lots for members and saves them a considerable amount each year. This organization, though young, has accomplished much towards the solution of the marketing problem in this section.

The Coöperative Fruit Associations of Wisconsin have done a great deal to promote the welfare of the fruit industry of this state, but there are a variety of ways in which they may bring about greater results in the future than they have in the past. They may prove effective in this respect by stimulating a judicious advertising of the fruits of each section. In the clothes industry the manufacturers regulate the styles and popularize them by skillful advertising. This can be done equally as well by fruit associations. Hood River apples, for instance, sell for twenty-five cents each, not because of their superior quality, but because of organized advertising which has educated a certain class of consumers to demand such apples at any price. Such advertising has been supplemented by proper growing, packing, and all the details of careful marketing. The same fruit, without advertising, would never have made land in the Hood River Valley worth hundreds of dollars per acre. Hood River Valley has turned the balance in its favor by making Hood River apples popular. Fruit eating must be popularized. Make the eating of fruit as popular as breakfast foods, pork and beans. This problem is not to be solved by one man, but by the united action of fruit associations. Advertise your fruit.

The fruit associations can further bring their influence to bear in the establishment of a Central Exchange or a State Coöperative Bureau in connection with the College of Agriculture. Such a bureau could examine local difficulties in the methods of marketing, help find markets, report condition of crops and fruit and crop movement from producing points to leading markets, keep a list of reliable commission men dealing in fruits and other farm products, and formulate an estimate of the supply of fruits and vegetables in the principal markets.

The Association should also strive to establish a few standard varieties of fruit in each section and establish a reputation of that section for a particular variety. Why cannot the Wisconsin Fruit Associations follow the examples of Community Live Stock Breeders'

Associations which have done so much to further the interest of their industry by developing certain definite breeds for certain sections? Up-to-date methods of culture and spraying should be stimulated by the associations. Further, they should encourage the passage of a law to compel farmers to spray the neglected home orchards against insect pests and fungous diseases. The use of fancy corrugated paper boxes should also be stimulated. Apples could be shipped for a considerable distance in these packages and would bring fancy prices at the large restaurants and hotels.

The Association may also serve as an agency for creating a more perfect social and business relationship between the inhabitants of the neighborhood in which it exists. It can justly be conceded that success has at last crowned the efforts of the hundreds of growers who have entered into the true spirit of coöperation. The most conservative will advocate a continuance of the coöperative movement which has accomplished, in its various applications, so much for both producer and consumer.

VARIETAL DISEASE RESISTANCE OF THE PEAR AND APPLE.

By ANDREW NELSON PORTMAN.

A Thesis Submitted for the Degree of Bachelor of Science in Agriculture, University of Wisconsin, 1912.

INTRODUCTION.

This work was taken up at the suggestion of Prof. L. R. Jones, due to the fact that no attempt had yet been made toward a collection of such information as is embodied here. The available information is the result of work and observation by many, and is scattered all through horticultural literature in a decidedly fragmentary form.

The importance of a collection of information of this sort is that it provides for all interested in practical horticulture a source of ready reference and obviates the necessity of an extended search. It should enable planters and nurserymen to avoid setting out varieties susceptible to diseases prevalent in their community, and call the attention of the established orchardist to the degree of susceptibility, thus enabling him to determine the care and attention necessary for whatever varieties he may be interested in.

The knowledge here embodied has been obtained from experiments and field observations recorded in the bulletins of the various stations, and in a small measure from growers' personal experience. The source of information has in each case been carefully cited.

There are several causes for difference in susceptibility, among them being variations in climate and soil, different methods of culture, the location and exposure of the orchard, and the presence of wild fungous hosts. Some varieties have inherited a resistance or protective quality developed as a result of the struggle for existence with the invading parasite.

FIRE BLIGHT.

Description.

This disease also known as pear blight, twig blight, blossom blight, and other similar names has been known in the United States for more than a century. It was first known in the eastern states, and by reason of its being there longest established is worse in that section, although the disease has long been bad in the middle west. In Illinois a severe attack occurred about 1880–90. In the far West and Southwest it has since become an important bacterial disease, and is certainly distributed throughout the United States at present. So far as is known it does not occur in Europe or Asia.

The disease is made noticeable by the wilting and blackening of blossoms and tips, and the subsequent blackening and shrinking of the older twigs and branches as the disease progresses. In some cases the bark is broken and a gummy exudate is given forth, which varies in color from a milky white to brown or black.

This disease known to even the earliest horticulturists of the eastern states has been attributed to several causes, such as insect attack, climatic and soil influences, and atmospheric disturbances. It was not until 1888 that Professor Burill of Illinois, discovered that fire blight was due to an organism known as *Bacillus amylovorus*, thus disclosing the true cause.

This disease attacks the pear worse than the apple, and the more rapidly growing varieties of either fruit suffer the worst. The application of much nitrogenous fertilizers which tends to force excessive wood growth should be avoided, as this renders the tree more liable to blight. Winter pruning also tends to induce wood growth and so is sometimes omitted.

A tree that stands in well cultivated land is more susceptible than one that is growing in sod or untilled land. Good tillage is usually necessary for growth, especially with the pear, but the vigor necessary for the proper development of fruit also makes the tree more susceptible to blight. The lack of tillage makes for short growth and small fruit, but makes the tree better able to withstand the blight.

Control measures consist in pruning out all areas where the blight may winter over. If this is done thoroughly no opportunity is afforded for infection the following season. It is very important to observe antiseptic precautions in the cutting out of infected areas.

The above facts apply to both the pear and apple, and to the other hosts of this disease, the quince, wild crabs and hawthorn, and less frequently the plum.

RELATIVE RESISTANCE OF VARIETIES TO FIRE BLIGHT.

Resistance of the Apple.

As has been stated this disease has long been known to horticulturists, and differences in varietal resistance were probably noticed, but it was not until comparatively recently that the real cause was discovered. Consequently reliable observations regarding this difference in resistance have all been made since that time.

Wisconsin. One of the most recent attempts to gather information of that sort was made in the spring of 1911 when H. D. White, in connection with his senior thesis at the University of Wisconsin, sent out letters to twenty-five growers throughout the state. Of the questions asked in these letters the one pertinent to this discussion was,"What varieties of apples are most susceptible to fire blight?" Out of the twenty replies received to this question twelve stated that the Yellow Transparent was the most susceptible to blight, while the remaining eight named the Wealthy. A. L. Hatch of Sturgeon Bay claimed that the Alexander was so badly attacked that he was forced to give it up, and also mentioned Switzer and Yellow Transparent as very susceptible.

The name of the grower, his locality, and the varieties named as susceptible in that district are given in the following tabulation based on the replies received by Mr. White:

Name and address of growers.	Yellow Transparent.	Wealthy.	McMahon.	Duchess.	Northwestern Greening.	Alexander.	Wind-or.	Fameuse.	Longfield.	Lowell.	Red Astrachan.	Twenty Ounce.	Sutton's Beauty.	Russet.	Tolman Sweet.
A. D. Barnes, Waupaca						+									
A. K. Bassett, Baraboo	+														
P. T. Gillette, Antigo		+		+											
T. H. Harris, Medford	+														
A. L. Hatch Sturgeon Bay			+				+						+		
John Howie, Waunakee				+		+	+							+	
H. Kaufman, Marshfield	+	+			+										
G. J. Kellog, Lake Mills	+				+										
M. S. Kellog, Janesville	+							+							
A. N. Kelly, Mineral Pt		+							+						
T. E. Loope, Eureka		+													
H. C. Melcher, Oconomowoc	+		+												
L. E. Montgomery, Reedsburg		+													
W. J. Moyle, Union Grove	+									+	+	+			
F. Muhlkamp, Sparta	+														-+
J. S. Palmer, Baraboo	+	+													
L. H. Palmer, Baraboo															
John Reis, Ithaca	+		+												
Jas. Riley, Bloom City		+	+												
E. G. Tulledge, Oakfield	+														

The writer conferred with Mr. Frederic Cranefield, secretary of the Wisconsin Horticultural Society regarding the above list, and it was his opinion that the Northwestern Greening was somewhat more susceptible than indicated, and also considered the McMahon susceptible especially to twig blight. Mr. Cranefield stated that the Duchess was rarely or never attacked, the Russet was comparatively free, and the Hibernal was absolutely resistant.

Mr. Cranefield's opinion regarding the following varieties was: Yellow Transparent, Windsor, Switzer, and Transcendent Crab are especially susceptible; the Patten Greening is moderately susceptible; and the Wolf River is resistant. Among the oldest trees in Wisconsin, some of them fifty or sixty years old, are found the Plum Cider, Tolman Sweet, Golden Russet, and Fameuse, thus showing that these varieties are especially resistant. These varieties then are listed accordingly by Mr. Cranefield as follows:

Susceptible.	Resistant.
Yellow Transparent	Wolf River
Windsor	Plum Cider
Switzer	Tolman Sweet
Transcendent	Golden Russet
McMahon	Fameuse
Mod. Susceptible.	Hibernal
Patten Greening	Duchess
Northwestern Greening	

General. According to Waite (1905:137), apples have suffered less damage in the older sections of New York, New England, and Michigan, but Spitzenberg, Newton Pippin, and Ben Davis have been very badly blighted. With the Russian varieties such as Yellow Transparent, Alexander and Red Astrachen the disease has even entirely killed the young trees.

By other observers, (Stevens and Hall, 1910:80) the Ben Davis is mentioned as almost entirely resistant, the Celestia, Buckingham, Mammoth Black Twig, White Winter Pearmain, and Winesap as resistant, while they consider the Lowell, Isham, Smith Cider, and Yellow Transparent especially susceptible. In general they consider the crab varieties more susceptible than others.

In his report to the Canadian Fruit Growers' Association in 1910, D. H. Jones said: "The Russian varieties have much more canker (due to blight) than the Russets." Large cankers exhibited by Jones at that time were on Russian varieties. "We have the Roman Stem and other varieties, but all cankers exhibited starting in the body and on the larger limbs were on the Russian varieties."

According to Duggar (1909:123) there is little difference in resistance among varieties of apple, nearly all the standard varieties being more or less affected.

A letter from M. B. Waite, the orchard disease expert of the United States Bureau of Plant Industry, (March, 1912) says: "The Newton Pippin is not proving to be a very susceptible variety in the Appalachian Mountain orchards—in fact we have come to consider it as one of the more resistant sorts. The Winesap which is extensively grown in Virginia varies enormously—some years it has been remarkably susceptible, particularly to blossom blight, while other years it has been comparatively uninjured. York Imperial, a leading variety, and Missouri Pippin, occasionally grown, have suffered extensively. The Grimes Golden is a particularly susceptible variety in the Eastern States. Yellow Transparent, White Astrachen, Alexander, and certain other Russians are very susceptible. The Red Astrachen and Duchess are only moderately so."

In connection with this work the writer sent out a letter in March, 1912, to fifteen growers in various parts of Wisconsin. From ten replies received the varieties, regarding which information was sought, have been listed as found below. This list agrees, with but a slight variation, the Tolman Sweet, with the opinion of Mr. Cranefield, whose observations are based on large experience.

Susceptible.	Mod. Susceptible.	Resistant.
McMahon	Wealthy	Duchess
Windsor Chief	Fameuse	McIntosh
Patten's Greening	Tetofsky	Plum Cider
Yellow Transparent	Ben Davis	Wolf River
Pewaukee	Longfield	
	Tolman Sweet	

From the foregoing observations it seems to be agreed that the crab varieties, with the exception of the Hibernal are more susceptible than the standard apple. Of the latter sort it seems generally agreed that the Alexander, Yellow Transparent, Wealthy, and McMahon are among the most susceptible varieties, while the Plum Cider, Golden Russet, Fameuse, and Duchess are held to be the most resistant.

RESISTANCE OF PEARS.

A large part of the commercial varieties of pear are quite susceptible to blight. Those varieties affected seriously are more uniformly susceptible than is the case with the apple, that is, a variety susceptible in one region is about equally so in another. The fact of their degree of resistance is quite definitely established, different observers agreeing as to that question as is shown in this discussion.

In the above mentioned letter, M. B. Waite says regarding pears, that the LeConte is one of the more susceptible of the Oriental hybrids. "It is not, however, nearly as susceptible as are the commoner varieties of the Pyrus communis group, such as the Bartlett, Manning's Eliza-

beth, Clapp's Favorite, Anjon, Lawrence, Comice, Bosc, etc. The average of the Oriental hybrids is much better as to resistance, the Kieffer being so resistant that its culture is a great deal easier even in the Gulf Coast States than any other prominent commercial variety."

Waite also has stated (1905: 137) that in states south of New Jersey and Delaware the Bartlett is abandoned, except in a few mountain localities. The Orientals are extensively grown in these localities but have sometimes suffered severely. The LeConte, an early pear in the southern states after very extensive planting, was almost wiped out.

It is possible to top-work the Bartlett on Winter Nelis, Kieffer, LeConte and other resistant varieties. It is usual in such practice for the Bartlett stock to blight to the graft and then stop.

Five authorities consulted, alike declared the Duchess, Anjon, Angouleme, Kieffer and Seckel are the more resistant varieties, and named the Bartlett, Clapp's Favorite and Flemish Beauty as susceptible varieties.

There is a decided agreement as to the resistance of pear varieties to fire blight. The Bartlett, the best known and most demanded of the commercial varieties, is agreed upon as the most susceptible. The Kieffer, a newer oriental variety producing a choice fruit is generally considered quite resistant.

SCAB.

Description.

The scab on apple and pear is widely distributed in the United States and occurs in all countries where these fruits are commercially grown. Regions with cool, moist weather either in spring or summer are liable to be troubled with it; hot winds suppress the disease.

The fungi causing the scab of apple and that of pear are very closely related, although generally referred to as two distinct species. The apple scab organism is known as *Venturia Pomi*, and that connected with the pear scab as *Venturia Pyrina*.

The casual fungus occurs on the fruit and leaves, also on leaf stalks, flowers and twigs. In bad epidemics considerable curling of the leaves may result. Upon the fruit circular green spots are produced, the epidermis being killed as the fungus spreads and the dark, scabby spots are later produced.

For control of scab at least one spraying should be given before blossoming. Differences in treatment arise according to differences in climate, but the general method is much the same. A second spraying should be given immediately after the petals fall, and at least one more two weeks after the second. Conditions, however, must determine the length of time intervening and the number of applications.

RELATIVE RESISTANCE OF VARIETIES TO SCAB.

Resistance of the Apple.

Regarding scab on the apple Duggar says (1909:267), "There are probably no varieties of (pear or) apple which are entirely free from scab. Nevertheless there is a great difference in susceptibility. The susceptibility of different varieties of apple to the scab seems to vary considerably according to the region in which grown, yet nearly all of the standard varieties may be affected during seasons favorable to the fungus."

R. A. Emerson (1905:9) of Nebraska states that from the behavior of young trees in the experiment station orchards, Oldenburg, Whitney, Wealthy, Salome, and Patten Greening might be said to be almost perfectly free from scab. Red Astrachen, Windsor, Jonathan, Ingram, York Imperial, Ben Davis, Gano, Northwestern, Missouri Pippin, Iowa Blush, and Grimes Golden might be called fairly resistant, while Winesap, Mammoth, Black Twig, Sheriff, Ralls Genet, Virginia Beauty, Red June and Northern Spy would be regarded as very susceptible to scab.

Stevens and Hall (1910:74) say that the Snow, Spitzenberg, Maiden Blush and Twenty Ounce are more susceptible than the Baldwin, and put Golden Russet and Hubbardston among the most resistant varieties.

In investigating the relation of color to scab resistance Erikkson (1911:129) said his experience in Southern Sweden led him to conclude that red apples are more susceptible. All varieties of Winterkalvill and the Rosenhager are very susceptible. Red and White Kalvill are also susceptible to scab on leaf (Stockholm 1884), the Red Winterkalvill suffering worst among thirty varieties near Malmo, Sweden. Therefore the red pigment is of no value in resisting disease.

Wisconsin grown apples may be classified about as follows according to replies received from growers to the author's letter mentioned previously under Fire Blight on the Apple. Susceptible varieties are Fameuse and Pewaukee, those moderately susceptible are Wealthy, McMahon, McIntosh, Plum Cider, Windsor, Chief, Wolf River, Ben Davis, Patten's Greening, Longfield, and Tolman Sweet; the resistant varieties are Duchess, Tetofsky and Yellow Transparent.

RESISTANCE OF THE PEAR.

Some varieties as will be seen, are more resistant than others, but apparently none of the commercially grown varieties are entirely free from scab.

In New York (Duggar, 1898:619) it is generally reported that LeConte, Kieffer, and Bartlett are less attacked than such varieties as

Anjon, Lawrence, Duchess, Clairgeau, Sheldon, Seckel, Summer, Doyenne, Flemish Beauty and Jones.

Waite makes a general list (1900:388); "thick-skinned and therefore more resistant" varieties are Angouleme, Kieffer, Lawrence, Clairgeau, Howell, LeConte, while the more susceptible varieties are Flemish Beauty, Seckel, and White Doyenne.

In Michigan the Flemish Beauty, Seckel, and Summer Doyenne are especially subject to this disease.

APPLE RUST.

Description.

The fungus, *Gymnosporangium macropus*, causing this disease produces the cedar apples and occurs practically throughout the range of the red cedar and its other hosts.

If the infection is severe, injury is sometimes done to the leaves, but it affects the fruit most seriously. The fungus is more common in humid regions, being noticeably abundant in the apple growing regions of the eastern Appalachians and in the South.

The disease first evidences itself as yellow spots on the upper surface of the leaves, that soon turn black. After some weeks a spore-bearing cushion is formed on the under surface of the infected spot, from which small tubes project. These tubes soon split and curl back on the leaf. The fungous spores from the apple leaves are scattered by the wind, those falling upon red cedar trees developing. Similarly the spores are liberated from the cedar trees in the spring, and only those develop that fall upon the apple.

No entirely satisfactory spray control has yet been discovered. Lime-sulphur is fairly valuable; Bordeaux is better, but far from successful. The date of the application is of more importance than the character and strength of the spray.

The most satisfactory method is to remove the red cedar trees in the vicinity of the orchards, and in vicinities where it is impossible to exterminate the red cedar the planting of susceptible varieties should be avoided.

RELATIVE RESISTANCE OF VARIETIES TO RUST.

RESISTANCE OF THE APPLE.

Duggar (1910:425) says that apples differ greatly in their degree of susceptibility. In the far West, crosses between the wild crab apple and the cultivated species have given some forms peculiarly susceptible.

Gidding's article (1911) says: "Some apples are more resistant to disease rust than others, and the degree of resistance which any variety

shows seems to vary quite widely in different sections of the country." He mentions Grimes Golden as practically immune in West Virginia, while Ben Davis, York Imperial, Smokehouse, and Rome Beauty suffer about in the order named. Varieties especially resistant in other states are McIntosh, Yellow Transparent, Gravenstein, Red Astrachen, Grimes Golden, Winesap, Sweet June, and Maiden Blush. He further records the fact that some western states report York Imperial and Ben Davis as resistant, but they are quite susceptible in West Virginia. There the York Imperial foliage is severely infected, the fruit but slightly; Ben Davis showed much worse infection on fruit.

Stevens and Hall (1910:80) name as resistant varieties: Duchess, Sweet June, Yellow Transparent, Red Astrachan, Ben Davis, Maiden Blush, Winesap, Oldenburg, Gano, York Imperial. Those more susceptible are: Wealthy, Red June, Whitney, Jonathan, Missouri Pippin, Prairie Crab.

In New York (Stewart, 1910:316) in 1909 and 1910 Wealthy and Jonathan were reported as affected. Baldwin, in 1902-4 was entirely free, while adjacent Russet and Ben Davis were infected. Ben Davis and Rome were particularly bad in 1909. A four-year-old orchard in 1909 showed the following: Wealthy, Boiken and Rome were very rusty; Hubbardston and Sutton were slightly affected; while McIntosh, Yellow Transparent, Gravenstein, Red Astrachan, and Oldenburg were nearly or quite free from rust. * * * *

Mr. Kellogg of Lake Mills, Wisconsin, (August 1911) reports Wealthy as susceptible to rust, Sweet Wine and Jonathan moderately so, and considers the following resistant: Tolman Sweet, Hubbardston, Nonesuch, Shield's Crab, Hyslop, German, Gideon, Wolf River, Northwestern Greening, Longfield, Plum Cider, Hamilton, William's Favorite, Bailey's Sweet, Virginia Crab, Pewaukee, Hyde's King, Gem City, Yellow Transparent.

From the above observations there seems to be the greatest agreement on the two varieties, Jonathan and Wealthy as susceptible. Those varieties most widely mentioned as especially resistant are: Yellow Transparent, Red Astrachan, Maiden's Blush and McIntosh.

BORDEAUX INJURY.

Regarding Bordeaux injury to apples Hedrick (1907:142) says: "The damage is severe some seasons and in others scarcely occurs at all; in some localities in a certain season and not in others; in some orchards and not in others treated the same; it occurs in dry or wet seasons; and parts of the tree may be uninjured. There is a difference in individual susceptibility; some seasons it is more severe on the fruit, others on the foliage. A variety with immune fruit may have susceptible foliage. The most thrifty, best-kept orchards in which

foliage is abundant and healthy seem most susceptible to Bordeaux injury."

BITTER PIT OF APPLE.

The following on the bitter pit of apple was prepared by Evans (1909:9) of South Africa: "It is practically impossible to make an accurate statement regarding the relative immunity or otherwise of the many varieties of apples now grown in South Africa, for it is of no uncommon occurrence to find that varieties which are clean one season become badly spotted the next."

BITTER ROT.

Duggar (1909:274) says of bitter rot that it is unquestionably the most destructive apple disease of the chief growing districts of the United States. "In some sections it is reported more commonly upon Ben Davis and Grimes Golden, but this may be more particularly due to the fact that these varieties were more generally grown in the regions for which the report was made. The fungus is, in fact, notably unrestricted as to host."

Longyear (1904:10) says that bitter rot is very destructive in some of the more southern states, being especially bad in southern Illinois, where it is the chief apple rot. It is uncommon in Michigan, but has been found on Pennock's Red (stored) and on packed Greenings. Ben Davis and Grimes Golden are recorded as the varieties most subject to this disease in Illinois. * * * *

FRUIT SPOT OF APPLE.

(*Cylindrosporium Pomi*).

Duggar (1909:341) says of this disease: "The Baldwin is especially susceptible but nearly every New England variety is more or less affected. In New York the Spitzenberg and Twenty Ounce are mentioned as the most susceptible varieties of apple to the limb canker, while Baldwin, Wagener, Greening, and King follow in the order given; the Tolman Sweet was reported practically resistant."

PEAR LEAF-BLIGHT.

(*Entomosporium Macalatum*).

According to Waite (1900:388) the Oriental varieties are particularly resistant to pear leaf-blight, especially the Kieffer; in the Gulf States, however, the Le Conte often becomes defoliated by it. Of the European varieties, the Lawrence seems to be especially free from it in Mary-

land and Virginia. Bartlett, Howell, and the ordinary European varieties suffer with it severely. The Duchess is also mentioned by Duggar as one of the most resistant varieties.

SOOTY BLOTCH AND FLY SPECK OF THE APPLE AND OTHER PLANTS.

This disease is caused by the fungus known as *Leptothyrium Pomi.* The organism is most abundant under conditions of considerable moisture, half shade, and abundant dust. The resulting discolorations affect the market value of infected fruit. Disfigurations are only superficial, being large and irregular in outline or small, dark circular specks.

In Michigan the varieties most affected are Greening, Northern Spy, and Baldwin (Longyear, 1904:14).

Selby (1900:13) in Ohio reports Peck's Pleasant, Rhode Island Greening, Rome Beauty as affected by this fungus. In the same state, Gloyör (1911:146) reports as follows: "Apple blotch was found on Baldwin, Ben Davis, Stark, Pippin, Smith Cider, and Rome Beauty in several counties of Ohio. In one orchard 90% of the fruit was blotched, a not uncommon condition with many of the varieties named. The disease was on sprayed and unsprayed fruit, and was claimed to be due to lack of proper pruning, permitting successive crops of spores to be produced on foliage and fruit not reached by spray."

Sturgis (1897:175) reports that in Connecticut the disease occurs principally on Rhode Island Greenings, and that it was found on Newton Pippins in Pennsylvania. Professor Lamson of New Hampshire found it common on Greenings, Northern Spies, and Baldwins.

APPLE BLOTCH.

This disease should not be confounded with the sooty blotch just mentioned as it is attributed to a different fungus, *Phyllosticta solitaria.* It is one of the serious apple diseases of the South, and is more common upon the light colored varieties of the fruit.

Scott (1909:12) has listed the varieties of that region according to their resistance to the apple blotch as follows:

Badly affected: Northwestern Greening, Missouri, Ben Davis, Limbertwig, Red Astrachan, Smith, Maiden Blush, Lawver, Shockley, Willow, Arkansas Black, Gano.

Moderately affected: Oldenberg, Benoni, Arkansas, Bradford, Ingram, Collins, Winkler, Rambo, Golden Russet.

Slightly or not affected: Grimes, Winesap, Jonathan, York Imperial, and Red Reese.

In addition to the above the writer has observed the blotch in various sections on the following varieties: Sherman, Shannon, Arkansas

Pippin, Bough, Baldwin, White Permain, Yellow Newton, Smokehouse, Northern Spy.

NATURE AND CAUSES OF RESISTANCE.

As has been previously stated, in the introduction, the nature and cause of disease resistance varies in different cases. The causes enumerated before were climate, soil variations, cultural methods, location, presence of wild fungous hosts, and the fact was also stated that some varieties inherit a resistance or protective quality.

In the opinion of Waite, as was stated, (1900:388) the thickness of the skin of certain varieties of pear enabled them to better resist the attack of the scab fungus.

According to W. J. Morse, of the Maine experiment station, the fruit spot (C-pomi) is observed most frequently on the Yellow Bellflower and on native green and yellowish seedlings. The writer's experience, although very limited, includes similar observations, the Baldwin being the only variety with any deep coloring that has been noticed as affected with this disease. This raises the question as to whether or not the red coloring matter acts as a protection against the attacks of this disease.

Clinton has observed in Connecticut that fruit of resistant varieties of apple when attacked by rust produces only the imperfect stage, thus indicating that the disease resisting quality is internal and not merely external or due to a difference in skin.

Erikkson (under apple scab) has stated that his observations lead him to conclude that red apples are most subject to scab. The following tabulation was prepared from those varieties mentioned under resistance to apple scab:

Susceptible.	Mod. Susceptible.	Resistant.
Snow (R)	Baldwin (R)	Golden Russet (Y)
Spitzenburg (R)	Red Astrachen (Light R)	Hubbardston (Y-R)
Maiden Blush (Y)	Windsor (R)	Oldenburg (Y-R)
Twenty Ounce (Y-R)	Jonathan (R)	Whitney (Y-R)
Winesap (R)	Ingram (Y)	Wealthy (Y-R)
Mammoth Black Twig (Y-R)	York Imperial (Y-R)	Salome (Y-R)
Sheriff (Y-R)	Ben Davis (Y-R)	Patten Greening (Green)
Ralls Genet (Y-R)	Gano (Y-R)	
Red June (R)	Northwestern (Green)	
Northern Spy (Y-R)	Missouri Pippin (Y-R)	
Pewaukee (Y-R)	Grimes Golden (Y)	
	McMahon (Y)	
	McIntosh (R)	

Note: R—red colored; Y—yellow colored.

In this list all the red apples are among the susceptible or moderately susceptible varieties. This would seem to justify to some extent the

conclusion of Erikkson, but such evidence cannot be taken as conclusive.

The Russian varieties are as a class more susceptible to injury than the native American varieties, this being well illustrated in the case of injury to apples by Bordeaux mixture. In this country it is plainly evident that, as a whole, the crab varieties are more susceptible to disease attack than the standard varieties. This is especially evident in the case of scab and blight.

SUMMARY.

Introduction. Previous to the writing of this thesis no attempt has been made to gather complete information of this sort. That embodied here has been taken from works available at the University of Wisconsin. Among them are included bulletins and reports from the various American experiment stations and the United States Department of Agriculture, as well as from other parts of the world, and standard works on plant pathology and horticulture. Information was also received by letters from fruit growers and government experts, and by personal interviews with men well versed in such knowledge. The collection has been made as complete as possible for Wisconsin and as far as important publications are concerned for the entire United States. The following summary gives a brief survey of each disease treated in the text.

Fire Blight. In considering the proportion of varieties resistant to and those susceptible to the disease treated here, it is found in the case of fire blight that the number is pretty evenly divided. There is, moreover, an apparent contrast, that is, varieties are either susceptible or resistant, very few being mentioned as moderately susceptible, among either the pears or apples.

Scab. With scab most apple varieties appear to be only moderately susceptible although the susceptible and resistant varieties are about equally numerous. Pears appear to be for the most part resistant to scab, but those varieties attacked usually suffer more severely than do apple varieties from this disease. In some cases varieties immune to fire blight are likewise immune to scab, while other varieties immune to one disease may be very susceptible to the other.

Bordeaux Injury. The varieties of apple immune to Bordeaux injury are about as numerous as those affected by it. Here again is an excellent example of a case where a variety immune to one trouble is susceptible to another. As previously stated (Hedrick 1907:142) those varieties which were found resistant to scab were very susceptible to Bordeaux injury while those quite susceptible to scab did not suffer from the spray. Pears were found mostly susceptible to Bordeaux injury the greater number suffering considerable damage.

Bitter Pit. The degree to which apples may suffer bitter pit is regulated largely by existing conditions in the area to which the disease may be limited. Apple varieties are quite generally affected.

Pear Leaf-blight. In the case of pear leaf-blight the Bartlett which is very susceptible to fire blight is mentioned among the susceptible varieties to this disease. The Kieffer and Duchess, resistant to fire blight, are alike resistant to leaf-blight. Consequently the same resistant characters may fortify against these two diseases.

Rust. The apples distinctly resistant to and those susceptible to rust are about equal in number, but when including those varieties mentioned as only moderately susceptible it might be said that they are mostly resistant.

Sooty Blotch and Apple Blotch. The sooty blotch and apple blotch are both found on the lighter colored varieties, some varieties being subject to both diseases.

Nature and Cause of Disease Resistance. Although several suggestions have been made as to causes of resistance and the theories which may be advanced may hold good in some cases, they may be entirely overthrown in the case of the other varieties. It is therefore evident that nothing definite is known regarding either the nature or cause of resistance.

THE ECONOMIC STATUS OF THE CODLING MOTH IN WISCONSIN.

H. G. SMITH.

The Codling Moth is the insect which ranks first in economic importance in Wisconsin. It produces the wormy apple with which we are all familiar and which we do not desire. Seventy-five to ninety per cent of the apple crop is injured annually; this expressed in other terms amounts to two hundred thousand dollars. Wisconsin has orchards numerous enough to produce sufficient quantities of apples for its own consumption, yet many carloads of this important crop are imported each year. Generally speaking every farmer has fruit trees which with proper care would amply supply him with fruit. At present nearly every farmer buys the apples he uses or gets along without them. This being true, Wisconsin farmers and fruit growers should give more attention to the control of the Codling Moth. The trite saying, "That years ago we had no apple worm" is no remedy to the situation, for wherever apples are produced the pest is sure to follow. There are only a few sections in this state now that are not infested.

To intelligently control any insect it is necessary to know whether the insect is sucking or chewing and in what stage of its life history it does its damage. In brief the life history of the Codling Moth

which extends over a period of fifty-six days is as follows: The moth lays its eggs shortly after the petals fall, upon the foliage and fruit, but largely on the foliage. In six to twelve days the eggs hatch. The young larvae instinctively begin feeding on the foliage or fruit and at the same time make their way to the fruits. Approximately eighty per cent of the larvae enter the fruit through the calyx end. The remainder enter from the sides. The larvae feed and grow within the fruit for about twenty days, when they emerge; seek hiding places, as under loose bark, boards or rubbish about the orchard; and spin their cocoons. Here the larvae pupate and emerge from the cocoon in about twenty days as full grown moths. This then completes the life cycle.

The second brood is produced similarly to the first. There is a slight difference in that the moths lay their eggs largely on the fruit and only twenty per cent of the larvae enter the fruit at the calyx end. It is this second brood that causes the most injury to the apple crop. Thus the greatest precautions should be taken in destroying the first brood for it is the parent of the second.

Many methods of controlling the Codling Moth have been used but practically only one merits attention, that of spraying with arsenicals. Paris green and arsenate of lead have been found most suitable for the purpose for now you are aware of the fact that the insect is a chewing insect. The time for applying the poison for the first brood is just after the petals have fallen. At this time advantage is taken of the open calyx and the upright position of the young fruit. Two other applications similar to the first should be applied at intervals of ten to fourteen days. This insures almost perfect control of the first brood. The few larvae which escape the early sprayings produce the second brood; and to control it a fourth application should be made about July fifteenth in the southern part of the state and ten days later in the northern part of the state. Every farmer and fruit grower can carry out these spraying operations either singly or in coöperation with his neighbors. The expense and trouble will be amply paid by a ninety per cent crop of apples instead of a twenty per cent crop.

NATIONAL CONTROL OF PESTS AND PARASITES.

E. A. SEATON.

Perhaps some of you may have known a person, friend or relative, who went out west to new lands and settled in one of those young fruit districts. And how glowingly they wrote of the wonderful possibilities out there, how bountifully everything yielded, how large and luscious the fruits were, and especially how free was everything from disease and insect pests! That was a true condition at first, but soon with the

advance of settlements, the potato bug, the codling moth, the pear blight and the host of fungous diseases that we must always combat were there too, and had to be fought.

The whole United States was once like those newly settled districts, and our fathers can tell stories of fruits here that will rival the wildest dreams of Bitter Root. But why the changed condition between those days and these? It is largely due to this fact: that half our pests are of foreign origin, and among that half are the most troublesome and expensive ones. Here is a partial list of them and their damages: codling moth, $16,000,000 annually; Hessian fly, $50,000,000 to $100,000,000; cotton boll weevil, $25,000,000; San Jose scale, $10,000,000. These are the big offenders. Some others of less general importance are the asparagus beetle, cabbage worm, pea weevil, oyster shell bark louse, and the gypsy and brown tail moths. The annual destruction caused by insects totals near a billion dollars, one-half of this being due to imported pests.

When we consider that those insects had to endure a voyage across the ocean and become established in a new environment, we can realize how easily they could all have been excluded. Rigid inspection with absolute quarantine of infected stock would have done it. In that respect we are far behind countries we consider barbarous. We are the only important power that does not have protection from diseased and insect infested nursery stock. Our lack of regulation has made us the dumping ground for diseased and inferior stock that could not pass inspection in foreign ports. Even Turkey is progressive enough to have a law absolutely prohibiting the entry of any American nursery stock.

After all that has been let in now it may seem useless to shut our doors, but even yet we can save ourselves much. For instance there are many insects of the tropical and semi-tropical fruits that are not yet here, but which if introduced would cause great damage in the south. In Europe there is a fatal disease of potatoes called the black wart. Its occurrence in a district practically puts an end to potato culture. It has been observed as close as the islands off Nova Scotia and without quarantine will next be in the United States. Germany has a law absolutely forbidding the importation of a single foreign potato. Why should not the U. S., disease free in this instance, not protect herself similarly?

Our commerce with the Orient is beginning to assume vast proportions. In the early 90's the San Jose scale was imported from China in this commerce. We know but little of the pests of China that would be dangerous here, but we do know there are other forms of scales over there quite as serious as the San Jose scale, and proper discretion would point to rigid inspection, and if necessary to an absolute quarantine of any products that may contain these pests.

Congress has dilly-dallied with this matter for near twenty years without doing a thing. In the 90's agitation was first started due to the spread of the San Jose scale. Nothing was done and meanwhile the scale has continued to spread. At the present time we stand in imminent danger of invasion by more foreign pests, and in New England the gypsy and browntail moths are almost making the hillsides desolate and regions uninhabitable. If something is not done the next ten years will see such advances made that control will be difficult if not impossible.

Congress will likely remain dilatory till public sentiment is sufficiently awakened to force their attention to such laws. Therefore the public must act and nothing would be more appropriate than for horticultural societies and horticulturists themselves throughout the country to appeal to Congress and your representatives in particular to take immediate and definite action.

CONSTITUTION AND BY-LAWS OF THE SPARTA FRUIT GROWERS' ASSOCIATION.

Adopted May, 1896. Amended March 17, 1906.

ARTICLE I.

The undersigned have associated and do hereby associate themselves together, for the purpose of forming a corporation under Chapter 86, of the Revised Statutes of the State of Wisconsin for the year 1878, and the Acts amendatory thereof and supplementary thereto. The business and purposes for which this corporation is formed is to buy, sell, market, dispose of and exchange small fruits and produce, as hereinafter set forth.

ARTICLE II.

The corporate name of this Association shall be the SPARTA FRUIT GROWERS' ASSOCIATION, and its location shall be the city of Sparta, county of Monroe, State of Wisconsin. The nature of its business shall be to buy, sell, market, and exchange, and dispose of small fruit and produce, and to do and perform such business, and to own such real estate and other property as may be necessary in carrying out the purposes thereof.

ARTICLE III.

The capital stock of said corporation shall be Six Thousand Dollars, and shall consist of three thousand shares, of two dollars each, par value.

ARTICLE IV.

The general officers of said Corporation shall be a President, Vice-President, Secretary and Treasurer, and a Board of Directors, consisting of six stockholders. The President and Vice-President shall be elected annually by the stockholders from among their number, and shall hold their offices for the term of one year, and until their successors are elected and qualified; and the Board of Directors shall also elect annually a Secretary and Treasurer from among the stockholders, each of whom shall serve for a term of one year. Such Board of Directors may provide for and elect such other officer or officers deemed by them to be necessary and for the best interest of the Corporation. At the first annual meeting of the stockholders there shall be elected six Directors, one-third of whom shall be elected for a term of one year, one-third for a term of two years, and one-third for a term of three years; and at each annual election there shall be elected two Directors for the term of three years.

ARTICLE V.

The principal duty of the President shall be to preside at all meetings of the Board of Directors, and of the stockholders, and to have general supervision of the affairs of the Corporation. He shall sign all orders drawn on the Treasurer by the order of the Board of Directors, and all certificates of stock issued, and shall have a vote on all questions pending before the Board of Directors.

In the absence of the President, the Vice-President shall perform the duties of President.

The principal duties of the Secretary shall be to countersign and draw all orders upon the Treasurer for the payment of money, and all certificates of stock issued by the Corporation, and keep an accurate account of all moneys received or disbursed by the Corporation or any of its officers or members thereof, as shall be reported to him, and to keep all records and accounts of such Corporation, and also be the Clerk or Secretary of the Board of Directors or stockholders, and keep a correct record thereof. He shall keep a stock record in which shall be registered all stock issued by the Corporation, with the names of the stockholders and all transfers thereof.

The principal duties of the Treasurer shall be to keep and pay over, on the order of the President and Secretary all moneys disbursed by

such Corporation, and account for all moneys that come into his hands, for, or on account of, said Corporation, and the vouchers for moneys disbursed and all property of said Corporation on hand, and what, if any, disposition has been made thereof, and any other or further duties as shall be required of him by the Board of Directors.

The Board of Directors may provide for the appointment of any additional officers, as may be deemed necessary, and for the best interests of the Corporation, and may provide that any two offices may be held by the same person. All such officers shall perform, from time to time, any other or further duties, as shall be required of them by the Board of Directors, or as may be prescribed by the by-laws or regulations of the Corporation. The Board of Directors shall be governed by these articles and by the general directions laid down for their government in any by-law, rule or regulation of the Corporation, adopted by them or the stockholders at any regular meeting, and they shall also obey any specific direction regarding the management of the affairs of the Corporation, given by a vote of the stockholders at any legal meeting, of a majority thereof.

ARTICLE VI.

Any person, at the discretion of the Board of Directors, may become a member of said Corporation by subscribing for one or more shares of stock thereof, and shall have one vote for each share so held by him in any and all meetings of the stockholders. Any stockholder may, in writing, authorize any other stockholder to appear and vote for him at any meeting of the stockholders.

ARTICLE VII.

The stock of the Corporation shall not be assessable, except by a two-thirds vote of the Board of Directors. Any stock or shares issued, shall be transferable by assignment upon the certificate, and shall be entered upon the books of the Corporation. The amount of dividends upon the stock or shares, earned by the Corporation, and the time of payment thereof, shall be determined by the Board of Directors, and be payable in like manner as any other money is disbursed by the Corporation.

ARTICLE VIII.

Only stockholders, according to the rules and regulations of the Corporation, shall be members thereof, and have a voice or vote in any of the affairs of such Corporation.

ARTICLE IX.

The Annual Meeting, after the first meeting of the stockholders for the election of directors and such other business as may properly come before it, shall be held on the First Saturday of May, and on the same day in the same month of each year.

After the adoption of these amendments, and commencing with the First Saturday of February, 1907, the annual meeting shall be held on the First Saturday of February in each year. The first meeting of the stockholders for the purpose of organizing, shall be held on the 30th day of May, 1896, at 2 o'clock p. m.

Special meetings of the stockholders may be called by the President, or any two of the Board of Directors, by giving personal notice, or by mail to each stockholder, at his last known place of residence, of the time and place of holding such meeting and the object thereof, or by publication of such notice in a public newspaper, published in the city of Sparta, Wisconsin, not less than five days prior to the time of holding such meeting. Such special meetings may also be called by request in writing of the President of the Board of Directors, signed by at least ten stockholders. Upon receiving such application, it shall be the duty of the President of the Board of Directors to immediately call such meeting so demanded in the manner herein-before indicated.

ARTICLE X.

The Treasurer and Secretary shall each give bonds for the faithful discharge of their duties in such manner and for such sum as the Board of Directors shall determine, with sufficient sureties to be approved by said board.

ARTICLE XI.

When a vacancy shall occur in the Board of Directors, for any reason whatever, the remaining members shall have the power and it shall be their duty to at once call a meeting of the Board of Directors to fill such vacancy, and such vacancy shall be filled from the stockholders, and the appointee shall hold his office for the remainder of the unexpired term.

The time of commencement of the Corporation shall be the 30th day of May, 1896, and the period of its duration shall be twenty years.

ARTICLE XII.

The highest amount of indebtedness or liability of this Corporation shall not exceed the amount of its subscribed capital.

ARTICLE XIII.

The names and residence of the persons forming the Corporation or Association are as follows: C. E. Tobey, E. A. Richardson and Jesse D. Searles, all of Sparta, Wisconsin.

ARTICLE XIV.

The following named persons shall constitute the Board of Directors until the first annual meeting held to elect Directors, to wit: W. H. Hanchett, E. W. Babcock, C. E. Tobey, Jesse D. Searles, E. A. Richardson and Alexander McIntyre; and L. S. Fisher shall act as President; W. H. Hanchett shall act as Vice-president; C. G. Hettman shall act as Treasurer; and T. M. Bowler shall act as Secretary of said Corporation, until the First Annual Meeting and election of officers thereof.

ARTICLE XV.

These articles may be amended by resolution setting forth such amendment, adopted at any meeting of the stockholders, by a vote of at least two-thirds of all stock of said Corporation then outstanding.

BY-LAWS.

ARTICLE I.

SECTION 1.—A majority of votes shall constitute an election.

ARTICLE II.

SEC. 1.—The Secretary shall keep a book to be called the Roll of Members, in which shall be legibly written the Articles of Incorporation, in which all members of the Association shall be enrolled.

Sec. 2.—He shall notify all persons of their election within five days after such election.

ARTICLE III.

SEC. 1.—The Treasurer shall be custodian of all the money of the Association.

SEC. 2.—He shall execute a bond to the Association in such sum and with such sureties as the Board of Directors shall direct, which bond shall be approved by the President of the Board of Directors.

ARTICLE IV.

SEC. 1.—The Board of Directors shall hold meetings as often as the interests of the Association may require.

SEC. 2.—The Directors shall have charge of all property, effects and assets of the Association, and have the management and general superintendency of the interest and affairs, where the same do not conflict with the By-Laws.

SEC. 3.—They shall be the purchasing agents of the Association.

SEC. 4.—They shall make rules for the Association, by which its members shall be governed, and any other regulation, not inconsistent with the By-Laws.

SEC. 5.—The Directors shall examine and audit all bills against the Association.

SEC. 6.—The Board of Directors shall have the power, and it shall be their duty to withhold such a percentage of all sales as they shall deem sufficient to pay all expenses of a legitimate nature incurred by the Association in the transaction of its business, after all losses from uncollectable accounts shall have been deducted.

SEC. 7.—At the close of the season after all expenses have been paid, any surplus of moneys so retained shall be paid the members as a pro rata dividend on their season's sales, in final settlement of their season's accounts.

SEC. 8.—At any regular meeting, or adjourned meeting, four of such Directors shall constitute a quorum to do business.

SEC. 9.—For any violation of the By-Laws of this Association, it shall be within the power of the Board of Directors to impose such penalty as they deem proper, not inconsistent with the provisions of the Statute under which this Corporation is organized.

ARTICLE V.

SEC. 1.—The manner of marketing fruit and produce, in general terms shall be as follows: All fruit and produce shall be delivered to the Association as the Board of Directors may direct, each grower being obliged to have his or her name stenciled upon each package so delivered by them. When deemed necessary the fruit or produce shall be graded by a competent grader as the Board of Directors may direct; each day's sales shall be treated as an entirety and shall be prorated according to grade, share and share alike; the fruit or produce of any member may he rejected at any time if in an unmarketable condition, or put up with an evident intent to defraud.

ARTICLE VI.

SEC. 1.—These By-Laws may be amended by a two-thirds vote of members present at any legal meeting.

SEC. 2.—Any person wilfully violating any of the By-Laws of this Association, shall, at the discretion of the Board of Directors, forfeit their membership in the Association. Any stock held by any person whose membership has been so declared forfeited shall revert to, and become the property of the Association, on the payment of all moneys advanced by such person for stock held by them. Such payment not to exceed the par value of said stock.

ARTICLE VII.

SEC. 1.—All business at any regular meeting shall be conducted according to parliamentary rules.

ORDER OF BUSINESS.

Calling of roll of officers.
Reading minutes.
Reports of committees.
Bills against the Association.
Unfinished business.
New business.
General welfare.

ANNUAL REPORT

OF THE

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VOL. XLIII

PART II.

F. CRANEFIELD, Editor.

MADISON, WIS.

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NOTICE TO MEMBERS

The 1913 Annual Report is issued in two parts. A limited edition of Part II has been issued and copies will be sent only to members.

Part I contains the transactions of the two conventions and other matters of general interest.

FREDERIC CRANEFIELD,

Editor.

CONSTITUTION

Article 1. This Society shall be known as "The Wisconsin State Horticultural Society" and its location shall be at the city of Madison, Dane county, Wisconsin, where its principal office shall be maintained.

Article 2. The object of this Society shall be the advancement of the art and science of horticulture throughout the state.

Article 3. This Society is formed without capital stock.

Article 4. This Society shall consist of life members, annual members, honorary life members, and honorary annual members. Wives of such members shall be entitled to the privileges of full membership. The fees for membership shall be fixed by the Executive Committee.

Honorary annual members may, by vote, be elected and invited to participate in the proceedings of the Society. Honorary life members shall be elected by vote of the Society, and shall be distinguished for special merit in horticultural and kindred sciences, or shall confer some particular benefit upon the Society.

Article 5. The general officers of the Society shall be a President, Vice President, Secretary, Treasurer and an Executive Committee, consisting of the foregoing officers and one additional member from each congressional district, a majority of whom shall constitute a quorum at any of its meetings.

The officers aforesaid, except the Secretary, shall be elected, by ballot, at the annual meeting, and shall hold office for one year thereafter and until their respective successors are elected. The Secretary shall be appointed by the Executive Committee at its annual meeting after the election of officers and shall hold office for one year thereafter or until his successor is appointed.

Article 6. The principal duties of the general officers shall be as follows:

The President shall preside at all meetings of the Society and of the Executive Committee, shall exercise a general supervision and control of the business and affairs of the Society, and shall sign all leases, deeds and instruments for the transfer, conveyance or assignment of the corporate property, and all contracts, papers and instruments necessary or convenient in the transaction of the business of the Society, and when necessary, acknowledge the same.

The Vice President shall act as President in case of the absence, disability or removal of the President.

The Secretary shall conduct the general correspondence of the Society and keep a record of the business and of the proceedings at all meetings of the Society and of the Executive Committee; he shall keep, safely and systematically, all books, records, papers and documents belonging or pertaining to the Society or the business thereof; he shall countersign all deeds, leases and conveyances, and, when necessary, acknowledge the same.

The Treasurer shall receive and safely keep all moneys, notes, securities and property of the Society, which may come into his hands and shall pay out or dispose of the same only upon such terms and conditions as the Executive Committee may direct or the by-laws provide. He shall keep a correct account of all moneys received and disbursed and shall render such account of the same as shall be required by the Executive Committee or prescribed in the by-laws. And he shall execute a bond to the Society, in such sum, and with such sureties, as the Executive Committee shall approve, conditioned upon the faithful performance of his duties, and for the payment and delivery to his successor of all the moneys and property of the Society in his hands or under his control; which bond when approved shall be filed with the Secretary.

The said officers shall perform such other or additional duties as may be required and any of the duties and powers of said officers may be performed or exercised, as far as is lawful, by such other officers, persons or committees as the Executive Committee may provide.

Article 7. The members of the Executive Committee from the several congressional districts shall be chosen by the delegates of their respective county or local societies present at the annual meeting of this Society, or in case of the absence of delegates from such societies or in case of failure to elect, such members shall be chosen from among the members of this Society present from such districts. But if any district is not represented the vacancy shall be filled by vote of the members of this Society present at the annual meeting.

Article 8. The term "county and local horticultural societies" shall include any organization that shall have for its object the advancement of the interests of its members in the growing or sale of horticultural crops: provided that such society acts by authority of a regularly adopted constitution and makes an annual report to the Secretary of the state society.

Article 9. The Society shall hold its annual meeting for the election of officers, exhibition of fruits, and discussions, in the city of Madison,

Wisconsin. Other meetings shall be held at such time and place as the Executive Committee may direct.

Article 10. Only persons holding memberships according to the regulations of the Society shall be members of it.

Article 11. This Constitution, with the accompanying by-laws, may be amended, at any regular meeting of this Society by a two-thirds vote of the members present; provided that such amendment is presented in writing.

RULES AND BY-LAWS

Article 1.—Membership.

Sec. 1. The Secretary shall decide upon all applications for membership in accordance with the Constitution and By-laws of the Society.

Sec. 2. Any member maliciously or intentionally injuring or working in opposition to the Society or its purposes in promoting horticulture may upon return of his membership fee be summarily expelled.

Article II.—Meetings.

Sec. 1. The Executive Committee may fix the time and place for holding the annual meeting of the Society, if the last meeting thereof failed to do so and may call such meeting by giving at least thirty days' notice to each member. Such notice shall be given by the Secretary, by mailing the same, postage prepaid, to each member at his last known address.

Sec. 2. Notice of a special meeting shall be mailed to each member at his last known address by the Secretary at least six days before such meeting is to be held. Such notice shall state the business to be transacted and the date, hour and place of meeting, and no business other than that stated in the notice shall be considered at such meeting.

Article III.—Duties of Officers—The President.

Sec. 1. The President shall preside at all meetings of the Society and of the Executive Committee; he shall, with the advice of the Secretary, call all meetings of the Society if the Executive Committee fail so to do; he shall appoint the delegates to the meetings of the other State Horticultural Societies; he shall have a general supervision of the business and affairs of the Society, and he shall deliver an annual address upon some subject connected with horticulture.

Sec. 2. He shall sign and acknowledge all leases, deeds, and instruments for the conveyance or transfer of the Society's property; and all other contracts, papers and instruments necessary or convenient in transacting its business.

Sec. 3. He shall sign all orders drawn on the treasurer for the payment of bills, accounts and claims audited by the Board of Managers and none other.

Sec. 4. In case of the absence from any cause of both the President and Vice President the members present, if a quorum, shall elect one of their number temporary president.

Article IV.—The Secretary.

Sec. 1. The Secretary shall attend to all the correspondence of the Society, he shall keep a correct and complete record of the business and of the proceedings at all meetings of the members and of the Executive Committee.

Sec. 2. He shall superintend the publication of the Reports of the Transactions of the Society and publish or cause to be published such special bulletins on timely and appropriate subjects and such special reports of the condition and results of experimental work in the Trial Orchards and Trial Stations as the Board of Managers may direct.

Sec. 3. He shall present a detailed report of the affairs of the Society at its annual meeting. He shall endeavor to secure reports from the various committees, and from local societies, of the condition and progress of horticulture throughout the state and report the same to the Society. It shall be his duty to make a report to the Governor of the State of the transactions of the Society according to the provisions of the statutes for state reports.

Sec. 4. He shall be superintendent of all Trial Orchards and Trial Stations. In that capacity he shall supervise the planting and cultivation of, and exercise general control over the same, subject to the directions of the Trial Orchard Committee.

Sec. 5. He shall engross in the general record book of the Society a true copy of the Constitution, Rules and By-Laws, and all amendments thereto and all resolutions of the Society and of the Executive Committee.

Sec. 6. He shall keep a record book in which shall be entered the names of all members of the Society from its organization, the place of residence, time of acquiring membership, and time of cessation of same.

Sec. 7. He shall notify all persons elected to office within ten days thereafter, if such persons were not present at the election.

Sec. 8. He shall keep a book in which a correct list of the property of the Society shall be entered. He shall draw all orders, checks, etc., ordered by the Executive Committee or Board of Managers and countersign the same when signed by the President.

Sec. 9. He shall keep a stub or record of all orders, checks, etc., drawn and delivered, showing the date and amount thereof and to whom and for what purpose the same was issued.

Sec. 10. He shall receive all fees for membership, give proper receipts for the same, and unless otherwise directed by the Executive Committee, shall pay the money to the Treasurer, taking his receipt therefor.

Article V.—The Treasurer.

Sec. 1. The Treasurer shall, before entering upon the duties of his office, execute a bond to the Society in such sum and with such sureties as the Executive Committee may direct, conditioned as provided in the Constitution.

Sec. 2. He shall receive and be responsible for the safe keeping of all money, notes, securities, credits, etc., of any and every nature, belonging to the Society which shall come into his hands.

Sec. 3. He shall keep proper books of account and a true and complete record of all business transacted by him for the Society; he shall keep proper vouchers for all money disbursed and shall render such accounts and statements of the moneys received, disbursed and on hand, and generally of all matters pertaining to his office as the Executive Committee may require or the By-laws direct.

Sec. 4. He shall disburse the money of the Society only on the written order of the President, countersigned by the Secretary, and shall make an annual report of the receipts and disbursements and furnish the Secretary with a copy of the same on or before the first day of the Annual Meeting.

Article VI.—The Executive Committee.

Sec. 1. The Executive Committee shall have the general care and management of the property, affairs, and business of the Society, and a majority of its members shall constitute a quorum. The President and Secretary of the Society shall be President and Secretary of the Executive Committee.

Sec. 2. Meetings of the Committee may be called by the President, the Secretary, or by the Secretary on the written request of five of its members.

Sec. 3. They shall fix the amount of the Treasurer's bond, the number of his sureties and approve the same. They may require any other officer, agent, or employee of the Society to execute a bond and prescribe the amount and conditions thereof, and approve the same.

Sec. 4. They may prescribe such salary or compensation for any officer, agent, or employee of the Society as they may deem proper, but not for a longer term than until the next annual meeting of the members, nor shall any officer of the Society be entitled to or receive any benefit, salary or compensation for, on account of, or during the time that he may be absent beyond the boundaries of the state unless such absence was at the request and on behalf of said Society.

Sec. 5. The Executive Committee shall have the power to remove any officer for official misconduct or neglect of the duties of his office. In case of vacancy in any office, either by resignation, removal or otherwise, such vacancy shall be filled by appointment

by the said Committee, but such person shall hold office only for the unexpired portion of the term.

Sec. 6. The Executive Committee shall make such rules and regulations for the conduct of the business of the Society, not inconsistent with law, the Constitution, or the Rules and By-Laws, as they shall deem expedient and for the best interests of the Society.

Article VII.—Committees.

Sec. 1. The President, Treasurer and Secretary shall constitute a Board of Managers which may conduct any business deemed necessary for the Society in the absence of the Executive Committee. All bills against the Society must be audited by the Board of Managers before being paid.

Sec. 2 Regular meetings of the Board of Managers shall be held bi-monthly to audit accounts and transact other business; special meetings may be called by any member of the Board.

Sec. 3. The President shall annually appoint the following standing committees—

Committee on Finance of three members, and one member of the committee on Trial Orchards and Trial Stations, of three members, to be appointed for a term of 3 years, and such other committees as may from time to time be necessary.

Sec. 4. It shall be the duty of the Finance Committee to settle with the Treasurer and to examine and report upon all bills and claims against the Society which may have been presented and referred to them, provided, however, that no member of the Executive Committee shall be a member of the Finance Committee aforesaid.

Sec. 5. The Trial Orchard Committee shall have general control of the locating, planting and care of all trial orchards and trial stations, and may visit collectively each orchard and station once each year or oftener if deemed necessary. Meetings of the Committee may be called at any time by the President of the Society or by the Superintendent of Trial Orchards.

Article VIII.—Miscellaneous

Sec. 1. The foregoing Rules and By-Laws shall take effect and be in force from the date of their adoption.

TREASURER'S REPORT

(July 1st, 1911 to July 1st, 1912.)

(Presented at Annual Convention Madison, Jan. 9th, 1913.)
The fiscal year of the Society begins July 1st.

L. G. KELLOGG, Treasurer,

In account with

THE WISCONSIN STATE HORTICULTURAL SOCIETY.

	Dr.	Cr.
Received from F. Cranefield for membership fees	$647 00	
" " " advertising	622 55	
" " " fruit sales	848 99	
" " " misc. receipts	15 43	
" State Board of Agriculture	150 00	
" State Treasurer	7,884 83	
By vouchers returned		$10,038 32
By balance due Society		157 48
	$10,195 80	$10,195 80

FINANCIAL REPORT OF SECRETARY

Jan. 1st, 1912 to Jan. 1st, 1913.

	Dr.	Cr.
Received for membership fees	$728 50	
" advertising	631 67	
" fruit, Wausau orchard	150 00	
" " Poplar orchard	75 00	
" " State Fair	26 00	
Miscellaneous receipts	6 38	
Payments to Treasurer		$1,617 55
	$1,617 55	$1,617 55

REPORT OF FINANCE COMMITTEE

Office of Secretary, Madison, Jan. 9th, 1913.

Your Committee report as follows:

We have examined the books of the Secretary and find same correct. We have also examined the books of the Treasurer, comparing vouchers with stubs in Secretary's office, and find same to correspond.

J. A. HAYS, Chairman.
J. S. PALMER.

STATEMENT OF RECEIPTS AND EXPENDITURES

Account of

WISCONSIN HORTICULTURE.

January 1st, 1912, to January 1st, 1913.

	Dr.	Cr.
Advertising and membership fees		$1,360 17
To printing, postage, etc	$1,206 49	
Balance		$153 68

Statement Sept. 1910 to Jan. 1st, 1913.

Total Receipts	$3,180.02
Total Expense	2,872.66
Balance	$307.36

MEMBERSHIP ROLL

WISCONSIN STATE HORTICULTURAL SOCIETY.

ANNUAL HONORARY MEMBERS.

Hon. C. P. Cary—Madison.
E. W. Catchpole—North Rose, N Y.
W. S. Keeline—Council Bluffs, Iowa.
R. S. Wright—Excelsior, Minn.
H. G. Street—Hebron, Ill.

HONORARY LIFE MEMBERS.

Prof. L. H. Bailey—Ithaca, N. Y.
M. E. Hinckley—Mt. Vernon, Iowa.
C. G. Patten—Charles City, Iowa.
A. J. Philips—West Salem.
Prof. Wm. Trelease, St Louis, Mo.
Geo. J. Kellogg—Lake Mills.

LIFE MEMBERS.

Allis, Frank W .....Madison
Allis, Wm. W.....Milwaukee
Ames, W. L. .....Oregon
Andrus, Dr. A. P.....Ashland
Auer, Mrs. Louis.....Milwaukee
Ayer, Ed C.....Fontana
Armstrong, W. J.....Milwaukee

Babcock, Chas. L. (Dr.)
..... Milwaukee
Babcock, O. W.....Omro
Baker, Dr. B. F.....Milwaukee
Barnes, A. D.....Waupaca
Bailey, Prof. L. H.....Ithaca, N. Y.
Barrand, C.....Sturgeon Bay
Bartholomay, Henry.....Chicago
Bassett, A. K.....Baraboo
Bethke, J. L.....Richland Center
Bingham, D. E.....Sturgeon Bay
Bingham, R. O.....Sturgeon Bay
Bingham, G. P.....Sturgeon Bay
Blessing, D. S.....Harrisburg, Pa.
Brown, F. G.....Madison
Browne, Paul .....Rhinelander
Bruning, Chas....Westwood, N. J.
Bruning, Jacob...Shermerville, Ill.
Buckstaff, D. C.....Oshkosh
Buehler, J. G. .....
Burnham, O. J....Richland Center
Bussey, W. P.....Omro

Carpenter, L. A.....Fond du Lac
Carver, N. E.....Bayfield
Cashman, Thos. E.....
.....Owatonna, Minn.
Chandler, S. S., Jr.,.....Waupaca
Chapin, S. B.....Lake Geneva
Cheney, Prof. L. S.....Barron
Cleermans, Aug .....Green Bay
Coe, R. J.....Ft. Atkinson
Cole, W. B.....Pleasant Prairie
Converse, D. C.....Ft. Atkinson

Copeland, Dr. Ernest....Milwaukee
Chase, H. M.....Green Bay
Coon, Dr. J. W.....Wales
Cornish, O. B.....Ft. Atkinson

Dunn Co. School of
Agriculture .....Menomonie
Dunlop, J. M.....Wauwatosa

Eaton, B. A.....Cudahy
Edwards, F. C.....Ft. Atkinson

Fancher, W. E.....Corliss
Fawsett, C. F.....Milwaukee
Fiebing, J. H.....Milwaukee
Fieldhouse, Wm.....Dodgeville
Foley, M. F.....Baraboo
Fox, Rev. Jos. J.....Green Bay
France, N. E.....Platteville
Freeman, G. A.....Sparta
Freeman, Roy F.....Racine

Geiger, Ferdinand A...Milwaukee
Gifford, Geo. P.....Madison
Goff, Moulton B.....Sturgeon Bay
Gonzenbach, Ernest ....Sheboygan
Greaves, A. C. .....Sturgeon Bay
Guilford, W. S.....Pecatonica, Ill
Guttman, A.....Manitowoc

Hager, W. S.....DePere
Hahn, H. J.....Sturgeon Bay
Haines, Melvin.....Sawyer
Hanchett, W. H.....Sparta
Harden, F. A.....Weyauwega
Harland, F. W.....Milwaukee
Harris, N. W.....Lake Geneva
Harvey, E. J.....Racine
Hatch, A. L.....Sturgeon Bay
Henrichs, Ernest .....Reedsburg
Henry, M. E.....Oshkosh
Herbst, J. L.....Sparta
Hildeman, E. S.....Belle Plaine
Hinckley, M. E.....Mt. Vernon, Ia.
Hitz, Dr. Henry B.....Milwaukee
Hudnall, Geo. B.....Superior
Hutchins, F. A.....Madison
Hutchinson, C. L.....Lake Geneva
Hennesey, G. H.....La Porte, Ind.
Hawarden, E.....Superior

Irwin, Ralph A.....Lancaster

Jacob, Nick C.....Sawyer
Jewett, A. J.....Sparta
Johnson, Chas. G.....Welcome
Johnson, Franklin.....Baraboo
Jones, E. S.....Sawyer
Jones, G. D.....Wausau
Jones, John D.....Platteville
Jones, Prof. L. R.....Madison

Jorgensen, Geo. .....Poy Sippi
Joys, A. M.....Milwaukee

Kellogg, Geo. J.....Lake Mills
Kellogg, L. G.....Ripon
Kellogg, M. S.....Janesville
Ketchum, I. P.....Madison
Kierstead, E. H..Lake View, Mich.
Knight, Wm.....Bayfield
Koehler, John....North Milwaukee
Kremers, Prof. E.....Madison
Kreutzer, A. L.....Wausau
Krienetz, Alfred J.....Milwaukee
Kronshage, Theo., Jr....Milwaukee

Laabs, G. F.....Milwaukee
La Follette, Robt. M.....Madison
Larkin, D. W.....Sturgeon Bay
Larson, W. E.....Madison
Lathrop, Rev. Stanley E.....
.....Eugene, Ore.
Lawrence, A. W.....Sturgeon Bay
Lawrence, W. I.....Sturgeon Bay
Leverich, J. W.....Sparta
Leverich, E. S.....Egg Harbor
Lillesand, L. E.....Cambridge
Loeffel, W. L.....Chicago, Ill.
Loop, A. I.....North East, Pa.
Loveland, T. A.Minneapolis, Minn.
Lyon, Jay F.....Elkhorn

Magnussen, Peder.....Augusta
Malde, O. G.....Grand Rapids
Marshall, S. H.....Simeon, Va.
Maxson, O. P.....Waukegan, Ill.
McGovern, Wm. P.....Cedarburg
McGregor, E. L.....Appleton
MacGilfrey, C. D.....Milwaukee
McKusick, H. J...Stillwater, Minn.
Melcher, H. C.....Oconomowoc
Melville, Jas. W....Chippewa Falls
Morawetz, Alfred .....Milwaukee
Morterud, Oscar .....Westby
Moses, L. D.....Ogdensburg
Moyle, W. J.....Union Grove
Moore, Prof. J. G.....Madison
Morse, Prof. W. J.....Orono, Me.
Milward, Prof. J. G.....Madison
Mayer, Louis.....North Milwaukee

Naffz, Henry E.....Sauk City
Nelson, J. C.....Green Bay
Nienaber, B. H.....Manitowoc

Oleson, Janes P.....Ripon
Orr, E. D.....Mt. Hope

Palmer, J. S.....Baraboo
Palmer, L. H.....Baraboo
Patten, C. G.....Charles City, Ia.
Patterson, Chas.....Franksville

Peck, Chas. G.....Sheboygan Falls
Pelton, Montross .....Reedsburg
Phillips, A. J.....West Salem
Plumb, Wm. H.....Madison
Pollworth, C. C.....Milwaukee
Patitz, Max.....Milwaukee

Randolph Harriet.....La Crosse
Raymer, Geo.....Madison
Rentschler, Fred.....Madison
Rentschler, Geo.....Madison
Richardson, C. L....Chippewa Falls
Richardson, E. A.....Sparta
Riordan, D. E.....Wausau
Rogers, A. J, Jr,.....Beulah, Mich.
Rosenow, H E.....Oconomowoc
Rounds, Wm.....Baraboo
Rundell, Albert E.....Platteville
Russell, Howland.....Milwaukee
Ruste, C. O.....Blue Mounds
Ryerson, M. A.....Lake Geneva
Rasch, G. C.....Burlington
Rasmussen, N. A.....Oshkosh

Salter, Walter N....Seattle, Wash.
Salzer, John A.....La Crosse
Saxe, Arthur W.....Loxley, Ala.
Schauer, J. M.....Sturgeon Bay
Schoenhiede, Frank.....Welcome
Schomberg,, O. H.....Milwaukee
Schroeder, Mrs. F. J....Milwaukee
Schuck, John B.....Milwaukee
Schuette, Aug.....Manitowoc
Seubert, Rev. John..Cologne, Minn.
Simon, H.....Barabco
Simonson, Arthur.....Racine
Smith, A. J.....Lake Geneva
Smith, Geo. B.....Green Bay
Smith, Irving.....Ashland
Smith J. Mills.....Ashland
Smith Alden W.....Ashland
Sanders Prof. J. G.....Madison
Schneider, Dr. Jos.....Milwaukee
Smith, Silas S.....Crandon
Steele, W. H.....Pewaukee
Stickney, Gardner P....Milwaukee

Taylor, Will L.....Mt. Hope
Telfer, C. J.....Ft. Atkinson
Temby, Peter S.....Milwaukee
Tiefenthaler, G. E.....Milwaukee
Tifft, Geo. L.....Milwaukee
Tilson ,Mrs. Ida E.....West Salem
Timlin, W. H.....Madison
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Marsh, W. H.....Antigo
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Morhusen, Ben .....Thiensville
Mitchell, H. P. .....Mt. Sterling
Meyer, Louis C. .....Sheboygan
Moore, S. .....West Allis
Murphy, Dr. J. L. .....Algoma
Marnitz, Chas. .....Milwaukee
Meacham, Geo. .....Evansville
Melberg, Albert .....Ashland
Mihleis, Dr. E. .....Ellsworth
Matthewson, J. E. .....Sheboygan
Morgan, Henry H. .....Madison
Mylrea, W. H. .....Wausau
Mills, Dr. N. K. .....Manila, P. I.
Moore. R. A. .....Madison
Macoun, W. T. ....Ottawa, Canada
Martin, W. I. .....Barrington, Ill.
Millard, Frank.....Barron
Meyer, A. A. L. .....Madison
Mundt, Chas. .....Marshall
Morton, E. W. .....Ferryville
McKay, W. G. .....Pardeeville
McLay, Geo. R. .....Janesville
McLeod, J. N. .....Platteville
McFetridge, E. C. .....Beaver Dam
McCarthy, Wm. .....Albion
McGowan, H. B. .....Madison
McGraw, Thos. F. .....Racine
McDowell, J. C. .....Waukesha
McSpadden, W. G. .....West Allis
McKercher, Alfred .....Burlington
MacCune, J. G. ..Minneapolis, Minn.
McNaughton, Daniel .....Wausau
MacNeil, Edw. H. ...Whitefish Bay
McKeith, David.....Milwaukee

McCarthy, T. J. .....Madison
McMahon, J. P. .....Milwaukee
McLeod, John .....Rice Lake
McVicker, E. M. .....Milwaukee
McGann, Mike .....Hollandale

Norsman, O. S. .....Madison
Niles, E. H. .....Oconomowoc
Nieman, Walter G. .....Hamburg
Nebel, Louis .....Sturgeon Bay
Nelson, J. A. .....Port Wing
Nelson, John .....Oshkosh
Nelson, Louis .....Victor, Mont.
Nelson, John, Jr. ....Sturgeon Bay
Naber, F. D. .....Shawano
Naffz, Louis E. .....Madison
Nelson, C. L. .....Sturgeon Bay
Nelson, Otto .....Sturgeon Bay
Newhouse, R. C. .....Milwaukee
Nelson, Chas. J. .....Eau Claire
Nutt, Ed. .....Weblake
Novak, Emil C. .....Antigo
Naffz, Otto .....Madison
Nichols, O. J. .....Poynette
Nadler, J. F. .....Hazel Green

Ovenden, Frank .....Waterloo, Ia.
Otis, B. F. .....Sturgeon Bay
Oviatt, Dr. C. W. .....Oshkosh
Otterholt, Henry .....Chetek
Olson, C. O. .....Union Grove
Osmundson, Henry .....Superior
O'Hare, C. N. .....Superior
Ollinger, John G. ....Sturgeon Bay
Olson, O. S. .....Ephraim
Orth, Michael, Jr. ....Random Lake
Opgenorth, Tony .....Sheboygan
Owen, Dr. E. B. .....Merrill
Olson, O. T. .....McFarland
O'Neil, J. .....Wauzeka
Ogden, John A. (Hon.) ....Antigo
Olson, O. S. .....Milwaukee
O'Brien, Elizabeth .....Milwaukee
Onstad, E. J. .....Wittenberg
Olson, Alfred .....Viroqua
Orth, Chas. .....Middleton
Olsen, H. A. .....Madison
O'Meara, P. .....West Bend

Pearson, C. L. .....Baraboo
Peterson, P. A. .....Poplar
Pfefferle, S. .....Appleton
Pederson, C. T. .....Prairie Farm
Pfaender, Wm. Jr..New Ulm, Minn.
Potter, Henry D. .....Baraboo
Proctor, J. C. .....Madison
Parsons, Frank .....Green Lake
Peters, Louis .....Pepin
Perkins, John .....Galesville
Paulson, H. E. .....Hollandale
Pierron, L. .....Milwaukee
Pommer, E. .....Milwaukee
Pinney, Mrs. Martha..Sturgeon Bay
Pfotenhauer, Reinhart...Green Bay
Pfaff, Wenzel .....Stetsonville
Peterson, H. L. .....Sturgeon Bay
Prindle, E. R. .....Alma Center
Paulson, Jacob T. .....Dodgeville
Preston, F. R...Minneapolis, Minn.
Peterson, Geo. .....Stanley
Post, Robt. L. .....Madison
Pazik, Henry F. .....Waukesha
Pierre, Jules G. .....Brussels
Pabst, Mrs. Fred .....Oconomowoc
Pesch, Lawrence .....Fish Creek
Pearson, Nels P. .....Lake Geneva
Pritchard, Hugh. Minneapolis, Minn.
Potter, F. L. .....Chippewa Falls
Proctor, Dr. Thos. C...Sturgeon Bay
Paris, C. H. .....Conrath
Putman, A. S. .....Sturgeon Bay
Perry, John .....Sturgeon Bay
Peck, Will R....Minneapolis, Minn.
Pflughoeft, H. A. .....
.....South St. Paul, Minn.
Parsons, Harry E. .....Crivitz
Perry, Ed. M. .....Forestville
Potter, Geo. F. .....Madison
Paul, Rev. J. H. .....Milwaukee
Parks, W. S. .....Thorpe
Peterson, A. L. .....Superior
Pauly, A. P. .....Sheboygan
Peterson, J. E. .....Westby
Pfiel, Reinhart .....Sister Bay
Phillips, Jesse .....Elizabeth, Ill.
Pierce, R. W. Jr...Foster City, Mich.
Peterson, H. P. .....Superior
Pingle, L. .....Watertown
Peterson, P. .....Green Bay
Painter, Prof. Ira C. .....Wausau
Platten, Will J. .....Green Bay
Powers, W. C. .....Madison
Pratt, G. E. .....Gays Mills
Pritchard, J. T. .....Eau Claire
Peterson, Fred B. .....Milwaukee
Porter, W. N. .....Evansville
Pape, C. H. .....Sheboygan Falls

Rentschler, Geo. .....Madison
Reeve, Dr. J. S. .....Appleton
Reigle, G. W. .....Madison
Rice, Wm. V. .....Elmwood
Richter, W. A. ...North Milwaukee
Richards, M. W. ....Lafayette, Ind.
Riley, James .....Bloom City
Riley, Wesley .....Plymouth
Richardson, Geo. J. .....
.....Spring Grove, Ill.
Renak, Edw. .....Racine
Randels, Herman G. ..Alma Center
Ray, Victor .....Madison
Running, S. .....North Menomonie

Remel, Casper .....Menomonie
Runkel, L. L. .....Milwaukee
Reuping, L. .....Fond du Lac
Reichert, C. K. .....Milwaukee
Rohlinger, A. G. .....Milwaukee
Revland, Frank .....Oshkosh
Richardson, Mrs. E. L...Milwaukee
Robertson, Albert .....Sawyer
Rockman, N. M. .....Barron
Russell, J. T. .....Oshkosh
Ramsey, Frank H. .....Baraboo
Reinhardt, Dr. J. Paul .....
.....Fountain City
Redelings, H. J. .....Jim Falls
Riese, A. W. .....Milwaukee
Ryan, Malachi ....South Kaukauna
Reupke, Albert H...Lake Forest, Ill.
Rom, Emil .....Milwaukee
Richter, Dr. R. G. .....Milwaukee
Richter, Verner ...Detroit Harbor
Reinhart, Frank C. .....Cudahy
Rehfuss, Fred J. .....La Crosse
Reeve, Mrs. J. T. .....Appleton
Reeves, H. L. .....Oconto
Reed, B. C. .....Racine
Russell, Chas. C. .....Milwaukee
Ronning, Geo. C. .....Ashland
Roese, J. C. .....Osceola
Rock, Jas. .....Watersmeet, Mich.
Rowley, C. R. .....Bayfield
Rowley, Dr. R. C. .....Ashland
Robertson, Wm. .....Wauwatosa
Roach, Thos. .....Fond du Lac
Riley, A. S. .....Pardeeville
Reiner, John .....Sturgeon Bay
Rantzow, Henry .....Juneau
Reynolds, Edward ...Sturgeon Bay
Rohrdanz, Albert C. ....Milwaukee
Roscher, E. D. .....Genesee Depot
Rand, Frank .....Gays Mills
Ranum, O. K. .....Dodgeville
Rich, Miss Flora .....Baraboo
Roberts, Thos. G. .....Westfield
Ragatz, C. J. .....Potosi
Rohrer, Carl .....Superior

Smith, B. H. .....Tiffany
Shenandoah Nurseries..Shenandoah
Sorenson, P. J. .....Somers
Shuckhart, H. .....Bloom City
Sullivan, E. W. .....Alma Center
Swan, Chas. .....Barron
Schnitzler, Jno. L. .....De Pere
Simmons, Fred G. .....Milwaukee
Smith, Rev. L. C. .....Waukesha
Seefeld, G. A. .....Milwaukee
Sprangers, Rev. J. J. ....Green Bay
Schmidt, H. A. .....Wausau
Spooner, A. K. .....Delavan
Swingle, F. B. .....Racine
Sherman, W. T. .....Elkhorn
Suchan, Jos. .....Green Bay
Samuelson, Aug. .....Dallas, Texas
Sherman, Lewis, (Dr.)..Milwaukee
Sorensen, C. L. .....Sturgeon Bay
Smith, F. C. .....Ashland
Sorley, E. B. .....Tigerton
Schultz, Robert .....Lake Mills
Sherman, E. M. ...Charles City, Ia.
Starr, W. J. .....Eau Claire
Shepherd, E. .....Milwaukee
Schneider, Gustav J. ....Green Bay
Schmitz, Fred ....Menomonee Falls
Schroeder, Dr. H. F. .....Marinette
Smith, E. K. ....Minneapolis, Minn.
Simon, Fred .....Cudahy
Stabelfeldt, E. F. .....Milwaukee
Secor, Eugene .....Forest City, Ia.
Schmidt, Dr. E. S. .....Green Bay
Stoeber, Ernest J. .....Madison
Shestock, F. E. .....Kewaunee
Smith, Wm. F. .....Sheboygan
Scherer, P. H. .....Two Rivers
Schimmelpfenning, Geo. .....
..... Oconomowoc
Schroeder, J. M. .....Burlington
Saabye, Christ.....Detroit Harbor
Shepard, John .....Superior
Schulz, Geo. W. F. .....Colby
Schimmel, Frank A...Sturgeon Bay
Seltzer, Leopold ..Independence, Ia.
Shutts, Prof. G. C. .....Whitewater
Sieker, W. C. .....Milwaukee
Schwarz, Christ .....Barron
Sacia, Fred .....Galesville
Seidel, Dr. J. G. .....Warrens
Schulz, Albert H. .....Juneau
Senn, Alfred .....Milwaukee
Schmidtill, Mrs. Oscar F. .....
..... Wauwatosa
Snashall, Dr. B. L. .....Delavan
Sternad, Jos. .....Hillside
Schimberg, H. A. .....Ladysmith
Schmidt, A. C. .....Wausau
Sherwood, O. A. .....Gays Mills
Sackett, B. W. .....Appleton
Shippey, J. H. .....Bayfield
Sullivan, Hollis W. ..Alma Center
Schleif, Dr. E. J. .....Milwaukee
Seamans, Geo. J. .....Reedsburg
Seymour, Robt. T., Jr. ....Darien
Schmidt, Max .....Fish Creek
Schroeter, Gust.....Grafton
Schell, Mrs. Lottie B.....Jim Falls
Steinback, Dr. P. E..Hancock, Mich.
Schuyler, Frank .....Fish Creek
Strelitz, Maurice .....Milwaukee
Smith, E. A. .....Lake City, Minn.
Simonds, O. C. .....Chicago, Ill.
Smith, L. P. C. .....West Allis
Smythe, H. A., Jr. .....Madison
Schoff, Michael .....Sturgeon Bay

Schindler, M. H.....St. Paul, Minn.
Stark, L. C. .....Louisiana, Mo.
Sutton, Luther F. .....
.....Morgantown, W. Va.
Stark, A. C.....Madison
Shoudy, D. W.....Fairchild
Spaulding, Harry ..St. Paul, Minn.
Sweeney, P. F.....Chicago, Ill.
Schuldes, W. P....Escanaba, Mich.
Sheen W. J.....Trevor
Salbreiter, Rev. B. ....St. Francis
Sauer, Adolph F.....Milwaukee
Schwartz, Geo .....Green Bay
Soper, H. J.....Cedar Rapids, Ia.
Scheinoha, Dan .....Manitowoc
Shively, Roy ...Minneapolis, Minn.
Stewart, Wm. .....Delavan
Stafford, R.....Milwaukee
Smith, Rollin E.Minneapolis, Minn.
Stevenson, Carl ....Soldiers Grove
Stark, Wm.....Chester, Mo.
Stolz, H. G.....Green Bay
Sullivan, Earl.....Port Wing
Schneider, E. C.....Madison
Shoemaker, J. H.....Gilman
Sime, Wm. W.....Milwaukee
Schindler, W. J.....St. Paul, Minn.
Showers, F. F.....Delavan

Thwaites, Mrs. R. G.....Madison
Ten Eyck, A. A.....Brodhead
Timms, C. J.....Ripon
Tulledge, Everett G.....Oakfield
Tucker, W. E.....Union Grove
Trim, Geo.....Galesville
Turner, Watson .....Vesper
Tollefson, Thos.....Grantsburg
Townsend, Gerald J.....Poynette
Townsend, G. H.....Madison
Thomas, Mrs. C. B.....Westfield
Tamblingson, Wm. A..Ft. Atkinson
Tichenor, W. M.....Waupun
Tucker, L. J.....Pardeeville
Taylor, A. K.....Milwaukee
Tiele, Mrs. Henry.....Baraboo
Traurig, Ed.....Milwaukee
Traudt, Rev. B. G.....Milwaukee
Thom, Paul .....Watertown
Thoresen, Bennet C.....Westby
Taylor, Robt. D..Cedar Rapids, Ia.
Tipple, Maria.....Madison
Thompson, C. B.....Altoona
Ten Eyck, Frank A.....Brodhead
Taylor, P. D.....Brodhead
Teresa, Herman .....Madison
Tollefson, C. G.....Sawyer
Tiemann, Harry D.....Madison
Tetzlaff, E.....Madison
Turnbull, Wm. H.....Kenosha
Taylor, H. A.....Madison

Trostel, G. .....Milwaukee
Towne, L. H.....Edgerton

Umlauft, Rudolph .....Dorchester
Unger, Ed.....Hancock
Ullsperger, H .W.....Sturgeon Bay
Utter, Delbert.....Lake Beulah
Upmeyer, W. H. .....Milwaukee
Ullrich, A. A. .....Watertown

Van Orden, J.....Baraboo
Vaughn, F. A. .....Milwaukee
Verhalen, P. J.....Burlington
Van Attena, John.....Milwaukee
Van Buren, T. D.....Conrath
Vantine, Lewis A. ....Milwaukee
Vetter, Edward.....Milwaukee
Von Briesen, Ernest.....Milwaukee
Van Kleeck, Mrs. M. J.....Edgar

Williamson, W. D.....Madison
Wayne, Jos.....Boscobel
Williams, W. D.....Sparta
Wood, C. L.....Sparta
Wright, Geo. S.....Eau Claire
Weber, Frank C.....Wales
Walker, Geo.....Sawyer
Wegner, Wm. E. .....Watertown
Weigel, Emil.....Malvern, Ark.
Worthman, A. J.....Baraboo
Worthington, F. P. ....Creeds, Va.
Wright, R. S.....Milwaukee
Week, Jack.....Star Prairie
Wolf, Abraham....Bismarck, N. D.
Walker, E. W.....Delavan
Walker, M. H.....Green Bay
Whitcomb, E. R.....Whitefish Bay
Wright, Dr. P. B.....Milwaukee
Wilson, Ralph E.....Milwaukee
Weld, Dr. Wm. H. ....Ft. Atkinson
Wrzosek, Frank.....Thorpe
Watzke, Walter .....Waunakee
Walbridge, F. E. ....Stevens Point
Winkler, Theo.....Sheboygan
Wilson, Wm.....Sturgeon Bay
Ward, F. D.....Milwaukee
Woerfel, W. J. .....Sturgeon Bay
Wagener, N. Z.....Sturgeon Bay
Wagener, W. E.....Sturgeon Bay
Wilke, Henry .....Milwaukee
Wiegand, Ernest.....Sturgeon Bay
White, Mrs. W. O.....Delafield
Wacker, F. J.....Fairchild
Wedgewood, R. E.....Shawano
Ward, Robt. W.....Ft. Atkinson
Wendt, Carl F. .....Bado, Mo.
Wood, Edgar L.....Milwaukee
White, J. Ernest.....Edgerton
Wilson, Jas. A...Lake Forest, Ill.
Wege, Frederick.....Antigo

Weiler, Theo.....Milwaukee
Wagner, Adolph F.....Milwaukee
Wallace, E. G.....Hixton
Wright, Chas. E.....Milwaukee
Wright, John S.....Milwaukee
Woerfel, Hubert.....Fish Creek
Warne, Theo. F.....Milwaukee
Walwoord, J. D.....Cedar Grove
Weber, F. W.....Oconomowoc
Warnecke, Wm.....Oconomowoc
Wigdale, Ole.....Ft. Atkinson
Wilder, T. M.....Ravinia, Ill.
Weld, Salem E.....Neillsville
Writt, Mike .....Sawyer
West, J. W.....Marshfield
Wetz, Geo.....Milwaukee
Ward, C. P.....Madison
Wilcox, R. B.....Madison
Wifler, Oscar C. .....Plymouth
Woerfel, Dr. R. A.....Eagle River
Wrightly, Louis.....Eagle River
Welcker, Dr. H. C.....Chicago, Ill.
Woodward, B.....Hayward
Wheeler, H. E.....Richland Center
Washburn, Chas.....Sturgeon Bay
Wells, O. E.....Wausau
Wood, John T.....Twin Bluffs
Ward, Mrs. Ed.....Arena
Warner, D. T.....Whitewater
Wiora, Jos.....Almond
Woll, Prof. F. W.....Madison
Worthman, T. J.....Omaha, Neb.
West, Allen B.....Milton Jct.
Winegard, W. W.....Green Bay
Walechka, J. H.....Antigo
Wilcox, W. O. .....Janesville

Yahr, Solon .....West Bend
Young, Anson A.....Wausau
Yunker, C. H.....Milwaukee
Yates, Mrs. J. L.....Milwaukee
Young, S. O. .....Poynette

Zaun, Jacob .....Milwaukee
Zabel, M. A.....Sharon
Zwerg, Robt.....Madison
Zimmerman, Chas.....Peebles
Zivney, Jos. .....Sturgeon Bay
Zimmerman, L. V.....Milwaukee
Zschetzsche, Theo.....Sheboygan
Zillmer Wm. C.....Brookfield
Zeddies Arthur T.....Cleveland

BAYFIELD PENINSULA HORTICULTURAL SOCIETY.

Bayfield, Wis.

Andreas, C. T.
Anderson, Harry
Anderson, C. G.
Bell, C. G.
Bell D. C.
Boutin Frank
Boutin S. L.
Bracken B. J.
Brauns, Fred
Brigham, E. K.
Barningham, Wm.
Brown, Joshua R.
Bissell J. E., La Pointe.
Bovee, J. B.
Black, J. M.
Brigham, Lloyd
Berry, H. C., Washburn
Bresette, Frank
Bigelow, Dr. F.
Brauns, Fritz J.
Beebe, Roy H. Ashland
Cooley, F. S.
Carver, L. S., Washburn
Carver, L. H.
Carver, Max
Carver, Ed
Carlson, J. E.
Dady, John W.
Downs, W. W., Eau Claire
Davis, L. E.
DeBraie P.
Eggler, Albert
Engbloom, John
Englund, Olaf
Englund, John
Flake, P. F.
Flanders, O.
Feldmier, Jos.
Fisher, J. J.
Flynn, W. W.
Flanders, Ruth
Farrow, Jack
Fleith, W. H., Cornucopia
Holston, W. V.
Holston, R. E., Ashland
Holston, E. L., Ashland
Holston, F. E.
Hannum, H.
Hale, H. C.
Hanchett, Herman, La Pointe
Hagman, Nels
Hagman, Rector
Hagberg, John
Hawley, Dr. F. M.
Hauser, J. F.
Hadlund, Ole
Holmes, W. H.
Holmgren, John
Hamlin, F. E.
Hastie, A. E., Washburn

Haley, G. B., Sioux City, Ia.
Hansen, Fred, Shaw
Hill, Burt P.
Inglis, R
Johnson, M. B.
Johnson, Martin
Johnson, Cevert
Jacobson, Jacob
Jewell, F. M.
Knight, Wm.
Kranzfelder, John
Koisky, Alex, Cornucopia
Keith, R. S., Des Moines, Ia.
Keith, J. A.
Kirkwood, R., St. Paul, Minn.
Kirkwood, Earl St. Paul Minn.
Kennedy, W. S.
Kern F.W .
Lang F. N.
Lodle, A.
Lotta, Edith K., Superior
Lambert, John
Linneak, Wm., Cornucopia
Leitey, Chas.
Larson, Chas.
LaBonte, A. G.
Libby, John
Long, Jas. M.
McConnell, J. C., Superior
Morris, K. A., Milwaukee
McRae, Margaret, Superior
Mussell, Jack
Miethke, Paul
Mills, Otis G.
Maxson, John
Mertens, H. G.
Nourse, Laurie
Nourse, Harvey
Nelson, John V.
Nelson, Leo
Nussing, Oscar
Nelson, A.
Neilson, Albert G., La Pointe
O'Connell, D. W.
O'Malley, J. P.
Peterson Chas.
Peterson Jos.
Pederson. P. J.
Powell, W. S.
Powell, A. W.
Powell, E. E., Sparta
Powell, Jesse
Pickett, Dr. S. L.
Packard, Geo. A.
Rowley, Roy C., Ashland
Reid, C. W., Cornucopia
Ripple, Robt.
Runyan, C. A.
Sykes, J. H.
Stark, Frank
Sherwin, L. B.
Sherwin, E. K., Proctor, Minn.
Schultz, Wm.
Sinclair, W. H.
Sense, Herman
Strand, H. S.
Salmon, E. P., Beloit
Stansvedt, J. A.
Thompson, A. M.
Turner, T. J.
Turnquist, A.
Theobald, Jas.
Tyler, A. E., Chetek
Vorous, O. J.
Van Cleve, H. L.
Wachsmuth, H. J.
Walters, John
Wolfe, F. L., Two Rivers
Whiting, Geo. H., Yankton, S. D.
Wasmuth, Sam
Wachsmuth, Henry
Wilkinson, A. H.
Weber, W. H.
Wescott, Albert, Cornucopia
Weaver, Henry
Young, Geo. W., Cornucopia

LAKE GENEVA GARDENERS' AND FOREMEN'S ASSOCIATION.

Lake Geneva, Wis.

Agern, John
Barrett, Miles
Barlow, Geo.
Blackwood, Robt.
Button, Frank
Griffiths, W. H.
Huntress, M. G.
Johnson, Axel
Krupa, Jos.
Kreiz, Paul
Kuehne, Frank, Oconomowoc
Larsen, Hans
Longland, Wm. P.
Laury, Frank
Milla, Fred
Martini, A.
Sangren, Edw.
Sauer, Emil
Smith, A. J.
Shepherd, Geo.
Sampson, Robt.
Short, Benj.
Topolinsky, John
Wahlstedt, Wm.
Yekes, Herman

MADISON HORTICULTURAL SOCIETY.

Madison, Wis.

Brown, Chas. N.
Buenzli, John
Cass, Van. W.
Clark, M. C.
Cranefield, F.
Isom, R. A.
Koester, Frank
Lamp, Robt. M.
McKay, Wm. G.
Mills, Miss Genevieve
Outhouse, Perry
Piper, Chas.
Post, Lewis
Post, Robt.
Reigle, Geo. W., (Deceased)
Rentschler, Fred
Rentschler, Geo.
Ray, Victor,
Roloff, E. L.
Schucardt, A. G.
Shepard, C. N.
Stang, A. J.
Steensland, E. B.
Tenney, H. A.
Turville, Thos.
Wermuth, Adolph
Wermuth, Alphonse
Woll, Prof. F. W.

MANITOWOC COUNTY HORTICULTURAL SOCIETY

Manitowoc, Wis.

Adelman, Jos.
Ahrens, W. J.
Bartels, Geo.
Bedell, Ed
Berge, John
Behm, Walter F.
Bies, Matthew
Bremer, Harvey
Brey, Ed. Jr.
Brick, Chas.
Christensen, Prof. F.
Detjen, Henry J.
Eberhardt, Henry
Eckardt, Ed
Erickson, Andrew
Esch, Chas.
Farr, John H.
Griffin, A. J.
Gruhle, Chas.
Herbst, Fred
Huebner, Fred A.
Huebner, Ferdinand
Kolanczyk, Jo.
Kolb, Roland
Krause, Alex
Kadow, John
Kestley, Jos.
Levenhagen, Henry
Madson, C. M.
Martin, J. W.
Meisnest, F., Branch
Meisnest, C. W.
Meyer, Jno. F.
Nash, L. J.
Nienaber, Ben
Oleson, Hans C., Cato
Paulson, J. E.
Paulson, Theo.
Pierce, Fred
Pietch, Jos.
Rathsack, Wm., Sr.
Salverson, Andrew
Scholten, John
Schmitz, Carl
Schmidtman, T,. Jr.
Schuette, Aug.
Staehle, Dr. M.
Stevenson, Ole
Spencer, Wm. H.
Terkelson, Sievert
Torrison, Geo., Reedsville
Tyler, J. Grant, Valders
Vogel, Wm., Branch
Waldo, Miss Flora
Wehausen, H.
Wernecke, Henry
Wiegert, V. E., Cato
Wigen, Chas., Vallers
Zahorik, Jas. J., Mishicot

OSHKOSH HORTICULTURAL SOCIETY

Oshkosh, Wis.

Buckstaff, Geo. A.
Cooper, Henry O.
Christensen, H.
Davis, L. E.
Davis, W. B.
Fisher, Peter
Howlett, Mrs. D. D.
Ihrig, J. J.
Lyman, H. A.
Nelson, Wm.
Noyes, J. B.
Phillipson, C.
Radford, S. C.
Roe, J. W.
Sperbeck. M. V.

POY SIPPI HORTICULTURAL SOCIETY

Poy Sippi, Wis.

Anderson, H. P., Pine River.
Borgeson, K., Red Granite
Davis, Henry
Gehrke, Agnes, Aurorahville
Gorden, John
Hall, W. F., Aurorahville
Jorgensen, Arthur
McCue, O. E., Aurorahville
Smith, J. H., Aurorahville
Virgin, Ed

SHEBOYGAN COUNTY HORTICULTURAL SOCIETY

Sheboygan Falls, Wis.

Arpke, Dr. H. A., Sheboygan
Bamford, L., Plymouth
Campbell, Jas., Sheboygan
Hahn, A. C., Sheboygan
Johnson, O. Z.
McIntire, A. H., Sheboygan
Quimby, Carroll, Sheboygan

WASHBURN HORTICULTURAL SOCIETY

Washburn, Wis.

Anderson, Erick
Axelberg, H. P.
Bell, F. A.
Burns, H. H.
Daley, Wm.
Downs, Frank
Estabrook, D. J.
Goodnough, L. D.
Gibson, J. W.
Hoffman, Aug.
Hagen, Ole O.
Hull, M. S.
Kinstler, L.
Maxey,D . M.
McLeod, A. W.
Morgan, Geo. F.
Oscar, N. M.
Oscar, S. A.
Olson, Wm.
Palm, Carl
Peavey, H. H.
Posey, Geo. W.
Raarup, M. J.
Schroth, Robt.
Smith, H. A.
Stevens, E. C.
Stuhlman, Frank
Swain, C. A.
Walsh, John
Wangsness, L. K.

CHIPPEWA VALLEY HORICULTURAL SOCIETY

Eau Claire, Wis.

Allen, Chas. L.
Bagley, W. J.
Burce, Ruth
Brown, Mrs. J. K.
Brown, J. K.
Campbell, N. H.
Garnett, W. B.
Gower, A. C.
Ingalls, G. R.
Johnson, O. S.
Lewis, W A.
Nelson, E. R.
Reed, Chas.
Wright, Geo. S.