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ANNUAL REPORT

OF THE

Wisconsin State Horticultural Society

For the Year Ending July 1, 1925

VOL. LV

Frederic Cranefield, Editor
Secretary State Horticultural Society
Madison, Wisconsin

MADISON, WIS.
DEMOCRAT PRINTING COMPANY
1925

LETTER OF TRANSMITTAL

Madison, Wis., July 1, 1925.

To His Excellency, JOHN J. BLAINE,
Governor of Wisconsin.

Dear Sir:—I have the honor to transmit to you herewith the Fifty-fifth Annual Report of the Wisconsin State Horticultural Society.

Respectfully,

FREDERIC CRANEFIELD,
Secretary.

OFFICERS AND COMMITTEES FOR 1925

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For Term Ending December, 1927

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For Term Ending December, 1926

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For Term Ending December, 1925

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JAMES LIVINGSTONE.....Milwaukee

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BOARD OF MANAGERS

W. A. TOOLE

J. E. LEVERICH

FREDERIC CRANEFIELD

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SUMMER MEETING

FRUITS RECOMMENDED FOR CULTURE IN WISCONSIN

The behavior of varieties of fruits is influenced very largely by their 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. Hardiness of plant and fruit bud has been the leading thought in the selection of varieties.

APPLES HARDIEST VARIETIES

Usually Hardy in Any Part of Wisconsin.

Duchess, Hibernal, Livland Raspberry, Longfield, Lubsk Queen, Malinda, Patten Greening, Whitney.

APPLES, GENERALLY HARDY

Astrachan (Red), Autumn Strawberry, Delicious, Dudley, Fall Orange, Fameuse (Snow), Golden Russett, Livland Raspberry, Longfield, Lubsk Queen, McIntosh, Malinda, McMahon, Newell, Northwestern Greening, Duchess, Patten Greening, Saint Lawrence, Salome, Scott, Tolman (Sweet), University, Utter, Wealthy, Westfield (Seek-no-Further), Windsor, Wolf River.

APPLES

Varieties Hardy in Special Localities.

Ben Davis, Fallawater, Gano, Hubbardston, Jonathan, King, Northern Spy, Pewaukee, Sutton Beauty, 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: **Delicious, Duchess, Dudley, Fameuse, McMahan, McIntosh, Northwestern Greening, Tolman, Wealthy, Windsor, Wolf River.**

APPLES (Six Varieties for Farm Orchard)

Duchess, Livland Raspberry, Northwestern Greening, Tolman (Sweet), Wealthy, Windsor.

CRABS

Hyslop, Sweet Russett, Virginia, Whitney.

PLUMS

Of the classes commonly culitvated, viz.: **European, Japanese, Native or American and Hansen Hybrids,** the two last named are most likely to succeed.

NATIVE PLUMS

De Soto, Hammer, Hawkeye, Forest Garden, Surprise.

HANSEN HYBRIDS

Sand Cherry type—**Opata, Sapa;** plum type; **Waneta.**

EUROPEAN PLUMS

(Not recommended for general cultivation.) **Damson, Green Gage, Lombard, Moore's Arctic.**

JAPANESE PLUMS

(Not recommended for general cultivation.) **Burbank.**

CHERRIES

Early Richmond, Montmorency.

GRAPES

Brighton (Red), **Concord** (Black), **Delaware** (Red), **Diamond** (Green), **Moore's Early** (Black), **Niagara** (Green), **Winchell** (Green), **Worden** (Black).

BLACKBERRIES

Eldorado, Snyder.

STRAWBERRIES

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

Aroma, Bubach, Dr. Burrill, Dunlap, Gandy, Glen Mary, *Haverland, *Sample, Splendid, *Warfield.

FALL BEARING STRAWBERRIES

Progressive, Superb.

TWO VARIETIES STRAWBERRIES FOR FARM GARDEN

Dunlap, *Warfield.

RASPBERRIES

Black: **Conrath, Cumberland, Gregg, Plum Farmer.**
Red: **Cuthbert, Marlboro, King, Latham.**
Purple: **Columbian.**

CURRANTS

Red: **Red Cross, Perfection, Pomona, Wilder.**
White: **White Grape.**
Black: **Lee's Prolific, Naples.**

GOOSEBERRIES

Downing.

WARNING.—Currant and Gooseberry bushes should not be planted or permitted to remain within 600 yards of white pine, especially in the northwestern counties. They spread the blister rust, a disease which kills young white pine trees. This applies to ornamental flowering currants also.—State Department of Agriculture.

PEARS

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

Anjou, Bartlett, Clairgeau, Clapp Favorite, Early Bergamot, Flemish Beauty, Idaho, Kieffer, Lawrence, Louise, Seckel, Sheldon, Vermont Beauty.

TREES AND SHRUBS RECOMMENDED

LARGE DECIDUOUS TREES

Silver Maple	Acer dasycarpum
Wiers Cutleaf Maple	Acer dasycarpum var.
Norway Maple	Acer Platanoides
Scarlet Maple	Acer rubrum
Sugar Maple	Acer saccharinum
Paper Birch	Betula papyrifera
Red Birch	Betula nigra
Hackberry	Celtis occidentalis
White Ash	Fraxinus americana
Green Ash	Fraxinus viridus
Maidenhair Tree	Ginkgo biloba
Honey Locust	Gleditschea triacanthos
Kentucky Coffee Tree	Gymnocladus canadensis
Black Walnut	Juglans nigra
Enropean Larch	Larix europaea
American Larch	Larix laricina
Bolles Poplar	Populus Bolleana
Carolina Poplar	Populus monilifera
Black Cherry	Prunus serotina
White Oak	Quercus alba
Scarlet Oak	Quercus coccinea
Bur Oak	Quercus macrocarpa
Pin Oak	Quercus palustris
Red Oak	Quercus rubra
Golden Willow	Salix vittellina
Wisconsin Weeping Willow	Salix blanda
Laurel Willow	Salix pentandra
Basswood	Tilia americana
American Elm	Ulmus americana

FOR STREET PLANTING

American Elm	Basswood
Norway Maple	Pin Oak

SMALL DECIDUOUS TREES

(This class includes small deciduous trees of more value for ornament than for shade or protection.)

Tatarian Maple	Acer tataricum
Juneberry	Amelanchier canadensis

Hawthorn	Crataegus-Crusgalli
Buckeye	Aesculus glabra
Russian Mulberry	Morus alba var. tatarica
Ironwood	Ostrya virginiana
Mountain Ash (native)	Pyrus americana
Western Crab Apple (native)	Pyrus ioensis
Bechtel's double fl. Crab	Pyrus ioensis var. Bechtelii

LARGE EVERGREENS

(None of the "large" evergreens should be planted on small lawns on account of their great size at maturity and dense habit of growth. A spruce or a pine may reach a height of 50 to 100 feet with a spread of 50 feet; so also may an elm but the lower branches of the elm may advantageously be removed while such pruning of an evergreen would destroy its beauty.)

Concolor Fir	Abies concolor
White Spruce	Picea canadenis
Norway Spruce	Picea excelsa
Colorado Blue Spruce	Picea pungens
Austrian Pine	Pinus austriaca
Red Pine	Pinus resinosa
Bull Pine	Pinus ponderosa
White Pine	Pinus strobus
Scotch Pine	Pinus sylvestris
Douglas Fir	Pseudotsuga taxifolia
Arbor Vitae (White Cedar)	Thuja occidentalis
Hemlock Spruce	Tsuga canadensis

SMALL EVERGREENS

Dwarf Juniper	Juniperus communis var.
Waukegan Juniper	Juniperus horizontalis
Japanese Trailing Juniper	Juniperus procumbens
Sabin Juniper	Juniperus Sabina
Tamarix-leaved Juniper	Juniperus Sabina var.
Mugho Pine	Pinus montana var. mughus
American Yew	Taxus canadensis
Siberian Arbor Vitae	Thuja orientalis var.
Pyramidal Arbor Vitae	Thuja pyramidalis
Globe Arbor Vitae	Thuja compacta

SHRUBS

Mountain Maple	Acer spicatum
Thunberg's Barberry	Berberis Thunbergii
Weigela rosea	Diervilla florida
Weigela	Diervilla floribunda

Winged Burning Bush	Euonymus alata
Strawberry Tree	Euonymus europaeus
Silver Berry	Ealeagnus argentea
Forsythia	Forsythia intermedia
Summer Snowball, Hardy Hydrangea	Hydrangea arborescens
Garden Hydrangea	Hydrangea paniculata gr.
Amur Privet	Ligustrum amurense
Regal's Privet	Ligustrum Ibota var.
Morrow's Honeysuckle	Lonicera Morrowii
Ruprecht's Honeysuckle	Lonicera Ruprechtiana
Tartarian Honeysuckle	Lonicera tatarica
Mock Orange	Philadelphus coronarius grandiflora
Mock Orange, large	Philadelphus coronarius grandiflora
Lemoine's Mock Orange	Philidelphus Lemoinei
Russian Almond	Prunus nana
Smoke Bush	Rhus Cotinus
Cutleaf Sumacs	Rhus typhina var. and glabra var.
Alpine Currant	Ribes alpinum
Flowering Currant	Ribes aureum
Rose Acacia	Robina hispida
Japanese Rose	Rosa rugosa
Cutleaf Elder	Sambucus canadensis var. acutiloba
Golden Elder	Sambucus nigra var. aurea
Buffalo Berry	Shepherdia argentea
Hybrid Snow Garland	Spirea arguta
Billard's Spirea	Spirea Billardii
Bumalda Spirea	Spirea Bumalda
Callosa Spirea	Spirea Callosa alba and rubra
Douglas' Spirea	Spirea Douglassi
Van Houten's Spirea, Bridal Wreath	Spirea Vanhouttei
Persian Lilac	Syringa persica
Downy Lilac	Syringa villosa
Chinese Lilac	Syringa chinesis
Common Lilac	Syringa vulgaris
Wayfaring Tree	Viburnum lantana
Snowball	Viburnum Opulus var. sterilis
Dwarf Cranberry Tree	Virburnum Opulus nanum

ROSES

Hardy garden—Rosa rugosa, Harrison Yellow, Persian Yellow, Cabbage Rose, Michigan Prairie Rose, Madame Plantier, Conrad F. Meyer.

Hybrid perpetual (require winter protection)—Paul Neyron, Mrs. J. H. Laing, Gen. Jacqueminot, Marshall P. Wilder, Magna Charta, General Washington, Ulrich Brunner, John Hopper, Capt. Christy, Druschki, Baron Bonstettin, J. B. Clark.

Moss roses—Salet, Henry Martin, Crested Moss.

Climbers—Prairie Queen, Seven Sisters, Gem of the Prairie, Crimson Rambler, Dorothy Perkins, Excelsa, American Pillar, Paul's Scarlet.

COMPARATIVE HEIGHT AT MATURITY OF DIFFERENT SHRUBS

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

The following may serve as a partial guide in planting:

Dwarf, 2 to 4 feet

Alpine Currant
Thunberg's Barberry
Rose Acacia
Bumalda Spirea
Callosa Spirea
Meadow Sweet Spirea

Medium, 4 to 8 feet

Hardy Hydrangea (summer fl.)
Japanese Rose
Silver Berry
Garden Hydrangea
Morrow's Honeysuckle
Missouri Currant
Mountain Maple
Billard's Spirea
Douglas' Spirea
Van Houten's Spirea
Persian Lilac

Tall, 8 to 12 feet, some kinds 15 feet

Weigla
Burning Bush
Strawberry Tree
Ruprecht's Honeysuckle
Tartarian Honeysuckle
Mock Orange
Forsythia
Smoke Bush
Buffalo Berry
Common Lilac
Snowball
Wayfaring Tree
Cutleaf Elder
Cutleaf Sumac

NATIVE SHRUBS SUITABLE FOR PLANTING ON HOME GROUNDS

Common Name	Scientific Name
New Jersey Tea	Ceanothus americanus
Button Bush	Cephalanthus occidentalis
Alternate Leaved Dogwood	Cornus alternifolia
Bailey's Dogwood	Cornus Baileyi
Round-leaved Dogwood	Cornus circinata
Gray Dogwood	Cornus paniculata

Red Osier Dogwood	Cornus stolonifera
Hazelnut	Corylus americana and rostrata
Leatherwood (Wickopy)	Dirca palustris
Wahoo	Euonymus atropurpureus
Witch Hazel	Hamamelis virginiana
St. John's Wort	Hypericum pyramidatum
Winterberry (Holly)	Ilex verticillata
Trailing Juniper	Juniperus procumbens
Ninebark	Physocarpos opulifolia
Hop Tree	Ptelea trifoliata
Dwarf Sumac	Rhus copalina
Smooth Sumac	Rhus glabra
Staghorn Sumac	Rhus typhina
Wild Rose (dwarf)	Rosa blanda
Swamp Rose	Rosa carolina
Prairie Rose	Rosa setigera
Wild Rose	Rosa humilis
White-flowered Raspberry	Rubus Nutkanus
Purple-flowered Raspberry	Rubus odoratus
Common Elder	Sambucus canadenis
Scarlet Elder	Sambucus racemosa
Meadow Sweet	Spirea salicifolia
Bladder Nut	Staphylea trifolia
Snowberry	Symphoricarpus racemosus
Coral Berry, Indian Currant	Symphoricarpus vulgaris
Ground Hemlock	Taxus canadensis
Maple-leaved Viburnum	Viburnum acerifolium
Sheepberry	Viburnum Lentago
Arrow Wood	Viburnum dentatum
Bush Cranberry	Viburnum americanum
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 Spirea (Bridal Wreath), Thunberg's Barberry.

HARDY VINES

Virginia Creeper	Ampelopsis quinquefolia var.
Engleman's Ivy	Ampelopsis quinquefolia var. Englemanii
Japanese Clematis	Clematis paniculata
Native Clematis	Clematis virginiana
Trumpet Honeysuckle	Lonicera sempervirens
Wild Grape	Vitis riparia

EIGHT HARDY HERBACEOUS PERENNIALS

Phlox, Peony, Larkspur, Bleeding Heart, Lily of the Valley, Iris, Oriental Poppy, Shasta Daisy.

COMPARATIVE HEIGHT AT MATURITY OF NATIVE SHRUBS

Dwarf, 2 to 4 feet

Winterberry
Trailing Juniper
Prairie Rose
Wild Rose (dwarf)
Snowberry
Hazelnut (rostratum)
Coral Berry
Ground Hemlock
Maple-leaved Viburnum
New Jersey Tea
St. John's Wort
Dwarf Cranberry Tree

Medium, 4 to 8 feet

Gray Dogwood
Winterberry
Swamp Rose
White fl. Raspberry
Purple fl. Raspberry
Leatherwood
Wild Rose (tall var.)
Arrow Wood
Hazelnut (americanum)

Tall, 8 to 12 feet, some kinds to 20 feet

Button Bush
Round-leaved Dogwood
Red Osier Dogwood
Bailey's Dogwood
Common Elder
Scarlet Elder
Bladder Nut
Wahoo
Ninebark
Staghorn Sumac
Dwarf Sumac
Sheepberry
Bush Cranberry
Prickly Ash
Hop Tree
Witch Hazel

SHRUBS REQUIRING PROTECTION

A list of shrubs all of which have been tested and found not entirely hardy without protection:

Common Name	*Scientific Name*
Bladder Senna	Coluta arborescens
Japanese Quince	Cydonia japonica
Slender Deutzia	Deutzia gracilis
Goumi	Eleagnus longipes
Pearl Bush	Exochorda grandiflora
Golden Bell	Forsythia suspensa
Snowdrop Tree	Halesia tetraptera
Kerria	Kerria japonica
Common Privet	Ligustrum vulgare

Purple-leaved Plum---Prunus cerasifera var. (Prunus pissardi Hort.)
Flowering Almond ---Prunus japonica
Flowering Plum (double)---Prunus triloba
Tamarix ---Tamarix var.
Thunberg's Spirea---Spirea Thunbergii

SHRUBS FOR SHADY PLACES

Alpine Currant
Elders
Ground Hemlock
Hydrangea (arborescens)
Indian Currant
Loniceras
Flowering Currant
Privets
Snowberry
Viburnum (Maple leaved)
Witch Hazel

HARDY PERENNIALS

Scientific Name	*Common Name*
Achillea ptarmica, The Pearl or Boule de Niege	Milfoil
Aquilegia, long spurred Hybrids, many varieties	Columbine
Boltonia, asteroides and latisquama	False Chamomile
Campanula Carpatica	Carpathian Bellflower
Campanula persicaefolia	Peach Leaf Bellflower
Chrysanthemum maximum	Shasta Daisy
Coreopsis lanceolata	Tickseed
Delphinium, Belladonna, Formosum, Hybrids	Larkspur
Dianthus plumarius	Grass Pink
Gaillardia grandiflora	Blanket Flower
Gypsophila paniculata	Baby's Breath
Hemerocallis, several varieties	Day Lily

SIX STANDARD VARIETIES IRIS

Mad. Chereau
Honorabilis
Silver King
Queen of May
pallida dalmatica
orientalis blue

Lilium tigrinum---Tiger Lily
Lilium elegans---Garden Lily
Lilium dauricum ---Garden Lily
Papaver Orientale---Oriental Poppy
Peony, many varieties—

Six good ones:
Rubra Superba, Late red
Felix Crousse, Midseason red
Festiva Maxima, Early white
Grandiflora
Edulis Superba, Early pink
Officinales rubra plena

Phlox, many varieties ---------- Phlox
Seven good ones:
Elizabeth Campbell, light salmon pink
Europea, White, carmine eye
Mrs. Jenkins, white
B. Compte, French purple
R. P. Struthers, bright rosy red
Beranger, delicate pink
Miss Lingard, early white, pink eye
Platycodon grandiflorum ---------- Balloon Flower
Pyrethrum Ulignosum ---------- Giant Daisy
Pyrethrum roseum ---------- Persian Daisy
Rudbeckia purpurea ---------- Purple Cone Flower
Sedum spectabile ---------- Stonecrop
Veronica spicata ---------- Speedwell

NATIVE PERENNIALS ADAPTED TO PLANTING IN HOME GROUNDS

Scientific Name	*Common Name*
Aster Novae Anglae	New England Aster
Anemone pennsylvanica	Prairie Anemone
Anemone Pulsatilla	Badger or Pasque Flower
Asclepias tuberosa	Butterfly Weed
Aquilegia canadensis	Columbine
Campanula rotundifolia	Harebell
Caltha palustris	Marsh Marigold
Dodecatheon media	Shooting Star
Eupatorium ageratoides	White Snakeroot
Euphorbia corollata	Flowering Spurge
Helenium autumnale	Sneezewort
Hydrophyllum canadense	Waterleaf
Liatris squarrosa	Blazing Star
Lilium canadense	Native Lily
Lilium Superbum	Turk's Cap Lily
Lobelia cardinalis	Cardinal Lobelia
Mertensia Virginica	Lungwort
Phlox divaricata	Woods Phlox
Phlox pilosa	Prairie Phlox
Physostegia virginica	False Dragonhead
Polemonium reptans	Jacob's Ladder
Rudbeckia hirta	Black-eyed Susan
Tradescantia virginica	Spider Lily
Trilium grandiflorum	White Wake Robin
Veronica virginica	Speedwell
Viola pedata	Birdsfoot Violet

SPRING FLOWERING BULBS

Tulips, single dwarf early: Duc Van Tholl, pink, scarlet and white, Tulips, medium season: Artus, red; Chrysolora, yellow; Cottage Maid, pink. Tulips, large flowering, late; Darwin, Gesneriana.

Hyacinth, white, L'Innocence; pink, Gertrude; lavender, Grand Maitre; blue, King of The Blues; yellow, Yellow Hammer.

Narcissus (daffodil); Von Sion, double; Emperor, single; Poeticus and Ornatus.

Crocus: Mixed.

Tulips and other Holland bulbs for outdoor blooming must be planted in autumn, preferably September or October, and will bloom early in spring.

BULBS FOR INDOOR CULTURE

Narcissus: Von Sion (double), Bicolor Victoria, Emperor, Poeticus, Paper White, Chinese sacred lily.

Hyacinths: Any variety.

Bulbs for forcing should be potted in October or November and kept in a dark, cool cellar for several weeks. When well rooted the pots may be brought to the light as desired for a succession of bloom. The Paper White and Chinese lily may be grown in water and do not require the "dark" treatment.

SUGGESTED VARIETIES FOR WISCONSIN HOME ORCHARDS

From Bulletin 363 Wisconsin Agricultural Experiment Station, April, 1924, by Professor James G. Moore, Horticulturist.

In all cases varieties hardy in the northern part of the state will be hardy in a southern section. However, because better varieties frequently may be grown in the southern sections than certain of those recommended for the northern section, it is not always best to select a variety simply because it is hardy. Figures in the lists refer to divisions on the map.

Apples

Summer:

1–2 Charlamoff, Yellow Transparent, Lowland Raspberry, Tetofsky, Oldenburg (Duchess).

3–4 Same as above, also Red Astrachan.
On account of its susceptibility to fire-blight, Yellow Transparent should probably be omitted.

Fall:

1– Patten Greening, Longfield, Okabena.

2– Dudley, Fall Orange, Fameuse, McIntosh, Plumb Cider, St. Lawrence, University, Wealthy, Wolf River.

3–4 Bailey Sweet, Golden Sweet, Twenty-ounce.

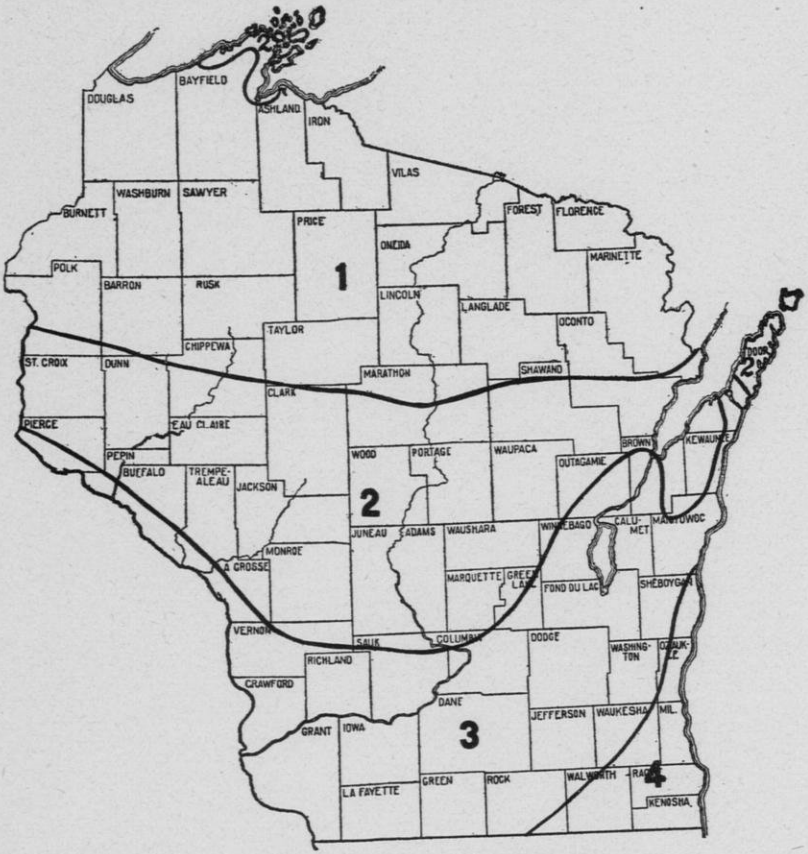


FIG. 7.—FRUIT ZONES OF WISCONSIN

It is possible to divide the state into such zones only in a general way.

Winter:

1– Malinda.*

2– Delicious, Golden Russet, Northwestern Greening, Salome, Tolman Sweet, Windsor.

3– Grimes Golden, Jonathan, Northern Spy, Stark, Wagener, Winter Banana, Westfield (Seek-no-further), Willow Twig.

4– Hubbardston, King, Sutton Beauty, Stayman Winesap.

Crab apples in order of ripening.

For all sections—Whitney, Martha, Virginia, Hyslop.

*Not recommended for sections 3 and 4.

Pears

1. Cannot be successfully grown in this section.
2. Only the hardiest varieties and then only in most favored situations.
3. Hardiest varieties moderately safe.
4. Hardy varieties escape with only occasional winter injury.

Varieties, (In approximate order of ripening).

Tyson, Clapp's Favorite, Wilder Early, Bartlett,* Flemish Beauty, Lincoln, Howell, Seckel,* Worden Seckel,* Sheldon, Anjou, Keiffer.**

*Slightly more tender than other varieties.

**Hardiest, but poorest in quality.

Plums

1. Hansen Hybrids.
2. Native.

3–4. European and Japanese fairly successful.

Hansen hybrids—sand cherry type; Opata, Sapa, Plum type; Waneta, Toka, Tokata.

Native—De Soto, Forest Garden, Hammer, Hawkeye, Surprise,* Terry.

European—Damson (for conserve), Lombard, German Prune, Italian Prune, Green Gage.*

*Not as hardy as other varieties, needs very favorable location.

Japanese—Abundance, Burbank.

Not recommended for general culture.

Cherries

1. and West three-fourths 2. (Substitute sand cherry type of Hansen plums or compass cherry-plums.)

3–4 and east fourth 2. Early Richmond, Montmorency.

Peaches

Peaches can scarcely be recommended even in the most favored sections. Occasionally seedling peaches live to produce fruit two or three years.

Elberta and Champion are among the most successful named varieties.

Some varieties not listed may be quite as satisfactory in certain areas as those suggested, but in general those recommended are most satisfactory.

CONSTITUTION AND BY-LAWS

OF THE

WISCONSIN STATE HORTICULTURAL SOCIETY

(As amended January 13, 1921.)

With Brief Historical Outline

In November, 1853, a small group of Wisconsin fruit growers met in Whitewater and organized the Wisconsin Fruit Growers' Association. According to the scant records available this association flourished until the beginning of the Civil War.

September 29, 1865, a similar group which had been in attendance at the state fair held in Janesville met and organized the Wisconsin State Horticultural Society. The first officers were: President, B. F. Hopkins; vice-presidents, one in each county named; secretary, J. C. Plumb; treasurer, F. C. Curtis; executive committee, Geo. J. Kellogg and L. P. Chandler.

For several years annual meetings were held at the same time and place as the meetings of the Agricultural Society and the proceedings printed in one volume.

In 1871 the society was granted a charter by the legislature and provision made for the publication of the reports of the society in a separate volume. From that time to the present the society has been a ward of the state, receiving state aid in return for which it has rendered a distinct service through the collection and dissemination of information on fruits, flowers and vegetables.

The society during its early years confined its efforts largely to the testing and selection of varieties suitable to our climate, an extremely important and valuable work.

The activities of the society have broadened from decade to decade through its more than half century of existence until it is now recognized as an important factor in the state's progress and as one of the most progressive and active organizations of its kind in the United States.

In 1904 the society departed from the plan then followed by practically all horticultural societies of paying the secretary merely a nominal salary for nominal services and provided funds for a full time secretary and a central, permanent office. Probably no other step has exerted greater influence on the society than this.

From 1896 to 1901 the society published a monthly journal, The Wisconsin Horticulturist. The records fail to show why it was discontinued.

From 1906 to 1910 Bulletins were published at irregular intervals, nineteen in all, of quarto size ranging from 8 to 32 pages.

September, 1910, marked the birth of WISCONSIN HORTICULTURE, a 16-page monthly journal sent to members and exchanges only. The membership fees and advertising more than cover the expense of publication, leaving a handsome margin of profit.

Early records show that the society was active in promoting horticultural exhibits at the state fair and it appears that close relations existed between the society and the fair management until the early eighties, when a break occurred. Beginning with the 1904 state fair and to the present the society has again taken an active part in these exhibitions expending in one year as high as one thousand dollars of its funds for an exhibit of fruit.

Relations with the Horticultural Department of the Agricultural College have been strengthened and the society and the department work in perfect harmony.

In this brief outline much has necessarily been omitted; no mention has been made of the spirit, the soul, of the organization. A perusal of the reports of the society leaves the impression that the courage and tenacity of purpose of that little group of sturdy pioneers who met in Whitewater in 1853 has been transmitted to their followers and has been our guiding spirit until the present day. As out of the oaken glades, rich bottom lands and rolling clay terranes of our state there has been developed one of the richest agricultural domains in the world, so have the men and women who have had the love of fruit and flowers in their hearts kept pace through a half century and more with the progress of events and have through the medium of the Wisconsin State Horticultural Society built up a splendid horticultural industry in our state .

FREDERIC CRANEFIELD, Secretary.

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. The fee 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 to be known hereinafter as Secretary, and an Executive Committee, consisting of the foregoing officers and eleven additional members, 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.

He 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 President.

The said officers shall perform such other 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 Society shall hold its annual meeting for the election of officers, exhibition of fruits, and discussion, in the city of Madison, Wisconsin. Other meetings shall be held at such time and place as the Executive Committee may direct.

Article 8. Only persons holding memberships according to the regulations of the Society shall be members of it.

Article 9. 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 I.—Membership.

Section 1. The Secretary shall decide upon all applications for membership in accordance with the Constitution and By-Laws of the Society.

Section 2. Any member maliciously or intentionally injuring or working in opposition to the Society or its purpose in promoting horticulture may upon return of his membership fee be summarily expelled.

Article II.—Meetings.

Section 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.

Section 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.

Section 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 Committe 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.

Section 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.

Section 3. 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.

Section 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.

Section 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.

Section 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.

Section 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.

Section 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.

Section 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.

Section 7. He shall notify all persons elected to office within ten days thereafter, if such persons were not present at the election.

Section 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.

Section 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.

Section 10. He shall receive all fees for membership, and give proper receipts for the same.

Section 11. He 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.

Section 12. He shall receive and be responsible for the safe-keeping of all moneys, notes, securities, credits, etc., of any and every nature, belonging to the Society which shall come into his hands.

Section 13. 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.

Section 14. He shall disburse the money of the Society only on the written order of the President, countersigned by the Secretary, and shall made an annual report of the receipts and disbursements and furnish the President with a copy of the same on or before the first day of the annual meeting.

Article V.—The Executive Committee.

Section 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.

Section 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.

Section 3. They shall fix the amount of the Secretary's bond, the number of his sureties and approve the same. They may require any other officer, agent, or employe of the Society to execute a bond and prescribe the amount and conditions thereof, and approve the same.

Section 4. They may prescribe such salary or compensation for any officer, agent, or employe 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.

Section 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.

Section 6. The Executive Committee shall make such rules and regulations for the conduct of the business of the Society, not incon-

sistent with law, the Constitution, or the Rules and By-Laws, as they shall deem expedient and for the best interests of the Society.

Artivle VI.—Committees.

Section 1. The President, Vice-President 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.

Section 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.

Section 3. The President shall annually appoint a 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 three years, and such other committees as may from time to time be necessary.

Section 4. It shall be the duty of the Finance Committee to settle with the Secretary 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.

Section 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 VII.—Miscellaneous.

Section 1. The foregoing Rules and By-Laws shall take effect and be in force from the date of their adoption.

AN OUTLINE OF THE WORK OF THE WISCONSIN STATE HORTICULTURAL SOCIETY

The Wisconsin State Horticultural Society conducts field work at twelve different points in the state as follows:

Baraboo, Holcombe, Pewaukee, Weston, Waupaca, Onalaska, Milton Junction, Fort Atkinson, Menomonie, Kenosha, Webster, Poplar.

A "Trial" Orchard is located at each of the four first-named places.

The Trial Orchard 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.

The orchard at Holcombe is a "Trial" Orchard, being for the purposes above indicated.

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

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

In the spring of 1921 four small fruit stations of one acre each were established. These are for the purpose of demonstrating best methods of cultivation of raspberries, blackberries, etc. The work is carried on in cooperation with the county agricultural agents. Four additional stations were established in 1922 and four in 1924.

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

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 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 an any horticultural topic. No charge 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.

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

WISCONSIN HORTICULTURE

A WISCONSIN MAGAZINE published by the **WISCONSIN STATE HORTICULTURAL SOCIETY** containing each month articles on fruit, flower and vegetable growing written by **WISCONSIN** growers for **WISCONSIN** conditions.

In this respect it is in a class by itself, as horticultural papers published for profit must cover the whole country.

WISCONSIN HORTICULTURE is not published for the purpose of making money, but exclusively for the benefit of the people of Wisconsin.

It is better for **WISCONSIN** people—than any other horticultural paper published. It tells the best varieties to plant in **WISCONSIN**, the best methods of cultivation for **WISCONSIN**. It's a paper for the home gardener and fruit grower as well as for the big grower.

"WE ANSWER QUESTIONS" is the slogan of the society. Every question answered, first by personal letter and then in the paper.

Every dollar received for fees (subscriptions) and advertising is put into the paper.

Honest nurserymen advertise in **WISCONSIN HORTICULTURE** and only that kind. The other kind cannot buy space.

The price, one dollar, includes membership in the **STATE HORTICULTURAL SOCIETY.**

No formal application necessary; send fee to secretary.

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

A NEW POLICY

From *Wisconsin Horticulture*, April, 1925.

The Policy, hereinafter set forth was adopted by the executive committee at the January 1925, meeting. The report given herewith should not be considered as a final or complete report, fixing arbitrarily the policy of the Society for any extended period but rather as concrete suggestions, a starting point on the new road around the corner that we are turning.

PRELIMINARY REPORT OF POLICY COMMITTEE:

In order to supply the need for a policy to substitute for the trial station work, now nearing a close, your Policy Committee recommends the following:

1. That the Society enter into a vigorous campaign for the development of interest in ornamental planting for home grounds and for civic improvement and that wherever possible this work be carried out in connection with local horticultural societies.
2. That a definite organized effort be made to stimulate the growth and activity of local horticultural and garden clubs. this work is important enough to justify its becoming a major project of the Society. The work among these clubs to take the form of stimulation of enthusiasm and of activity insofar as possible along lines similar to the Society's projects.
3. That a more largely attended winter meeting be developed. That for 1925–26 the meeting be held in November, the week before Thanksgiving, and at some place other than Madison, and that the place selected should be one where active local co-operation can be secured for working up a good fruit, vegetable and flower show as well as for securing attendance from several adjoining counties.
4. That, in order to conform with the spirit of the times, a program looking for the stimulation of consumption of fruits and vegetables, rather than for stimulation of greater production, should be undertaken. Because of the important bearing of new scientific discoveries upon the value of fruits and

vegetables in the diet it should be easy to stimulate a remarkable interest on the part of the consuming public. The activities of the society should take the form, among others, of press clippings furnishing to newspapers, of a vigorous policy in our own paper, of an active co-operation with the University which will stimulate its departments to place the proper emphasis on fruit and vegetables instead of merely working for increased dairy product consumption, and also of a studied effect to enlist the support of every organized group in the state which can be of assistance in the campaign. We have in mind particularly groups of clubs such as business men's clubs, women's organizations, where a speaker might spend several days in a given locality, and we also feel that the use of posters, letters and speakers in connection with the schools should be highly profitable.

5. That the trial orchard and small fruit stations now operated by the Society shall be continued until such time as the purposes for which each plot was established has been fully accomplished. The discontinuance of any of these plots shall be a matter of decision for the Board of Managers when they feel that the proper time has come. For the present at least there shall be no expansion of this department of the Society's work.
6. That a budget system should be adopted, in order that the different activities of the Society may be more effectively financed, which divides by departments all such general expenses as traveling, printing and stationery, and which provides for regular reports to the Board of Managers and to the Executive Committee showing the progress of expenditures in each of the several departments. Your Committee believes that unless a budget is fully worked out some of the activities of the Society will be in danger of being curtailed at the expense of others.
7. Your Committee feels that definite results on the above projects can be shown within a year if steps are taken to provide the necessary office assistance. It strongly recommends to the Executive Committee the hiring of a part-time or full-time assistant for the Secretary on such basis as will make it possible to expand the usefulness of the magazine and to enlarge contacts with local horticulturists throughout the State.

This is the section that is of most vital interest to the secretary and is of most far-reaching importance. In fact the entire policy hinges on this section. It bristles with difficulties but with none that cannot be removed. There is no need to go farther into this now; the board is wrestling with the problem and hopes to win. Members will be fully informed as things happen.

The New Policy cannot be summarized in a few words. The first thing to keep in mind is that it is a *preliminary* report which the committee offers; that changes will come as time goes on; that the field work as carried on in the past is to be discontinued; that aggressive campaigns are to be launched, one to increase the love of flowers thus making life more worth living and the other to compel the rightful recognition of our calling. We have turned the corner and we are on our way. Will you join the procession.

TRANSACTIONS

WISCONSIN STATE HORTICULTURAL SOCIETY ANNUAL CONVENTION JANUARY, 1925

WISCONSIN STATE HORTICULTURAL SOCIETY MEETING

January 14–16, 1925

Called to order at 10:00 a.m., by President W. A. Toole.

MR. TOOLE: Our Governor is busy but we are fortunate in having Mr. Ekern, the attorney-general to address us and give us a welcome here.

ADDRESS OF WELCOME

By HERMAN EKERN, *Attorney-General*

(Reporter's transcript, editor's revision)

Mr. President and Members of the Wisconsin State Horticultural Society, on behalf of Governor Blaine, who unfortunately cannot be with you this morning, I extend to you the official welcome of the State of Wisconsin. Now, I do not know just how much these meetings mean to you but I assure you that they mean a great deal to the State of Wisconsin. You are one of the very old organizations in the state; as I understand it from a copy of the last year's Proceedings, furnished me by Secretary Cranefield, you extend back to about 1853. That is about the history of the state and you are one of the regular institutions here. I know that, as I have been around this capitol a good many years, I have gotten gray since I have been around here, I always look forward to the show that you put on down stairs and the meetings that you have.

Now I will not try to talk shop to you because in reading your reports I notice that you discuss these questions that are before

you here in a very detailed and a very scientific way and a meeting like yours seems to me to be a liberal education horticulturally. The thing that strikes me about it is that you have this association meeting. You come here individually interested in your problems and you probably overlook the great advantage that I see in association meetings. Of course you learn a lot with respect to your business but, as in a college, it is not what you learn from the books but it is the association with men and women who are interested in the same problems, the rubbing elbows, that really bring the great benefits in association meetings. My principal business for a number of years has been attending association meetings and I believe in associations. I believe that it furnishes the greatest adult education that we have today and I am not excepting the vocational schools, in spite of the wonderful work they are doing.

Now I want to say this for you, that I do not know of any association that so far as I see their proceedings and from what I have learned of your work, that does as conscientious educational work in its meetings as you do. You are of immense value to the State of Wisconsin; you have developed this business and kept it in the forefront and increased the quantity and the quality of the plant and you have added to the prestige of the State of Wisconsin. You do not have enough people come to your meetings. You do not get your reports, your literature, before enough people. I do not believe that there is anything that the State of Wisconsin can spend money for that will earn so much in ultimate returns in the years to come as something that they give to you in the way of forwarding your work, because it would be a very small sum that would be necessary to greatly stimulate and encourage your work. We are a great dairy state. There is no reason why in that same connection we should not be a great fruit state. I would like to see that come about. You have your minds on this problem. It comes to me fresh without being able to give a great deal of attention to it but there is one suggestion that I would like to make to you this morning and that is this; something which has been done in other lines, that you utilize the interest of the children in the schools. Now if you can secure the writing of papers by the children in the schools on some of the problems that affect your work, that would encourage their use. Have these topics not alone on the taking care of apples and cherries and the various marketable fruits that can

be grown in Wisconsin but the picking of them, the marketing of them, and above all the uses of the fruit, so as to create a demand right here at home for the home grown fruit. If something of that kind could be organized and prizes offered for competition throughout all the schools of the state—we have thousands of schools—you would immediately create a demand for the things that you put out in the way of literature and create an interest in this subject and create a big demand for anything that you want, so that it seems to me would be absolutely irresistable.

I am just leaving that as a suggestion. It may not be worth anything but I would like to see you follow it up and I would like to see your body come here and fill the largest building in the city with enthusiastic apple growers, enthusiastic fruit growers, and all those who are interested not alone in the growth but in the marketing and in the disposing and uses of fruit.

As I stand before you and view your work I know to a great many of you it is an ideal, and idealized. You haven't, as the reports indicate, all gotten rich out of it and you may not, it is a work that counts for the good of the state and I congratulate you and I wish you all possible success and again, Mr. President, I welcome you here.

MR. TOOLE: A great many times a viewpoint of someone who has not his nose to the grindstone as we have ourselves, regarding the affairs of someone else, is of a great deal of value and it has been of great value to us to hear Mr. Ekern. I am sure that in taking up our plans for the future that his suggestions as to widening our activities will be of considerable help to us because it gives that outside view of what we can do that we couldn't get ourselves because of the fact that we are too closely interested in specific problems to get the broader view and I am sure we thank Mr. Ekern very much for giving us this frank help of ways in which we can widen the work of the society.

We will next take up the introduction of the delegates from the various societies. We have with us Mr. Gertin of So. St. Paul, delegate from the Minnesota society.

MR. GERTIN: Mr. President, Members of the Wisconsin Horticultural Society: I think we will get acquainted this afternoon. I have to keep my eyes open because when I get back they will

want to hear what has been done here and what they can do to advantage in furthering the interests in Minnesota societies. I was very much impressed by the talk of your attorney-general. We do not get enough out to the meetings but at the same time we do not often realize what a vast amount those who attend the meetings do in an unassuming way. When you get back to your own orchard and talk with your neighbor, and, without thinking of doing him any good you are telling him how to do things and when you are producing a better product, you have done a great deal of good and nobody knows about it, but it is there just the same.

MR. TOOLE: I hope you will make it a point to get better acquainted with Mr. Gertin. I find from my own experience it is pretty hard for a stranger to make all the advances. If you will go up and make yourselves known it will help him and ourselves to get all the information we can. Mr. Day, of Illinois, I believe is here.

MR. DAY: I am very glad to be here and I wish to say this is my first opportunity to attend any of the meetings of the Wisconsin State Horticultural Society. I am here to listen and to carry back to my society the report of the things which we hear at this meeting. I think we will become better acquainted this afternoon during our discussions on the marketing system.

MR. GREEN, of Northern Illinois: I am certainly glad to be here this week and hope to learn a great deal because I know that the conditions of Northern Illinois and Wisconsin, at least this part of Wisconsin, (that we in Illinois feel that we are more at home than in southern parts of our own state) our conditions are so similar that I know the Illinois people can learn a great deal from Wisconsin and vice versa, because it is a profession where the interchange of ideas is the most wonderful thing about it. I am certainly going to pay very close attention.

MR. TOOLE: We have two or three other out-of-the-state people here who are not delegates, some of them will be on the program soon but I think if they will stand up so that we can take a look at them we will feel better acquainted. Mr. Durst, of the American Fruit Grower magazine.

MR. DURST: I used to think that the editor of a newspaper was a wonderful personality and when I was told that I was going to meet one, I looked forward to meeting some one great. I have learned since becoming an editor that he is glad to meet

people, like all the rest of us. I wish it were possible for me to have at a meeting like this all of our 225,000 subscribers over the country, but of course that is impossible. I do have one advantage, I can speak to you through the columns of the paper each month. I enjoy going around to these meetings, meeting the people, and because it gives an opportunity to learn what is going on over the country. I have an ambition to put out a paper that will be a benefit to the industry and I think I can do that best by getting out and seeing what is going on. I had an opportunity this past summer to take a nice long automobile trip through New England and New York and learned a lot, although I thought I was pretty well acquainted there too. Next year I wish to take a trip through the far west, possibly to Texas and Florida, also, and of course that gives an opportunity to see what is going on.

I appreciate very much the opportunity to speak to you.

MR. PRATER: I noted quite particularly the remarks of my friend from Northern Illinois but I believe that the closest neighbor Wisconsin has is Michigan. It is only a jump across the lake and I believe that in a way Michigan is the closest competitor with the fruit growers here, due to the fact that the boys do jump across the lake so often with their products and I assure you that it is a pleasure to meet this organization with a possible personal acquaintance, at least, and more fully familiarize myself with your conditions, because our organization is a competitor of the State of Wisconsin and one of the tricks of salesmanship is to tread on his competitor's toes the least possible and that means to find where competition is the least and it will be with the veiwpoint of learning about your production activities that I will study this meeting. I want to thank you for the opportunity of gaining this information.

MR. TOOLE: Mr. Hottes, Mr. Sherman and Mr. Garner are not present. Mr. Virgil Fieldhouse has a paper on grapes which he will give us.

GRAPE GROWING IN WISCONSIN

VIRGIL FIELDHOUSE

Grapes have been raised on the rolling prairies of southern Wisconsin for sixty years or more, and the Concord grape is a leader now as it was then.

Our home and grounds are located on part of the old Ellwood nursery and vineyard at Dodgeville, and we still have some vines said to be fifty-five years old. The first plantings were made here in 1865; and by 1880 fifteen acres were devoted to the Concord alone. Twelve hundred gallons of wine were made that year, and this seems to have been the principal way of disposing of the crop.

When I first saw the place eighteen years ago there were still two acres of these Concords, mostly on stakes. We grubbed most of these out in recent years because while there were not many gaps, we found that the vines would not properly ripen even a moderate crop of grapes. The clusters seemed to grow all right until ripening time, and then stay reddish and partly ripe until they finally had a dull appearance. The leaves on this old vineyard would be brown or gone before the heavy frosts. Perhaps potash or phosphate would have helped matters; but as we had a young vineyard we grubbed out the old. Besides, we did not care to sell third quality grapes when our new vineyard was producing large clusters of excellent quality table grapes.

These pioneers in grape growing in Wisconsin probably found that they could not well compete against the rapidly developing grape districts of other states where the climate was more favorable. Six years before the Ellwoods made their first plantings, Chautauqua county, New York, had only twenty acres of bearing vineyards. By 1910, this one county had thirty thousand acres. Time has proved that the climate of southern Wisconsin with the exception of a few sheltered nooks does not allow the wholesale production of grapes on a paying basis.

I have given this early history to show also the hardiness of the black grapes here, when properly cared for. We bury the new canes every fall if possible, and I have not seen or heard of serious damage by winterkilling in this vineyard.

The certain favored locations to which I alluded are along the Mississippi river bluffs on rather low-priced land. The Potosi growers produce large quantities of very fine grapes. The territory within a radius of thirty-five miles probably uses almost all of these.

On the other hand, in the northern part of Wisconsin, to quote Mr. Cranefield, "It is useless to attempt to grow grapes except for a vine or two in the back yard and these should be Janesville, a Wisconsin cross; or Beta, a Minnesota seedling; for no matter how well protected in winter nor how carefully tended in summer, the fruit fails to ripen before frost."

It is true that grapes, even in the southern zone of Wisconsin, are very uncertain as a market crop; but this has always given a fascination to the work for me. It is often a close race to ripen and pick most of the crop before the killing frost, but usually we win out by a narrow margin.

The most favorable location for the vineyard should provide a free circulation of air, and plenty of sunlight during the greater part of the day. Our own location is a very good example. It is on the south slope of a hill, sheltered from the north, but getting the full benefit of the south winds. Two rather deep valleys draw the cold air away on the first frosty nights, and often cause people to ask us how we escape the killing frosts that are occurring on the more level lands. This air drainage is a very important thing to consider in the location of your vineyard as it helps to ward off fungi. Our clay loam soil on a limestone ridge produces a much sweeter and earlier grape than we used to raise on a level black soil twenty miles west.

The Moore's Early, Campbell's Early, Worden and the Concord are the best grapes for market, but the amateur may enjoy growing also the green and red grapes recommended in the Annual Report of this society.

The Moore's Early is about two weeks earlier than the Concord with us. In recent years, we have not been successful in raising paying crops of this variety, but have learned that it should have a richer soil, much more bearing wood, and that the fruit buds suffer more damage from insects. It is less subject to downy mildew than the later varieties. At ripening time, the wasps and hornets cause great waste and damage to the clusters. The Campbell's Early has a tougher skin and would thus be a better shipper.

The Worden grape may be the most delicious of the lot, or really nauseating, according to the treatment of the vines. When well grown, the grapes are very large and formed very closely together on the bunch. Heavy pruning, a good trellis with the vines well spread, and removing some of the bunches in case of an overload will usually give nice fruit. The Worden cracks very easily, and even more so than any other black grape, should be picked in the warm part of the day, if possible. Although we have calls for this variety for table use on special occasions, the uncertainty of the flavor of each bunch leads us to prefer selling them for canning.

The Concord is our main crop grape and is easily the most profitable. It ripens at a time when we suffer little loss from insects. When well ripened it is our sweetest grape, and each bunch can be relied upon to have a good flavor. Many people do not seem to know that the Wisconsin raised Concord grape is ever sweet and their amazement when they first sample our product is always amusing and pleasing to us. They also marvel at the size and beauty of the clusters no matter what the variety.

When you order your plants from the nursery, always get the best plants. We prefer the one year old, No. 1 grade, as these are usually the choicest vines. If you are planting only a few vines and want them larger to start with, get the best two-year olds. It is best to have the soil well manured and disked thoroughly before planting. The plants will grow much faster if the soil is rich and kept moist the first year. I have noticed that writers differ as to whether the vines should be crowded more on a rich soil or given extra room. We certainly have not benefited by crowding. If the soil is found to be too rich after the vines are well started, something can be grown between the rows to take the surplus nitrogen out of the soil. It would have to be planted in hills at first so as not to interfere with cross cultivation.

It is best to cross cultivate for the first few years, if possible. If you plan on a trellis, it should be in for the third year. Always use smooth, single wires. Amateurs sometimes get the bright idea of using woven wire. After the vines have twisted through this, the only way to do a reasonably quick job of pruning is with an axe. Even the rusty barbed wire that the farmer sometimes uses, gives better results, although it is dangerous.

Some claim that the amateur is better off with his vines on

stakes; because he is not so likely to leave too much fruiting wood and so ruin his vines. That proves true in many cases. They also say that where the ground is not too sloping, even the professional should use stakes and cross cultivate to save hand labor. Personally, we have found that it must be a pretty level piece of ground with no surface water running onto it in rainy weather if it can stand cross cultivation for years and yet not wash so as to expose the grape roots.

Some advocate a perfect cultivation and absolute freedom from grass and all weeds, but I dropped that idea ten years ago and am thankful that I did. Our vineyard has no more gullies in it and is catching soil from the corn land above. The soil is full of humus from decaying weeds, and the grape roots are not exposed by washing rains. A grass carpet makes nicer walking for the pickers, and the grape vines can be covered much faster as there are grass roots to hold the soil in sods.

Our trellises were put in three years ago, and they enable us to grow much more first quality fruit from an acre of ground. The fruit can be spread along the wires nicely so as to be up away from the ground, lightly shaded with leaves and in a free circulation of air. The rows run east and west, but we cannot see that the vines are handicapped any. We had a neighbor once who, when building a chicken house, put half the windows on the east side and half on the west. He explained that when the sun wasn't in the east it was in the west. We could not run the rows orthodox fashion because of the lay of the land, but the sun stays in the south long enough to ripen the grapes as well any way.

As we have lots of other work, the weeds are usually nearly a foot high by the time we have the vines all tied to the wires, and are ready to work the soil. We plow the ground away from our vines every year, starting with a team and ending up with one horse, almost touching the trellis with a six inch adjustable vineyard plow. We hire a slow steady draft horse and his driver for the finish, and choose a day when the soil is moist. The one holding the plow raises the point as he nears the grape trunk and the plow is often less than two inches deep when over the main roots. Then we start disking the soil back toward the vines. While there is still an open furrow next the vines, the narrow strip of sod is cut away with a shovel. When we drag, a rope is tied to the back of a single section to help in steering and dumping it. When necessary, the disk is reversed so as to throw

toward the center of the aisle. It has been very difficult to plow or cultivate close on the lower side of the vines because the earth has worked down hill, so last year we started using a small road patrol or grader to grade up this side of the rows. This worked fine in the wide aisles, but the axle will have to be shortened before we can grade in the nine foot aisles. The ground is left level so that at picking time a wheelbarrow and a Ford car can be used for handling the grapes. Fall weeds or grass absolutely should not be allowed to grow up through the vines as they rub the bloom off the grape bunches and prevent the free circulation of air.

I am not going to tell you much about pruning. Prof. J. G. Moore has written a very good bulletin, No. 134, containing that. F. F. Rockwell in his "The Lttle Pruning Book" gives the amateur some very good advice when he says, "There are two main facts which must be constantly kept in mind in pruning grapes; the first is that the fruit is borne only on shoots of the current year's growth; the other is that the grape vine, under culture, naturally attempts to produce several times the number of bunches that it can fully mature."

This sounds very simple, but very few amateurs pay much attention to the amount of bearing wood on their vines. A well-educated man, who had been in our vineyard many times and who had asked many questions, decided one spring to prune his own vines, which had been neglected for a few years. A month later, I happened to see the vines. "Why," I said, "you have cut off practically all the bearing canes. What you have tied up is wood two years old or more." That fall, he got so few grapes that he decided to quit pruning. If a vine has not been pruned for two years or more, the new wood may be very spindly, short, and located very far from the main trunk.

We have learned that when pruning neglected vines for the first time, it is well to leave many more buds than on our own regularly pruned vines if the main object is a good set of fruit. Of course, these vines really need a severe pruning to bring the bearing wood back close to the main trunk. I do not believe it is ever good policy to cut everything back to the ground to secure a renewal, as the setback is so great that the vine may even die. I think a neglected vine can be whipped into shape better, by leaving a trunk with a few buds on it.

Covering is not difficult or even slow if done every year. We

do not even tip the base of the vine as has been suggested. We pin the canes down with a five tined fork and also stand on any extra springy trunk. With a shovel we skim off shallow sods from under the trellis, and throw them onto the new growth. The sods should always lie top outward so as not to form mice nests. Any vine that is too large and stiff to be buried is not pruned until early spring, and a renewal at the ground is secured when possible.

It is well to spray the vines to kill insects that eat the buds, and to ward off diseases. We pick off any harmful insects that we can find in the spring. The downy mildew bothered us last year for the first time, and we were very sorry that we had sprayed only once. Dr. A. J. Riker and Dr. L. K. Jones, fruit disease specialists at the College of Agriculture, have very kindly given their opinion as to future damage from this disease.

"Downy mildew of the grape is believed to overwinter on the young growth as well as on the leaves on the ground. A serious outbreak one year therefore provides an abundant source of infection for the following season. Practically each year, however, there is sufficient downy mildew to act as a source of disease in case weather conditions are favorable. The weather next season will therefore be a much more important factor in determining the prevalence of disease than the abundance of inoculum remaining in the vineyards this winter. The best control measure consists of spraying with Bordeaux 4-4-50, making the first applications before the blossoms open and repeating four or five times, depending upon the weather."

We do just enough summer pruning to keep the grape shoots at least six inches above the ground as this makes cutivation easier; and by checking the wood growth, turns the vine toward the development of the fruit. We use an old style sickle and try to always leave at least two joints beyond the last grape blossom. The shoots that follow the wires can be let grow long.

When the grapes are as large as peas, we go over the rows, carefully shaking out any tangles of clusters and cutting any grape tendrils that are drawing shoots or bunches together. The value of leaving long arms on the wires rather than pruning to a more compact form can readily be seen at this time. This shaking out of grape clusters makes easier and more rapid harvesting and also gives each cluster a much better chance to ripen evenly on all sides and in perfect shape. This work cannot be

well done when vines are on stakes, and is another point in favor of the trellis. If a vine is heavily overloaded, some clusters are removed at this time.

When fall nears, we go over the rows again and thin each vine down to the load that we think will ripen properly. The kind of growing season we are having and the apparent ability of each individual vine are carefully taken into consideration. We rarely leave over eighty good sized bunches on any vine, often sixty or fewer.

This policy of producing a moderate crop of well-ripened grapes, and of trying to see that each individual vine does not overtax its strength, preserves the vitality of our vineyard and helps it to pass through severe winters or droughts.

I have not told you how to produce the largest possible quantity of grapes; but when quality will bring more money, why overtax your vines with quantity?

I have not told you how to sell quality grapes, because they sell themselves. When people drive for thirty or fifty miles to buy them, when the big job is to satisfy the waiting line of out-of-town customers, when people ship them as far as Oregon or Florida,—the marketing part is a minor point.

THE ROOT STOCK PROBLEM IN RELATION TO PROFITABLE ORCHARDING

by C. E. DURST,
Managing Editor
American Fruit Grower Magazine

Fruit growing has become a highly specialized and a very complicated branch of agriculture. Success in the business is attained only by close attention to numerous and varied operations. We spray, prune, and fertilize, for instance, to grow better fruit and to make the business profitable. The gains which come from each improved practice may seem small in themselves, but when put together, they turn the business from failure to success. Failure to give proper attention to these numerous details and to stop the leaks which result from inefficient methods have been responsible for many failures in the business.

In present-day orcharding, we are giving a lot of attention to such things as spraying, pruning, cultivation, fertilizing, etc. All these are concerned with the care of the growing trees. We have given little attention to the inherent qualities of the trees with which we begin; in fact, we have not realized fully, until recently, that there were any other very important matters to be considered in selecting our fruit trees.

DEVELOPMENTS IN PLANT BREEDING

Previous to 1900, we knew little about the laws of heredity. Various scientists had almost discovered the fundamental principles involved, but none of them had been able to definitely explain the matter. In 1900 three European scientists, almost at the same time, rediscovered an important law of heredity which had been forgotten or discarded as untenable since 1865, when it was first announced by Gregor Mendel, an Austrian. Mendel's law gave us the clue to the explanation of heredity, and with its help, vast progress has been made in plant and animal breeding in the past 15 or 20 years. This new understanding has given us an entirely new viewpoint in regard to the propagation of our orchard trees. It seems to me this new viewpoint is of extremely important commerical significance to you, and I think

you can stop another big leak in your operations and make your business more profitable by giving proper attention to this problem.

THE DIFFERENCE IN ORCHARD TREES

Go into any commercial orchard section and what do we see? We see marked differences in the size, vigor, health and productivity of the trees. Some are large, some small, and some intermediate in size, though all may be of the same age and may have received identical treatment. Some are vigorous and healthy, while others are weak, though all may be equally free from insects and diseases. Some trees may bear good crops of fruit regularly, while others may bear ordinary or poor crops regularly in comparison with others. Usually the better growing trees are the better producers. Not infrequently we see whole orchards which seem to bear good crops regularly, while other whole orchards seem to grow poor crops in comparison, though the varieties, age, soil and treatment may be essentially the same. These matters have in the past been unexplained by statements that the differences were probably due to differences in care, but the newer developments in plant breeding make it a serious question as to whether the differences can be explained away by such reasoning. What are the reasons for all these differences in individual trees, and, in some cases at least, in orchards as a whole?

SOIL DIFFERENCES AS A FACTOR

First of all, we might regard soil differences as responsible. No doubt variations in soil do cause considerable differences in growth and performance of orchard trees, but the results of many observations indicate that soil differences cannot account for all the variations. In orchards in which the soil appears to be quite uniform, there are still marked differences in size, vigor and productivity of trees. Sometimes a poor tree is entirely surrounded by good trees, which means that the roots of all of them are growing in practically the same soil; such differences are not explained by differences in the soil. The fact that poor trees are, as a rule, uniformly distributed over an orchard is a pretty good indication that soil conditions are not entirely responsible for the differences in trees. Soils often grade from one type into another in a given direction, and therefore if one found

the trees varying uniformly in a given direction, we might conclude that soil differences were the primary cause of these variations.

Careful records taken in many orchards indicate that while soils are sometimes responsible for differences of the kind noted, they do not account for all of the differences which have been observed in orchard trees. The Maine Agricultural Experiment Station, for instance, analyzed the differences in an orchard of 881 Ben Davis trees and concluded that while soil undoubtedly plays some part, it is not the chief cause of the differences existing in fruit trees. Other investigations have resulted in similar conclusions.

VARIATIONS IN SCIONS OR BUDS AS A FACTOR

Secondly, we might consider the part played by the scions or buds. It was believed a few years ago that scions or buds taken from the best producing trees, or from the best producing branches of a given tree, would produce superior trees.

But the careful investigations of Crandal, Whitten and others, as well as a knowledge of the fundamental principles of plant breeding, indicate that this view was entirely unfounded. It is now well established that scions or buds of a given variety, no matter from what tree or part of a tree they are taken, are equally valuable for propagation purposes.

In this connection we must take into consideration the question of bud sports. Bud sports do occur sometimes in fruits, when a new variety or strain arises by sporting of a bud of the parent variety. Bud sports apparently occur more often in citrus fruits than in deciduous fruits, and the nectarine quite often arises from the peach by sporting. Now, of course, if propagation were made from a bud sport, we should get a tree that is different from the parent tree. Some people, among whom are some nurserymen, have contended that numerous bud sports occur, including minor variations in color, productivity, etc. But if as many sports have arisen as some people would have us believe, our commercial varieties would be a badly mixed lot. Take the same variety in different orchards and under similar cultural treatment and you will find them pretty much the same. The trees, however, may have been obtained from entirely different nurseries. The New York Agricultural Experiment Station

brought together Baldwin trees from 42 nurseries located in all parts of the country and grew them in New York. The trees behaved in substantially the same manner. In other words, there appeared to be no influence of different sections on the inherent qualities of the variety.

Evidence from many directions therefore justifies us in concluding that real bud sports are rare indeed. Unless we propagate the trees from buds or scions resulting from real bud sports, we shall most certainly obtain trees that are of the same nature as the parent variety.

ROOT STOCK INFLUENCE AS A FACTOR

A third possible cause of differences in orchard trees is found in the root stocks on which they are budded or grafted. Before we discuss the reasons for this, let us consider briefly our methods of propagating fruit trees. We propagate fruit trees by budding or grafting. Why are these methods followed? We follow them because most fruit varieties do not come true from seeds. Therefore, in order to perpetuate a variety, we take buds or scions from a tree of the variety desired and bud or graft them on seedling root stocks of the same or a related species. Buds or scions from these trees are later used to propagate other new trees, and so on. If we pause to think the matter out to its logical conclusion, it is easy to understand that all of the trees in the country of a given variety are simply extensions in growth of the original tree or bud, depending on whether the variety originated as a seedling or as a bud sport. All of the Red Delicious apples in the country, for instance, are only extensions of the original tree growing in Iowa. Buds or scions from any true Delicious tree are equally good for propagation, for all of them are of the same identical stock.

Returning now to the question of influence of root stocks on the character of orchard trees, it was believed until rather recently that the stock exerted little influence on the scion. We have known for a long time of such influences as dwarfing, but these have been regarded as the result of food relations. Aside from such influences, we have believed that the stock exerted little or no influence on the scion, but the developments of the past few years indicate that root stocks exert a wide variety of influences on the scion or bud and on the resulting tree.

EFFECT OF USING VARIOUS SPECIES OF ROOT STOCKS

It is already well known how various species of root stocks are used to adapt fruit trees to different conditions. The peach is usually worked on peach roots, though it is sometimes worked on the plum to adapt the trees to moist soils. For high, dry soils in the West, the almond stock is often used. The Chinese peach is being used as a stock to some extent in the West to adapt peaches to alkaline soils. In the East, seedlings from wild *Prunus persica* seeds grown in the South, are preferred as root stocks to seedlings from seeds of cultivated varieties. Seedlings from yellow-fleshed varieties, like Elberta, are regarded as more susceptible to collar injury than seedlings from white-fleshed sorts.

Varieties of plums and prunes show different affinities for different stocks. The Myrobolan plum is used to adapt plums and prunes to deep, heavy, moist soils. Peach or almond roots are used for shallow soils and dry conditions.

Sweet cherries on Mazzard roots are more productive and longer-lived than when worked on Mahaleb roots. In the West, sweet cherries are also more hardy and better adapted to moist soils when worked on Mazzard roots. Mahaleb roots are believed by some to make cherries more resistant to die-back. They also have a dwarfing effect on the trees and result in earlier bearing. Mahaleb roots, however, are more commonly used for both sweet and sour cherries, because trees can be grown more readily on this stock. Sweet cherries do best when worked on Mazzard roots, but the sour cherry appears to do well on either Mazzard or Mahaleb.

Pears and apples may be worked on each other, but in both cases the trees seem to be short-lived as a result.

Dwarf pear trees are produced by grafting scions on Angers roots; larger fruit also results in this case. Winter Nelis pears do better on quince roots than on pear seedling roots. The Kieffer pear appears to do best on Chinese Sand pear or Kieffer seedling roots.

Myrobolan plum roots are used for apricots to adapt them to soils too wet or too heavy for apricot or peach roots. For light, well-drained soils, peach roots are best for apricots. Almond roots are now seldom used.

Oranges on trifoliate stock ripen earlier than when worked on

the commonly used sweet or sour orange stocks. In California Eureka lemon trees on trifoliate stock, when 13 years of age, were not more than one-fifth the size of trees on sweet, sour or grape-fruit stocks.

Most nurserymen prefer French crab stock for apples, but often seeds sold as French crab stock are obtained from the pomace mills and are in reality from commercial varieties. In many cases as good results have been obtained from seed secured from American pomace mills as from the so-called European French crab stock.

Occasionally apples are dwarfed by grafting them on French or English Paradise stocks. Half-dwarf apple trees are obtained by working the scions or buds on Doucin roots.

DIFFERENCES BETWEEN SEEDLING STOCKS OF A GIVEN SPECIES

The varying effects of different root stocks are interesting, but they are to be expected. What is perhaps more interesting and pertinent in this connection is the fact that there are marked differences in the influence of different seedling stocks of a given species.

EXPERIMENTS IN MAINE

At the Maine Agricultural Experiment Station it was found that several thousand French crab seedlings varied from four to 15 millimeters in diameter. The seedlings were budded, and after one year's growth it was found that a decided relation existed between the size of the seedlings and the size of the resulting trees. A group of seedlings 13 millimeters in diameter in the fall of 1922 produced whips 50 per cent larger than seedlings 10 millimeters in diameter.

In a seedling orchard planted in Maine in 1911, the trees in 1922 ranged from one to seven inches in growth. All were of the same age and of standard commercial varieties and of apparently good health.

In another Maine test Dr. Karl Sax studied an orchard of 881 Ben Davis trees. The trees were classified as large, medium and small. The productivity was found to be correlated with the size of the trees. There were 121 large trees with a five-year average of 191 pounds of fruit per tree; 233 medium sized trees with an average of 113 pounds per tree; and 136 small trees with an average of 39 pounds.

Soil conditions and variations in buds and scions may have been partly responsible, but after a study of the data from every standpoint, it was concluded that the differences in root stocks were mainly responsible for the differences in size and productivity.

In another Maine test, 100 trees of 10 commerical varieties were studied. Trees that were large in the second year after planting were relatively large six years later, and those that were small in the second year were inferior and runty six years later, in most cases. The only known variable factor in this test was in relation to the root stocks. Extreme care had been taken to provide uniform soil and cultural conditions and to propagate the trees from buds true to variety.

CALIFORNIA INVESTIGATIONS

At the California Experiment Station marked differences were noted in the size of citrus seedlings, all of which were of the same age and from the same sources. The seedlings were separated into three sizes and budded with the same material. After the trees had grown four and one-half years, the differences were as distinct as when the trees were budded, the three groups bearing the same general relation to each other. At the end of two and one-half years, the larger trees began to bear fruit, the medium trees bloomed but bore no fruit, and the small trees did not bloom at all.

In another California test, citrus buds of four varieties were carefully taken from trees of known character and budded on seedling stocks. From this material 18 large, 18 medium and 18 small trees of each variety were transplanted to an orchard. After four years, the three groups of each variety bore the same general size relations to each other.

Dr. Webber, of California, found that large nursery trees produced orchard trees that after five years of growth were 50 per cent larger than small nursery trees. Since care was taken to make all conditions as uniform as possible, it was concluded that differences in the heritable characters of the root stocks were responsible for these differences.

EXPERIMENTS IN ENGLAND

In England, Hatten obtained apple seeds from pomace and grew trees from them. Of 96 trees remaining after two years,

43 were classified as tall and vigorous; 39 as medium in size, and 14 as small and dwarfish. Uniform cultural and soil conditions had been provided.

MINNESOTA RESULTS

In Minnesota 4,000 seedlings of the Malinda apple were grown. Marked size differences were noted in the seed bed. Before planting in the nursery, 200 of the seedlings were discarded as being too small and runty. The remainder were planted. In the next two years, 1903 seedlings, or nearly 50 per cent of the total number, were discarded as being inferior for tree production purposes. Some seedlings were discarded because of faulty shape.

THE STOCK EXERTS A WIDE VARIETY OF INFLUENCES

The effects which have been noticed relate chiefly to the influence of the stock on the size, vigor and productivity of the resulting trees, but there are other important influences of the stock on the resulting tree. It is well known, for instance, that the color of McIntosh apples is made lighter by topworking the variety on Duchess. Several investigators believe that the degree of sweetness or sourness of fruit is influenced appreciably by the stock. Hatten, of England, believes that the coloring and size of the fruits are influenced by the stock. The time of maturity of both the wood and the fruit in some varieties may be influenced by the stock. Certain late varieties of apples are sometimes worked on the Duchess in northen sections to make them mature earlier and thus adapt them to the climate. There are marked differences in the resistance of various stocks to disease, and thus susceptible varieties worked on roots resistant to root and crown diseases thrive better than they otherwise would. Resistant stocks in this way make the trees healthier and longer-lived.

There is little doubt but that seedling stocks of a given species differ greatly in their ability to extract food and moisture from the soil and thus they may vary greatly in their ability to feed trees. Some stocks are shallow-rooted, some are deep-rooted, and others are intermediate in habit; such differences would cause marked variations in the ability of the trees to withstand drought. Some stocks, by reason of being good

feeders, make the scion more vigorous than would otherwise be the case. Stocks which are susceptible to disease are more likely to transmit the same to the scion than resistant stocks. Pear seedlings are known to differ greatly in their resistance to blight. Some stocks shorten the lives of the trees. As a rule, a weak-growing variety grafted on a vigorous stock will result in a short-lived tree. Probably everyone is familiar with the method of double working Grimes Golden on Northern Spy in order to give them healthier trunks and a good branching system.

Grapes are ordinarily not grafted, but in a New York test grafting resulted in larger fruit, bigger seeds, thinner skin, fewer berries, more copious juice having a greater acid and sugar content, and in several minor modifications.

We thus see that root stocks exert a variety of influences on the resulting trees, including influences on vigor, size, productivity, color, habit, resistance to disease and drought, time of maturity of wood and fruit, hardiness, and so on. Not only do stocks of various species have different effects on the trees, but even among the seedlings of a given species there are marked differences in the influences of the stocks. Why is this the case, and what is the explanation of it?

REASONS FOR THE DIFFERENCES IN SEEDLING ROOT STOCKS

Earlier in this discussion I mentioned Mendel's law. According to this law, the reproductive cells of plants and animals contain definite hereditary units. The number of units varies in different species, but is apparently uniform for the same species. These units are contained in definite bodies called chromosomes, which can be seen through a microscope. When two reproductive cells unite in fertilization, two sets of units are brought together. All the body cells of the resulting individual thus have two sets of units. These units, acting in response to surrounding conditions, determine the development and character of the resulting plant or animal. During the life of the individual, the corresponding hereditary units are not contaminated by each other. When the reproductive cells are again formed, the units separate from each other, each new cell containing a single set. However, the chromosomes containing the units separate on the laws of chance, and thus new reproductive cells may, and usually do, contain different combinations of units.

Since most species contain a large number of chromosomes, and perhaps hundreds of individual characters, the chances are that in the recombination of characters during fertilization individuals of many kinds will be produced.

Now in self-fertilized plants, the two sets of units are practically always the same, so that even though the combinations are different, the result is the same, because both members of all sets are the same, therefore the entire organism must be the same. But most of our fruits are more or less cross-fertilized, and in such cases we are usually bringing together sets of units of different composition. Since there are large numbers of units in every organism, it is easy to see that numerous combinations are possible. As a matter-of-fact, it is extremely seldom that two individuals of the same composition are found. It is thus easy to see that various fruit tree seedlings may be, and probably are, different from each other in hereditary composition. With this fact in mind, it is not surprising that we should see very numerous and varied effects on the resulting trees.

RELATION OF PROBLEM TO COMMERCIAL PRACTICES

In this connection it is worth while to consider some of the practical problems in the growing of seedlings and nursery trees. As indicated, seedlings differ in vigor. Sometimes the difference is the result of soil conditions but more often it is caused by differences in hereditary constitution. The seedlings are most commonly sorted in four sizes by growers who make a specialty of producing seedlings. Now, of course a lot of nurserymen and growers, in order to save money, buy the smaller grades, but in the light of our present knowledge, they are thus taking steps that will result in poorer trees that will be a handicap throughout the life of the orchard.

Nurserymen buy the seedlings and graft or bud on them the desired varieties. The trees are sorted into grades according to caliper measurement. Some growers buy smaller grades to save money. They are courting trouble when they do so. Sometimes the nurserymen, after they have dug the best grade of trees from a given lot, let the remaining trees grow another year in order to allow them to reach the desired caliper measurment. Such trees are decidedly inferior for orchard purposes. It is quite likely that some of the unproductive orchards with which

most of us are familiar have been produced from trees of this kind.

Taking into consideration the fact that low grade seedlings and low grade trees are often used by some growers, it is easy to understand why some entire orchards may be relatively unproductive even under the best care, as compared with other orchards.

LARGE VIGOROUS SEEDLINGS PRODUCE BEST TREES

The information developed to date indicates that the best orchards are produced by using the largest and most vigorous seedlings for propagation purposes. There is no doubt, however, but that the better and larger seedlings differ greatly in their hereditary constitution, and the writer believes that in the future we shall find decided differences in even the largest seedlings for propagation purposes. For instance, we may, and probably shall, discover that a certain stock is particularly adapted for Jonathan, another for Baldwin, another for Grimes, and so on. We may find that one stock is best for a certain variety in northern sections, while another may be better in southern sections. One stock may be better for dry soils for a given variety, while another may be better for wet locations. We may find a certain stock particularly adapted for a certain variety in relation to crown and trunk diseases. The indications are that we shall use a great many stocks in the future, each for a particular purpose.

The question arises as to how such stocks will be multiplied after those of exceptional merit have been discovered. They cannot be propagated by seeds, for most fruits are cross-pollinated and are impure in hereditary constitution, therefore new combinations would result from propagation by means of seeds. That would defeat the purpose desired. The only practicable method seems to be by a sexual reproduction. The United States Department of Agriculture has already done some excellent work on this problem and has found ways to multiply seedling roots fairly rapidly. While the method is more difficult than growing seedlings from seeds, it will pay for its trouble if better trees can thereby be obtained.

RECOMMENDATIONS

A discussion of this problem would be incomplete without practical recommendations based on present knowledge. Many investigators are working on the problem and in a few years we shall know more than is at present known, but we can at the present time make certain recommendations, as follows:

1. In planting an orchard, growers should be careful to select trees worked on species of stocks adapted to their conditions.

2. If you buy your trees, make inquiry as to the grade of seedlings used as root stocks. If you propagate your own trees, use only the best and largest grade of seedlings for root stocks. In buying trees, buy only the best grade. These may cost more than others, but the difference will be money well invested. Be careful to avoid trees of the second or third grade that have been held over and allowed to make additional growth.

3. After planting an orchard, go over it carefully after three or four years of growth and replace all trees which appear to lack vigor and health.

4. Every grower should study the root stock problem more thoroughly and acquaint himself with the methods used in propagating fruit trees. He should also keep in touch with the many developments which are certain to come in the next few years in relation to root stocks so that he will be able to make the most effective use of such information.

DISCUSSION OF MR. DURST'S PAPER

QUESTION: Is it the size of the root that makes the difference?

MR. DURST: It is better to use a pretty large piece.

MR. KELLOGG: I was very much interested in the history that has been given me and the tests that have been made of the productiveness of trees and as the reports of the experiments show such vast differences in results of the different sized trees. There has been with me for a great many years this question of production of stocks and trees and it has interested nurserymen for many years. My father was quite a hand to try and learn all the whys and wherefores and something like thirty years ago he made an experiment of growing seedlings. Some of our seedlings were grown at Janesville and the experiment that he made was in taking these seedlings, making a certain number of grafts from the larger seedlings, taking the first, second and third cuttings, planting those grafts and making records and I am frank to say that it was my job to keep a rec-

ord on those trees and I defy a Philadelphia lawyer to tell which was the first, second or third cut. If the trees had a proper chance and the same soil our experience was that we grew just as good a tree from the small roots because if you use a scion that is over size and large and match it with the root you are not going to get as good a tree as if they are the same size.

QUESTION: Is it known just how the root stock affects the sourness or maturity of the apple?

MR. DURST: A number of instances on record are shown in which the sweetness and sourness has been definitely determined. I think it is a question of food relation. Of course the root or the foot part of the tree supplies the food and the sap that goes through affects the sourness or sweetness. In this case of New York grapes, they found that a Concord grape on European stock root that the sweetness, that is the sugar in the grape was increased appreciably and they found that the degree of acidity was increased, more acid and more sugar in that particular root, than it had on its own root when it was propagated by cuttings.

MR. MOYLE: And if I take these first class seedlings, everyone perfect, and graft 5,000 apple grafts and plant those trees out and dig and grade these trees we find there is three grades and there is a cull grade. Are we to discard all except the first grade? Where is the cull?

MR. DURST: Of course I realize that there are some practical things in that that are quite important. I do not know just where they are going to lead. Of course the grower wants the best trees. I know how to grow trees and how they ought to be grown. You are going to have to charge a lot more for your trees if you do that. It is a question of course whether the growers will be willing to pay that money. I do believe that as a result of what we know we ought to use first and best grades of seedlings and then we ought to use the best grades of trees and then we ought to take out the poor ones and put in new ones. That is what I would do if I were planting an orchard.

Afternoon Session

Called to order at 2:20 p. m., J. E. Leverich presiding.

MR. LEVERICH: A great deal has been said about growing and encouraging the growth of more fruits but very little up to the present time has been said on the subject of marketing. This afternoon we have a very good program planned on that particular subject and I am sorry there are not more here. I presume before the session is over this room will be filled, at least it should be.

We have with us this afternoon a man whom I have known for some time, who has practically grown up in our town and who, I might say, has done a great deal for the berry interests of Sparta. I think that our section had the first or nearly the first cooperative marketing organization in the state. For the past several years Mr. Kern has had charge of that and has made a success of it. The first number will be the Marketing of small fruits, by Mr. F. Kern, of Sparta.

MARKETING SMALL FRUITS

F. KERN

Mr. Chairman, Mr. Secretary: It is a fact I have been in this marketing game for quite a while but there really isn't anything new that I can tell you today. Maybe I can remind you of some things that you have been told a good many times before and have not heeded. I recall having been before a lot of you horticulturists on this same topic some ten or twelve years ago and I am quite sure it is not due to any great brilliancy nor to any really valuable suggestions made on that occasion, and carried out since that I am here again to tell you what you all know and what in substance I told you ten years ago.

Then you might ask, just what is the justification for imposing upon you again. The secretary asked me to talk to you.

Well, in explanation, some eight or ten weeks ago I happened to be mixed up in a matter pertaining to better marketing, where I think perhaps I talked too much, which might possibly have suggested that I knew something about the subject. At any rate, that session aroused in me a desire to have

something on this program on the subject of Marketing and I took the liberty to suggest it to Secretary Cranefield by mentioning to him the names of two men highly prominent in the marketing of perishables, who were good talkers, one of whom I am pleased to know is here to tell us something really worth while on this subject; But anyway, as is always the case when one makes a motion to appoint one or a committee, the maker of the motion always gets on the committee and I think that is how it happened.

This subject is one that has occupied the minds and attention and tested the ability of a great many capable men for years and years, with some degree at least of success.

In Wisconsin, we have the Wisconsin Division of Markets, whose main purpose is to devise and put into operation the best methods of marketing. They have been very active in their efforts along various lines of marketing, some of which may have been in some measure beneficial, though I am not sold on their plan of grading eggs or strawberries, but they have tried their experiment on a district in our locality which if local reports can be relied upon, in that instance did not prove satisfactory, but one of the prominent members of the Division is listed to speak on the program this afternoon and I am sure he will tell us what was accomplished for the growers at Warrens by giving us net results.

We have been passing through a theoretical period on this marketing proposition, with the urge of cooperative marketing on one side and various other methods on the other side.

I will take the affirmative and let those who follow me take the negative if in their opinion my theory is incorrect.

I hold no brief against any other plan or method and my statements will be based on my own knowledge gained from actual experience during the past fifteen or more years in this work, and in my talk I may appear to refer to the author too frequently to be really polite, but in giving my own experience I know the statements are true, whether or not the theory is correct.

To keep close to my text and to keep my thought in the right channel I have written what I have to say, because there have been so many misstatements, giving rise to many misleading conditions, and with apologies for inflicting an essay upon you rather than a burst of oratory, and with the idea of getting

a birdseye of the bull rather than a bullseye of the bird, my brief is as follows:

It has always been my notion that "markets" should be considered under at least two heads. I think I made that clear in my paper on this topic some ten years ago, but I want to emphasize it again that there are at least two distinct kinds of marketing, the first and most important of which I want to consider under PROPER, or PROFITABLE MARKETING.

The first essential, of course is to have something to market. If it be strawberries, we must have enough of them to interest some locality that must import its supply of that product. And, too, we must have enough to insure the buyers of that locality or market that we can take care of their orders and assure them of a regular supply.

How are we to know where these markets or localities are? That is one of the most essential studies in marketing and with the continual changes in strawberry producing areas and the source of supply for the non-producing areas it is some study.

In this discussion I shall confine my talk to cover commercial sections only. In any locality where a sufficient quantity of any perishable commodity is grown to require real effort to market it properly I would say the first essential in marketing is organization. The old Proverb; "Let not the right hand know what the left hand doeth" does not work out satisfactorily in marketing perishables.

We must have *organization* in order to have standardization and proper distribution. Both are very essential in PROPER MARKETING.

The grouping of 100 growers into one organization does not create a market for their product, but the fact that they cooperate makes it possible to concentrate their product in sufficient volume to interest some non-producing section, assuring that section of an uninterrupted supply, another very essential factor in successful marketing of perishables.

Now, after you have organized the growers of a commercial section producing perishables, which should assure volume you are about as far from successful marketing as you were before you organized, UNLESS you can standardize your product and thus be in a position to assure the market or markets you expect to use that you can deliver the quality they want to buy. And, ladies and gentlemen, as the public becomes more

able to buy they become more and more exacting as regards quality. They demand quality. They want the value of their dollar, which by the way, is but fair for their dollar is only worth about seventy cents. They want what they pay for and it is but right they should have it.

The buyer of quality is the kind of buyer I am always looking for, because they are willing to pay the price. I never lost a customer in any line of business on good quality goods.

Then the question of marketing resolves itself into ORGANIZATION AND STANDARDIZATION as the first *two* essentials in proper marketing.

I would place distribution third among the essentials in marketing perishables, for without **Organization** you cannot have **Standardization** and without both you cannot have **Proper Distribution** and without proper distribution there is no such thing as **Proper Marketing of Small Fruits.**

Through organization we get uniformity which the buyer or buyers come to know and which they in turn can have confidence to recommend to their customers and to the ultimate consumer and without standardization you will not have a commodity that will command attention necessary for proper distribution and without proper distribution we cannot have proper marketing.

Organization, Standardization and Proper Distribution, while the first essentials in proper marketing, by no means solve the problems of marketing. We can arrange our volume, our quality, and make our connections for the proper distribution without any knowledge of our competing sections and what they are planning, and think we have the marketing of our crop solved to wake up the next morning to find our plans all shot to shadows.

Yes, what about these competing sections? What place do they occupy in the discussion of this topic. *A mighty important* one. Are *they* organized? They may or they may not be. If organized, the marketing heads could work together and keep each other advised as to the movement from each section, what markets they were using, etc. Do they? No. Why not? Because each of these marketing agents seems to think it is none of the other fellow's business what Sparta or Warrens or Bayfield or Sturgeon Bay or Washburn or Brule or any other section is doing.

I have mentioned the most essential factors in **Proper Marketing,** but the independence among the marketing heads of the various competing sections is directly responsible for more real grief than any other one factor in the whole marketing scheme, and if it were polite I could give you some concrete instances, but most of us are present and I will let the other fellows spring it. We marketing heads belong to one of two classes: We either think we know it all or else do not want the other fellow to know how little we do know and I should class us all in the *first* group.

There is a deplorable lack of cooperation among the marketing agencies of the various competing sections shipping berries and at a tremendous expense to the growers of these shipping sections.

In our locality we have been troubled some days by what I term **Truxters** coming into our district and hauling out enough berries to interfere with our plans for loading or filling orders just whenever conditions are favorable for them, buying from our growers whom we depend upon to help fill out a car we have promised, and have been short sometimes 100 casse.

They truck them into nearby towns which we depend upon for an outlet by express. They often buy the berries from our growers for less than we might have netted them but the grower feels secure if he has the cash in his pocket. This **Truxter** does not add transportation to the cost of the berries and he sells them perhaps for less than we have quoted the same dealer in that town several days previous, we disappoint the fellow who bought the car, possibly lose him because he cannot depend upon us for a supply and has to pay excess freight because of the hundred cases short in the car, and we lose him just at a critical time in your shipping season, for this usually happens at the opening of the season. He has for a time copped our outlet for express, and the berries continue to ripen regardless of this situation and we have to hunt a new outlet, get things sized up and feel that it is safe to drop a car into Chicago, there are only about ten thousand cases of straws in there this morning. The next morning after your car is past a diversion point you read that Michigan has dumped 55,000 cases in Chicago over night, and your marketing stock drops to zero, and we emphasize the word LUCK with a few adjectives that would sound improper at any other time in a man's life, and we turn to some other

market. Duluth looks good and we ship a car there and two days later get a phone call from the consignee actually shedding tears over the telephone—most of these commission men shed that kind of tears—while he tells you that there are two cars of Hood-Rivers, one from Alma Center and two from Warrens in this morning and the market is rotten and says if you have any better place for them he would not advise shipping another car until this situation cleans up; and so it goes until the end of the season—we are butting in on each other day after day and paying the penalty about twenty days out of the season.

But we have to settle with the grower, who from some glowing report he has heard or read in the Milwaukee paper concludes he is going to clean up a nice little sum this year and he buys a new car, or paints the house, or maybe goes to Yellowstone Park expecting we marketing heads have netted him enough for his berries to warrant all this, and we have to meet the situation.

Possibly **Roadside Marketing** has some bearing on marketing in some localities but that is merely a retail proposition, selling direct to consumers, many of whom might not have bought at all, but for the individual grower located on a State Trunk Highway this system has its place and at times may have some bearing on **Proper Marketing**, but it has never been a factor in my experience.

In this paper I have endeavored to bring out clearly the main essentials as I see them, in marketing berries in particular, as well as mention some of the difficulties with the purpose of bringing out any questions from the audience on this important subject, being conscious of my inability to cover the subject properly.

And in justification of results obtained by the various marketing agencies and our failure to keep abreast of the times in our marketing, I want to leave with you the suggestion that the grower is a very uncertain quantity as applied to our state, and I might add, Michigan as well, for I have some experiences in that state. For that reason we are unable, due to the uncertain source of production to build dehydrating and canning plants to relieve the fresh fruit markets in peak season and thus maintain a steady market for the fresh fruits shipped.

Demand and production fluctuate and for that reason the

term **Orderly Marketing** is a misnomer. There can be no orderly marketing with a fluctuating production and demand.

Production is governed largely by price. If returns are good this year more growers will plant strawberries next spring, and if prices happen to be low they will plow up the old bed and possibly neglect to clean out the new bed or take care of the new planting, with the result that the following season we have a good outlet for a small production, get a good price, and the following year they all go back into the business again,—after you have lost your markets or that portion that you need so badly in big crop seasons; and perhaps that year we get a price too low again to satisfy the growers and the operation is repeated. We have to sell the whole crop, and if we have a poor demand and price is low, naturally, and if we have high production the price is accordingly low.

What we need, then, is a steady supply of standardized berries from organized growers, officered by competent men, men who know the selling end, know the markets and know the firms in the markets with whom he intends to trade. In fact, if we had everything made to order and had the cooperation of all the local organizations marketing the same commodities at about the same time, had a juicing plant to take care of the unmerchantable berries, then it seems to me the only other essential would be that one man should regulate the distribution. Then we would in fact have PROPER MARKETING. Would we?

It seems to be the law of nature that there should be counter influences in the onward march of progress and I am wondering, if we could coordinate all the perishable fruit shipping organizations under one head, so far as distribution is concerned at least, in this state, whether or not we might stir up these counter influences, whether such cooperation would fully solve our problems in marketing small fruits?

Those of you who have followed closely the phenomenal growth of the new **Octopus,** the Continental Baking Company, a corporation of six hundred million dollars, a baking corporation which plans to have a line of bakeries from the Atlantic to the Pacific, have seen opposition, have seen this counter influence against this gigantic scheme, by the growers, the grain dealer and the entire milling industry of the whole country. Why? Because it means that one man will do the buying of

the raw material for that firm for flour to bake one-tenth of the bread used in these United States, will dictate not only the price of the finished product—bread—but the price of the wheat that is used in making the flour, by dictating the price they will pay for the flour.

Of course it is not fair to compare our little marketing scheme on a few perishables we have to sell to this immense organization, but I used it to illustrate the point that whenever we attempt to control the price or distribution of any commodity in the raw material class you immediately antagonize the manufacturer or in our case the dealers, as well as the consumer, probably through fear that we might grow strong enough to dictate the price that would make the production of a commodity highly profitable, and that you producers will just literally eat up the middle man who has builded for himself a splendid business, and the fight is on.

Personally, I do not take this situation seriously, for we are yet a long way from such a goal, but it is something to think about. With perishables, they come with the seasons, they grow regardless of market conditions and they must be marketed almost on a monment's notice, making control practically out of the question, so that the most we might expect from coordination, amalgamation,—the term applied to all big business—would be proper distribution, one of the most essential, if not the most essential factor in marketing perishable products such as small fruits. And even this could not be accomplished without some man with a life time of experience, one who has been confronted with every obstacle,—and there are a lot of obstacles—one who has a broad knowledge of conditions, one who knows the marketing game well enough to enable him to market the crops of the growers comprising these organizations for enough more money through this PROPER DISTRIBUTION so that his services would not cost the locals a cent; then such an organization, in the course of a lifetime might give satisfaction after having first justified its existence by being able to do business for nothing, so to speak. The idea is correct, the plan sounds good. Can we work it out, it is the solution of marketing small fruits.

The cooperative idea is as old as time. We have seen cooperatives such as the grange, the farmers' alliance, and I might add dozens of others that are still functioning just preparatory to their sad funeral, flourish for a time, start a store,

an elevator, a potato warehouse, a livestock shipping association, a creamery, and out of it all, about the only thing we can point to as being a success in Wisconsin is the dairy business, an industry producing milk enough to float the United States Navy, and excepting Wisconsin and Minnesota and a few sections of a few other states, the industry is unorganized, and it represents an annual production of $2,566,000,000 last year. It has been bled from the beginning and yet it is the one industry or project of farm production that is proving profitable or at least that is not losing money; and yet I dare say there is not a creamery or a cheese factory bordering on the territory of an independent corporation or privately owned factory that is not being patronized by those who once boosted for cooperation.

We have one of these large creameries at home, one of the largest creameries of the state in point of production, making a million and a quarter pounds of butter annually and I am safe in saying that at least ten per cent of the stockholders and probably 25 per cent of the farmers in the district tributary to that creamery patronize other agencies. Why do they do it? *I don't know,* but I do know this, that until the producer is ready for cooperation, whether it be milk producers, strawberry growers, potato or any other kind of growers—until the growers are ready for cooperation, no man nor no set of men can do very much but theorize; yet I still cling to the theory of cooperation as the only correct theory, especially for the marketing of small fruits and perishables.

In all cooperative marketing schemes the main item watched is the selling cost. The grower as a rule pays very little attention as to whether you are getting more than the market price for him through cooperation and cooperative marketing, but they watch the marketing cost so closely that our small marketing organizations dare not do any effective advertising in an effort to broaden their markets, because it figures in the marketing cost. Many times they have laid too much stress on the cost of marketing or selling service, and too little on the service rendered and the advantages gained.

It is my firm conviction that we have been giving too much attention to the small percentage of the consumer's dollar which covers the cost of selling through cooperation, and too little attention to the net returns secured.

In my own organization we charge the stockholder 5 per

cent for marketing and prorating and we have so handled the business that we have never had to take one cent out of the small fruit growers for the handling cost on berries, but have made it out of other lines, and been able to refund that commission in the way of a patronage dividend at the close of the year.

Possibly in the marketing of small fruits we have become too keenly interested in the consumer. We have been too anxious for him to eat our berries, our apples, etc., so that through common methods of marketing we have given him our products for practically nothing if we have not in some instances paid him for handling them.

Personally, I am more concerned about the PRODUCER'S dollar and in seeing the producer get a reasonable return on his labor and investment and this can only be accomplished through **Proper Marketing.**

DISCUSSION

MR. LEVERICH: We will be glad to have any questions which you wish to ask regarding marketing of small friuts.

QUESTION: What was your average price? Your low and high prices?

MR. KERN: I know what the average price was. We shipped 47,450 crates in 44 cars and the balance of them by express. They averaged $1.496 net at Sparta. That is the entire crop. We sold berries as high as $3.50 a case. These were rare instances. People who wanted something picked specially and were willing to pay for the effort.

MR. H. H. HARRIS: Was that after expenses were paid?

MR. KERN: That was net from the association. We have to take off 5 per cent but we pay that back in patronage dividend at the end of the year.

MR. RASMUSSEN: Then they got about $1.45 per crate. In other words, they got just about enough to break even.

MR. KERN: I do not know how expensive your operations are. We are satisfied to grow berries if we can get $1.40 net for them.

MR. RASMUSSEN: Yes, but when you keep careful check on the acreage one or two years you are not very far from the cost of production. I would think it would be very few cents above cost of production.

MR. KERN: I have in mind one particular instance in our association where a grower had four acres. He had 1600 and some odd crates—11 I think, of berries and his average on his entire crop was $1.68 net to the association. Taking off 4.8¢

for commission left him practically $1.66 and he was the only one that kicked all season. It just depends on how valuable you figure your services.

MR. RASMUSSEN: In figuring packing, trucking, and everything, it costs just about a dollar, so you have forty cents left for growing.

MEMBER: Would not yield have something to do with that cost price?

MR. RASMUSSEN: Yes, but taking it year after year. Some years you would get out fairly well if you did not figure things too high. Some years they are practically a failure on account of leafrollers, winds, etc. We once in a while have a failure of strawberries.

MR. KERN: Our last six years in the strawberry business I suppose would be out of line to use as an average. Our average is $1.91 and a fraction cents and a fellow can't go into business and go out next year because the price is poor and expect to hit the high spots. A fellow has got to take that average over a period of time. It is just the same with everything else. The potato people have two or three bad years once in a decade.

MR. HARRIS: How many times during the shipping term would you figure for each individual grower. How many times was it pro-rated?

MR. KERN: The pools? Every day.

MR. HARRIS: How would you get the expenses for the different ones? The same amount for each shipment?

MR. KERN: It would be five per cent on the average price each day. If the average was $1.60 the cost would be 8¢ deducted from that for the grower to get as his net.

QUESTION: Mr. Leverich, how much less than a dollar a crate can you lay down strawberries at the depot?

MR. LEVERICH: I do not think we can put them down for less than a dollar a crate. That is outside of growing.

MR. RASMUSSEN: Then if you can grow them for 40¢ you can do better than we can at Oshkosh.

MR. LEVERICH: Well, we will take all we can get. I might say that as far as growing them we have kept at it a number of years. We have been right in the game all the years Mr. Kern has been telling about and while sometimes we have taken a low average price, in 1920 when we had the biggest crop we ever picked I think our average was $2.20 a crate and of course that went a long way to make up for all these lean years.

We will pass on to the next subject. It has been brought up that a quality pack was necessary. The department of markets has been devoting some time to our neighboring berry section on securing a quality pack. I think they have done some good work along that line and we will now hear how Mr. Jones, of the Department of Markets, can help.

HOW THE STATE DEPARTMENT OF MARKETS CAN HELP

W. P. JONES

In the first place I want to inform you that our department is strictly a service department and as far as the small fruit is concerned, I want to state that we are glad at any time to give any assistance within our power to any of the growers or the associations that ask for it. I might relate in a short time some of the things we have tried to accomplish in the last two years and we have confined our activities practically to the packing of better quality fruit.

Two years ago I was asked by the Warrens Association to come up there during the harvesting season and supervise their packing. After getting there I found, as we find in many other places, that the board of directors had no satisfactory idea as to just what they wanted to pack. That is, they had no set ideas as to just what the specification of a certain grade should be, so they finally decided we had better try and divide the crop up into two grades, one fancy and a lower grade. They were all of one accord that they were sure that could be accomplished by my staying on the platform and inspecting the cases as they came in. We started on that plan and in a couple of days I convinced them there was not much doing on platform inspection. It was impossible to change a crate after it had been packed and brought up to the platform. So we started some field supervision. I was to spend my mornings out in the field working with the growers and I am pleased to state that in getting in personal touch with the different growers and the pickers, showing them when the fruit was in proper condition it could be harvested, and showing them how to take the fruit off the vine without injuring the fruit, and how the crate should be filled; so that there was a marked difference within a very few days after we started our field work. We find that human nature is about the same in any line of industry—berry people are no different. If they can put every berry that grows on the vine into the crate and get away with it they are going to do it. We did not have so much trouble in getting them to take out the undersized as the fully ripe, stock that was really on the

over-ripe side, that would not carry to destination. Those are the berries the growers objected to putting into No. 2 or pie grade. They were in prime condition then, but two days later they would not be.

So, working with the pickers in the field we found that we were doing some real service and I want to call your attention at this time to the fact that one of the hardest problems that I had to confront was that the owner in practically all cases was the field superviser of the picking. Now, your berries look better to you than to a disinterested party and naturally you are going to get some berries into the box that another would not have put in and I would like to suggest right here that any grower that has an acre of strawberries cannot afford to be without a field supervisor. That he put one person in charge of the pickers that has absolute charge of the pickers and you will find that you will be well paid for the extra labor you are putting in there. As field supervisors, we find that women are more efficient than men; they are more careful in handling the berries; they will go into more detail and show the pickers just what they want them to do; and the pickers will work with them better than they do with men. At least that has been my experience.

Then, we found that the pickers were not so interested in taking out these undersized and over ripe berries. We were giving them nothing extra for taking them out, for the extra work; so I suggested that we start cup sorting. The carriers hold six cups. We placed two of these cups in one end and asked the pickers to put all undersized and over-ripe stock in these two cups, and some of the growers paid a premium for the best sorted berries. At once you could notice a big difference in the crates as they came onto the loading platform. The over-ripe and inferior stock was practically all taken out because there was an object there for the pickers in taking it out.

Then we come to packing. The first year I was there we were using the old Leslie cup. I am not advocating any style cup but my experience has proven to my satisfaction that fruit will drop further in a straight Leslie cup than in an American type cup, that it is harder to get a full pack. That is another thing that bothers a lot of the growers. They feel that if their box is full when it leaves the field that is all that is necessary.

They do not consider that the man who buys that box wants a full quart at destination and in order to give him a full quart at destination we must keep our boxes as full as possible without crushing, at the point of origin. This last year we used the ventilated crate and the American cup. We were able to get a full pack easier on account of the top of the cup being larger. You naturally would round the top a little and in that way get a fuller quart than in the old Leslie type, and we felt that we were getting better ventilation in the crate than in the old style.

The next problem we were up against was shipping. They had been shipping by freight in a refrigerator car, consigning to Chicago, Milwaukee, and Duluth markets. That was practically as far as we could get away from home and all the berries in Wisconsin were being marketed in that small area. Last year I was successful in getting the commodity rate on refrigerator express shipments, and the Warren association shipped everything by refrigerator express. In that way we were able to enlarge our marketing area and get farther away from home.

Just allow me to get back again to field supervision. We found that the grower has a good deal to do with quality. The care that he takes of his field, the condition he keeps his plants in. I would say the greatest trouble I experienced up there was that the growers paid no attention to the width of their rows. They allowed some to get three feet wide with the result that they had a lot of berries of small size that did not materialize to be any quality stock at all. So I feel that there is a good deal that the grower can do as well as the care taken of the berries during the marketing season. At the close of the 1923 crop, or early last winter I spent a little time up in the Bayfield section. We found up there that there were four or five different groups that were all working separately; that in some of the groups, although they had been organized for some time, the old organization was practically gone and so I assisted in helping the Washburn Fruit Growers reorganize and we also were able to get the Washburn, Moquah and Bayfield groups to work together on the sales end. Mr. Knight took care of the sales for the organizations and I understand that they are very well satisfied. That gave me the idea that if those three local associations could work together to good

advantage, why couldn't the state as a whole work together. I drew up some articles and by-laws of organization and we held a meeting at Chippewa Falls in November with the representatives from each of these four districts, with the idea of federating these four into one organization. I cannot help but feel that the plan is all right. Under our present system, and I think Mr. Kern will agree with me, we are our own worst competitors. These local organizations working by themselves are quoting prices on the same markets and it is a case of one cutting the other, so that I felt everything was in favor of a federation and I hope that before this convention ends something concrete will be offered us so that we can go ahead and perfect this federation.

In closing I want to say that if there are any groups of growers in the state, whether they are organized or not, if there is anything we can do to assist them in their work I want them to feel free to come to us and ask for our help. We are your servants, we are your hired men, and if you do not tell us what you want done it is very hard to find out what you want.

DISCUSSION

MR. KERN: Have you any figures on the percentage of pieberries on the crop. What percentage would run to high grade?

MR. JONES: In 1923, fifty to sixty per cent.

MR. LEVERICH: The field supervision was a success, was it not?

MR. JONES: I felt it was. Those people were paying no attention to quality at all.

MR. LEVERICH: I am a friend of field supervision. We grow ten to fifteen acres of strawberries every year and it costs us from five to ten dollars a day for that field supervision. That money is well spent if the smaller growers would do likewise but you are up against a proposition of them not growing them in big enough proportions so that they will do that. This field boss that we have goes around and sees that the berries are picked clean so that there will not be ripe berries there next day and thus make the berries an inferior quality, and he is also supposed to see that the boxes are filled. That is one thing that makes trouble with the strawberry business when you go to sell them even though you have a good quality fruit if the boxes are way down, half full—if they are just level full when they leave the patch they are going to be down considerable when they get to market.

The field supervision is a big part of it. People who grow them in quantity so that they are natural berry growers will hire a field superintendent. Those who are not will usually plant five or six acres and make a failure of it and go out of the business. It is the small growers that we find are hard to handle along those lines.

MEMBER: What did the pickers receive per box?

MR. JONES: We paid 2½¢ for the two boxes and 3¢ for the others. Some picked for 3½¢.

MEMBER: Most of us get our pickers on the share system and we get along very nicely. The fellow who picks the slack box takes a chance of drawing it and gets just what he picks.

MR. LEVERICH: We are always interested in hearing from our neighbors. This afternnon we have a man from a neighboring state and we will now hear what Mr. Prater of Grand Rapids, Michigan has to say on The Michigan Way.

THE MICHIGAN WAY

G. E. PRATER

(From Reporter's Transcript, Editor's Revision)

I am very glad you gave me that subject, The Michigan Way, because I can tell you all about that in just half a minute. The Michigan Way is just like all of the ways of the individual picker throughout the United States. I see your way over here is to put all the small ones in the bottom, the soft ones in the middle and the large ones on top, so that they can stamp on the others all the way to Chicago, and the way the big proportion of the Michigan business is done at the present time is the same.

First as to Cooperation. I believe that there is no word in Webster's dictionary that is any more misued, abused and misunderstood than that one word "cooporation", which merely means the accomplishment of certain ideals and certain developments by a group of individuals that is impossible for the single individual. It does not necessarily mean a bunch of farmers gotten together to fight among themselves over certain matters, or it does not necessarily mean a group of merchants gotten together in the hope of forming an association to throttle their patrons, but it means the uniting of similar interests in any line of business for the betterment of all concerned and we are

going to view what I have to say today along the lines of co-operation from that angle.

Now in Michigan, I want to give you a little outline of some of the things we have been up against; Where we started in cooperation, what we have done thus far. I was born and raised on one of these sand farms in the southern part of Michigan in what is now known as the central part of the grape belt. My father was a Baptist preacher and he worked six days of the week on the farm and drew a meager salary on the Seventh. Yet with all the thrift that he could exhibit during those good old times it was impossible to support his family and make ends meet, even by working the Seventh. I do not know how the neighbors got along but the result was that when I was fourteen years old we had accumulated a fifteen thousand dollar mortgage. No fruit was grown 18 miles west of Kalamazoo. Over here at South Haven more or less peaches were grown, considerable small fruits, and they had started going across to Chicago, as they do yet. They had also started with their wagons to marketing in the interior of the state and I know that as hard up as we were, father bought a bushel of peaches and paid $3 for it. We got along with one bushel, quite true, but we were glad to get them at that figure, so I rather coaxed father into planting ten acres of that farm to peaches. In four years we had one of the finest crops I ever saw. We had no pests in those days, there was no leaf curl, no yellows, no insects. They grew to perfection, and we thought little of marketing them. Why couldn't we market them? In South Haven they were selling at $2.50 and $3.00. We certainly could get that for that crop of fresh stuff right on the ground. Well, when they got ready to pick I can recall distinctly how those same neighbors came around and said, with tears in their eyes, "What are you going to do with four thousand bushels of peaches?" We had no railroad except as we took them to Lawton to get onto the main line of the Michigan Central and it did look like a hopeless case to sell two or three hundred bushels a day. Those neighbors thought they were doing us a favor to offer us 30¢ a bushel for those peaches that they would have gladly paid in South Haven $3 for. I was eighteen years old and I foresaw that unless we did something right now that mortgage was going to stay right on that farm and I might say that that

instance is exactly what started my marketing career. I took three baskets of those peaches and went to Kalamazoo and sold from ten to fifty to go by express. Then I went to Battle Creek, Fort Wayne, over to South Haven and back home. I was gone three days. In the meanwhile, I had wired them orders for all they could ship, and the result was that within thirty days after those farmers thought they were doing us a favor to pay us 25 or 30¢ a bushel we pulled the same trick on them that the dentist does on you today—"All right Jake, but they are three dollars a bushel. You will have to leave your order and come tomorrow or next day, we are sold out today." We paid the four thousand dollar mortgage out of that crop and materially increased the buildings on the place. That was really a proposition of distribution in a small space but the neighbors in that territory saw that there was money in growing peaches and within three years there was better than two hundred acres of peaches produced or set out in that territory. Before I was twenty-one years of age my brother was loading this stuff at Pawpaw in carload lots and I was going to these other towns around Richmond and marketing that fruit out of the car, usually with the commission merchants, but we got what that fruit brought less cost of transportation and actual handling and by doing that it developed into a business where we had to have our neighbors in on the same deal. Finally Lawton, Dowagiac and Decatur got onto the grape business and the fruit business and so the Michigan Fruit Association, which I believe is as large if not the largest individual fruit association in the state, today, was formed. They are still operating. I can remember distinctly that less than fifteen per cent of the growers were in that association at one time. More than that were in it to start. They said, the cash buyers are coming in here, we do not need an association. It is true that they had their cash buyers on the track, Pittsburgh houses had their cash buyers on the track. We had a good live market so long as the towns took a sufficient amount of the goods to keep those cash buyers competing among themselves for the cars but as soon as we had more cars than those cash buyers wanted, then the price went down. Distribution and cooperation go hand in hand. They have to. Right here we faced a condition that you mentioned this morning. Southern Michi-

gan growers were flourishing. They had commenced to grow, they represented 80 per cent of the tonnage of that territory but this town and another town conceived the idea that they had better have an association of their own. As many as fourteen grape organizations were formed in that period. Out of that fourteen it simmered down to 5 in about two years and for three consecutive years the growers of three counties met in mass meeting not less than six times each winter to discuss the policy of placing their crop under one sales head and cutting out the sales manager. Every one of those associations and every sales manager agreed. They conscientiously felt that it was the right thing to do but they did not believe that any one man except themselves knew enough to run it, and they did not get together. I was just as bad as the other five. The result was that along about ten years ago after having given up any possibility of getting that great crowd together on a common basis and after having gotten wholly and fully disgusted with the other fellows in their actions because they did not listen to me, I hired out to the North American Fruit Exchange in their sales department on the southern work and told our association to get another sales manager. I went down to Mississippi and worked down there. Installed in that section what is still operating, municipal inspection. It is an impossiblity for any grower to put anything onto the market without a certificate from the inspector to say what grade it is. That is a kind of political proposition, but cooperation just the same. Forced cooperation, but it works. When I had been down there about three weeks a man who was until recently director of markets in Michigan came down to Crystal Springs to see what I had been doing. I was there when he slipped off of the train.

When I came back to Michigan he invited me to call the grape growers together and in less than three years we signed the grape belt organization under sales contract. I presume you people know what that meant. The product went up in value better than 300% in two years, and there was no more fooling with the prices. We worked for six or seven years until the trucking business came along. These buyers made pools to meet the situation and wrecked the morale of the individual grower towards cooperation. That is not exactly the entire story. The eagerness to give a low sales cost was so great that it was

impossible to handle a sales service featuring on quality and getting the quality shipper the difference and gradually our quality dropped down until we have got a job on our hands again. That is what wrecked the associations, or the getting together of the associations. Today the grape belt of the State of Michigan is controlled by four interests. The Michigan Fruit Growers, Inc., controlling the St. Joe section; the Federated controlling the Lawson section; the Loraine controlling the St. Lawrence section; and the group of Benton Harbor dealers with whom you are acquainted.

I am simply giving you this to show that even after you have perfected an organization that has not got a hole in it anywhere if you fail, either through your marketing efficiency or through your inspection service to maintain your quality, your boat is not going to keep running. We are having most of the difficulties in the commission at the present time due to the personal friendship of the fellows in charge. We cooperate together but that is as far as it goes toward putting us one shilling ahead at the present time.

Now I am going to give you a very short outline on marketing. I want to say I appreciate very much what Mr Kern said and the way he brought about the essentials to start them. First, your organization; second, your quality; third, your distribution. Now we are working close on inspection but we are not only lining up the stuff for our association but we demand that the other fellow ship just exactly as good as we do. That reputation in Michigan we have got to overcome and our state department has been very valuable in helping bring about conditions that may exist but we have got to let the trade at the other end know that the stock we are offering is not the same stock that the average shipper in Michigan is offering, otherwise we can only get the average price. So we have developed a label. This is the grape label showing the map of Michigan with the master label or trade-mark inserted here. That is the sweet cherry label. There is the peach label, the packer's name or association below. So far as our association is concerned we supply the labels at a very much lower cost than is possible for the individual to buy them. We feature a national reputation on these commodities. But every packer is using care to grade and when an order comes back they get the bene-

fit of the price on the order which their efficiency has developed. This label states that this is packed with Wolverine inspection. That gives him reasonable assurance that we know what we are talking about.

Just a little word on our sales system and how distribution is brought about. Here is Grand Rapids, eighty miles north of the southern line, a little south of Madison, south of Milwaukee, and right across to the grape belt. Just about the same distance from the cherry and apple belt. We are located within three miles of the exact geographical center of the average total fruit production, in the state of Michigan, which aggregates something like 28,000 cars annually. From this office all quotations that go into our telegrams are issued. All of these stations report daily their conditions, what they are loading, where their car is, with descriptions of the contents of the car, so that definite shipping instructions may be given from this office as early as possible after the car is started reloading. These red spots show branch representatives. These boys are like brokers. We have a definite contract with each one of them and a sufficient bond. They also contract with us to keep us posted daily on their market. We operate through a system of market letters. We have a large number of customers in Wisconsin, and this letter endeavors to keep the trade advised of what we are offering. That brings in the request from direct buyers and from our branch representatives and we follow that up with what we call our leased wire service. That is on cars that we have not heard of before. That is where your expense on cooperation runs up and where your locals can cut down on your overhead. Supposing for example, Mr Kern calls us up in the office and says, "I have an acre of strawberries this afternoon, 365 crates fancy and 145 pies. Where do you want them? We don't want to consign them anywhere unless it is out in the center of Lake Michigan and have them dumped there. There is an overload on all markets, and with a car of that nature we are up against a hard proposition. It is going to take noting less than rapid long distance telephone and telegraph work to sell them and you can't talk very stiff to the other fellow if he makes a reasonable offer either. On the other hand, if Mr. Kern had let us know the night before that he would have a car rated that way the next day it would have gone out in our regular night letter and we

would have have had an offer upon it by at least ten o'clock. Our idea is to get away from this Michigan way of going across the lake. In two years 81% of the tonnage through our office has gone into cities of two hundred thousand inhabitants. Less than fifty cars in Chicago from our organization. Detroit about the same. We are working the smaller towns. The function of our work is to improve general conditions in Michigan from the growers' standpoint and we feel that it is our duty to take the goods that come into our hands and put them into the markets where they are not being used, and it is a good form of cooperation.

I spoke about the strawberry car. Here is what happens to an apple or a peach or a plum car. We are blessed over there the same way as Illinois, Missouri and you people here and our apples are the results of a good live nursery solicitor's work several years ago with a pretty plate book. All of our growers had tried out all the varieties that agent had in his book and a few more. It is practically impossible from any of our stations that even ship seven and eight hundred cars of apples each year to load a straight car. Consequently, we issue a bulletin with sometimes as high as 125 to 150 cars on it, with special descriptions, during the apple season toward these diversion points that have been indicated by our market reports from these representatives that will be most likely to take those cars when they receive that bulletin giving indefinite information as to what the cars contain. Therefore, when one of our shippers up state wires us that they have a car that contains 225 bushels of Wealthy, 64 bushels of Culbert, 12 or 14 bushels of Maiden Blush and a few others, we do not fall to work on the long distance telephone or Western Union to sell that car but we run it over the mimeograph and it goes out to all those boys and they all work. So we can ship it immediately to one of these diversion points and the minute that that car strikes one of these points unsold, or strikes there without instructions we are immediately wired that that car is there. We have taken that precaution so that in the event the shipper should ship us a car, mail us the bill of lading and failed to telephone us and in the event that that bill of lading should get lost in the mail we still have not lost a car of perishable stock. And there have been a number of instances that cars we never heard of before have come in that way. This

system enables us to market those cars on an f. o. b. basis and get away from the competition that is throttling the growers of both states. That is, the individual farmer that stands so firmly on his individuality that he will not trust his neighbor to get into an organization but will trust any old drunk on the street that can pay the price of a rubber stamp and consign to a broker. And if you people in Wisconsin ever name the price on your strawberries, apples, or anything else, the price you wish, you have got to get rid of the fellow that consigns his goods to any of your markets and lets the other fellow name it for you.

DISCUSSION

MR. LEVERICH: Mr. Prater has probably aroused some curiosity.

MR. KERN: I understand that you take in dealears in the Wolverine Association as well as local associations. I think that is a good idea to regulate that much more of the output of your district.

MR. PRATER: Fifty-eight per cent of the apples that go out of the state of Michigan are packed by dealers. Fourteen to eighteen per cent is the output that has ever been packed by co-operators. If we are going to regulate the price or have any dent in the price of the products of the State of Michigan we have got to go beyond eighteen per cent control.

MEMBER: Do you have compulsory grading laws?

MR. PRATER: I forgot to say anything about that. Yes, on grapes, potatoes, apples, peaches and pears. They can do what they want to with fruit,—pack pears and small fruit, anyway they want to,—and they do. In our organization under these brands we diverge from all U. S. standard grades. We have a special grade of our own.

MRS. BASSETT: I wish he would tell us how it happens that we get baskets of peaches with big ones at the top and little ones at the bottom.

MR. PRATER: It is the Michigan way. I thought I explained that.

MARKETING VEGETABLES

MR. FRANK GERTEN, South St. Paul, Minn.

It is a pleasure to me to extend to you greetings from the Minn. State Hort. Society, and congratulations at the large and healthy membership which your society can well be pround of. I am not acquainted with the exact membership rolls of the horticultural societies in the Northwest, that is data our secretaries are interested in. You and I are more interested in what the horticultural societies are doing to promote better and greater horticultural activities and what practical benefits you and I have because of our horticultural membership.

This session of your meeting being devoted entirely to marketing problems, I am expected to say something about marketing vegetables. As secretary of the St. Paul Growers Association, I am perhaps familiar with the difficulties encountered in marketing vegetables in the Twin City territory and other specialized truck growing sections of the state. I am a grower myself and as those of you who are in the trucking business know it has been quite a battle to make ends meet as they should.

I am not acquainted with your vegetable marketing problems, neither am I expected to give you a solution, for such solution can only come from united effort of groups or communities. I can however give you an outline of what we are doing and hope you will get some helpful suggestions from it. My first experiences in marketing vegetables date back to before the general use of the motor truck. The vegetable supply of the cities was secured from a radius limited by team haulage. Vegetable growers enjoyed alternately more or less extreme plenty or shortage. The shipping facilities for vegetables from specialized sections were not as responsive, in fact at that time sections especially fitted by soil and climate for certain crops had not been developed. In St. Paul we had a number of shippers who made up solid or mixed cars and shipped to Duluth, the Iron Range, the Dakotas and Nor. Michigan. I actually believe that this period some fifteen to twenty years ago, with its restricted area, low overhead and plentiful barnyard manure, was as favorable for market gardening as any

period we have had since, excepting perhaps the three or four years during and after the war.

To offset the advantage gained by the growth of the cities, the motor truck came into use and the radius of the vegetables growing circle was correspondingly increased. The cultivation of new and better land was possible. As new varieties of vegetables were improved and developed for growing in shorter seasons, the vegetable producing area moved northward and tended to curtail rather than increase the shipping demand. To illustrate, last summer the Duluth Growers, a cooperative concern, in one shipment sold 2300 bu. of cauliflower to Chicago people, price $2.25 F. O. B. Duluth, while cauliflower on the St. Paul Market was going begging at $1.00 and $1.25 per bu.

A little incident of last summer will illustrate what the professional vegetable grower has to contend with. A woman and a boy in a touring car with some vegetables packed in the rear backed on the local market one morning. They were one of hundreds like that who did so every morning during the heavy season from July to October. A local grower a trifle curious asked them where they came from. They named a town some forty-five miles distant. "Certainly" the grower asked, "it does not pay to drive forty-five miles to market a little vegetable." They replied that "they wanted to do some shopping and the $4.45 they received for their goods would help to defray expenses." Such people do not grow vegetables for a livelihood but as a sideline. They are not conversant with prices, take anything that is offered them, in fact cannot command a price because their goods are usually off grade and quality.

The market gardener found it necessary to make some changes in his methods. He did so by specializing in earliness in quality and in the raising of vegetables and plants under glass. The tomato is an excellent illustration of the first method. The professional grower through the use of selected seed, hotbeds, and coldframes, painstaking care, especially adapted and well prepared soils, matures his crop thirty days ahead of the rush. The price for this period will run from $5.00 to $75. per half bu., while the price during the glut in a normal season is $.50 per bu. In addition to getting his main tomato crop early, the alert grower often has a late crop which usually pays well because of the superior quality of fruit.

Growing and forcing lettuce, radish, cucumbers, rhubarb,

plants, etc., out of season help the professional grower to keep his business running throughout the year. Vegetables out of season usually market readily and extend the grower's income season.

Other factors which assisted the professional grower were his knowledge of quality and grade. These enabled him to create a demand for his goods among discriminating buyers even though the market was long.

But other factors were even more revolutionary in changes they brought about in market gardening, and chief among these is the ever increasing overhead brought about by expensive land, expensive buildings, motor and garden equipment, seed, labor and fertilizer. It is difficult to raise all vegetables in season and market them successfully, except in the East where it is not uncommon to see twenty to fifty employes on a single truck farm. It has been found more profitable to develop the production of several or more vegetables on a large scale and specialize in them, filling in time and space with other crops. When shippers are looking for goods they get them best from the gardener whose production is large enough to enable him to furnish quantity and quality.

Our biggest market is our local consumption, but a considerable shipping is done in an unsatisfactory manner. In the first place our shippers work with the handicap of having to compete with the local demand, which desires the best and pays big when goods are scarce. Thus the shipper's quotations fluctuate and he is not positive that he can fill orders at price and of same grade he quoted out. So much in their defense. We growers do not feel that the shippers exercise the proper care and precaution in the vegetables they send out. An order which does not repeat is not satisfactory. Though some shippers make a fair attempt to ship only quality goods, too many instances are noted by us of goods going out which cannot give satisfaction. The president of our association during a trip he made to Duluth walked along the commission row and saw grocerymen pass up sunken half filled baskets of St. Paul tomatoes for California goods which traveled 2,000 miles and competed successfully with goods grown 160 miles away.

There are many growers who have no scruples about packing or shipping poor quality vegetables when the shipper is not

watching. Such growers should be blacklisted and all purchases made of such should be carefully inspected.

This brings up the subject of the golden rule in marketing vegetables. Something is fundamentally wrong with our moral fibre, when a gardener can take fifty baskets of tomatoes to the local market and be asked exactly fifty times, "Do they run alike from top to bottom, are they the same all through." And if they are uniform throughout the buyer is agreeably surprised. Whether you sell on a local market, or to a retailer, be it groceryman, huckster or peddler; to a shipper, or ship yourself to a distant market; whether you are naturally honest or unscrupulous in your makeup, you will find it a sound economic policy not to misrepresent your goods in the package or by description. Though a sucker is born every minute, with apologies to Barnum, there are many buyers who try not to repeat any oftener than necessary and soon make it a habit to buy from those growers whose goods correspond to description or grade exhibited. Identify your goods with your name or brand, if you are doing business as an individual. If you sell through an association help make the association brand mean something and see that your neighbor does likewise. The public will soon learn that the melons grown by Ed. Jones are always of uniform quality, and when Jones found it necessary to sell second grade goods he sold to the wild buyer on price alone and not under his name.

Proper grading is another big asset of the market gardener. The price of any package of vegetable or fruit will be closer to the price of the poorer instead of the better grade contained therein. A discriminating buyer will mentally weed out the poorer grade and make an offer on the basis of the quantity of the better grade in the package, basket or bunch. Illustrating with carrots, compare a standard bunch of nine uniform carrots with a bunch in which two or more of the carrots are tiny, misshaped or withered. Every market should have a standard package, as well as standard bunches suitable for the various vegetables. Growers and dealers should be agreed on what should be a standard package or bunch aside from weights of commodities which are fixed by law. During a conversation I had with a shipper last summer, he told of how his quotations on certain bunch goods were consistently beaten by a competing shipper. He quoted carrots and onions out nine in a

bunch and discovered that his competitor sent them out six and seven in a bunch. Such business practices are a decided handicap to the development of a sound market. It is a situation which can be remedied by strong and active growers' associations.

The popular use of the family auto, the development of good highways, has inaugurated a method of marketing almost revolutionary in its methods and vastness.

I believe that the roadside market is as great a direct to consumer method of marketing, as has ever been developed. It has made it possible for the consummer to purchase a week's supply of vegetables, while he and the family were on the weekly outing and at a saving which helped to defray the outing expense. The grower was able to dispose of his surplus of miscellaneous goods at prices usually higher than he could have realized otherwise, if he could have sold at all. During the season of 1923 when local apples were almost unsalable on the Twin City markets even at $.50 to $.75 per bu., the roadside markets in the proximity of the Twin Cities could not keep supplied at a $1.00 and $1.25 per bu. The same was true of tomatoes, unsalable in the cities and the city people at the same time eager for all that were available. It would seem to me that market gardeners and fruit growers located on trunk highways up to 30 miles or so from big centers of population have with the coming of the roadside market solved their marketing problem. Of course the roadside market does not injure or supplant other marketing agencies to an appreciable extent. A large percentage of the roadside sales are a distinct gain to the community. Melons, tomatoes, potatoes, dry onions, all root crops, apples, plums and berries are good roadside sellers. perishable vegetables as lettuce, bunch goods, spinach, endive, parsley, green onions, radishes, peas and beans can only be sold in limited amounts and are still marketed to the best advantage through the grocery store.

In some localities especially in the East, the roadside market has become a varitable green goods counter, protected from the weather with provisions for weighing and wrapping and the preservation of perishable goods. The roadside market is nothing more than going the cash and carry one step better with the producer coming in for a share of the saving.

I wish to say a few words about the big desert in our vegetable marketing, and what efforts the St. Paul Grower's Association is making to remove it. We have with us as regular as the seasons what is called the annual glut, varying from year to year in degree and tempered only by nature causing a short crop here or elsewhere. Beans selling today at from $2.00 to $4.00 per bushel may at the end of tomorrow's market be unsalable at $.50, cucumbers likewise, cauliflower the finest going begging at a $1.00 per basket. Tomatoes always experience a time when the going price does not pay the picking. Cabbage when down is out and can't be sold locally at all and is only marketed if shippers find an outlet for some carlots. Very perishable crops as radishes, lettuce, spinach, peas and beans are fast up and fast down, the crop going to ruin if not sold when mature.

Our membership felt that the public as a whole was not eating enough vegetables and that the consumer did not know what vegetables were in season as the summer went by. Strawberries though not a vegetable are a big factor in our market and a great majority of the homes like to preserve some berries. Devising some quick and effective way to inform the public when berries were reasonably priced, would quickly create a vast case lot sale to consumers for canning purposes and thus relieve the market. Such information in the hands of the consumer would compel the retailer to quote reasonable prices, instead of taking big profits on small quantities. The same may be said of tomatoes, for there are few families who do not and should not put up from 1 to 3 bu. of tomatoes for winter use, if they can get them at a price of 6 cents to $1.00 per bushel. Pickles are usually sought for after the prime of the season is gone, and the consumer through his ignorance pays more and buys less.

The St. Paul Growers raised $150.00 in 1922, $400.00 in 1923 and a like amount in 1924, not a large amount you might say but contributions to an advertising fund were largely voluntary, the percentage of organized growers is not large, and the approval of our publicity attempts was not unanimous. Our advertising committee cooperating with the county agent and the University Agricultural Extension Division anticipated heavy receipts on the local market and advertised the fact in the

leading Sunday dailies. There was no way possible to check up results but we believe the method a good one. Our budget was too small. We should have no less than a $1,000.00 to spend on Newspaper advertising.

Through the courtesy of the Northwest Farmstead our association secured from WLAG considerable broadcasting opportunity. Direct advertising over the radio was not permissible. Our program had to be strictly educational in its makeup. It included one speaker per week for 23 weeks. The talks included discussions by doctors, nurses and others on the value of vegetables in the diet, seasonable instruction in making home gardens and beautifying the grounds, lessons in canning and preserving strawberries, cabbage, cauliflower, pickles, tomatoes and apples appeared in season. Every week on Tuesday during the household hour, a woman engaged and paid for by the association, gave a five minute talk called a weekly trip to market. Housewives listening in learned what vegetables were available and what to expect the following week. A recipe or two for the preparation of some vegetable was included.

We received numerous letters and inquiries, one as far as St. Louis. Curiously enough, all but one outside of the cities. The results were encouraging nevertheless, and whatever the benefits may have been they accrued to all vegetable growers in the community, though but a small portion were association members. What we are trying to get is some concrete evidence that vegetable consumption can be increased through advertising the value of vegetables in the diet and making possible the purchase of vegetables by the consumer at prices he can afford to pay, not forgetting of course that the grower is first deserving of a profitable return. Securing of tangible results of the value of vegetable advertising would enable us to arouse more interest, and get more shoulders to the wheel so to speak. I believe that to the plebian spinach, belongs the honor of being the first vegetable to show the effects of persistent advertising. Years ago spinach was only in season a few weeks in spring and again in fall, the demand for it at other times was negligible but now spinach is bought and sold the year round. Credit for increasing spinach consumption belongs to the doctors and dietitians who are also responsible for the ever increasing demand for carrots.

The closing of WLAG early last summer cut short that part of our publicity program which promised the most interesting results. However our plans for the coming season include some features to be given over the radio pending what arrangements we can make with WCCO.

DISCUSSION

MR. RASMUSSEN: I was just wondering when he said they sold three dozen for 25¢. In Oshkosh we are not organized as vegetable growers but we have had pretty much the gentlemen's agreement that if they will not pay us at least 20¢ for a dozen bunches we will leave them in the field. That is for the cheaper vegetables. We have done that for several years, I can remember way back, and here you said three bunches for 25¢. And if I can't get a dollar a crate for berries then they will stay in the field. I am entitled at least to pay for the work and picking. I think that is one thing which can be worked in every market. Get your growers together and agree on one price below which you will not sell. You can't dictate the market but you are entitled to cost and that is the biggest life-saver you have.

MR. GERTEN: We have probably two or three thousand or more growers that grow vegetables. There are not that many market gardeners. We have professional market gardeners and as far as they are concerned—you do not have to place any flowers on their graves. They are taking care of themselves and there is plenty of room for good gardeners, but a gentleman's agreement is impossible in every sense of the word. The professional has to turn his attention to something else and he does. The same way with tomatoes. We have people with a little garden, with sweet corn and tomatoes, and when they come to town with the tomatoes they raise, that is the end of the tomato business for the market gardener. The professional grower raises the Earliana, it is not the best but it is an early tomato and he gets it early and he gets through before everybody is coming with tomatoes. He has to produce a fruit of inferior grade of tomatoes for that reason and you don't get the nice tomatoes any more.

MEMBER: How many rigs are on your market a day?

MR. GERTEN: About five hundred. That means those who buy on the market. Different shippers load five or six cars a day. A large part of them are potatoes. We have 115 members who are large producing market gardeners; they regulate the market in a way but they cannot regulate production and price except as they keep off the market or find another outlet.

A MEMBER: You have just one market for the twin cities?

MR. GERTEN: We have one in either city. The one in Minneapolis is smaller than the one in St. Paul. It don't accommo-

date a third of the teams. The professional gardeners don't want a new market, which is killing the proposition. They say if you had a market large enough to accommodate all, you couldn't sell at all, and they are right. They are looking after their own pocketbooks. It is a case of dog eat dog, as far as that goes.

MR. TOOLE: We will have Mr. Day's talk at this time.

MR. DAY: It is about five o'clock. We have been here since 2:30. I see some have left, no doubt you all want to leave soon. We are not going to keep you very long.

The Illinois State Horticultural Society held its annual meeting at Urbana along in December 16 to 19 and Mrs. C. E. Strong of west Allis was the delegate from the Wisconsin State Horticultural Society and we sincerely enjoyed having Mrs. Strong with us. I am very glad to be the delegate from the Illinois society and attend this meeting and extend to you the greetings of that society.

Mr. Cranefield asked me to talk concerning a "glimpse" of the Chicago wholesale produce market, and in including that word glimpse he has done me a great favor and also you, because I am just going to give you a glimpse. It would be impossible to go into the details of the Chicago wholesale market but I do want to make one or two points which affect you people and the people of Illinois who are trying to dispose of your products through the Chicago wholesale markets. Chicago presents the usual manner in which products are handled in the wholesale distribution of producer to consumer. The spread in price from the producer to the consumer has caused many remarks from people and they have cast the blame on certain people for that spread. The consumer begins to talk about the producer for wanting so much for his product; the producer lays the claim on the middleman and the middleman passes the buck. There is considerable spread, we all know that. As to where the blame lies it is rather difficult to come right down and say. There may be several things that are at fault and the entire spread may be proper and it may not. What I have to say concerning the wholesale trade is not in condemation of their practices, neither is it defending them, and if there are any members of the fraternity here now I want you to know I have nothing against you or your business.

A GLIMPSE OF THE CHICAGO WHOLESALE PRODUCE MARKET

H. W. DAY, Springfield, Ill.

Chicago presents the usual example of the manner in which produce, including fruits, vegetables and poultry products are handled in distributing them from the producer to the consumer. The distance between the producer and the consumer has naturally called into existence a great number of middlemen. A few enthusiastic workers along the line of marketing have contended that these middlemen are unnecessary and that they should be eliminated. However, the majority of marketing specialists, assuming a more sane viewpoint, consider most of these middlemen necessary in the process of distribution and should not be eliminated. Without doubt there may be some of them that are unnecessary and as such of course should be eliminated. Most of them however have certain useful functions to perform and we certainly could not get very far without them.

There are something like 3,000,000 people in the city of Chicago, including a few of the suburban towns. The area within a radius of thirty miles of Chicago is very thickly populated. The number of cities and small towns covered by reshipments out of Chicago is unlimited. In other words, a very great number of people look to the wholesale market of Chicago for distribution of their foodstuffs. It is estimated that approximately ten million people depend upon the Chicago wholesale market for their food supply.

Products come into Chicago from all directions. Chicago stands as the natural outlet to northern markets for shipments from the South, to eastern markets for shipments from the West, and during the winter, to western markets for shipments from the East. In addition to handling the products from points within the United States, it is also a distributing center for products coming in from foreign countries. In 1915, records show that there were 4,011 cars of apples handled in Chicago. Of this number 1,683 cars, 42% were barrelled apples, nine cars, or 22%, were apples in boxes, while the remainder, 1,444 or 36% were bulk. This quantity was handled in a season of

70 business days. Peaches, cantaloupes, watermelons, grape fruits, oranges, strawberries, mixed vegetables, bananas, lemons, eggs, live poultry, dressed poultry and numerous other products were handled in proportions according to their importance. Chicago is primarily not a live poultry market. It is estimated that a little less than 2,000 cars are handled each year. The greater part of poultry coming into Chicago comes in as dressed poultry. It is estimated that 300 million dollars worth of produce is handled annually by the Chicago wholesale trade.

In addition to this great quantity of produce being shipped into Chicago there are the local producers to take into consideration. There are approximately 3,000 vegetable growers in the district of Chicago who sell practically all their products within the city limits of Chicago. Onion sets, tomatoes, cabbage, asparagus, sweet corn, pickles, cauliflower, eggplants, root crops, early vegetables and other minor products are the principal ones produced in this section. The problem then of course presents itself as to how all of these products are going to be distributed to satisfy the demand of the people within the given area. What kind of organization do we have to distribute this quantity of products to these people? An enormous task is presented. A task requiring a great personnel, a large amount of equipment, some storage houses, a large number of railroad cars, unloading platforms, sales rooms, display rooms, office rooms, teaming and trucking equipment and various other items.

A greater proportion of these products of course come into Chicago by railway transportation. Passing through various terminals, over various railroads, weaving through the city yards they finally reach the yards along the Chicago River and afterwards the South Water Street market. Some products are moved directly into cold storage to be doled out as the market may demand. Some cars are broken up and distributed among various dealers. Some are never opened but are reshipped to other points. Some are opened and unloaded, the products being moved into display rooms on South Water Street and elsewhere to be sold as the market demands. Other cars are sold at auction and unloaded by the buyer. In addition to shipments coming in by railroad, some fruits and vegetables come in by boat, principally from the Michigan section.

The business of handling this great quantity of produce is done mainly in the South Water Street wholesale market. South Water Street is an east and west street running parallel to the Chicago River and the principal business is done within an area of six blocks extending from State Street to the River. This market certainly is not well located from an efficiency point of view. The early development of the city of Chicago was principally on the northern side of the Chicago River. Harbor and river transportation accounts for the movement of grains, furs, lumber and various other products into the city at this point. As the city developed it was necessary to move southward and this section was left in the hands of the produce dealers. In the western end of this street are handled mainly the poultry and meat products, while the principal part is given over to the handling of fruits and vegetables. The buildings themselves are mostly three or four story buildings. The first floor is usually a display room and the second floor is usually the general office of the firm. The third and fourth floors may be given over to the packing and sorting rooms or they may be housing certain carlot wholesale dealers. The south side of the street has the advantage over the north side of the street in that it has an ally which facilitates the matter of loading and unloading products at the various firms. Buildings along the north side of the street are backed up against the river and do not have this advantage.

In the 1924 classified telephone directory of Chicago there are approximately 800 commission men listed who handle produce. There are also listed about 1,000 wholesalers and in addition to these there are a large number of brokers and jobbers. The offices of the large distributing companies are included in this list. The offices of the various sales organizations are usually found on some one of the adjoining streets. In addition to all of this personnel and various helpers and workers, there is an F. O. B. auction located at 108 W. Lake Street.

The commission men of course receive goods on consignment and these goods are usually placed on display in the display rooms. The goods are usually sold at whatever figure the commission men can get and this is refunded to the shipper less the charges for commission, cartage, drayage, freight and various other incidental items. The broker usually sells for

the shipper on a specified fee. There is both the selling and buying broker. The jobber usually buys products on his own account and sells them. His revenue lies in the profits which he may make in these transactions. The carlot wholesaler is a very important factor in the Chicago market. His place of business usually consists of an office and he handles carlots only. The F. O. B. auction usually sells on commission for the shipper and charges a freight terminal fee for the buyer.

The only way to really appreciate the condition in South Water Street is to take a trip through it. Your first impression is that it is an extremely busy street. The sidewalks on both sides are filled with an overflow of boxes, crates, bags, baskets, barrels and various other containers of fruits and vegetables. The roar of the handtrucks, the cry and rabble of the workers and the noise of the drivers in the street gives one an impression which he is not likely to forget soon. A great many of the workers are foreigners, mostly Germans, Italians, Jews and some Greeks. Wagons and trucks are backed up to the curb in front of the business houses so closely that they touch each other. On the side streets may be found other wagons and trucks waiting for their purchases. They could not even get on to South Water Street. The sidewalks and pavement are usually damp and dirty and do not present a very sanitary appearance. Although the appearance is one of business, one cannot but see that there is a great deal of lost motion. The whole street presents a condition of inefficiency. Even the trucking and hauling to South Water Street stores presents an enormous item. It has been estimated that this item will amount to $7,000,000 a year.

If one would continue in his trip and cross the Chicago River to the west he would find himself in West Randolph Street, two sides of which are lined with commission and jobber stores. This street is very wide and the Cook County growers line themselves up on both sides of the street car track. As many as 500 or 600 growers' teams and trucks may be found in this street on a good day in the summer. From May 1st to October 31st this street is quite busy from four o'clock in the morning until 10 o'clock. The growers themselves leave their farms the evening before, taking from one to two hours to drive to the market and almost fighting for a good stand, spend the

entire night in order to be ready for business the next morning. These growers do mostly a wholesale business with some retail. The market is open six days a week and a small fee is usually charged for each wagon or truck. Grocers, peddlers and various other kinds of retailers buy on this street. Very little poultry is handled on Randolph Street. Edna Ferber's "So Big" presents a very interesting and unique picture of the marketing problems with which Cook County growers have to contend.

In close conjunction with the Randolph Street market and in fact almost adjoining it is the Fulton Street market. This market consists of commission men and jobbers. This market is mainly for the purpose of handling veal, poultry, game, lamb and other meats. In addition to these markets there are members of the wholesale trade distributed through various portions of the city, however, most of the wholesale business is done in South Water Street. With this appearance of business on these streets we must still keep in mind that only a very small percentage of the total amount of produce is actually handled through these houses. Most of it is handled in the yards and storage houses without going through the display rooms in the street.

Even though there is the feature of inefficiency there are a number of activities for the purpose of making possible better distribution. There is an inspection service offered by the U. S. Department of Agriculture through the Bureau of Agricultural Economics. This Bureau employs a number of market inspectors who, upon request, inspect cars of produce in the markets. The same Bureau issues a daily market news service bulletin on the condition of the various markets as to receipts, weather conditions, prices, etc. This news report is available to anyone who may request it. There are various trade papers giving market information, among which the Chicago Packer holds an important place.

Many members of the Chicago wholesale produce trade belong to one or more of the various national associations which are organized for the purpose of urging legislation and to furnish information. Among these organizations are: The National Poultry, Butter and Egg Association, The National League of Commission Merchants, The Western Fruit Jobbers Associa-

tion, The International Apple Shippers Association and The National Onion Association. With all of the railroad facilities which Chicago presents there still exists the lack of a real good railroad terminal equipped for handling fruits and vegetables. For a number of years there has been a movement on foot to move South Water Street to some other section of the city. This movement seems now to be crystallized and there is formed what is known as the South Water Street Trust which has recently announced its plans for moving the South Water Street market to 15th Street and 14th Place running from Morgan Street to Racine Avenue. This location will be within two miles hauling distance of practically all of the railroad yards in the city. A building will be erected which will include two hundred stores. A twenty story office building to take care of carlot distributors will be erected. A mammoth garage, power plant, incinerator and various other equipment will be included in the project.

In conclusion I wish to say that it appears that the wholesale trade is not responsible for the large spread in price that exists between the producers and the consumers. If the cost of wholesaling seems high, it is most likely due to the inefficiency of the methods employed. It is sincerely hoped that the new market will offer better facilities for handling the products and through greater efficiency reduce the handling charges.

THE SECRETS OF APPLE GROWING IN DOOR COUNTY

D. E. BINGHAM

Sometime ago the secretary wrote me that I was supposed to come down here and tell you people how to grow apples. That sounds rather flattering when you look over the audience and see men who have grown apples a great many years longer than I and, perhaps, better. I have been in this game only about thirty-four years and if I get thirty-four, or thirty or twenty-five more I may be able to tell you some of the essentials of apple growing. We used to think that apples could be grown on good soil and then not do much of anything but select varieties and pick fruit. Apples can be grown most any-

where in the state. We can grow them. We have grown lots. Lots of poor apples. It is not my intention to tell you how to grow apples. I may bring out some of the essentials perhaps and then get up an argument. Mr. Moyle says that he likes to have an argument to bring out interest in the subject. I think there is more learned by a good argument than by any particular suggestion that might be offered through a paper.

As I said, it is not my intention to tell you how to grow apples but to give you some of the things I feel you will need to have done in order to make apple growing economical. I am going to take 100 acres because we can easily divide by two or ten or multiply by two or four and get somewhere near the commercial orchard you are handling. Let us assume you are starting with nothing. Ten thousand dollars more or less does not matter. In one instance it means you will have some interest to pay the other fellow and in the other that you will have some to charge up. Good orchard land is worth $150 an acre if cleared. If not cleared it will cost you that much by the time it is ready for planting. The trees on 100 acres if set 25 ft. apart will number seven thousand and will cost to plant that orchard, including the land at $150 per acre, about $2,500 to $3,000. It will cost about $500 for refilling next year. You have approximately, $20,000 invested and no equipment, no labor bill, no salary for yourself or living expenses. You will have another ten thousand dollars when this is made up, a total of $30,000. I am giving estimates but there are always enough incidentals to make up for over-estimates. The first two or three years you will want to make expenses. If you are a good agriculturist you can do this; it is up to you. The next three or four years is the same story with a lot of added expense for spraying and pruning. Every year less space to farm and not much fruit. You will want either two or three good teams or harrows and two tractors and the proper tools for them to do this work. You will also need two or three good men to help you handle this proposition. These men can be secured for about $125 a month and house rent. They usually demand their pay every week, so you must be in a position to write them a check every Saturday night.

At the age of five or seven years the trees will cover enough land so that orchard farming will not pay. You will have

to discontinue growing any crop and take care of the trees. If you have other land to farm the tendency will be to neglect the orchard. In this case, if done at a critical time, like the spring, will cut down the quality of your fruit and often will result in a loss equal or more than that made out of the crop on the balance of the farm. So beware of neglecting to tend to that which is most important.

The method of precedure on 100 acres is something like this. Begin about February 15. Hire some good men, get pruning saws and go into the orchard with them. It will take four or five weeks, a little longer if you are slow. When that is finished, get a team and wagon or brush boat, or flat rack and haul out the brush. That will also take three or four weeks. Burn it as you go along. Don't pile it in fence corners because it won't lower your taxes very much and it is a harbor for mice.

We had $30,000 invested. Farming did not pay and in six or seven years you will have five or seven thousand dollars more invested. Equipment will be worn out and you will need new, if you have not kept yours up by trading in your old for new as you went along. Your spray rings are pretty well rusted out, so a few more thousand dollars has slipped away there. In ten years you will have a charge of about $50,000. This does not include investment for trucks if you haul your crop to market, buildings, water spraying or dusting machinery. You will have needed them before this. This must be ample and of such a construction and arrangement as to facilitate the work of handling the orchard economically. It is important to spray at the proper time and in the proper manner, the rigs must be always in working order or you must have reserve rigs.

With constant stirring of the soil the humus has been destroyed, so that you will need to devise means of replacing it. Legumes may be sown for this purpose, clover or peas. This gives you a rest on cultivation for a season, but no lowering of the taxes. Two good mowers will be needed. It will also require three or four weeks' work with three or four good men to grub the sod away from the trees and so we find from spraying time, with no crop, you will find but very little to do that year. You might use this time to figure out the supply of lug

boxes you will need to handle your crop of 100 acres of orchard. They will be about 30¢ apiece and $1,200 will cover your lug boxes.

Equipment necessary for harvesting a ten thousand bu. apple crop. A building 100 ft. long and 30 ft. wide can be built for three or four thousand dollars and will do very well. Spray materials? A few days work and a few hundred dollars worth of material will be needed to do this work on 100 acres. Always have plenty of spray material on hand.

I have purposely lost track of the total investment, because I did not want to discourage you. It is a good game in Wisconsin with proper soil.

I have also omitted varieties. Everyone has his own favorite varieties.

I have not mentioned fertilizers. I am not enthusiastic about stable manure for apples. I would rather use clover. I am not a soil expert and what I say may be dead wrong, I am only judging from my own orchard. It is fun to grow apples and you are welcome to all the time you have after handling 100 acres of orchard and handling it successfully.

DISCUSSION

MEMBER: How close do you plant your trees?

MR. BINGHAM: Twenty-five feet apart, would give about 69 trees to the acre.

MEMBER: Do you have fillers in it?

MR. BINGHAM: No. We may call one row a filler after while. Wisconsin has been practicing that method. Most of the orchards are planted 35 ft. Most of the apples, Northwestern Greening, Wolf River, Wealthies, etc., I think that is all right. We figure now that by that method and severe pruning you can set 100 trees to the acre and have just as much money as thirty-five. Some are planting 25x30, some 24x24, but most are 25 ft.

MR. MOYLE: Some trees are set thirty feet apart and come together at the top.

MR. BINGHAM: Ours are not old enough for that. There are two ways of working at the orchard game and one is to get more to the acre and get the crop off before they begin to crowd. After that when they begin to crowd why you of course will be broke or able to retire. You have got to invest a certain amount of money and then double it before you get through. I took 100 acres. If you have 25 acres you will find you have about the proportion we have figured out. About

$500 an acre. If anybody can grow a good orchard and get it by to about fifteen years for less than $500 an acre, he is operating economically.

A MEMBER: Do you get five per cent on that $500 an acre afterward?

MR. BINGHAM: Look at all the fun you get.

A MEMBER: It comes down to dollars and cents to a commercial man.

MR. BINGHAM: Yes. When you get a fruit farm paid for the margin of profit is small unless you are operating in a haphazard way, then you take what you can get and figure it's all profit. You have four or five hundred apple trees and cultivate them a little bit and have a herd of dairy cows. If you have taken good care of them in the fall it is absolutely clear money. But charge up everything against it; if your entire force is hired, every bit of material; if it is a cash proposition and everything charged up against the other industry, it looks like a paying proposition. A lot of fellows charge up to the wrong account, but there is more of tendency to figure that the orchard game is better paying on those proportions than on a purely, strictly, commercial basis.

A MEMBER: What kind of fertilizer do you use that will give you more color and a good healthy tree?

MR. BINGHAM: We are applying nitrate of soda about three pounds to the tree and perhaps a pound and a half of potash with it. We get our soil analyzed and they say we need more potash. We use sweet clover. We want more humus. I feel we have gotten some results, although it might fall down after a while. My impression is at the present time we have some wonderful results with sweet clover. Some time about June 15 sow five to ten pounds of sweet clover seed to the acre. Some prefer Hubare clover and there is a question as to which is the best. By leaving that grow that fall with the weeds we have a cover crop. The next spring it grows up and when it is about waist high we mow it down and immediately it sends up several sprouts, beginning to bloom from six to eight inches high until it gets up above your head. At harvest time it is higher than your head and full of bloom. The woody fiber forms rapidly and you have an enormous amount to cut and get away with. The first crop soon dries and mothing is left in a few days. The second crop is cut and left on the ground without cultivation. The field is mowed over twice and the clover chopped up. If you have allowed the seed to get ripe and cultivate three or four times it will self-seed and come back. We are working on a plan of following a permanent seeding by that system. This year we had two blocks of Snow apples. We used no sweet clover but stable manure on one block. I had only a few loads but put a single coat around about three hun-

dred trees, and the other block of Snows was a mile or so from the house and we did not haul any fertilizer there. We have a plot planted fourteen years and we have used no manure in it, we have used clover entirely. The apples are about equal in size and yield about the same crop but there is twice the color on the clover plot. They are a hundred per cent ahead in color. That soil is pine land. It puts something into the soil. I do not know what element it is, but it persists. On that soil we used nitrate of soda and potash and clover. On the other nitrate of soda and stable manure and cultivation. On the first, no cultivation excepting every other year; and clover, potash and nitrate of soda.

MEMBER: Did I understand you to say you cut up your clover and used it later for fertilizer?

MR. BINGHAM: We cut it and let it fall on the ground.

MR. EDWARDS: Don't you think that anybody that can bring about the idea that the farmers can take these orchards which they have, which amount to thousands and thousands of acres and have them produce fine fruit that people really want to use and they can sell? That is the most important thing we can mention. It is an awful hard job to convince a farmer that they can do this and get them to do it. How is it going to be accomplished?

MR. BINGHAM: I sometimes think that in the orchard and the fruit business a lot of fellows get off on a notion and kind of fool themselves into an idea that certain things are all right to do and they go on doing something in an expensive way or some way that won't get them anywhere. There is an exhibit down stairs of orchard supplies and the man in the booth asked me what kind of tools I used for pruning. I told him a crescent shaped saw and a long handle. He had the short ones with short handles, and I asked, How do you prune your trees up in the top? He said, "We climb up the tree." Now, that may be all right in some of those old farm orchards after they have gotten so large and out of control but to advocate to a bunch like us the use of a short handled saw in the orchard is putting up pruning so expensive that you have got to cut the corners. Climb the trees! I have eight or ten men pruning in my orchard and if I send them up the trees all wearing hob-nailed boots they will do more damage than the other saw that strips the limb perhaps, once in a while. If you start in the fifteenth day of February and you are going to prune that orchard what with off days and rainy days and snowy days you are running into April. By the time you get your brush off your cultivation is ready to be done. The spraying is the same thing. A lot of fellows in the spray ring get it out of repair and there is not enough pressure. It takes four times the amount of time and it is here a lot of your spraying is

wasted. A man has got to work fast to get a hundred acres put on in four days. It takes two hundred barrels a day in that orchard in order to get it done in season. I pumped the first hand spray used in this section, a Nixon tripod pump. We covered twenty-five acres of orchard. Had eleven barrels to a load and picked four hundred barrels of apples in one season; hauled them out to Twin Bluffs. Now in two days we picked 490 barrels and put them on board the cars, and are coming to appreciate the value of rapid work more than anything else. Just imagine spraying twenty-five acres of orchard with a Nixon tripod hand pump, putting out three barrels in the forenoon and three in the afternoon. Now we put out 300 gallons in forty-five minutes.

ADDRESS

By PROFESSOR JAMES G. MOORE

(From reporter's transcript, editor's revision)

Your president has made an error. I am not going to give an address. I have a very few moments at my disposal because this happens to be my busiest week of the year, and I have not prepared anything. I am just going to talk off hand on some of the things that the Department of Agriculture is trying to do. I think it is a good plan for the horticulturists of the state to be informed as fully as possible on what the horticultural department is trying to do in order that you may have some idea whether we are doing the things that we ought to do and if you think we are not, you can give us some suggestions as to some of your problems which you think we should undertake.

It is not possible, of course, in the very few minutes which I have, to tell you all the things which we should attempt to do. Of course you all realize that some of our business is teaching. I am going to pass that over because you are not primarily interested in that. However, there are three lines of work in which we are engaged at the present time which have a direct relation to horticulture in the state. The first one I want to mention is one which most of the fruit growers will not be in touch with because you are interested in other phases of horticulture. That is the work which we are doing at the present time regarding the improvement of potatoes or potato culture in Wisconsin; and the phase of that which I want to mention is a new line of work which was instituted last winter and which we believe is going

to have a very important bearing upon the commercial seed potato industry of the state. You probably are aware of the fact that Wisconsin's market for seed potatoes is the South, primarily, but that we have come into keener and keener competition with other states; with some varieties of potatoes at least, particularly with the one in which we are particularly interested in the southern trade, the Triumph, we have a very serious disease which pathologists designate as mosaic. This is of a peculiar nature. Nobody knows what causes it. We think we know that it is transmissible. We know that under Wisconsin conditions we may have a field of potatoes yielding well over two hundred bushels which is as fine a looking field as you could desire and the seed taken from that field and taken south and planted under their conditions very frequently fails to produce a commercial crop and is so badly diseased that it is practically worthless. That is a serious proposition because we are maintaining in the horticultural department a service which we call "Seed Potato Certification" and we certify that certain things have been found in these fields where these potatoes are growing. We will say 5% mosaic and when taken south they may show 95% of mosaic. You can imagine what kind of an opinion the southern grower would have of the potato grower and the Wisconsin department of Horticulture. The point of the difficulty is that this disease is absent under certain conditions. Certain temperature conditions will bring the disease out prominently and those conditions are what obtain in the south in the growing season. We have almost the reverse of those conditions in Wisconsin, so that we may have a field producing over two hundred bushels per acre of finest grade of stock anywhere in the state and yet which may be seriously diseased and not capable of detection in our fields, but when taken south gives the results which I have spoken of.

The line of work on which we have been engaged for a number of years is trying to get potatoes reliably free from mosaic and the way we are trying to do that at the present time is this: We are collecting from the various growers of the state samples of their seed potatoes. We are having them sent to Madison, taking every potato in the bushel sent in, putting a number on it, taking a single eye out of it and planting it in a flower pot and growing it in the greenhouse under the conditions which will be most favorable for the development and for the showing of mosaic,

if the potato has it, and then sorting out the potatoes produced by this single eye which show mosaic. To give you an illustration of what happened this past season in the first work which we did. After putting them through this test and sending back to the grower those which were not culled out, we reduced the mosaic in that particular strain of Triumph potatoes as it appeared in the field this year, (which was the most favorable year we have ever had, at least in recent years,) from about ten per cent to a very small fraction of one per cent. You can grasp immediately the significance of that work to the seed potato industry of the state. We are carrying that on this year. We are carrying this work on very much more extensively, one entire greenhouse of 70 ft. is devoted to it. Doing nothing but going through this process which is known as the indexing of potatoes, so that we can get enough seed started which will reduce our troubles in the seed sent to the south. That is just one phase of our potato work.

I want to speak second of the the research work which is being done in relation to the orchard. Professor Roberts has spoken to you a number of times in regard to the work he is doing. The basic thing Pofessor Roberts is working on is to determine why a tree produces fruit. What are the conditions which cause a tree to produce fruit rather than to go to wood? That seems like an abstract question. It is the question that horticultural research encounters all the time. It may not seem to have a direct application to your particular problems but it is fundamental to your problems because unless we know something about what the processes are through which a tree goes which makes it develop or produce fruit we are not able to judge of a certain practice which we may give to trees in relation to that function which we want it to perform. Now the phase of the research work which has gone out to the horticultural departments of this country in the last five or ten years has been generally closely associated to that problem. Your fertilizing and spraying work in your orchard is associated to that problem, in fact it is fundamental to the results you are going to get. Your pruning is tied up with that same problem, and your tillage and your insect control. In other words, you see that that question is fundamental to practically all of your orchard operations. We are trying to get at that thing and when we do get at it (and we have gotten some of the phases of it) we will be able to make certain recommendations in relation to your problems.

Professor Roberts has been studying the set of fruit, the question of biennial bearing, etc. That is beginning to "bear fruit" in the southern sections of this state. I refer particularly to the work in Door county. The pruning and trimming for a different type of cherry tree than we have had in the past is the question of this food relation but it is going to the home orchardist and to other small orchardists in other parts of the state through the extension service and thus we are encouraged in this line of work and will be encouraged more than we have been in the past through interest in our work by the small grower as well as the large grower.

The third line which I want to speak about—and very briefly because Mr. Kuehner is going to speak on the question—is extension work. But I just want to bring this work in in this connection because I consider it one of the very important lines of work which the horticultural department is doing and one of the greatest phases of the service to the state which we are undertaking to do. That is the work Mr. Kuehner does in preaching and extending the gospel of better fruit for the home. Not long ago I was in a meeting where an animal husbandman giving a talk on the subject "More, better, live stock". Now I think that is a very good basis for us to develop a motto on. Why can't we make our motto "More, better, fruit"? The first thing we need in horticulture in Wisconsin is not more fruit, but it is more fruit that is good fruit. How are we going to get it? We are getting some of it through the commercial orchards. But we have comparatively few commercial orchardists in Wisconsin and the extent to which they can develop this fruit industry in the state is relatively limited and if we are looking into the future with the expectation that Wisconsin is going to grow and develop as a fruit producing state my judgment is that we have got to look to that development through the medium of the man who has a home orchard who is going to become interested enough to see the cash coming in from that sort of a project is enough to induce him to develop his home orchard into a commercial orchard. It is not necessary that he is going to put all his emphasis and all his time on orchards like many in this state and other states but that he become sufficiently interested in orchards and that he will carry it along parallel to some of the other phases of industry on the farm and I can't see any other way for the development of the orchard.

We are going out and we are interesting men all over the state in those sections where fruit can be grown. We are teaching them the proper methods of caring for an orchard so as to produce good fruit. We are helping them, when they do produce this good fruit in excess of what they need in the home, to dispose of this good fruit and get the idea started for the farm orchard, which I believe is going to develop a commercial fruit industry not only in one or two little spots in the state but more generally over the state. No fruit growers who are going to send the crop to Chicago or Kansas City or somewhere else but the man who is going to be the fruit man of the community, who is going to supply his local market and his neighbors who do not have the fruit. I believe there is room for that kind of a man in Wisconsin and I believe that individual home orchard extension service leads to that development ultimately.

Thursday Afternoon

HORTICULTURAL EXTENSION

C. L. KUEHNER, Horticultural Dept. U. W.

Mr. President, Ladies and Gentlemen: Most, if not all of you, will agree with me that it is no longer so necessary to prove to farmers that fruit trees must be sprayed if clean, usable fruit is to be obtained; fruit which will keep. This part of the orcharding lesson has mostly been learned. However, it is not nearly so well realized how and when spraying should be done to accomplish the best results and this is part of the work which requires considerable emphasis and time in the program of the farm orchard improvement. Neither has the value of systematic orchard pruning and fertilization been learned. In fact, next to the marketing of the surplus, this is probably the most sadly neglected part of the farm orchard management program and it is right here that much educational and demonstration work is necessary to bring the home orchard into its own as a part of the farm business of home making.

Marketing is a very important issue in all cases where more fruit is produced than is needed for the family supply. Some good work has been started in several counties of the state and

more remains to be done in the near future. So far we have only started, but we believe that much improvement can be made in this part of the game by employing a rigid system of culling in all farm orchards which produce more fruit than is needed for the home, and by demonstrating to these orchard owners the elementary principles of efficient merchandising.

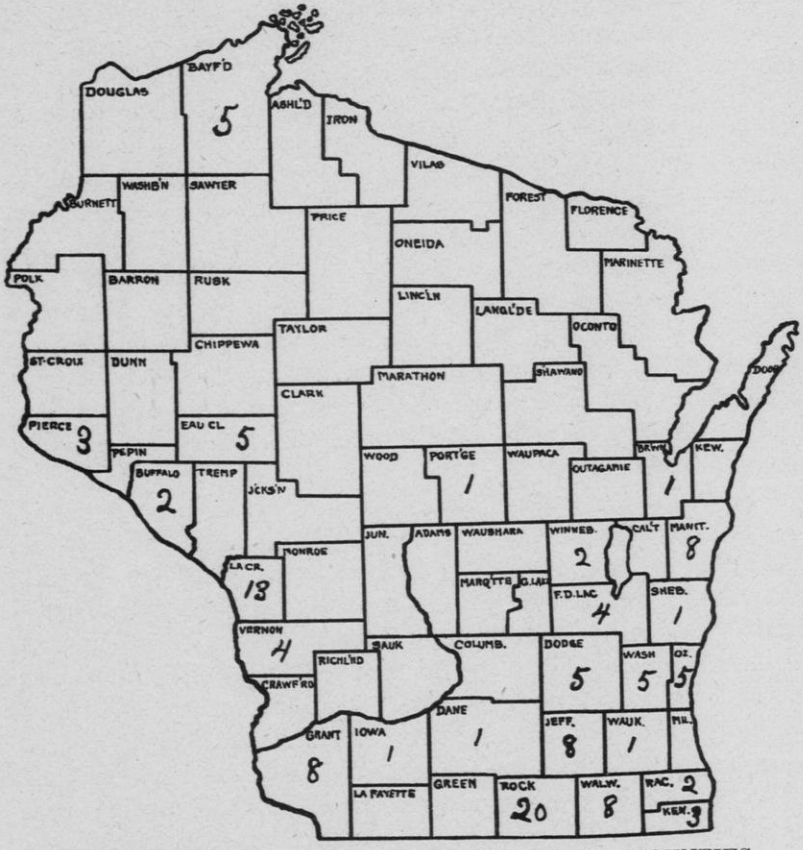
For your information it may be well to state the purposes or aims of the field work in horticulture. They are two-fold; namely; 1st, improvement of the farm orchard so as to supply the farm home with home grown fruit of quality over the greater part of the year and to help the farmer in the advantageous disposal of any surplus he may have. 2nd, to show the farmer, through the efficient management of the farm orchard, the possibilities of commercial orcharding in Wisconsin.

These aims are accomplished mostly by orchard demonstrations in pruning and fertilizing, by spraying demonstrations, and county fair displays, showing results obtained in demonstration orchards.

In the past year, 88 pruning demonstrations were held in 24 different counties of the state. At these demonstrations the farmers are shown how to prune different types of trees and are then put to pruning other trees in the orchard under the direction of the demonstrator. At the close of the demonstration an illustrated discussion on orchard management is held, including soil work and fertilization, explanation of the spray program, and a discussion on the essentials of spraying. Wherever and whenever applicable, spray ring organization is explained. Frequently spray rings are organized at this time, or at least get their start so they can go ahead with the actual organization under the direction of the county agent. In fact, most of the spray rings are organized in this way. Oftentimes a pruning demonstration serves as an entering wedge for intensive orchard improvement in that particular community or township.

During the spring and summer months, much of the time is spent in coaching operators of spray rings in timely and thorough spraying. Through the organization of the spray rings in the state it has been made possible for one man from the Horticultural Department with the cooperation of the county agent, to help a relatively large number of farmers to get their orchards sprayed; not only sprayed when they should be sprayed but thoroughly sprayed at the proper time.

That the spray ring is an efficient and successful means of handling the spraying of the average farm orchard has been clearly demonstrated by the steady and rapid growth of spray rings in Wisconsin. From the time the first spray ring was formed in Grant county in 1920, spray rings have sprung up in all parts of the southern half of the state so that at present there



FIGURES SHOW NUMBER OF SPRAY RINGS BY COUNTIES.

are twenty-four counties in Wisconsin which have one or more spray rings. The total number of spray rings in the state now is 116 with an approximate membership of eleven hundred farmers. It took many years of educational and demonstrational work on the part of the horticultural extension workers and the county agents to bring this work into the prosperous growth it has been making within the last four or five years. In number of

spray rings Rock county leads all counties with twenty rings: La Crosse comes second with thirteen; Jefferson, Walworth and Manitowoc third with eight each. The general distribution of spray rings is indicated on the accompanying map of Wisconsin.

County fair spray ring displays of fruit, local store and bank window displays of fruit from spray ring orchards, together with apple grading, packing and marketing demonstrations in spray ring orchards, and at county fairs have all contributed greatly to help the farmer learn how to market his fruit so that the consumer will want to buy it.

County fair associations are beginning to see their responsibility in helping to place the farm orchard where it properly belongs by awarding special premiums to spray rings for tray displays of apples at the county fairs. This is a commendable innovation and undoubtedly within the next few years most county fair associations will offer special premiums to spray rings in their county who will make a tray display from their orchards. It is hoped that in the near future Wisconsin spray rings may be able to put themselves into the foreground with sufficient credit so that the State Horticultural Society may find it possible to offer special premiums on spray ring displays at their winter meeting.

To summarize briefly just what field work in horticulture is accomplishing, it may be interesting to know that in the year 1923 to 1924, of the 676 farm orchards which were pruned for the first time, 79% were in counties in which the horticultural department held pruning demonstrations; of the 12,627 trees which were pruned for the first time, 94% were in counties in which we gave pruning demonstrations; of the 877 farms spraying their own orchards for the first time, 60% were in counties in which the department gave talks on spraying; and of the 1,268 farms which adopted improved farm orchard practices, 81% were in counties in which horticultural extension work was carried on during the year and 68% of the twenty-five spray rings organized were in counties in which horticultural extension work had been done.

The credit in this field work in horticulture does not by any means belong entirely to the horticultural department. A very large share of the credit must be given county agents for their untiring efforts and splendid interest and cooperation in the farm orchard improvement program.

WHY SAY IT WITH FLOWERS?

C. C. POLLWORTH, *President Society American Florists*

(From Reporter's Transcript, Editor's Revision.)

In our National Florists' organization we have several branches. One is the florists' telegraphic delivery. Just think what a fine thing it is when you have a sick friend, or when someone dies in a distant part of the country or at the end of the world even, and you known that you can within an hour's time send some token from home and that in the course of an hour or two your sentiment is expressed to that friend with flowers.

There is the popular interest in flowers. During my administration we put on the National Flower Show at Cleveland last spring. We had the big public auditorium which seats probably ten thousand people and the flower show, from the statistics, drew the largest crowd, tens of thousands of people, that ever came to that building. We have also put on a little show in Milwaukee in which Mr. Huron Smith takes great part. This show is put on at the public library and I think I can safely say that the biggest crowds going into that building throughout the entire year are the ones while we have our flower show. That shows the public's interest in flowers. At our meeting in California, at Los Angeles last summer, we passed a resolution there to cooperate with various state organizations in what they call the Wild Flower Protective Association, and I think it was a very fine thing for our organization to go on record and protect the beauty spots in our state and protect the wild flowers. People have come to realize the damage done by the thousands of automobilists traveling along our highways.

The American Florists' Association is putting on a million dollar campaign to interest the public in the buying of flowers. This million dollars has now been subscribed for and the publicity is beginning, and you, I know will feel the benefit of this publicity. We had a page in the Saturday Evening Post recently that cost seven thousand dollars. That may seem like a lot of money to spend for one page to advertise flowers, but why shouldn't we? The more people we can interest in flowers the better people we can make out of them. People with an article like soap that have a ten cent article to sell, spend three million

dollars; chewing gum people spend several millions, so it is not too much for the florists to spend a million dollars.

Publicity is required to push any article; the public will back up anything that is well advertised. We in our florists group and our state organization with which we are all affiliated with your organization here and I think it is to mutual advantage to both societies that we cooperate with each other. I would like to see the day when we can have one large building on our state fair grounds and get all the space we require and put on a tremendous exhibit there. I think it would be one of the greatest drawing cards there. We have an attractive building and our club has cooperated with your state fair board and your society but we lack space. The more space we can get the bigger exhibits we are going to give you. If we can cooperate with you fruit growers and other people in your line, I am pretty sure we can give the people in Wisconsin a show that is worth coming a long ways to see.

In closing I want to say this about your organization and its work. This has been my experience. We do not know of the work that you are doing and we do not take advantage of what we can get out of the state association and the work the state is doing. I notice you have a lecture on greenhouse pests. The room should be full of dozens of florists because that is one of the battles they have on their hands all the time. They sometimes lose an entire crop. We ought to interest ourselves more in the work the state is doing for us free of charge.

COLOR IN OUR NATIVE LANDSCAPE

WILLIAM TOOLE, SR.

As practical people, we strive for wealth in the accumulation of money or its equivalent in property, which we may have in reserve to promote future happiness, or we may use our earnings to sustain our ideas of present happiness.

Of the pleasurable sensations which we call happiness, none are more gratifying than those of seeing. Natural inclination or educated tastes cause varied preferences for sources of happiness. Some delight in ball games and athletic sports, others prefer the movies and various shows. Fortunate are they who

appreciate the beautiful landscape views, which Nature offers us here in Wisconsin. These beautiful scenes ever vary with the changing seasons, and never become monotonous to the real lover of nature. They are free for all, rich and poor alike. Few or many may own the land, but none can hold to themselves possession of the landscape views. A poet has fittingly said:

Oh the privilege and blessing,
Thus to think I ever own,
What the rich ones in possessing,
All imagine theirs alone.
Oh, be glory to the Maker
Who has given such boom to hold,
Who has made me free partaker
Where the others buy with gold.
For, while woods and lofty mountains
Still stand up where I can see,
While his hand unlocks the fountains
They all belong to me, yes all belong to me.

As I am now writing, the world is white with newly fallen snow. Not all white of course, for here and there, shrubs and stems of perennials are to be seen. The orchards near by with their snow laden branches, add a fantastic labyrinth of network to that part of the picture.

In the distance, the tree clad hills, hazily seen through the diminishing snow storm, seem to blend with the clouds above, showing no distinct separation in the picture. Winding through the farming lands in the valley, a heavy fringe of trees with here and there a white pine overtopping the others, tells us where are the Skillet Falls and the Peewee Nest. The darkened edges, where lower foothills nearly meet, indicate a narrow gorge, where the rocks tell of geological changes, and where early wild flowers will in spring follow the retreating snows.

When the storm has cleared away and the sun shines bright, perhaps tomorrow morning, what a change there will be in the landscape. The wooded hills will stand out clear and bold, seemingly taller and nearer. In the morning, if the air is clear and cold, we will look for chimney smokes, to tell us the way of the wind. If very still the columns, darkening as they rise higher and higher, before dissipating, tell us where are distant farm homes, some so far away that a second look is needed to locate them. A morning passenger train speeding towards the city marks its progress with rising, rolling cloudy masses of

steam, which quickly advance and slowly rise in the rear, till the smoke, separating from the condensing steam, is blended with the higher atmosphere. And the farm homes and surroundings, how much color and cheer they give to our landscape pictures. Not only the buildings, but also the ornamental plantings, especially if they include evergreens, add to the charm of the various scenes. Following a cheerful sunrise how the clustered snowflakes sparkle in the sunlight. Diamonds give no more beautiful effects.

Our landscape embraces so many scenic aspects, we need to change our place to take in the varied beauty, as we may wish to study our picture in detail. Then will we get out Fleet Foot and the cutter that we may go through the byways, where autos travel but little in the winter time. Not many years ago we young people sang:

"Over an ocean of sparkling snow, Merrily O, Merrily O,
Swift as a bird in its flight we go, Merrily O, Merrily O."

With closer views of our shrubs and trees which add so much to the beauty of our landscape, we note the contrasting color of the stems of the various dogwoods from rich red and maroon to mahogany of the various species. The ragged salmon yellow of the nine-bark, so different from the darkly mottled alder, very dark blue gray of the water beech or the mottled gray of the witch hazel.

In the deeper woods, we compare the barks of the oaks, maples, elms and hickory, with the lighter shades of poplars and the birches with white yellow or reddish shades, according to the species. On the north sides of many trees, especially maples, the mosses or lichens hold our admiration. All are gray green in varying shades and some are tipped with red, like sparks of fire. Our road to the woodlot takes us past a rocky point, which is a notable feature of the landscape. We note that at an elevation of more than 500 feet above the river valley, the formation is of granite-like quartzite, much older than the sandstone, which underlies the valley.

We marvel to think of what might have been the scenery ages ago before the material was worn from the heights above and deposited in the chasm below. The varying shades of pink to rosy red and reddish purple of the quartzite exposure, blended with patches of lichen, give a pleasant color effect to this

portion of our picture. In other places we are interested in the various shades of yellow, red, or dark brown, of sandstone outcrops. What glorious changes, and display of color effects, are given to us by our beautiful sunsets; and sunrise too has a share in the magical illumination of our scenery. If I were capable of describing the varied beauties of different sunsets, space could not be spared in this short paper to do full justice to the subject. Flame color, amber tints, golden, afterglow, luminous, silvery edged, gorgeous, what an array of adjectives would be needed to describe the fair weather sunsets. And how shall we describe the varied beauties of sunrise from the bright, rosy morning or when the sun rises as a great red globe, to the cold, below zero morning, when the sun is guarded by its attendant sun dogs.

None too soon will come the changes heralding the approach of spring, which we are always eager to welcome. The snow drifts which are yet to come, will have nearly disappeared with the bulk of the snow blanket, showing long ridges where the snow drifts had accumulated. With milder weather the late snow falls will linger over the higher parts of the bluffs, while none is to be seen in the warmer valley lands. Soon we admire the silvery pussy willows by the woodland roadside, followed by the pendant brown catkins of the alders. The red maple with flowers opening before the leaves appear, gives a decided change of color by road and hillside. Following the touch of color given by the flowering of the elms, we realize with the greening of the poplars and maples that spring is really with us. As the verdure spreads over the wood-clothed hillsides, how we feel the charm of the blending of the many soft shades of green, as contrasted by the variations of the different species of trees.

While Autumn's coloring of forest leaves is more vivid and contrasting, it is never more attractive than is the at first delicate and varying, steadily darkening of the foliage color of spring time. How refreshing is the contrast of the greens of fields and pasture, the wheat, the rye, the clover, and the blue grass.

Of wild flowers in early spring we do not get much in the way of masses of color, except occasionally colonies of both species of Phlox. As the season moves along we have the various wild shrubs, including the roses. The orchards each season appear in gala dress, giving much of color to our pictures. As the season advances we seem to get more of floral color, where

lighter soils abound. Of course there are many sheltered nooks where favorite flowers are to be found, but we cannot claim them for landscape effects.

We have in quantities sufficient to give color to our pictures, the yellow Puccoon, birdsfoot violet, both the Monardas, both the Horsemint with its masses of pink flowers, and the mottled or spotted kind, which is distilled for medicinal purposes. This last always attracts the attention of those who have not been previously acquainted with it. For color in masses we have the Pleurisy Root, Blazing Star, Swamp Milkweed, Turks Cap Lily, Wild Baby's Breath, Joe Pyeweed, Golden rods and asters in great variety. Sometimes the wild Babys Breath, which is so useful in floral work, whitens a considerable expanse of abandoned fields. Some of the grasses, notably an attractively red panic grass, brightens the outlook. Perhaps I am making too much of our favorites, our native wild flowers, but they are an important part of our smaller pictures.

As summer advances the ripple-like waving of grain fields gives a touch of animation to the scene. Sometimes, but rarely, we are interested in seeing rise over the rye fields mist like waves of pollen when gently aggitated by the wind. The changing hues of ripening grain fields are also interesting for color effects.

Soon we have passed the season of ripening grain and the nearly golden color of the harvested fields. Through the summer we have visited many places of interest where are concentrations of Nature's beauty. We have enjoyed the changing pictures, viewing the distant hills from the valley or from some outstanding eminence looking down perhaps on the silvery gleam of Lake Wisconsin or from some other point viewing away below the distant city and village along the Baraboo Valley. To view this wide range of landscape we have taken several auto rides and all has been an enjoyable succession of moving pictures. We see many tourists coming to spend their vacation time in Wisconsin. Some seem to appreciate the beautiful scenery but too many of them appear only intent on reaching the next crowded place in the shortest possible time. How much pleasure they lose, by not being capable of appreciating what is so free for their enjoyment. Our summer sunsets give colors still different from those of winter time. When the storm clouds roll towards us from the west with the flashing of lightning we have

an awe-inspiring picture. Then too, we admire the glories of color of the rainbows when the storm has rolled by.

Was it ever your pleasant experience to be in early morning on some high bluff, overlooking the valley, where a sheet of fog made it seem as if the valley was one great lake? And what a change of color when the warmer sunshine caused the mists to settle or roll away.

Soon comes the time when the frost is on the pumpkin; and the leaf ripening process on the trees and shrubs goes on, till the glow of color spreads over all the woodland. First we have the sumachs on rough pasture land and in places by the roadside. With them or almost as soon, we have the brilliant colors of the maples in the woodlands, blended with the soft yellows of poplars and birches. Later are given to us the dark purple of the ash, with the maroon and garnet, sometimes almost crimson and scarlet of the oaks. Next comes the russet brown of the oak leaves still retained, and bare branches of trees which have shed their leaves. We are then thankful to those who have here and there spared some of the native evergreens. During our autumn rides to admire the scenery we have been attracted here and there by the color of native wild fruits. The climbing bittersweet seems doomed to scarcity because those who admire the fruit, so ruthlessly destroy the branches. The winterberry often makes a fine showing of its bright red berries, but it is safe as it is most plentiful in out of the way places. Sheep berry is in noticable contrast to the preceding. Numerous other shrubs with showy fruit there are but they are too much out of the way to count as part of our landscape color. One shrub is worthy of more than passing notice because its flowers are the last of the season, the witch hazel with its masses of fringed pale yellow flowers. In some roadside borders these are very attractive.

Through these autumn changes, our orchards have held to most of their green foliage, blending with the rich color of the later apples.

We have made the round of the seasons and are ready to enjoy Thanksgiving and Christmas cheer, also to meet each other in convention, to exchange experiences of the joys of the year gone by.

A COUPLE OF DOZEN (OR MORE) ROSES WORTH GROWING

W. J. MOYLE

(From Reporter's Transcript, Editor's Revision)

Mr. President, Ladies and Gentlemen: We are located, unfortunately, in a very unfavorable climate for the growing of roses successfully. The past summer has been a very moist, rainy summer and roses have done remarkably well throughout the state in general. The previous winter was comparatively mild and there were some stems and some stalks to start growing in the spring to produce flowers. Our secretary got enthused with the rose game and he therefore suggested for your consideration a rose program this afternoon. He asked if I would discuss before you my choice of two dozen or more roses for our conditions. So, to come back to the subject, in making these recommendations this afternoon I do this from the standpoint I feel that what I am saying to you and in naming the varieties, that I am recommending varieties that have succeeded with me. I am endeavoring to tell you why I make this choice. In the first place, the most important list of roses in my consideration at the present time are the Jacques or rugosa for Wisconsin conditions and their hybrids. Of course you all know the rosa rugosa rubra and the alba, the pink and the white. I think the most popular and satisfactory is the Hanson. This was produced, if I am not mistaken, by student work and was a cross between the General Jack and rosa rugosa. Later on two other rugosa hybrids were introduced, Belle Pitcairn, and Blanche de Coubert. These are just as hardy as the old standard rosa rugosa. Those two and the Hansen are the only ones that can be compared with the General Jack. We have others introduced by our French brethren who have not realized our climate was so vigorous and they crossed the teas on the rosa rugosa and produced a lot of hybrids. I might mention Conrad Meyer. It is a very popular rose but it has never proved very satisfactory because it has tea blood that makes it quite tender. When the weather gets down below zero, it will freeze back to the ground; in the spring it makes a lot of growth but has few flowers.

There are half a dozen more rosa rugosa hybrids that have all proved beautiful and satisfactory. I have not advertised them in my catalog lately because they are tender and freeze back. Thomas Lipton is extensively advertised and sold. It is a double white and has so much tea blood that it is not hardy for our climate. Another one that I put myself on record for several years ago in this society that I thought was a good one and that has failed, is Agnes Emily Carmine, also Marie LeGray. Here is the one which was successful, Rosea de LeHay. That is peculiar inasmuch as it has a peculiar colored flower, a purplish red. I think it will become very popular. A sister of a similar name is very satisfactory. They are both French productions. So much for the Rugosas.

The next thing that we take up will be the moss roses. They may be classed next for hardiness. I am talking now distinctly from a hardy standpoint, something that will stand our climate. I recommend that we grow Henry Martin or Old English Pink. The latter grows about a foot high. It will grow anywhere. Then there is Princess Adelaide and Blanche Moreau. The Blanche Moreau is a beautiful shade. Those four are the best moss roses.

From that I take a step to the yellow roses. They are of oriental origin and came originally from China. There are three distinct varieties. The Austrian yellow, the Harrison yellow and the Persian yellow. The Austrian and Harrison yellow are grown on their own roots, mutiply rapidly and can be found in all the old-fashioned gardens today. I can recall a Harrison's yellow rose that was thirty years old, grew to the eaves of my grandmother's house and blossomed every year. The French hybridizers have tried to use this yellow briar rose as a stock and crossed it but they have never produced a hardy perpetual; the nearest they got was Sol d'Or and that did not prove satisfactory at all. The Hebron (?) was introduced from China. So far I have not had enough experience with it to say anything about it. My impression has always been that the Harrison yellow or the Austrian yellow were so little different that it was unnecessary to pay any attention to it. We all know that the Persian yellow is decidedly a better rose than either the Harrison or the Austrian yellow but it is not quite as hardy and does not propagate from the root as the other two.

I will include the climbers before I introduce the hybrid per-

petuals. For climbers, I would recommend starting out with Dorothy Perkins and Excelsior, or Red Dorothy and White Dorothy. Then I would suggest Paul's Scarlet, American Beauty and Queen of the Prairie. You will notice, if you make a study of this matter that all of the successful climbers are hybrids of the Wichuraiana rose. That is a native of Japan; it trails on the ground. It has very glossy foliage. That characteristic, which has been bred into it, has made it the most satisfactory and popular rose of any climber at the present time. Paul Scarlet has Wichuraiana blood in it. Alida Lovett, Bessie Lovett and Silver moon are hybrids with Wichuraiana blood in them. They are not hardy as far as winter is concerned. They have only a slight climbing tendency and can be taken down and covered for the winter. Our old climbers grew so stiff that it was practically impossible to take them down and protect them. I think there is nothing that will surpass Red Dorothy as a climber; I think this is the queen of all the climbers. White Dorothy is acknowledged now to be the best climbing rose in existence.

Then the hybrid perpetuals. J. B. Clarke is a little the most hardy and popular. The great drawback in growing roses has been the propagation. They always have been budded on foreign stock and when planted in Wisconsin their tops freeze back and we get a rose from the wild stock. I cannot get a man to go into my nursery and rouge my roses in the summer time. I have to do it myself. Few people know how to distinguish between the budded and the root stock. How can you expect the amateur to detect the wild rose when it shoots up from the stock? They cannot do it, and the result is that the briar or the wild manetti grows up and chokes out the rose and the nurseryman gets abused and the rose game is all off. Therefore, I have advocated growing varieties on their own roots. I am glad to see this matter of growing roses on their own roots taken up. I called your attention to a man in the west some time ago. Today I am glad to say the large part of his stock is California grown roses on their own roots. If I was buying roses tomorrow from a nurseryman I would insist that they were on their own roots. Some of the most beautiful hardy perpetuals are weak, sickly growers. That is the beauty of the J. B. Clarke, it is hardy on its own roots; it has wonderful vitality and will come up from the ground and give you bloom the same summer,

after being frozen to the ground. Clio is the nearest white. I don't think anything at all of Frau Carl Druschi; it is very delicate and freezes back. We have some in the nursery that will be deader than hay next spring. We have a white rose, I do not know whether it belongs to the old hundred-leaf family or not, Madam Hardy. We often see this rose; it is a semi-double, almost double, white rose. It is the only white rose we have found successful in southern Wisconsin for growing out of doors. If some nurseryman would take hold of it and propagate it and increase the stock, everyone would soon have a rose of that kind and it would be very desirable. I also recall at this time several others that have done remarkably well with us. Paul Neyron is a good one; there you have the vitality again. While they are tender yet they can be cut down and come up from the bottom and succeed. There is Magna Charta, another hardy perennial; Clyde, Captain Hayward, George Dixon, Hugh Dixon, J. B. Clarke, Anna de Diesbach, Eugene Furst. Prince C. de Rohan is one of our best roses and does well on its own roots but they are not so vigorous.

Then there are the baby rambler roses; they are Polyanthus by origin. They are apparently hardy in the root and can be cut back and they certainly are very pretty and they are improving and multiplying them and they are becoming more popular with the people all the time. I want to state furthermore in regard to the Crimson Rambler that it is a great rose to mildew. That is due largely to its relation to the Polyanthus. The Crimson Rambler is a Polyanthus hybrid; it is a tender plant and very susceptible to mildew but it is not as bad as the American beauty and some of the other varieties that have Polyanthus blood.

THE MUNICIPAL ROSE GARDEN

LOUIS BOEGLIN
Horticulturist, Board of Park Commissioners, Minneapolis
Minnesota.

With the ever-increasing demands for reliable information about roses, the Board of Park Commissioners decided in the summer of 1906 to establish a rose garden in one of the city parks.

The dominant object in doing so was to inform and teach the public what kind of roses to plant in our locality, and how to grow and take proper care of them.

Lyndale Park with its favorable location, its varied soil conditions, desirable exposure and its other horticultural features, was the logical place to establish such a rosary. The work on the garden was started in the fall of 1906, and the rose beds were ready in the spring of 1907 to receive the young plants.

The garden covers an area of about one and one-half acres, and harbors about four thousand plants in over two hundred varieties.

During the blooming season, the spacious turf walks between the rose-beds cannot always accommodate the multitude of visitors from far and near, who receive untold pleasure and much valuable information from our rose garden.

The space immediately surrounding the garden is planted with all varieties of our native roses which are hardy without any protection. There are also beds and colonies of Rugosa, Sweet and Austrian Briars. These plantings when in bloom are really a show by themselves and attract very favorable comment.

The garden is now sixteen years old and about half of the varieties originally planted are still with us, without showing any signs of deterioration. Some varieties were discarded as inferior, and new varieties are being tested right along to take the places of discards and to enlarge the number to select from.

A feature which is well-appreciated is our having a competent man in charge who is always ready to serve the public with his advice and experience in rose-growing.

To be successful with roses, you have to love them and know how to treat them properly. I think it is not so much the soil and the climate as the care and skill of the cultivator that wins success.

Roses love a well-drained, deeply-prepared and well fertilized soil. Hybrid perpetuals and heavy-growing climbers like rather heavy soil, whereas teas, hybrid teas and Bourbons revel in lighter and warmer soil. Budded plants are far superior to own root plants in our locality.

Well-rotted cow manure is the old standby fertilizer of the rose grower. Put in plenty and then some more—roses seldom die of indigestion.

Spring planting is preferable to fall planting in the northwest. Before planting roses, the holes should be dug large enough to accommodate the roots in a natural and uncramped position. Remember to keep the roots covered with a damp burlap and dip the roots into thin mud before planting. Plant the roses firmly—not too deep nor too shallow, just about one inch deeper than they were when standing in the nursery. Water after planting.

Plant hybrid remontant 2½ to 3 feet apart; climbers not less than 6 feet; tea, hybrid teas and Bourbons 18 to 24 inches apart.

When planted, remove all but three or four of the strongest shoots, and trim them to about three to five eyes.

Roses need continuous cultivation during their growing season. Keep the soil loose so that it does not cake, but do not cultivate deeper than two inches, or you will injure the feeding roots of the plants. Water your roses thoroughly when necessary. Do not sprinkle and think you are watering—soak the ground when you do water them and then do not water again until the surface is quite dry.

Protect your plants against diseases and pest by taking proper care of them; remember that a vigorous growth will act as the best protection against insects and diseases. Green Aphis or plant lice can be easily overcome by spraying with a soap or a weak nicotine solution such as "Black leaf 40." The rose caterpillar or leaf roller can be easily destroyed by crushing them between thumb and finger. This crushing process is not an agreeable pastime, but it must be done, as it is the

only solution. Look out for them when the flower buds are forming and begin to show signs of plumpness.

"Black-spot" and mildew are the worst fungi diseases of our garden roses. Both can be prevented to some extent if the plants are regularly dusted with a mixture of nine parts of dusting sulphur to one part of powdered lead arsenate. Repeat the dusting every two weeks during the summer; it will protect your plants against fungus growth and certain insects. The "Black-spot" is a fungoid parasite and lives over winter in dead rose leaves only. For that reason all leaves should be removed from the rose plants in the fall and burned.

Mildew is mostly caused by great and sudden atmospheric changes and by long continued spells of damp and cloudy weather. The best proved remedies are sulphur and soot. One of the two should be applied the moment the disease makes its appearance. The plants should be sprinkled with water so that the substance applied will adhere, or else put it on early in the morning while the dew is still on the plants. Some localities are much more subject to visitation by this disease than others, and in such places care should be taken not to plant varieties that are known to be specially liable to mildew. Bear in mind that prevention is better than cure: keep your roses in healthy condition and watch them closely every day during the growing season.

One of the most important problems confronting us in our rigorous climate is the winter protection of our roses. Special pains should be taken to ripen the wood of our rose plants before the frost comes. Discourage late growth by stopping watering and cultivation in September. Water only once in October, if the soil is too dry to supply the plants with the moisture necessary during the winter.

Before the frost arrives, tie the rose shoots closely together and pile the soil around the plants as high as possible. Let the plants stand in this condition until there is about four or five inches of frost in the ground; then cover hill and plant with dry leaves. Do not pack down the leaves but protect them from wind with chicken wire, if possible, or any other material at hand.

Roses ought to be protected against mice and rabbits in winter. If the hill of soil around the plant is frozen, mice will do

hardly any damage, but rabbits will, so a protection with chicken wire will keep the rabbits off.

In protecting roses over the winter, the following three points are of utmost importance:

Cover and protect them from the sunshine, to prevent thawing after frost has set in.

Protect them from the drying effects of our strong winds and also against mice and rabbits.

Do not prevent the free circulation of air about your plants but do protect your covering material against rain with boards or any other water-proof covering.

Do not uncover your plants too early in the spring—better wait until danger of frost is past. The most violent changes in weather occur during the early spring. If the weather is fine by the middle of April, you may uncover them, but keep your covering material close at hand—it may come handy if the weather should change.

The pruning of roses in our climate should not be done before the 15th of April. The tender varieties such as teas and hybrid teas should not be pruned before the sap begins to flow and the buds begin to swell, for at this time dead and weak wood many be more easily distinguished and cut out than earlier in the season. Hybrid remontant and other hardy kinds can be pruned any time the weather permits. Austrian Briar roses and Bourbons need very little pruning. Wichuraianas and multifloras should not be pruned in the spring nor in the fall, but just as soon as they have finished blooming during the summer.

Proper pruning is an art—it improves the productive power and appearance of the plants. It consists of two distinct operations: First, the removal of dead, weak and superfluous wood; second, the shortening of the shoots which are allowed to remain on the plants after the thinning-out process has been completed.

In thinning out, the shoots should be either cut clean away from the base of the plants or from their starting points on the old wood. When the plant has been pruned, it should present a well-balanced appearance on all sides. The rules of pruning are modified somewhat by the character of the plant. The weaker-growing varieties should be cut back farther than the strong-growing kinds. The strong-growing variety, if cut back

too heavily, will run to wood and in some cases it will even kill the plant.

The crop of flowers on the rose plants is largely governed by the kind of pruning the plants receive. In fact, other conditions being ideal, the pruning will determine the quantity and quality of the flowers.

The following list of roses are without question the best and most practical varieties to plant in the northwest:

Hybrid Remontants—Captain Hayward, Clio, Frau Karl Druschki, Mrs. John Laing, Ulrich Brunner, Baroness de Rothschild, J. B. Clark, George Arends, Gen. Jacqueminot, Duke of Wellington, Pride of Waltham, Baron de Bonstetten, Magna Charta, Paul Neyron, Hugh Dickson, Prince Camille de Rohan, Anna de Diesbach.

Hybrid Teas—Colonel Leclere, Gen. Supt. Arnold Jensen, La France, Kaiserin Augusta Victoria, Mary Countess of Ilchester, Red Radiance, Florence Pemberton, Killarney Queen, Duchess of Wellington, Ecarlate, Lady Ashtown, Mrs. Aaron Ward, Radiance, Lady Alice Stanley, Johkheer, J. L. Mock, Farbenkoenigin, Gruss an Teplitz, George Dickson, Mme. Caroline Testout, Willowmere, Killarney, Gen. MacArthur, Lady Ursula, Edith Part.

Polyanthas—Mary Pavic, Amy Muller, Abundance, Yvonne Babier, Mrs. W. H. Cutbush, Baby Rambler, Cecil Brunner, Orlean, Baby Tausendshoen, Clothilde Soupert.

Climbers—Crimson Rambler, Hiawatha, Goldfinch.

Tausendshoen, Dorothy Perkins, Carmine Pillar, Excelsa, White Dorothy, Dr. H. Van Fleet.

Austrian Briars—Harrison Yellow, Persian Yellow.

HORTICULTURAL TRENDS AS REVEALED BY NURSERY INSPECTION RECORDS

By S. B. FRACKER, *State Entomologist*

Instead of discussing insect pests which feed on flowers, vegetables and fruit, and plant diseases which cause them to rot and decay, subjects that have received attention on horticultural society programs summer and winter for many years, it occurred to me not long ago that some of the facts revealed by nursery inspection records might be of interest. We will therefore diverge somewhat from the usual subjects of entomologists today and branch into agricultural and horticultural economics.

The nursery business is the foundation of all fruit-growing and landscape architecture. If we add to it the production of flower and vegetable seeds, we may say that it is the foundation of all branches of horticulture. Unless nurseries produce and sell sound, healthy stock of profitable varieties, the orchard owner cannot plant them nor are they available for adorning the premises of home owners and the grounds of public buildings. The development of the nursery business therefore, shows the stage which horticulture has reached at any given time and indicates the direction in which it is moving. Nurseries hold an even more important place than this in their marketing of new varieties and the popularizing of those which have not come into general use. In this respect the nursery owner is a pioneer with his eyes ever on the future, and his search for new trees and shrubs that will prove profitable to him is a search for varieties of fruits and flowers which will prove more palatable and more attractive than anything the public has been using before.

The nurseries of an individual state such as Wisconsin do not, of course, reveal the only source of nursery stock available to Wisconsin growers. In fact, as this is known as one of the smaller nursery states it is probable that the public purchases considerably more than all the nurseries of the state produce each year. The reason the nursery acreage of Wisconsin is not as great in Wisconsin as it is in many other Mississippi Valley states is that young trees and shrubs have a somewhat

shorter and cooler growing season than in the latitudes somewhat further south and it is therefore possible for the nurseries in some competing regions to produce larger trees which appear at first glance more vigorous, in a shorter length of time. Neither is Wisconsin quite close enough to the semi-arid regions where nurseries are few and far between, to compete on even terms with those nurseries located closer to the Missouri River.

Nevertheless, there is a good field for the producer of nursery stock and as we shall see in a moment, the acreage in the state has been increasing from year to year. Many purchasers prefer plants grown as far north as possible in order to insure hardiness which will stand the climate. For many reasons it is desirable for customers to purchase stock from nurseries operating in their own state and we doubt whether trees superior to those grown in the better Wisconsin nurseries can be secured anywhere in the country.

The variety of plant products covered in nursery inspection is surprisingly large. Probably to the average person the term "nursery stock" means little more than apple and shade trees and the ordinary ornamental and small fruit shrubs. The bulk of the acreage in most nurseries, it is true, is devoted to plants of this kind. There are, however, a number of special classes which may be of interest.

Several Wisconsin nurseries confine themselves to evergreens only, one devoting itself entirely to trees for the reforestation of large areas. Such trees are transplanted to the woods while still very small and the nursery therefore with its shaded seed beds of tiny evergreens presents quite a different aspect from the usual one with a line of general stock. Other special forms of nurseries are those devoted entirely to strawberries and raspberries while a number grow only bulbs and perennial plants. Even these are further specialized, there being a number of growers who confine their work to an individual species of plant such as dahlias or gladioli.

One of the most puzzling branches of the nursery business from the inspector's standpoint is that of the man who makes a business of transplanting native forestgrown trees and shrubs. When properly handled and regulated this is a perfectly legitimate line of work and provides for the conservation of a valuable natural resource. The most common way of

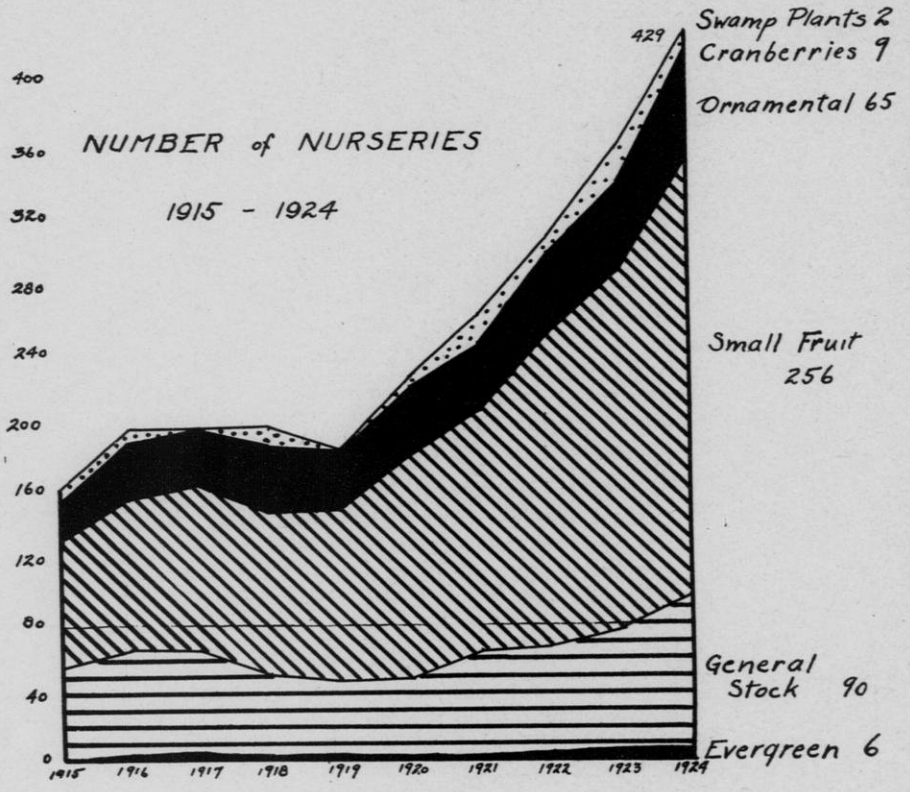
handling the inspection is for the owner to designate particular plots from which it is expected to gather trees and shrubs and go over these carefully in the field. Another method which is sometimes used is that of inspecting the stock after digging and before it is loaded for shipment. As forest-grown trees and shrubs are as likely to carry insect pests and plant diseases as nursery stock secured from other places, the general, unrestricted transportation of such material is fraught with considerable danger for the areas into which the plants are carried.

A branch of this same line of work is the inspection of individual shipments of nursery stock and forest-grown plant material at the Madison office. This inspection is becoming more volumnious each season. It includes in great part bundles of shrubs which home owners in one locality wish to send to friends or relatives in another. Many well-to-do city residents have summer homes in the forested parts of the state and often wish to have their caretakers send down material of this kind for the adornment of their city property. Inspections of individual express shipments are not great in bulk but numbered sixty-five during a three or four weeks' period in the spring and fall of 1924. Tourists are also given the opportunity of shipping their trees to Madison for inspection when the conservation warden finds them carrying such material but in most cases they seem to set little value on the trees and prefer to destroy them rather than go to that trouble.

Two special lines of work probably not represented at this meeting at all are the inspection of two different types of swamp lands. The first one to which I refer is the cranberry industry. New cranberry bogs are set out by using the cuttings of plants mowed from well-established bogs. Any cranberry producer who is planning to mow part of his acreage during the season is therefore likely to want to sell plants. Several owners specialize in this branch of the work, particularly when they are growing varieties of unusual merit or popularity. The number of applications for inspections of this kind has varied from none to fourteen during the past ten years, the total number of cranberry growers in the state being I believe, about ninety.

Another line of work of unusual interest is that which has

been carried on by one young man in Winnebago county: namely, the production of plants or seeds of wild rice and other swamp plants to attract game birds. The market for this material is among the members of hunting clubs, as well as private individuals who wish to improve the hunting on their own premises. In this case the inspection, which is made from a boat, is perhaps less important than the examination of



other classes of plants, as neither important insect pests or plant diseases are likely to be carried in the material, but the owner wishes to be covered in order that his shipments may not be delayed enroute in certain states. The business must be sufficiently profitable to attract competitors for we now have a second nursery dealing in the same products.

The first plate shows in graphic form the trend of the nursery business in Wisconsin during the past ten years. The

mountainous area at the right hand side indicates the great increase which has taken place in the number of nurseries in the past three years.

At the base of the map are shown the number of nurseries limiting their sales to evergreens. Although the future holds out some promise for nurseries of this type it may be noted that there has been little development of the business as yet. Perhaps the influence of the federal and many state quarantines which limit the distribution of the most profitable of the evergreens, namely white pine, has had a retarding effect. The presence of white pine blister rust in northern Wisconsin will continue to prevent a large increase in the production of young white pine trees in this state but as the land owners and the state administration become more interested in reforestation, the production and sale of other evergreens will doubtless show a material increase.

The wide belt marked with horizontal lines above the one representing evergreens is that showing the number of nurseries selling general stock. It represents all those handling three or more different classes of plant material. Many of the nurseries included in this group also handle evergreens and practically all of them small fruit and ornamental stock so that the other curves on the diagram represent only the nurseries which specialize in one line.

The feature of interest in this diagram is that the increase in the number of nurseries growing general stock is not marked There is less than a 50% difference between the number of general stock nurseries in 1916 and those in 1924.

The most consistent, healthy growth of any branch of nursery business is shown in the case of those nurseries specializing in ornamentals. These are located in and adjoining Milwaukeee and the other larger cities. In number they have increased from 24 in 1915 to 65 at the present time but the increase has been steady and regular rather than sporadic, as in those producing small fruits. The situation here is an encouraging sign for general horticulture because it means a greater employment of the home owner's funds in the adornment of his property and a greater appreciation of the cultural and esthetic value of shrubbery and flowers.

The belt above the ornamental stock represents the small fruit situation, which is perhaps the most interesting one on

the chart. For seven years, from 1915 to 1921 inclusive, the total number of nurseries growing only raspberries and strawberries and related plants varied up and down with a general upward trend. During 1922, 1923 and 1924 however, there has been a boom in this line of endeavor which has included all the leading small fruit growing areas of the state, in particular Bayfield, Monroe and Outagamie counties. Prior to 1919 we never inspected more than six small fruit nurseries in Bayfield county and they reported little business in the sale of plants. In 1921 this had risen to 15; in 1922 and 1923 to 34; and in 1924 to 51. In Monroe county the increase has been from 7 to 33 and in Outagamie county from three to ten. Apparently those who are growing small fruits have taken to heart the pessimistic viewpoint of the State Horticultural Society as expressed from three to six years ago and are doing the best they can to improve the situation by placing plants on the market. We must also assume that they are finding a good demand or the increase would be neither so rapid nor would it have extended over a period of several years.

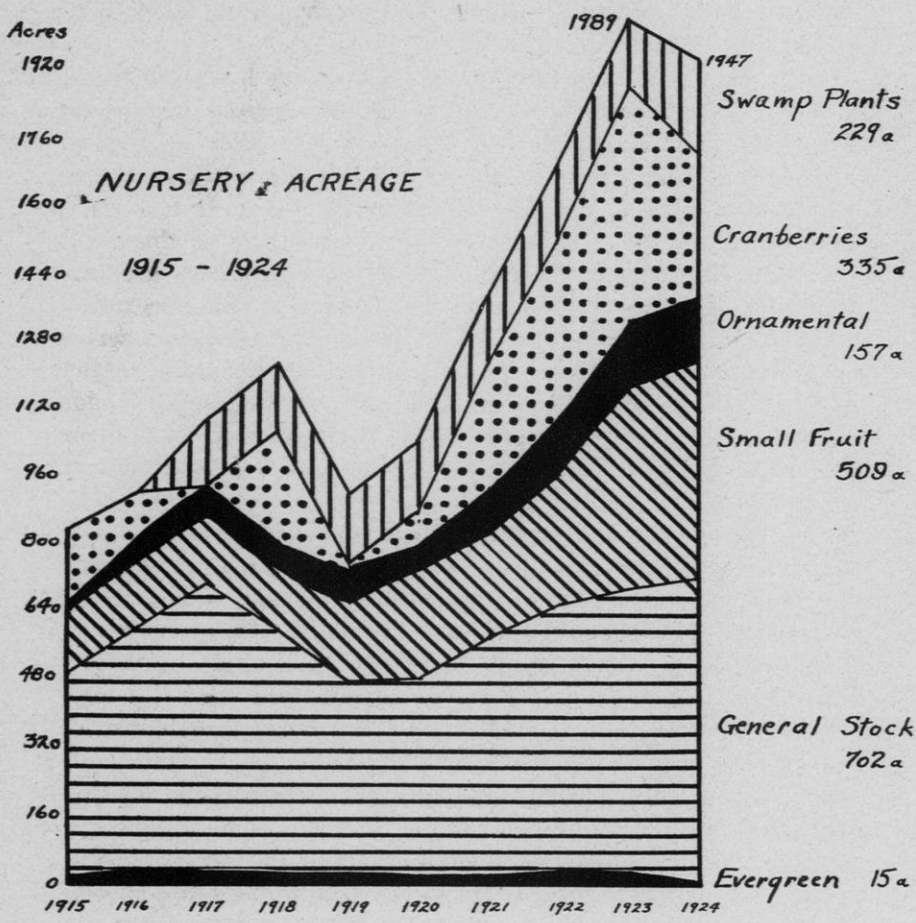
In the case of most agricultural movements of this kind, the more rapid the increase the more sudden the decline will probably be; whether that will be true of small fruit nurseries remains to be seen.

The few cranberry nurseries and one or two producing wild rice and other swamp plants are shown in the dotted border at the top. As a result primarily of the increase in the number of small fruit nurseries, the record of the total number of nurseries in the state as indicated by the top line also shows a marked ascent during the last three or four years.

The next chart is somewhat similar except that it shows the acreage instead of the number of nurseries. The same markings are used as were employed in the first chart. The changes from year to year in the different branches of the nursery business are seen to be closely similar to those of the first chart but the widths of the various belts are entirely different. Those representing general stock, cranberries and swamp plants are relatively much wider than the ones showing evergreens only, fruits and ornamentals. This is because the average size of the nursery specializing in ornamentals is only two and one-half acres and that of those growing small fruits only one and one-half acres, while the average size of the ones grow-

ing general nursery stock in Wisconsin is between seven and eight acres; that of cranberries, 37 acres and of those producing swamp plants, over one hundred acres.

Of particular interest in this chart is the increased acreage of general nursery stock in 1918. The peak at that point is in



itself a lesson in agricultural economics. It in the main represents the organization of a large stock company in the northern part of the state for the production of nursery stock. This company increased its acreage rapidly until it had more nursery stock growing than any other company in the state. Naturally, its means of distribution did not develop so rapidly; the manager found the competition with other nurseries both

inside and outside Wisconsin more severe than he had anticipated, and after a re-organization of the company the stock was finally sold out and the entire proposition dissolved. Many companies and individuals have found that in case of any specialized crop or product the market must be gradually developed hand in hand with production or the result will be disastrous.

In working out these two charts it was our intention to see whether an increased price for fruit or an increased crop would result the following year in a larger or a smaller number of applications for nursery inspection; that is, whether either would stimulate or depress the sale of plants. It has often been observed that a long continued movement of this kind resulting either in prosperity or depression will have a corresponding effect upon the demand for plants. This was noted a decade or two ago in the case of the apple business, a series of prosperous years to the apple growers, mostly those in the west, resulting in the sale of hundreds of thousands of additional apple trees. Unfortunately, the statistics bearing on the crops of small fruits are very meager and unsatisfactory. No information on the value of strawberry crops in Wisconsin or that for the United States as a whole seems to be available. Attempts were made to secure data of this kind from the marketing services of both the state and the federal government but without success. Securing the information from season to season would appear not to offer any more difficulties than any other form of agricultural statistics and I would suggest that the officers of the State Horticultural society take up with the Marketing departments the matter of better market information and more accurate records on the prices and production of small fruits than is now obtainable.

In the case of cranberries, a comparison of the curves shown on the chart with the total value of the crop in the state shows the definite relationship which might be expected. That is, when the crop of a particular year is unusually valuable, the demand for plants the following season almost invariably shows an increase while if the crop has not been a profitable one, the demand for plants, as indicated by the applications for inspection, is lighter. During the ten year period the most valuable crop was that of 1922 which was worth $550,000, while the one which brought the lowest returns was that of 1915,

valued at $229,000. In only one year has the value of the crop failed to affect the number of applications for nursery inspections in that way and in both cases the changes from the previous season were very slight.

The records of another branch of nursery inspection carried on by the federal rather than the state government, may be of interest here as indicating the importance of one unappreciated branch of horticulture. That is the direct importation of plant material from other countries. During the fiscal year ending last June 30, 2,742 cases of bulbs were imported directly into the state of Wisconsin under regular permit. These bulbs were largely tulip, narcissus, hyacinth, crocus, lily of the valley and other lilies, in the order given. Assuming that each case contained 1400 bulbs which is the average for the United States, 3,838,800 bulbs are annually imported direct from foreign countries into Wisconsin. This does not include the number of bulbs purchased by Wisconsin growers from wholesale florists in other states.

In addition to those coming in under regular permit, special permits are required for the introduction of new varieties and necessary propagating stock of those kinds of plant material which are more likely to introduce insect pests or plant diseases. Such new propagating stock consists largely of gladioli, dahlias, iris, peonies and such woody nursery stock as ornamentals, roses, orchids and fruit trees. This material is not allowed to be imported on a commercial scale as it carries considerable risk of bringing infection or infestation. In addition to the special inspections required for it, the purchaser must agree not to permit it to go off his premises for three years after importation and to employ the original plants entirely for propagation rather than for commercial sale, except when it is imported to meet other technical and educational needs. In spite of these close restrictions, Wisconsin has imported 123,000 plants and bulbs since these limitations went into effect in 1920. Most of these were of course gladioli, dahlias and iris but it is interesting to note that 24,900 ornamental and miscellaneous plants have come in under these restrictions as well as 1014 orchids and 495 roses.

Several recent developments have added to the technical difficulties of nursery inspection some of which may be of interest to the Horticultural Society. The one having the most

wide-spread effect comes as a result of recent studies on the mosaic diseases of plants in particular those affecting raspberries. You will recall several newspaper stories of about two years ago based on a warning issued by the U. S. Bureau of Plant Industry as to the damage done black raspberries by a disease called "blue stem". It is not certain whether this disease, as originally described, is present in Wisconsin or not and if so, it is apparently of negligible importance, but a branch of the same investigation resulted in an advance in our knowledge of the diseases of red raspberries which had formerly been called "puckers" and "yellows".

The latter two are now known to be diseases of the mosaic type such as have already been described and studied on potato, tobacco, cucumber and other plants. The two forms, one now known as leaf curl, formerly called puckers, and the other as yellows or simply raspberry mosaic, appear to be two separate diseases, although they are probably transmitted by the same species of aphid, *Anyshorophora rubi.* Leaf curl is particularly destructive and raspberry growers are all familiar with the dwarfed and gnarled plants resulting from infection with this disease. Yellows is not as conspicious in its work but is one of the causes of crop failure in plants which are of approximately normal size and vigor except for the yellowish, mottled appearance of the foliage.

Now that we have a fairly definite idea of the symptoms, it is possible to retard the further spread of these diseases by seeing that they are taken out of nurseries growing plants for sale. As they are generally distributed it has not been possible to apply these regulations suddenly. During 1923 and 1924 the method of roguing or pulling out the infected plants has been employed but as the percentage decreases it is expected that in an increasing number of nurseries plantings entirely free from these diseases may be developed. Largely as a result of these raspberry diseases, thirty-five nursery certificates this year were limited to particular varieties of plants. In most cases this limitation was to strawberries in order to provide against the sale of infected raspberry bushes from the same premises. In a number of cases owners had several blocks of plants, one or more of which were being used only for fruiting purposes and had considerable mosaic while others used for the production of plants were free, or nearly so. Thirty-

three owners were issued certificates on the signing of special agreements or statements regarding the treatment of the infested fields or the limitation of their sales to certain ones of their plantings.

A second interesting development during the past season in nursery inspection has been the discovery of a comparatively new disease known as Maple wilt, caused by a fungus parasite. This was found in Milwaukee in some trees shipped two or three years ago from Pennsylvania. It is the second time the disease has been discovered in a nursery in the United States, although it is becoming fairly well known and is doing considerable damage on street trees in some sections of the eastern states. All the trees in this one block, that is, all those which came from the Pennsylvania nursery, were destroyed. The only other case of the disease observed in Wisconsin thus far was in a suburb of Madison two years previously.

The symptoms of maple wilt are a sudden wilting of the leaves on either a single branch or the entire top of a young tree. The leaves turn yellow and later brown, but remain on the tree. A maple tree infected with this disase is of striking appearance for most of the tree will have a healthy green appearance while one section of it will show the leaves turned brown as if that branch had been girdled or scorched. By cutting into the branch one can see that the inner bark has a greenish, (later a brownish) water-soaked appearance. The limitation of the work of the fungus in the tree may be determined in a general way by searching for the boundaries of this discolored area and if it has not gone too far, pruning will doubtless prove an effective control.

PROBLEMS OF THE SMALL COMMERCIAL ORCHARDIST

R. A. GREENE, Ottawa, Ill.

In discussing the problems which the small commercial orchardists have to meet it is well to remember that such growers are of two classes so to speak—those who have only a limited acreage, all of which is devoted to fruit growing, and those who are engaged in commercial fruit growing in a small way and devote only a small part of their land to the growing of

such crop. While each has its own problems, it is evident that they are not the same.

It is now pretty well understood that successful fruit growing requires an expert knowledge of the business, that work must be done at the proper time, and that orchard work must have first call on the proprietor. This is no less true of the large commercial grower than it is of the small orchardist, and being true, the acreage devoted to fruit growing must be sufficiently large to justify the owner in giving his time to such crop, and to the investment of the necessary capital in the business.

The question of capital is of great importance, for to carry out his program with any degree of success, there must be ample equipment for cultivating, spraying, harvesting and marketing; for water supply, buildings and storage facilities. If the amount of land devoted to fruit growing is too limited, it is plainly to be seen that the overhead expenses will be out of proportion to the production.

To what extent can a fruit grower engage in other farm activities?

It is believed that the small commercial grower who is devoting a part of his land to fruit—which is managed as a part of a farm business which includes some other interest, affords the soundest business basis for economical and profitable fruit production. Combining fruit growing as a part of his other farm operations, reduces to a considerable extent the overhead or fixed charges against fruit production, as a considerable part of the equipment is used in other work. The labor problem is more easily solved and production costs reduced. This question was investigated by the Purdue University Experiment Station a few years ago, and the conclusion was reached that orchards of from ten to fifty acres in size, managed as a part of the farm business, afforded the soundest basis for profitable fruit production. There are many factors which will determine what the other farm business shall consist of, such as land values, soil conditions and etc. If the land is especially adapted, some form of live stock production fits well with fruit growing, preferably a kind where the labor requirements are not too exacting. In what is here said, it is of course understood that fruit growing must have the call over the other work—that the one must be the principal and the other the side line. The time factor in fruit growing is too important a one to neglect.

The labor question is one of the serious problems affecting the small fruit grower, and if he can manage so as to find profitable employment the year round for the necessary help, a part of it perhaps outside of his fruit growing activities, he is to be congratulated.

The question of varieties to be grown is a most important one, and cannot receive too much attention. Many orchards have proved failures or near failures by not paying sufficient attention to this feature. Observe the fruit at almost any horticultural exhibit and you will find too many varieties, especially of apples, and too many varieties that cannot be grown, commercially, at a profit. The number of really high class apples suited to any one locality is not large, at best. The small commercial orchardist who markets his crop locally must, of necessity, have a succession of marketable varieties beginning with the early apples, but this does not mean that there should be grown all of the varieties listed in the fruit catalogues. "Stick to the old established kinds which have proved their merits in your locality" this has long been the advice of successful apple growers, and it is good today; but it is unfortunate that more have not heeded such advice in the past.

Northern Illinois and Wisconsin growers cannot compete with southern Illinois in the early summer apple markets, as the southern apples are marketed a month earlier, and by the time our early varieties are ripe, the Michigan crop is ready to harvest and the general result is an oversupply and a low market. While the small grower who caters to a local demand must have some early fruit, it is unwise to have too great acreage. The Duchess is widely distributed and in demand for kitchen use. Its acidity or tartness disappears when fully ripe, at which stage it is good for eating out of hand. Where the Wealthy is a late summer apple, as it is with us in the southern part of Northern Illinois, the acreage should be limited. Farther north, where it is a fall or winter apple, it is a different matter entirely.

The main crop should be late fall or winter varieties suited to the locality. With us this list consists of Snow, McIntosh, Grimes, Jonathan, Salome, Northwest Greening, and a few others. Jonathan is a general favorite, is in great demand at prices generally higher than other sorts. During the past few years it is quite noticeable that the Delicious in our latitude is an apple of high quality and greatly in demand. Growers

speak well if it, especially those who are marketing their crops locally, and its planting in small commercial orchards is increasing.

The large commercial orchardist must of necessity largely market his crop wholesale, in car lots. How shall the small grower market his crop to the best advantage? Shall he market it locally or place it in the usual channels along with the commercial pack?

The location of the orchard will largely determine this very important question. In Northern Illinois and Southern Wisconsin there are many cities and villages, in addition to the larger industrial cities which furnish a local market. In such markets there is a demand for fruit of the best quality, and to a lesser extent, a demand for lower grades.

The local demand will respond to the treatment given to it by the grower. Quality is coming more and more to be recognized by fruit growers as the factor that represents the difference between profit and loss. If he grows quality fruit and will treat his customers fairly, the consensus of opinion of growers who are marketing locally is, that this method is satisfactory. While there is generally a local demand for low grades, or windfalls, they should never be sold except for just what they are—low grade fruit, and at a price consistent with their quality.

Large commercial growers make use of cold storage facilities, but the small grower selling locally cannot generally do this. He must, however, have some storage facilities if he is to market his crop advantageously. Cool storage houses have been in use for a number of years, and plans for such houses have been worked out successfully by many growers and by several State Universities and Experiment Stations. A number of articles concerning cool storage houses have appeared in the last few years in the leading fruit magazines. Of course they do not take the place of cold storage, but where they have been correctly constructed and properly operated they have given excellent results in our latitude.

One of the serious problems affecting apple growers, great and small, is that of increasing consumption. It is not necessary to point out the many qualities possessed by the apple at a convention of horticulturists, and it is believed that the people, generally, do not underestimate this fruit, but it is a fact nevertheless that the consumption of this King of Fruits is not nearly

what it should be. The reasons are many. The competition of other fruits not having the qualities of the apple, but better advertised and merchandised, is probably the principal one. Others are—the change in the habits of the people with respect to purchasing smaller quantities of foodstuffs—the general prevalence of furnace heated homes, which makes it difficult to store fruit in the home, the competition of low grade apples on the market, and the high prices of apples demanded by the retailers; the effect of all of these is to restrict the use of apples.

Over production and under consumption are related terms, but practically speaking, it is a question of under consumption when applied to the apple. The average American family, dwelling in the cities, could easily consume four times the amount of apples which it does, and this without denying itself of the present amount of the fruits now consumed.

The small commercial grower who caters to a local trade comes a little closer to the ultimate consumer than the large commercial grower, and should be in a better position than he to properly merchandise his crop and get it into the hands of the consumer in good condition and at a price commensurate with the ability of the consumer to pay. There are retailers who realize that there is as much or more profit in making more sales at a less profit per sale, but they are in the minority. One farsighted grower of my acquaintance stipulated with the grocers to whom he sold, what the selling price of his fruit should be, and agreed to take back from the grocer all fruit which decayed or became spoiled in their hands. This guaranty induced greater purchases on the part of the grocers, and the reasonable price for which they sold the fruit increased their volume of sales, to the benefit of the grower, the merchant and the consumer alike.

It is to be hoped that the horticultural societies will earnestly take up this question of increasing consumption. It is a phase of merchandising that will be of great importance to the apple growers of America if it can be successfully worked out, and I believe that the small commercial grower will play no small part in solving the problem. His part lies in producing fruit of real quality and seeing that it reaches the consumer in good condition and at a reasonable price.

BLACKBERRY, HOW DID YOU GET THAT WAY?

By ALBERT M. FULLER, *Assistant Curator of Botany, Milwaukee Public Museum.*

It is through the variable plants that a large number of our economical plants have originated. For that reason plant breeders are interested in plants showing variations. The Rose Family is one which is blessed with variable plants. This same family gives us a large part of our cultivated fruit. The apple, pear, peach, strawberry, raspberry and blackberry are members of this family. Also a large number of our choicest ornamental plants belong to this family. For the most part, the causes responsible for variation in the blackberries may also be applied to the other variable members of this family.

Until the middle of the last century it was generally believed that like always gave rise to like. If plants differed in any respect they were put into separate species. After Darwin's "Origin of the Species" appeared, people began to pay more attention to variations and to how characteristics are inherited. About 1900, De Vries, a Dutch experimenter, discovered a paper written by Gregor Mendel, an Austrian monk, in 1865. In this paper Mendel told of experimenting with garden peas and other plants and the results that he had obtained. He crossed peas having contrasting characteristics and observed how the offspring behaved. When he crossed a colored-flower variety with a white flowered one, all of the plants of the first generation produced colored flowers. In the second generation there were produced three colored-flowered plants to one white-flowered plant. The white-flowered plants of the second generation always bred true, while the colored-flowered plants always gave rise to three colored-flowered plants and one white-flowered plant. He tried out a number of contrasting characteristics and obtained similar results.

Today many botanists, believe that natural crossing is responsible for variation. Others believe that variations come about by "sport" or mutation as they are called. De Vries had noticed that among some plants of an American species of the Evening Primrose, were some that varied greatly from others. He transplanted these to his garden. Offspring of some of the

plants differed from the parent plants. The modern "sport" is based largely on the results of De Vries experiments. There are a few variations that the hybridization theory will not explain and the mutation theory does. The "Silver Wedding Rose" which appeared as a bud "sport" on an Ophelia rose is one of these. Nearly all of the other variations that occur in native and horticultural forms can be satisfactorily explained by hybridization and changes in environment.

It is only within the last forty years that any attention has been paid to our native species. Up to a few years ago it was supposed that all of the blackberries of North Eastern America could be confined to at least a dozen species. About 1900, W. H. Blanchard, a Vermont school-teacher became interested in the group. He traveled over the north eastern portion of the country making careful collections of the blackberries. When he died in 1922, he had added thirty-six new species and five varieties to the group. Since 1890, L. H. Bailey of Cornell University has been interested in the group, particularly in tracing the origin of the cultivated forms.

About the same time that Blanchard was collecting the blackberries, Dr. Ezra Brainerd, President of Middlebury college in Vermont, had been doing some cultural work with violets. He found out that in the violets, crossing is the chief cause of variation. Bees and butterflies go from flower to flower regardless of species. Where several species bloom at the same time crossing is bound to occur. Dr. Brainerd was also interested in the blackberries. Assisted by A. K. Peitersen of the Vermont Experiment Station, he transplanted a number of native blackberries to a control garden. Here he crossed and recrossed species and observed how the offspring behaved. In 1920, the results obtained were published in Bulletin 217 of the Vermont Experiment Station. The conclusions were that of the 48 species listed for New England, only 12 were good species. All of the other species could be explained by crossing any of the 12. They also showed that certain species are very responsive to changes in environment.

For some reason or other Blanchard never got hold of any Wisconsin forms. This fall I sent some specimens to L. H. Bailey. In a letter that I received from him he says "I see at once that you have interesting things in Wisconsin".

Our Wisconsin species fall in three groups; the tall, the trail-

ing and an intermediate one. There is not a clean cut line separating the groups. The most distinct species is the high-bush blackberry which is found growing in all parts of the state. The canes are from six to twelve feet high and are heavily armed with stout straight prickles, which are as formidable as the barbs of any wire fence. The leaves are five-parted. 10-20 large white flowers are borne in cone-shaped clusters. I think that by careful selection and breeding one could produce varieties worth growing just for the flowers and for the beautiful dark red foliage in the fall. The fruit is small, seedy and has a delightful spicy taste. In the smaller towns the fruit is sold on the market.

The thornless blackberry has been collected near Saxon, Iron Co. Plants showing an infusion of this blood have been collected at Devils Lake, and in Sheboygan Co. The round canes grow from five to ten feet high. The canes are free from prickles. This is the chief difference between this species and the preceeding one. 5-10 flowers are borne in flattish cluster. The fruit is large, juicy and somewhat acid.

The leafy-flowered blackberry has been collected in Waukesha, Sauk, and St. Croix counties. The canes may grow trailing on the ground or may be partly erect. It is likely that the blackberries growing in the cinders along the railroad tracks and in sandy fields belong to this species. 5-10 large white flowers are borne in flattish, leafy clusters. The fruit is large, black, sweet and juicy and is the most desirable of any of our native species. I suspect that this is the species that is commonly called dewberry and the fruit of which is esteemed by many people.

On the edges and in peat bogs we find the running swamp blackberry growing. The stem is trailing and covered with many bristles. The leaves are evergreen and three-parted. The flowers are small. The fruit is small and seedy. Sometimes on the edges of swamps one finds several puzzling forms. They appear to be intermediate forms between the running swamp blackberry and the leafy-fruited blackberry. More careful observation is necessary before they can be placed into their proper place.

Specimens exhibiting variations due to natural crossing are common and puzzling. There is evidence that the following crosses exist in the state high-bush Vermont, high-bush bristly, leafy-flowered bristly and running bristly.

In most parts of the world the blackberries or brambles as they are known are regarded as pests. England alone is supposed to have a hundred or more forms. Cultivated blackberries are practically unknown anywhere except in the United States and Canada. The first variety raised for its fruit in this country was the Dorchester, a native seedling, introduced by Eliphalet Thayer of Dorchester, Mass. He exhibited it before the Massachusetts Horticultural Society, in 1841. Since that time about 123 varieties have been introduced. Nearly all of these have come from seedlings found growing wild. Most of these are very closely related to the high-bush blackberry.

The species recommended for growing in Wisconsin are the Snyder and the Ancient Briton of the tall growing type and Lucretia of the dewberry type. The Snyder is probably most largely grown of any of our garden forms. It originated on or near the farm of Henry Snyder, near La Porte, Indiana about 1851. The Ancient Briton was first mentioned in the Wisconsin Horticultural Report, for 1869. J. S. Stickney reported that it originated with A. H. Briton of Wisconsin. Another report was that it was named by Robert Hassell of Alderly, Wisconsin, who received it from England. Since no variety of this type is known to occur in England, it is likely that the first report is the authentic one. Both of these varieties are sturdy, hardy, and very good producers but the fruit of the Ancient Briton is superior to that of the Snyder.

Some of the other varieties which are prized by growers in nearby states are the Early Cluster, the Eldorado, Taylor, and Agawam, and Early Harvest. One of the more recent varieties although not recommended for Wisconsin, might succeed here is the Mersereau. It resembles the Snyder in being very hardy but is a heavier producer and the fruit is of better quality and seems to ship well. Recently a blackberry has been introduced from South America which yields fruit nearly as large as one's fist.

The dewberries differ from the blackberry in their trailing habit. Lucretia, the variety recommended for this state is a good yielder and the fruit is superior to that of our common high-bush forms. This variety has an interesting history. During the Civil War, a young man by the name of White was stationed near Beverly, West Virginia. While guarding private property there, he became acquainted with a young lady who afterwards he married. He settled on her plantation after the war and up-

on it found dewberries growing wild. He transplanted some of these to his garden and these plants attracted the attention of his father who was visiting him in 1875. The following year plants were sent to his father in Ohio and were distributed among friends. Some of these plants fell into the hands of B. F. Albaugh of Covington, Ohio. He introduced the variety into the trade under the name of Lucretia.

It is to be regretted that more people do not raise raspberries and blackberries. Although most of our blackberries are unpleasant to get along with I am sure that by crossing with the thornless blackberry and by careful selection, a thornless variety yielding fruit of good quality could be obtained. With the fast onrush of civilization throughout the state, many of the places where blackberries once abounded are being cut off and plowed under. This is bound to create a demand for garden grown fruit in the smaller towns and in the country.

In certain districts of California, Washington and Oregon blackberries and loganberries are raised extensively for canning and for shipping to distant cities. Near Tacoma, Washington, at one town seven hundred teams hauled wagon loads of blackberries to the shipping station and to the jam factory. In this particular locality the Evergreen Blackberry, a cultivated form of the despised bramble of England, is grown. In other places the loganberry, supposed to be a cross between the dewberry of the Pacific Coast and a red raspberry of the Red Antwerp type is grown.

APPLE ORCHARDING IN ILLINOIS

JOHN A. GARNIER

The commercial apple production of Illinois is quite largely carried on in the southern division, the south half of this division producing the bulk of the summer varieties grown in the state not a heavy production of late varieties. The north half of this division as well as a strip along the west side of the state, produces a small quantity of summer varieties, their production almost all being fall and winter varieties. The heaviest producing county being Calhoun, lying between the Illinois and Mississippi rivers. This county has no railroad, depending on one of the two rivers for transportation. The land is quite rough, the soil is a

wind blown loose soil which seems especially adapted to the production of apples of a fine flavor, high color and good size. Production on this soil is accomplished with quite a reduction in expense for cultivation and spraying, the location and elevation being quite favorable for fruit production with seemingly considerable less fungous diseases to contend with. This county alone in 1923 shipped out more than 500,000 barrels. The street leading to the landing at Hamburg, the principal shipping point, was closed to traffic that year and the street completely filled with barrels piled quite high awaiting shipment by boat. This fruit quite largely went to St. Louis for sale or storage or to Alton and was loaded in cars for shipment to other markets. Apples are the principal crop of Calhoun county.

The commercial unit of apple acreage is considered from forty acres up. One to three or four hundred acres are quite common with one grower controlling thirty-three hundred acres, somewhat divided over the state. I will not attempt to tell you just how Illinois carries on the production of apples as methods vary quite widely. Trees have largely been planted thirty feet, although there is a tendency to widen this out to anywhere from thirty-two to forty feet square, some growers putting in fillers of somewhat upright growth to be cut out in from fifteen to twenty years. I have seen orchards planted this way but have not seen the cutting out, evidently a change of heart. The young orchards are cultivated quite intensively for six to eight years with cow peas, soy beans or buckwheat sown about July 1 for a cover crop to be worked in the next year. Heavy pruning and heading back is practiced less and less each year, cutting out crossing and interfering branches about covers pruning on young orchards.

A dormant spray is put on each year followed by two or three summer sprays until trees come into bearing. After this time six to eight sprays are applied, also during this time some kind of a nitrogen fertilizer is applied. Nitrate of soda, sulphate of ammonia or stable manure in an amount to correspond to the size of the tree and the thrift it shows. Nitrogen in any form has paid well and seems to be the limiting factor in apple production in southern Illinois, at least.

Bearing orchards are given a dormant spray, commercial lime sulphur one to eight or the newer scale spray, lubricating oil emulsion. This is followed by lime sulphur one to forty with dry

arsenate of lead one barrel to fifty before buds open for scab control. Another spray, using the same formula at petal fall, four or five more sprays follow in about ten day periods. These may be the same formula as above or may be changed over to Bordeaux and lead at any time as the grower may think best, according to temperature and moisture condition and what trouble he has in sight. A very heavy damage from small stings the past two years, probably from bud moth, will result in the use of an extra half pound of lead to fifty gallons of water in the first two summer sprays.

In harvesting our own orchard, which contains a hundred and twenty-six acres of apples, picking is done by the bushel, the fruit being placed directly from picking bags into crates and hauled on flat top racks, one crate deep, forty-four to the load, to the packing shed where it is run over the grader, packed in barrels as promptly as possible and sent at once to the cold storage house which is one mile from the packing shed. Apples not suitable for barrelling are sold as bulk and loaded in cars or sent to the evaporator or cider mill.

DISCUSSION

By the time this orchard was fifteen years old it had not produced anything to speak of. The man who bought it did not get anything in the way of fruit for two or three years so he put in a bunch of cattle and hogs and it was a pasture proposition rather than a fruit proposition. It was planted in the spring of 1888 or 1889. A banker bought it in the winter of 1912 and did some pruning and spraying and came out with a nice crop of fruit. He had it three years and then I came into possession of it. In all those trees from the time the orchard was first sprayed until now, there has never been a complete failure. The Johnathan have been light two crops on account of frosts in the spring and the Ben Davis have been a near failure twice. The Roman Beauty have never produced less than three barrels and up to an average of four barrels. We have an average of about forty cars a year. All our apples are handled in a wholesale way, we do no retailing, except to our help. They are sold in carloads and largely all direct to buyers over the telephone. Eighty or eight-five per cent are sold over the telephone or telegraph. Only the select apples are put in our pack, all stuff that is all solid, no soft spots, when it goes to our customer and he in turn sells it out to the consumer and everybody along the line gets out on the apples. I have sold next year and the next giving us an opportunity to move our apples all the time.

MR. TOOLE: Do you have any culls?

MR. GARNIER: The stuff that would not make the No. 1 grade goes into our bulk. Every one with a small soft spot is put into a crate and sent to the evaporator or to the cider mill but we do not pack any low grade apples and I think that whenever the growers in this country come down to that sort of plan our marketing problem will be largely solved. It is too expensive to put all these into storage and they can never bring anything but a low price.

MR. TOOLE: You have these evaporators close by?

MR. GARNIER: Half a mile from the gate. Our cold storage will take care of about 100 barrels of fruit. It is located so it is not a long haul from any part of the orchard to get to it. The evaporator is just in the end of town and more than half of my 126 acres is within the city limits. We have a 1400 gallon tank in the front end of the orchard which takes care of the north end from the city main and a four thousand gallon tank of water a ways farther down the field. We never pump any water, run it in with an inch pipe and run it into our spray wagons with two inch hose. We use two tractors with four tanks. Three are three hundred gallon capacity with six horse engines with 15 gallon pumps and a pressure running from 250 to 300 lbs. Each one will deliver fifteen gallons a minute. Another outfit with a four horse engine and a two hundred and fifty gallon tank which delivers nine gallons a minute.

We prune all the time when we are not busy with something else until the apples get to be one and one-half inches in size. Then after harvest is over we start pruning again.

We have used what we think is quite heavy fertilizing. In eight years we applied nitrate of soda six times running from five to ten pounds per tree and during that time we put on two applications of stable manure, a sideboard load to eight trees; two applications of stable manure with a sideboard load to four trees. We have done very little cultivating, more last year than for some years. We do not favor a continuous clean cultivation and the growers generally are about of that opinion. After trees get up to bearing age and even before that time they insist upon getting some sort of a cover crop to protect that land from leaching away and the wind helping to take some of it along. There are different sorts of cover crops used but nearly everyone is using some sort of cover crop on the young orchard as well as the old.

QUESTION: What do they use for a cover crop?

MR. GARNIER: One cover crop is buckwheat. Some years we get what you might call a natural cover; water cress and weeds come up. Sometimes about the time we get through cultivation we get a good heavy rain and this natural cover comes on to stay on the ground during the winter. Occasionally it forms a light sod and is worked down into the ground during the spring.

QUESTION: You spoke of 3,300 acres of apples. Is that the apple acreage of Illinois?

MR. GARNIER: That is our big grower. We have one who has 1,725 acres and another with 1,200 that I know of.

QUESTION: You think any time of the year would be proper to prune the trees?

MR. GARNIER: When the saw is sharp and you have the time. I think there are times that really would be preferable but where you have got quite an acreage to get over it is not practical to put in a bunch of men and not have them to use at any other time. You are almost compelled to take your men and give them steady employment. It is hard to pick up the right kind of men just for two or three weeks so we are pruning all the time until the apples get an inch across and after harvest is over everybody is pruning at any time the weather is fit. If I had a small orchard I would do my pruning along about the middle of May to the first of June. I think the wounds will heal over much more quickly at that time and leave your tree in better condition.

QUESTION: You sprayed from six to eight times?

MR. GARNIER: Yes, after the dormant. We have nearly every pest I guess that is common to your section and to most other sections. We have had many thousands of acres of orchards in southern Illinois entirely killed by San Jose scale.

QUESTION: What kind of a container do you use to pick in?

MR. GARNIER: A picking bag with a strap across the shoulders that crosses behind. The strap is about two and one-half inches wide and ends up with a leather strap ¾ inch with several holes that will hook into a little hook. It is a full length grain bag and on the end of that bag we have a little snap that we pull up. It is a full size grain bag put on a frame made out in Kansas. We have never been able to buy it again and this year we rebuilt them ourselves. It is the best we ever got, it distributes the weight nicely, will hold almost a bushel of fruit and the fruit drops down into a crate, the sack is bottomless, sewed around a frame just as you would put it in a rack to fill up the sack. This is drawn over and hooked up here and when you get ready to release it you just drop it down and let the apples go into the crate. Our fruit is carried in crates entirely, except when it goes over the grader; then it is put back into a crate and set off into its grade and remains there until it is hauled out of the orchard. We use about four thousand crates and we have none too many. Our production this year was about thirty to thirty-two thousand bushels.

Another thing I was going to bring out. I do anything and everything there is to do. I can pick up a job any place in the orchard. We have been replacing. The fact that this orchard had been pastured for many years before it was put back into fruit production resulted in the dying of hundreds of trees.

These have been replaced with new trees and we were able to grow a new tree where this old one went out and get a very high percentage of them to live but we have also found that the replacing of those trees and bringing of them up to where they will commence to come into production has entailed too much hand work and I am of the opinion that after an orchard gets around twenty years old, replacements should not be made.

QUESTION: What is the average production?

MR. GARNIER: We have 126 acres of apples, the balance peaches. 100 acres are thirty years old. Fourteen acres were planted in 1918, the rest in 1888 and 1889. Trees thirty-five feet across. We take off from thirty to thirty-five bushels of fruit from one of those trees. They don't all average that, of course.

QUESTION: What is your average yield per tree per year?

MR. GARNIER: I have not figured it out. We have such a wide difference in the stand of the trees at this time. Our Jonathans are a good stand and all you could expect at this stage of life. Our Ben Davis in some sections are pretty well killed out and we have new trees coming in on all of this old tract of land. Of course there is fourteen acres not in production at all. That leaves us about 112 acres and we have about fifty cars a year off of that. A car will run 160 barrels or from 540 to 600 bushels of bulk apples.

I wish to compliment you on your exhibit and especially the flowers. They certainly add much to the beauty. It is much nicer than anything Illinois has ever put on since I have been connected with the society. We have had greater volume but you certainly have beauty.

CONTROLLING THE PESTS OF GREENHOUSE AND ORNAMENTAL PLANTS

E. L. CHAMBERS, *Asst. State Entomologist*

A greenhouse affords an almost ideal environment for the development and rapid multiplication of certain kinds of pests, and as a consequence we find a long list of them taking advantage of it. These often result in doing a great deal of damage to the principal crops grown under glass. Much of the loss which results from the attack of insects, fungus diseases and other pests could be eliminated by adopting timely measures. The losses are not necessarily confined to sudden outbreaks of pests which may result in a partial or a total loss of the crop involved, but much injury is chargeable to such common pests

as plant lice, white fly and red spiders, the destructiveness of which is often greatly underestimated, by many growers.

The florists and gardeners are of necessity compelled to wage a continual warfare against such enemies to avoid serious losses. This naturally requires considerable expense and in some cases the grower then is only partially successful in lessening the damage usually because of the failure to fully understand the nature and tactics of his enemies.

The production of flowers and vegetables under glass is an expensive process, involving not only a large outlay of capital at the outset but a continual expense for labor, fuel, fertilizers and insecticides. Such produce is a luxury and as such it sells at a premium and once the limiting factors to success are under control prosperity is the reward, but woe unto the grower who speculates in this line of business without a full understanding of its drawbacks.

In order to get the most out of his business and the returns from his investment he is entitled to, he must be able to compete with his brother florists and gardeners. To meet this competition he must be able to solve the problems which represent the controlling factors in the growing of his particular line.

Although the value of greenhouse products is between $75,000,000 and $100,000,000 there has not been as much study given to the pests of these groups as has been given to many crops of equal or less value, on account of the comparatively small number of indivduals engaged in the industry. There has been a continual growth in the size and number of greenhouse establishments until today we have nearly four thousand acres of land under glass in the United States. Wisconsin, although not one of the leading greenhouse states, has increased quite extensively until now it has three and a half million square feet of glass.

Like disease control, the first essential in pest control is prevention. In order to know how to prevent the introduction of pests into greenhouses we must study some of their means of entrance. My personal observation has been that, too often the source is through the practice of accepting so-called "Boarders." Some friend or good customer has a plant that is not doing well or else the owner is leaving town on a rather long visit and desires to have the plant left in good hands until he calls for it, and the good-hearted florist takes it into his fold with all its

bugs and germs and infests his own stock. The usual methods of introduction are probably through infested cuttings or plants in the soil or manure used in resoiling the beds and benches or from infested weeds or other vegetation allowed to grow in close proximity to the greenhouse from which the insects may crawl or be blown in through open ventilators. There is no better means of getting a good start toward a new infestation than by the failure to destroy all the pests harbored in the house by fumigation before replanting.

Once established, the method used to control the pest depends upon its habits. For instance, in the case of an insect, it is important to know its method of development and its method of feeding. Whether or not an insect has an incomplete or a complete metamorphosis, that is, whether or not the young when they first appear resemble their parents as do the aphids and grasshoppers, or whether they do not resemble their parents but appear very differently in the form of a "worm" or larva, as in the case of the leaf-tyer and other larvae, makes a great deal of difference in their control.

In forms where the young resemble the adults they are as a rule subject to control measures throughout the entire life cycle while the other forms spend much of their life cycle in the egg and pupal stages. In this latter form the larvae usually have chewing mouthparts and quite often do most all of the injury. There are few measures strenuous enough to kill the egg or pupa even though exposed, without injury to the host plant.

Even more important is a knowledge of the insect's habit of feeding. Generally speaking, insects secure their food in one of two ways, by actually biting off and devouring portions of the plant or by piercing the tissues with their beaks and sucking out the sap.

Insects such as the various plant lice and scale insects with sucking mouth parts it is evident can only be controlled by contact insecticides or by fumigation. The more important contact poisons are the soap, sulphur, oil and nicotine sprays and the sulphur, cyanide and nicotine dusts. These substances may act in various ways, they may glue the insect down, attack the body by dissolving the tissue, act as a narcotic or asphyxiate the pest by closing the breathing pores.

Insects with the chewing type of mouth parts like those possessed by the various foliage feeders such as the larvae of vari-

ous beetles and moths which devour portions of the leaf surface can best be controlled by stomach poisons. These stomach poisons are familiar to most horticulturists and consist of such materials as Paris green, arsenate of lead and calcium arsenate, applied either in the form of a dust or spray. Arsenic forms the basis of these poisons and contrary to the general belief they are not soluble in water but simply are held in suspension like sand in muddy water. The water is merely used as a carrier as sulphur, gypsum or lime is used in dusts. If a sample of the spray material is taken and set aside for an hour or two it will settle out and a perfectly clear liquid will appear with a thin layer of the poison at the bottom of the container, which emphasizes the need of thorough agitation during application.

When an entomologist visits a greenhouse he amuses the florist because he hardly pauses to admire the grower's prize plants and attractive varieties but inquiries for certain varieties often which are the least attractive and looks for the sickest plant in the lot, because he knows where to find what he is primarily interested in. For instance, he knows that with practically every pest there are varieties of the host that are more or less susceptible and other varieties that are more or less resistant. The Ophelia rose and its sports are susceptible to almost every pest, the Mistletoe variety of the chrysanthemum is most susceptible to the midge, the Supreme variety of carnations is hardest hit by rust, etc.

The modern trend of plant breeding in such plants as the Cyclamen, for instance, has been to get certain colors and new varieties at the expense of vitality to the plants, so that there seems to be a big field for plant breeders who would specialize in producing plants that would show resistant qualities toward the various pests. This has been done to some extent with greenhouse plants and in a great many instances with other plants and indications are that this will become much more important.,

Ferns are frequently seriously injured by scale insects which are often overlooked at first on account of their small size. At least five species of importance occur on indoor grown ferns in this state. Three distinct groups of scale insects may be readily distinguished: the Lecaniums, or soft scales; the armored scales; and the mealy bugs which, besides attacking ferns, attack palms, rubber plants, citrus, cactus, oleander and other plants.

Among the Lecaniums, the soft brown scales *(Coccus hesperidum* L.), the hemispherical scale *(Sasissetia hemisphaerica* Targ.) and the aspidistra scale *(Hemichionaspis aspidistrae* Sign.), are very common on house-grown ferns. These scales are usually of a brownish color and quite strongly convex. The

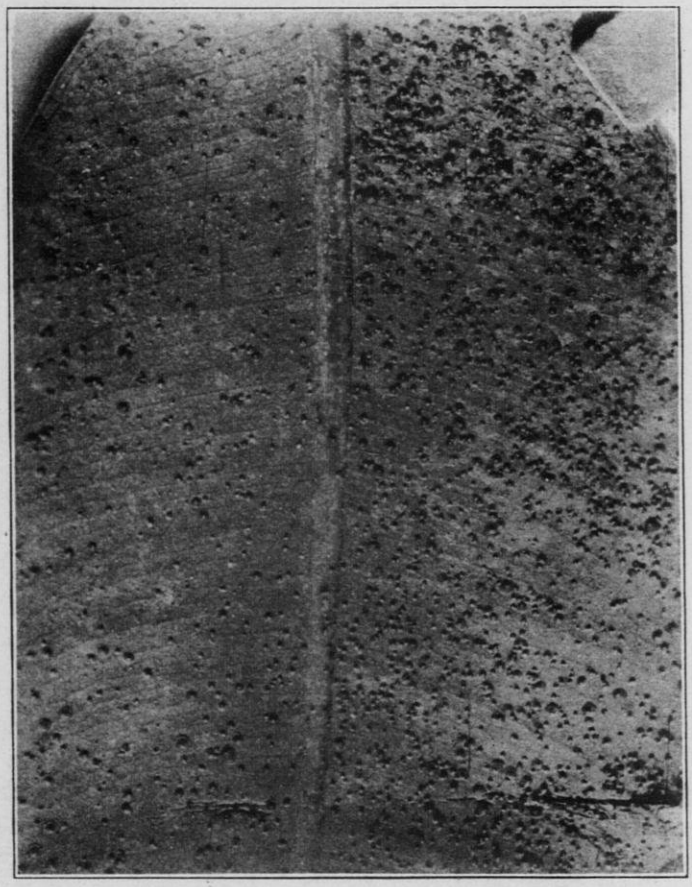


FIG. 1.—FLORIDA RED SCALE (ENLARGED)

upper surface of the female gradually hardens and upon maturity she dies and the old skin forms the scale which protects the young and eggs laid beneath it.

The armored scales have quite a list of species which are present in this state but the most serious ones we have to contend with are the Florida red scale *(Chrysomphalus ficus*

Ashm.), and the Oleander scale *(Aspidiotus hederae* Vall). In this group the scales are smaller than the Lecaniums, are flat and either circular or elongate in outline and are called armored scales because the scale merely forms the covering and is not a part of the insect itself. In this group the young scale upon hatching crawls for an hour or two until a suitable location is found and then settles down, inserts its beak in the leaf or stem

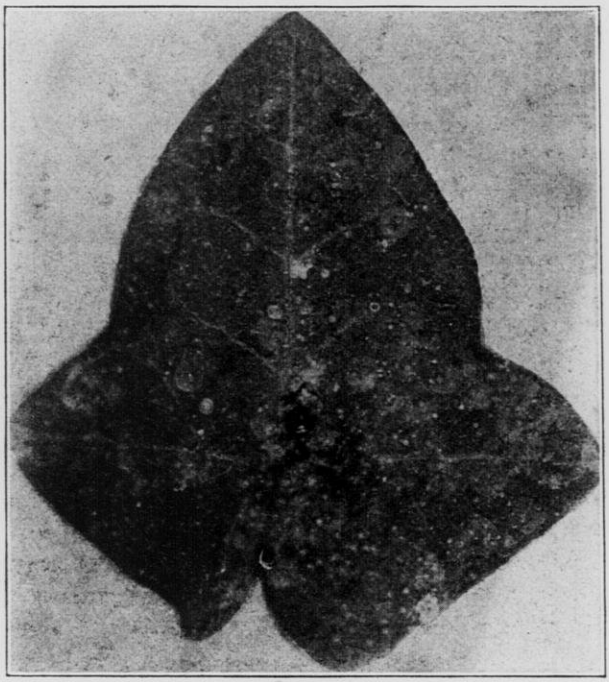


FIG. 2.—OLEANDER SCALE (ENLARGED)

and henceforth the female remains in the same place, secreting the waxy scale covering over her.

Among the mealy bugs the two principal species attacking greenhouse and house plants are the long-tailed mealy bug (*Pseudococcus adonidun* L) and the common one *(Pseudococcus citri* Risso). The group of scale insects acquire their name from their mealy covering of wax and the numerous white, waxy filaments which are given off from their bodies. They are from an eighth to a quarter of an inch long and instead of being anchored to the plant as are the other two groups, they move slowly about over the plant.

The greenhouse Orthezia *(Orthezia insignis* Dougl.) belong to a closely related genus of scale insects as do the mealy-bugs and likewise have the habit of crawling about over the plant. The fully developed female presents a rather striking appearance with its fluted white ovisac and marginal fringe of white plates. They do not appear as abundantly in Wisconsin greenhouses as do the other scale insects.

Scale insects having sucking mouth parts must either be controlled by a contact insecticide or a fumigant. Species which reproduce by means of eggs are more difficult to control than

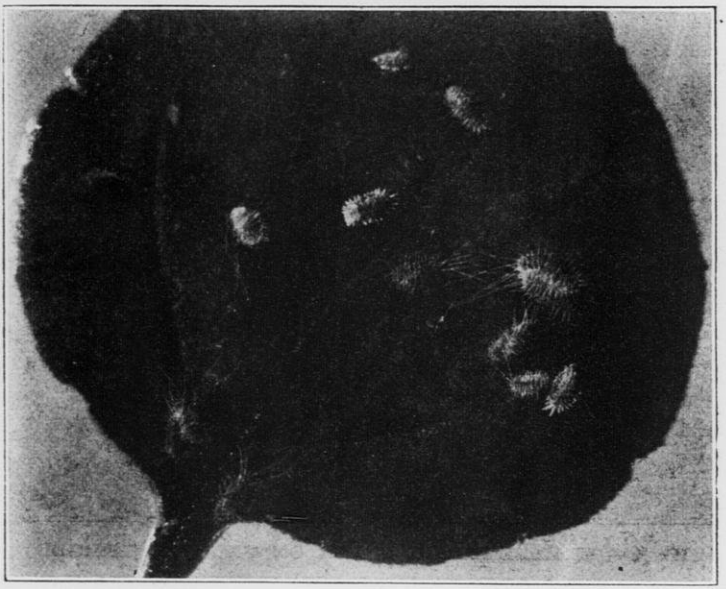


FIG. 3.—CITRUS MEALY BUGS (ENLARGED)

those that give birth to living young, since it is difficult to find anything which will destroy the insect eggs and still not injure the plant. It is evident that effective control measures are not easily practiced since they must be of such a nature as to kill the wax protected insect without injury to the plant. Hothouse plants have the further disadvantage of being much more succulent and delicate and thus more susceptible to injury than other plants.

In the case of house plants infested with these scale insects the most practical means of control is to use in the form of a wash, dip or spray, a soapy nicotine solution made up by using

Black Leaf "40" at the rate of two teaspoonfuls to a gallon of water in which an inch cube of Ivory soap has been previously dissolved. A tablespoonful of fish oil soap will give a slightly stronger solution without injury to such plants as ferns and palms if they are syringed off in an hour or two.

This same solution is quite effective as a dip for treating ferns on a large scale and to be effective should be repeated three or four times at ten day intervals. Perhaps the easiest and most

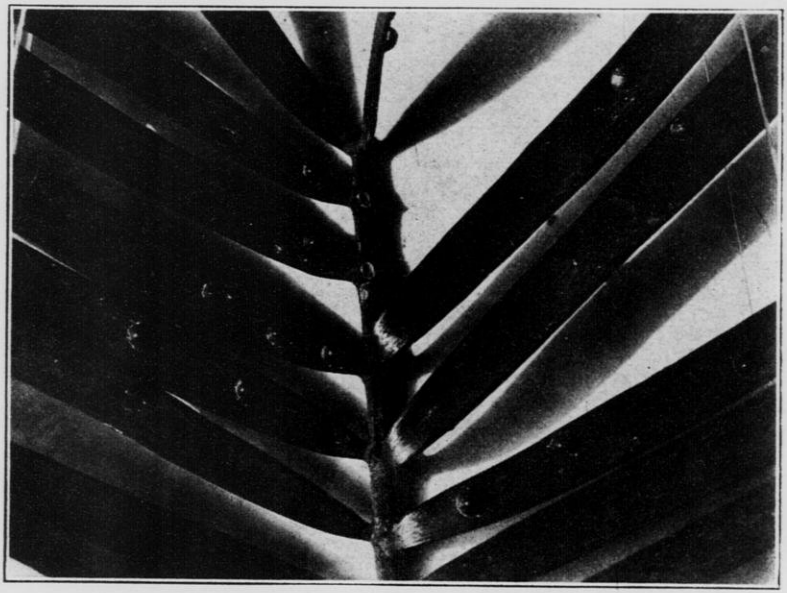


FIG. 4.—HEMISPHERICAL SCALE ON PALM (ENLARGED)

effective way to control these pests is to fumigate the house with hydrocyanic acid gas at the rate of three-fourths ounce per thousand cubic feet. This treatment should likewise be repeated three or four times at ten day intervals. The advantage of this latter method is that it not only eliminates the laborious task of dipping but it loosens the dead scales so they may be syringed off.

For scales on palms a mixture known as kerosene nicotine oleate has recently proven to be a very effective and safe remedy, and has been adopted by one of the largest palm growers in the country. Like all effective control measures where the killing point of the insect requires strong dosages, this must be done

strictly according to directions to avoid injuries. The substance is really a kerosene-nicotine soap, and is made up without heating by simply mixing eight parts of kerosene with two parts of nicofume liquid as well as they will mix and then pouring this mixture onto one part of Oleic acid very slowly and stirring well all the time. Finally to this paste add slowly while stirring, eight parts of water. This gives you a stock solution of a creamy emulsion which should be used at the rate of one and one-half to two ounces to each gallon of water. In diluting this stock solution always add the water to it and never it to the water. The stock solution has been used at the rate of four ounces per gallon of water without injury to the palms. The whole danger lies in using the material that has not mixed well and instead of being a perfect emulsion the kerosene has partially settled out. In case any oil floats on top, the material should not be used.

Within the last few months a still more recently developed spray has been demonstrated by the Federal Bureau of Entomology for greenhouse plants and has proven very effective against various scale insects on palms and citrus plants without injury. This material is the recently developed lubricating oil emulsion. The stock emulsion is made up by boiling together for five minutes two gallons of paraffine oil (Junior Red Engine Oil) and two pounds of potash fish oil soap with a gallon of water. It is then emulsified by pumping through a nozzle twice at a pressure of fifty to one hundred and fifty pounds while still hot. This stock emulsion is diluted one part to fifty parts of water and sprayed on the plants several times at ten day intervals.

Perhaps one of the quickest pests to get a foothold and one to have the greatest host range is the plant louse or the aphid. Aphids reproduce very rapidly, the female, under favorable conditions, begins giving birth to young when she is but seven or eight days old. With the average birth rate of six to ten young a day and with the average life of an individual being nearly a month in duration, and the fact that indoors their summer host is available the year around and that the aphids can maintain this multiplication process indefinitely, it is not difficult to appreciate their numbers and their nuisance. These sucking insects occur on the tender new growths and on the leaves. Certain species, when they feed on the leaves, cause them to crinkle and curl. This deformity of the leaves sup-

plies a decided protection to the plant louse against all ordinary sprays. All species, to a greater or lesser degree, eject a sweetish liquid, known as honey-dew, which is very attractive to ants and is smeared and tracked over the leaves by them, furnishing an ideal culture medium for sooty fungus and, besides rendering the plants unsightly, it causes the dropping of the leaves. The ants play a large part in spreading these plant lice from one plant to another in their habit of carrying them about to increase their own food supply.

The housewife usually finds such plants as Freesia, tulips, Easter and calla lilies, cyclamens and chrysanthemums, pestered with these plant lice. The lily-aphis (*Myzus circumflexus* Bucton) and the melon aphis (*Aphis gossypii* Glov) and the Spinach aphis (*Myzus persicae* Sulz) are the most common ones reported. The chrysanthemum grower is bothered principally with the Green aphis (*Rhopalosiphum rufomaculata* Wils) and the black aphis (*Macrosiphoniella sanborni* Gill) but several other omnivorous species are found feeding upon them.

The rose grower has his own pet species to deal with, the rose aphis (*Macrosiphum rosae* L.) seems to restrict its diet to the rose as does a small green aphis (*Myzus rosarum* Kult) a species commonly found associated with it. These are gregarious in their habits, living in colonies, usually on the young terminal shoots.

The sweet pea is attacked by a large bright-green creature with long cornicles, the pea aphis, (*Illinoia pisi* Kalt), while the violet is chiefly the victim of the black violet aphis (*Micromyzus violae* Perg.) although several other species frequently feed upon it.

Under natural conditions the aphid has many different parasites which feeding upon it greatly reduce its numbers. The chief one under greenhouse conditions is a tiny wasp-like creature much smaller than the host even, and consequently often not recognized by a florist. The female deposits an egg in the abdomen of the aphid with its sharp ovipositor which hatches into a larva and feeds within the body of the aphid until it reaches maturity, resulting in its death. The aphid bloats up and turns brown before its death and the adult parasite cuts a round opening through the back of the abdomen and starts in pursuit of other victims.

Aphids having sucking mouth parts are controlled with a con-

tact insecticide or fumigant which is a very effective remedy against their soft, delicate bodies.

The standard remedy for the treatment of house plants infested with plant lice consists of Black Leaf "40" at the rate of one and a quarter teaspoonful in a gallon of water in which

FIG. 5.—GREENHOUSE WHITEFLY

an inch cube of Ivory soap has been dissolved to increase the spreading and adhesive qualities. This can be used either as a dip or as a spray.

On a large scale, where spraying would be too laborious, Nicofume liquid volatilized on the steam pipes, or nicotine paper smudged at the rate of a sheet or two per thousand cubic feet is the most practical. Hydrocyanic acid gas used at the rate of

one-fourth ounce per thousand cubic feet for an overnight exposure, is even more effective.

The greenhouse white fly (*Trialeurodes vaporariorum* Westw) is another very common pest of a long list of plants grown under glass principally such soft hairy-leaved plants as the Ageratum, Geranium, Tomato, etc. The wings are about the most conspicious part of its tiny body and being of a pure white color give the insect its popular name, whitefly. In the larval stage this pest may be mistaken for a young mealybug, except the margin of the flat body lacks the spines. The eggs of the whitefly are deposited on the under side of the leaves and are very minute, yellowish-green in color. Since approximately twenty-five eggs are laid per female and these hatch in about ten days, the entire life cycle requires only a period of six weeks, their rapidity in developing is well understood. The control measures given for aphids are likewise used against this pest.

The greenhouse thrips (*Heliothrips haemorrhoidalis* Bouche) attacks almost every plant grown under glass. Being very active and tiny, this insect is frequently overlooked until its characteristic injury appears. This manifests itself as whitish areas on the green foliage and as stained spots on the petals of such plants as the rose, carnation and cyclamens. Their habit of feeding in protected places, together with the fact that nearly one-third of their life cycle is passed either as an egg imbedded in the tissue of the plant or as nymphs beneath the soil, makes their control more difficult. The same control measures used against the aphids and the whitefly is the standard means of controlling this pest.

Two species of ants which are most commonly found infesting homes and appear as nuisances in various places are the little red Pharaoh's (*Monomorium pharaonis* Linn), and the little black one (*Monomorium minutum* Mayr). The former builds its nest in the wood work or walls , while the latter build theirs out-of-doors in the soil. Since each nest contains two or three queens each laying large numbers of eggs, the rate of reproduction is very high. Although the food habits of these two species vary, each is attracted to sweets and this habit is taken advantage of in their control with poison baits. The standard ant poison is made by dissolving two pounds of sugar in a quart of water and after adding a gram and a half each of tartaric acid and benzoate of soda the mixture is boiled for thirty minutes. To

this then is added one-eighth ounce of sodium arsenate previously dissolved in two ounces of hot water, as soon as it is cold, and carefully stirred; and finally a third of a pound of strained honey is added. By saturating small bits of sponge with this dope and placing it in perforated baking powder cans where the ants can get to it, they will do the rest.

Sodium flouride dusted about the haunts of this insect has been giving excellent results and just as good as the poison bait in some cases.

By following the black workers back to their colony and thus locating their nest they can be exterminated by injecting a few ounces of carbon disulphide or calcium cyanide into it.

A cosmopolitan pest that often becomes a nuisance around homes and greenhouses in close proximity to packing houses and warm, moist places is the cockroach. They are very easily controlled by dusting sodium flouride about their runways, which they lick off of their feet and get into their stomachs, where it poisons them. There are several species in Wisconsin. One species, the American roach (*Periplaneta americana* Linn), was observed recently doing serious damage to a bench of Ward roses near Milwaukee. The roaches were feeding upon the breaking buds and were causing quite a loss. Phosphorus rat poison spread on pieces of glass is quite effective where the dusting of sodium flouride seems impractical.

The sow-bug and milliped are other pests that thrive in warm, moist places where there is lots of decaying organic matter, such as a greenhouse bench affords, and frequently they become serious pests, feeding on the lower leaves and blossoms. These are easily controlled by a mixture of Paris green one part and sugar nine parts, scattered along on the dry surfaces of the sides

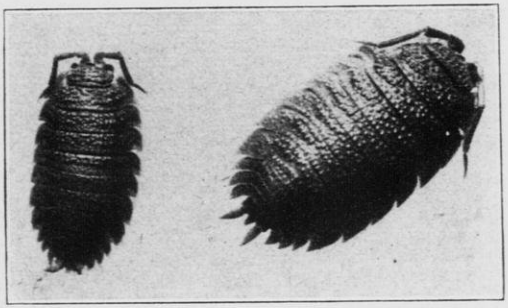


FIG. 6.—SOWBUGS (ARMADILLIDIUM VULGARE)

of the bench just about sunset. They relish this mixture and so it works fast.

Two very important pests of the rose and chrysanthemum are the larvae of two moths, the oblique banded leafroller (*Coecia rosacena* Harris) and the greenhouse leaf tier (*Phlyctaenia rubigalis* Guen.). Once established there seems to be a continuous batch of the young of these insects disfiguring the buds and foliage of the hosts named. Dusting with a mixture of sulphur ninety parts and calcium arsenate ten parts has been a very effective control. The sulphur should be a dusting sulphur and will be found very effective against mildews and black spot. When applied with one of the modern adjustable hand dusters a very light coat can be applied over a large area in a few minutes.

The rose midge (*Dasyneura rhodophaga* Coc.) and the Chrysanthemum midge (*Diarthronomyia hypogaea* Low) attack their respective hosts and become at times serious pests to some of our florists in the state. Under greenhouse conditions the rose midge completes its life cycle in from twelve to sixteen days and in case of a heavy infestation it can be controlled by nightly nicotine fumigations for this length of time. Hand picking and burning the distorted and infested buds is usually sufficient in this state.

The chrysanthemum midge has a life cycle of thirty-five days and heavy infestations can only be controlled by frequent fumigations or strong nicotine sprays over a long period of time. Hand picking is usually practical in handling the light infestations occurring in this vicinity.

The marguerite fly (*Phytomyza chrysanthemi* Kowarz) although at one time quite a pest in this state, has not been observed during the past four years. Being a leaf miner it is rather difficult to control, but through persistence it can be controlled by the use of free nicotine sprays.

The cattelya weevil (*Cholus cattleyae* Champ) was at one time established in some of our Milwaukee greenhouses where it was a serious pest to orchids. Through an ardent fight with everything from Hellebore to arsenate of lead together with handpicking it seems to have been completely stamped out.

An enemy of roses which seems to be quite generally distributed throughout the country out-of-doors as a native pest attacking the strawberry, has in some sections of the country suddenly changed its diet to roses. This is the strawberry root worm (*Paria canella* Say) and as a new pest it has shown itself to be

a serious menace to the rose industry. The adult is a little brownish-black beetle and it is such a voracious feeder that it perforates the foliage and buds and scars up the stems in short order, and its young larvae do equally as much damage to the roots. Although doing quite serious injury to the strawberries in this state, it has never been observed in a greenhouse. New soil for rose benches should not be taken from ground in which strawberry plants are growing, since this has been the means of introduction in all of the cases investigated. The control consists of a series of treatments, dusting the foliage with sulphur and calcium arsenate, covering the beds with light applications of wood ashes and tobacco dust and fumigating with strong dosages of hydrocyanic acid gas at the drying-off period.

Another pest never recorded in this state but which seems to be gradually spreading this way from the east, is the European corn borer (*Pyrausta mubilalis* Hubn). It has been observed doing serious injury to such plants as the chrysanthemum in greenhouses of the east. The larvae of this moth tunnel the stalks, causing the plant to wilt and frequently break over at the point of entrance. Suspicious plants should be pulled up and burned, and a specimen boiled in water a minute to kill the insect should be sent to the state entomologist for determination.

The florist has three serious mites to contend with, the common red spider (*Tetranychus telarius* L.), the Cyclamen mite, (*Tarsonemus pallidus* Banks) and the bulb mite (*Rhizoglyphus hyacinthi* Boisd).

The injury by the red spider is almost wholly confined to the under surfaces of the leaves which lose their color and fall prematurely. Heavily infested plants are further disfigured by the white webs. This mite reproduces very rapidly, the entire life cycle lasting only three weeks, and it attacks practically every plant grown under glass. Syringing the plant where practicable is the easiest means of control. Special nozzles have been designed which throw a fan-shaped torrent of water upwards, destroying the webs and dislodging the mites effectively and at the same time throwing the bulk of the water on the walks. Superfine sulphur may be used to check the mites where syringing is not feasible.

The cyclamen mite is even smaller than the former species and usually confines its injury to the young leaves of such plants as

the cyclamen, snapdragon and geranium. By its habit of piercing the tissues and sucking out the liquid contents, it causes at first small brown specks but eventually a crinkling and distorting of the leaves and dwarfing of the entire plant. The pest is quite difficult to control, but if the plants are watched from the time they set their first leaves, the infested ones sorted out and the remainder sprayed every two weeks with a strong nicotine solution (Nicofume liquid ½ pint to 10 gal. of water) until they are in bloom, they will be free from injury when they are ready for the market.

The bulb mite is commonly found on foreign bulbs being shipped into this country. It attacks principally the Easter lily, tulip and amaryllis bulbs, burrowing into the roots and stems and frequently results in preventing the flower from developing. According to recent experiments carried on by the Federal Horticultural Board, these mites can be controlled without injury to the bulb by treating them for thirty minutes in hot water, ranging from 122 degrees to 124 degrees F.

The use of hydrocyanic acid gas in the greenhouse for insect control is one of the most promising but least understood methods we have today. Properly used it is one of the most economical and effective means of control we have. Improperly used it is one of the most dangerous methods. If proper precautions are taken this gas can be used with a reasonable degree of safety on growing plants against such insects as aphids, whitefly, and some of the scale insects, with excellent results and without any injury to the plant. However, only from one eighth to a half ounce of sodium cyanide are required per thousand cubic feet for this purpose, while the dosage would not have to be increased very much to injure the tender growing tips of the plants, hence the importance of following directions. In commercial practice this gas is produced by the action of diluted sulphuric acid on a chemical salt, sodium cyanide. The gas is colorless and has the characteristic odor of peach pits. Sodium cyanide (96 to 98 percent) containing 50 to 52 percent of cyanogen should be used. The "cyan-egg" brand put up in "eggs" weighing one ounce each, is satisfactory. Commercial sulphuric acid, with a specific gravity of about 1.84% or approximately 93% pure, gives the best results.

The jars used to generate this gas in should be half-gallon glazed earthenware jars. And in mixing the acid with the water,

always add the acid to the water to avoid its sputtering in your face and the cyanide should be dropped into the jar enclosed in tissue paper, to delay the generation of the gas until the operator can get away from it without undue haste. These materials are used in the proportion of one part cyanide, 1-½ parts acid and 3 parts water. The cubic content of the house must be carefully computed and the dosage figured on the the basic of one-eighth, one-fourth or one-half ounce per thousand cubic feet, depending upon the pest.

Fumigation with H. C. N. gas should never be done in the daytime unless a dark fumigation box is used and the plants are kept in the dark a few hours after treatment.

Calcium cyanide dust and flakes have recently proved very effective and the hydrocyanic acid gas can be produced with even less trouble by simply applying this dust with a hand duster. In using this compound twice as much should be used per thousand cubic feet as is used in the case of sodium cyanide. On account of its simplicity and safety it is becoming popular as a control for white fly, thrips, and aphids and especially on violets where nicotine discolors the foliage.

RELATION OF GROWTH AND FRUITING TO ORCHARD PRACTICE

R. H. ROBERTS

One of the discouraging features of practical orcharding is the conflict of opinion as to the way to cultivate, fertilize and prune the trees. No answer is gotten from the successful commercial orchard, as no one treatment gives the best results, at least the most profitable orchards in different sections of the country are not treated alike. Likewise, discouraging reports have come from the experiment Stations, as these have furnished conflicting recommendations. It appears from this situation that there is no one best way to treat the trees.

Because of this condition, attention was turned to the way in which trees grow and fruit to see if there was any consistent relation of growth to fruiting. It was soon found that such re-

lations do exist. We will take, for example, the relation of length of terminal growth to the formation of spurs on it in the next season, in varieties which have spur fruiting habits. Short growths of 3 to 4 inches form only a few weak spurs. Four to six inch growths form more spurs which are larger. Increased production of number and size of spurs continues with increased growth up to about 12 to 15 inches. On growths longer than this the number of spurs may increase, but size and plumpness decrease. Since it is the fatter, good growing spurs which have the greater tendency to bear fruit, it is evident that not all lengths of growth will fruit alike. In fact, the generalization can be made that trees of shorter growth, of a few inches in length are unproductive as are also the trees of the longer 2 foot growth. That is, the unproductive tree either grows too little or too much. The significance of this fact is that weakly growing trees must be made to grow *more* in order to fruit and over-vegetative trees must be made *less* vegetative in order to fruit.

This fact offers an explanation for the conflict of reports as to how best to grow a tree. Some experiments and experiences were with trees in one condition of growth while others were with trees in different growth conditions. Naturally, conflicting results were secured.

It appears from this that the same treatment, such as using a readily available nitrogen fertilizer as nitrate of soda, would not have a constant effect upon the tree response, as fruiting, but should have opposite effects if the trees being treated were not growing alike. This leads to a rule for orchard practice: base the cultural treatment upon the way the tree grows.

The question arises now as to just how the tree grows. The relations of length of growth to fruiting in a general way have been indicated. Another character of importance is the diameter of growth. It appears that there is a close relation between thickening of the new growth and blossom bud formation. A good example of this is the unproductiveness of very dense shaded trees which have typically very slender growths. Pruning of such trees might cause them to make a little more length of growth, but if the cutting is of a type which increases the light in the tree this will have a tendency to give plumper wood and so more fruiting. If the pruning only makes more growth, and leaves the tree dense at the same time, it will delay fruiting.

Regular bearing of biennial varieties, as Wealthy, is found to follow the growth conditions. Regular bearing trees of this variety, for example, have more than 20 to 25 per cent of branch growth over 10 inches long. This growth condition results in regular bearing because the late season of growth, as is the case if 25 per cent of the branch growths are over 10 inches, many being 18 to 20 inches, prevents excessive formation of blossom buds such as occurs in the case of biennial trees.

The habit of growth is the key to why certain varieties are regular bearers. Such varieties as McIntosh, Stayman and Grimes have the habit of producing spurs of variable length and diameter. This means that they vary in the formation of blossom buds. Consequently they do not usually form excessive number of blossoms unless the terminal growth is very short and the spur growth is uniform. Moderate blossoming is the key to regular bearing. Varieties forming uniform length spurs of thick diameter blossom excessively and fruit biennially; those with variable length spurs blossom moderately and fruit regularly.

The thing most needed to improve fruiting of old bearing trees is to get rid of the poor wood in them. The wood does not merely remain on the tree and "bear some apples". It enters into the complex of the tree to pull down the average of the performance of the better wood. The weak wood should either be cut off or rejuvenated so that only such wood as bears good apples remains on the tree. That is, keep the tree in the growth condition it had in the earlier bearing years.

Watch what kind (length, diameter, bark color, leaf color) of wood bears the best fruit. Make the rest of the tree and all of the trees like this.

DISCUSSION

MR. IRWIN: Tell us once again about the amount of growth needed for regular bearing.

PROF. ROBERTS: We have found quite definitely—I have never yet seen more than two or three per cent of the trees that varied from this rule—all regular bearing Wealthy trees have from 20 to 25 per cent of the branch growths over ten inches. The reason for this is as follows: Buds form in Wisconsin about the first to the 10th of July. That means that after the 15th day of June we can't stop the buds forming by practices

like defoliation. Previous to this time we can. If increase in length is over and thickening takes place on all growths, all buds become blossom buds. This happens when there is less than ten inches of growth. On the other hand, if increase in length continues beyond the bud-forming period, fewer blossom buds especially lateral buds are formed. Consequently there are more leaf buds to form spurs during the next fruiting season.

MR. KELLOGG: Do many trees grow too much to bear fruit?

MR. ROBERTS: Rarely, except young trees before they come into bearing. That raises the question of how you bring young trees into bearing. I do not like to check the growth on a tree to get it into bearing. The thing I would rather do is to increase the light in the tree, which is just the same as if it were more shaded and getting less growth.

Friday Afternoon

REPORT OF THE SECRETARY

MR. FREDERIC CRANEFIELD

(Reporter's transcript)

This report may be in part rhetorical effect and part facts. Our state motto is "Forward." We cannot stand still. As a society we must keep up with the state motto. In the past year we aimed to move forward. We have established four new small fruit stations. I can't take time to define just what that means to the delegates from other states who may be present here but our own people are fairly familiar with it. We are trying to get people to grow the red raspberry in the state of Wisconsin and are doing it through trial demonstration stations. We now have such stations in Kenosha, Milwaukee, Burnett, Douglas, Rock, Langlade, Wood, Burnett and Waupaca counties.

The new local societies that were established during the year are located at Wisconsin Rapids and Antigo.

We have 28 local societies with 1098 members including the Sturgeon Bay fruit growers, the Wisconsin State Florists Association and the Women's auxiliary. The two last are state-wide. The society has aided in forming marketing associations whereever possible and that will be a considerable part of our work during the coming year, working with the Department of Mar-

kets and establishing local cooperative fruit selling associations, and we also gave aid to the local societies through premiums amounting to one dollar per member for each member of the local enrolled, that has amounted to two or three hundred dollars during the past year.

We still retain a part of our old trial orchard work on which the society was really built up. At one time we had thirteen such orchards; the number has now been reduced to four, those contracts expiring in 1928, 1929 and 1930. When they expire it is probable that we will not establish any more trial orchards nor any more small fruit stations. It appears entirely possible that we are going out of that line of work to devote our energies to something better and bigger. We have been engaged in it twenty-six years and it has been most satisfactory but is now pretty well in back of us.

We found difficulties in continuing the small fruit work; it was practically impossible to make a fruit grower and to get a practical demonstration at the same time. If we could find the fruit growers all ready made we could get along very satisfactorily.

Last year we gave premiums to new members. We secured 386 members, only fifty of which were renewals. There was some expense involved but we found it was worth all the cost. Doubtless that plan will be carried on during the coming year although we shall probably make some modifications such as offering scions and root cuttings in addition to plants. We have answers from over two hundred of those who selected plant premiums and there was only one complaint, all the rest were very well pleased and some very enthusiastic with the plants they received. Those reports will form a very remarkable and valuable part of the literature of this society when they are analyzed and compiled. I could give you many humorous and many pathetic instances but here are two that are practical and to the point. One man said that he thought the plants we sent him were from the ten cent store and they all died. They were not worth anything at all and he positively would not accept such an offer the coming year. Another person presented his viewpoint and wondered how we could send out such value for 50¢, that she could not have replaced that order for less than $5. There you have two extremes. One man said that his raspberry plants did very poorly indeed—his

dog chewed them all off. Another said that of the six apple trees which we gave, four were dead, two were alive. A rabbit had eaten the first four but he killed the rabbit and saved the other two and thanked us very kindly. I have not had time to go through all of them but I shall publish some of the answers without names in forthcoming issues of our paper Wisconsin Horticulture.

Regardless of what that premium cost us, it is worth ten times what it cost if we can only put a rosebush in every front yard or interest these people in growing flowers in the front or back yard.

The Annual Report is eagerly sought for and we of the society are rather proud of the fact that this report is sought for all over the known world. From Brazil and the Philippines we receive applications for our annual report and with the plant lists and other papers which it contains it is coming to be increasingly valuable each year.

Wisconsin Horticulture has been published more or less irregularly every year and we might mention for the information of our members who have not known this in the past, we might give you some cheering news—that the publication has been transferred from Des Moines, Iowa to Madison. Other improvements are in prospect. We hope to enlarge our publication so as to serve a great many more people.

I now come to one point which may be new even to the older members, the question of finances. I am sorry I cannot go into as full a discussion of that question as I had intended. The situation as I feel it now is this; that the board of managers, consisting of the president, the vice-president and the secretary, have always known how all of the money was spent to the last dollar and to the last cent. The executive committee have sometimes known how it was spent. The executive committee consists of fifteen members. The average member has never known. There was no effort to conceal anything;—we know, I hope, better than that, because when you attempt to conceal anything you invite criticism. It was simply a matter that did not occur to us at all. It did not occur to me that the general finance committee should have a general detailed statement as to how the money was spent and for what purposes. The bills are audited by the board of managers and again by the secretary of State and for the past three years the general executive

committee has had a detailed statement covering hundreds of items. I did not think it was scarcely worth while to have a hundred copies made of the detailed statement covering hundreds of items but I have prepared a detailed fiscal statement from July 1, 1923 to July 1, 1924. We not only ask but urge everyone to take a copy and digest it and ask questions later on. It shows the total receipts, from what sources derived and how the money was spent. We have always meant to give full publicity to those things but I have never quite succeeded. I doubt if the average member realizes, even after reading that report, what a task is imposed upon the executive committee and the board of managers in making the money reach. Anybody who has been connected with a state society will know what we are up against. You may not know just what that term "fiscal year" means. We cannot spend one cent beyond our appropriation and our general receipts for 1925 after the end of the year. The penalty is very simple—it is a term in Waupun—and we are very cautious. All moneys received must be turned into the state treasury one week after receipt.

That is about all, except there are two subjects I can only touch upon. I wish I could give a half hour to each one. I want to urge closer connection with the American Pomological Society, the fee has been reduced now to one dollar a year; and the American Rose Society is also another organization to which we can well extend our hand and comfort through membership to that society. In giving this report each year it always occurs to me to ask you, "is the Society worth while?" I want each one to answer it, if you can. After thirty odd year's connection with the society and watching its growth, I am convinced it is well worth while. It is needed in more cases than one. I can only repeat what I have said earlier, that the society must cover both commercial fields and ornamental horticulture but should not be dominated by either one. The society is needed and can be, and I do not know but what it is today, the most dominant factor in horticultural development in the state of Wisconsin, and we do not say that boastfully but humbly, as we view the situation and we know it. It is needed by the commercial horticulturists and the society is giving all help possible to them. If it were devoted entirely to commercial horticulturists we should have less than two dozen men here at the convention. It is needed to carry to a million and a half homes

in Wisconsin the message that life is not complete unless every home knows the beauty of a flower and until, in the language of the officers of the American Rose Society, until there is, figuratively, such a rose in every yard, and no one is a true horticulturist, I care not what his work may be, who does not rejoice in the beauties of the flowers. There are an increasing number each year who do so rejoice; the trend of thinking is in that direction. Someone said that people learned to build stately before they learned to garden finely, as if gardening were the finer art. That is as true today as when it was written.

Now then with reference to the other agencies that are looking to the development of horticulture in Wisconsin. They are each doing their own part. There is no one society as ours that can get as near to the hearts of the people. We are anxious to carry this message as another message was carried to all the people of the earth two thousand years ago.

MY JEWELS

MRS. F. H. HORSTMAN

(From Reporter's Transcript)

I did not know the title of my talk before I got here and, seeing that I have no jewels in truth, the secretary must mean the things that I treasure most, and that must be my garden of peonies.

The thing that has attracted me to the peonies has been the personality of the flower. I do not know whether you may think that I do not know what I mean, but to me flowers have personality and personality plus, some of them. There is a something about the peonies that appeals to me more than any flower. I presume the fact that you can abuse the peony and it will go on furnishing its beauty for you as though you were doing your best for its care and the long-suffering of the peony and the richness of its returns to you, are something that have often appealed to me; perhaps because I am a teacher. You know that we have among our students those that respond readily and also those who do not respond so readily and it is the ones that react to our work that we cannot help but feel the closest feeling for.

Now in the peony, if I told you some of my experiences you would think that I have a great deal to learn still but I smile when I think of the many things that I have taken for granted and have had results because I did not know that anything else could be expected. The first peonies that I planted I waited until they got well up in the garden in which they were growing. It was one of our neighbors who was dividing the peonies and I waited until they showed color in the buds in the spring. Any peony grower will tell you that it is a very unheard of thing to transplant peonies in the spring, but we went on a rainy afternoon and got our peony roots and transplanted them. We took them when the color showed and we knew what we were buying. I was somewhat disappointed that they did not bloom that spring but the next year there seemed to be nothing the matter with those peonies—they did their full stunt. And since then I have wondered how they did anything. From that day to this those peonies have furnished their full quota of bloom every spring. There is no necessity of taking them up in the fall and putting them in the cellar and watching over them all winter to see that they do not get too damp and rot. That is the experience I had with dahlias. I do not grow them any more.

The peony garden grew from that stock and since that—fifteen years ago,—there has been so much of interest developed in the line of peonies that it seems as though it is a never-ending joy and source of interest. From year to year we have added to the peony garden and unlike many other flowers in growing it there never have been the disappointments that come from seasonal conditions or anything like that. For instance, two years ago we had sharp frosts late in the spring after everything else had started and that was the spring the Therese had been added to the garden. It had just been planted the fall before and I had read in so many catalogs that planting small divisions would not give you any results inside of two years. That year that small root furnished eight blooms. I could not account for it because I counted only four eyes on the root when I planted it in the fall but the explanation came later through Mr. Cooper. When he put out his fall leaflet he spoke of the fact that when the peony bud was spoiled by some untoward accident in the spring that the two leaf buds had grown so that instead of having four I had eight. So that is

the personality of a flower that appeals to me. No matter what the conditions, it is always ready to give its full of joy and beauty.

Another thing that has always seemed of comfort to me; the peony may be abused but I do not know of any instance where it has been killed. It may be neglected and long-suffering but it is always there and year after year without cultivation, without any particular fertilization or anything being done to it, there will be that dependable bloom that can be counted upon in June. Then to think of the wealth of color and the wealth of different kinds. I do not mean kinds in varieties, but the singles and doubles and half doubles, all contributing their variation, that will lend interest and also attraction to your garden.

Another thing that makes the peony especially loved by me is the fact that the peony will go on and on and year after year. I think some one made the statement that there was a peony in Maine that had furnished bloom every year for 125 years. The bloom was exhibited at a show in New York. Just think of planting flowers that will bloom for 125 years and still going strong. When we plant other things and they die out in the course of a few years we take it as the course of nature. Think of something that will last that long a time.

In Baraboo there is what we call the south side—that is over across the tracks and in the course of years the mill district has grown up along the tracks and it has been more or less unpleasant because of the heavy smoke and the traffic that usually is found around yards and the depot, but in front of one of the weather beaten houses, dingy because of the smoke and in the little space between the door-step from the porch down to the street, like all such places look when children are accustomed to run across it, in that spot each spring there was one plant that grew and it was a single peony. The flowers are not large and as the half opened bud came up it made one think more of a pink rose than anything else. I used to pass that peony bush on the way to town and made special trips through that part of town when it was in bloom. I asked the owner of the place who is a fellow teacher, if some time she would let be buy a division of that peony and she said, "Buy it? No, But you can take one off at any time. Be glad to have you. That peony means a great deal in our family. When

we moved there, I think it was something like twenty years before, we brought that out from the old house where we lived. That is the one thing which connects the two places." It is sixteen years since we had that talk. Last spring it had its quota of bloom, beautiful as ever. That thirty-six years it has been going strong.

I presume there are a number of single plants that are marks of beauty that people consciously or unconsciously look for each spring. Another place we always look for peonies is in the cemetery. I did not know until I made a business of looking for peonies that they were so much of a favorite in cemeteries. But why not? There they will grow, neglect or not. They will live and bloom year after year. There are several plants in our cemetery that are referred to among flower lovers. They ask each other, Have you seen a certain bloom this spring? I remember last spring we took a whole afternoon going around looking for the certain plants that had been described to us; showing the interest that may be in plants people see from year to year. The length of time people can see those plants also makes it a great joy.

Whether there are pests or untoward things which hinder the growth of the peony or not, I have not found them. Of course there are ants that suck the juice of the peony. Some say they are harmless; others say, I think it is Mrs. Harding, that there is danger of their spreading fungus growth. At any rate, they are there and do not particularly disfigure the flowers.

I have heard people complain that they plant peonies and that they do not bloom. I have in mind a peony that was planted in the churchyard and one of the old parishioners had been watching that peony for thirty years and it never had had a bloom on. That was two years ago and we thought that something ought to be done. The rector was going to take it up and put in the alley. If it had kept that ground for thirty years with no return, something should be done. He dug it up and looked at it and said, It looks like a good root, I guess I will plant that peony and give it one more year. The next year he sent me a peony blossom with a note saying, "What is it?" It was a beautiful, beautiful specimen. I went down to see where the peony came from. He said, "that is the peony that I dug up after it had been planted for thirty years and re-

planted it in the garden and this is what has resulted." Now, why did it bloom? My theory is that the peony was planted and that the dirt was piled in to fill up the lot and it was a little too deep for the plant. It seemed to be the best explanation, but it may not be correct. Planting a thing too deep is going out of the way to make trouble. It will make its return if it has any possible chance, or half a chance.

The freeness of the peony from pests and diseases that makes it a hardship to grow some plants is another thing that makes it especially dear to me.

Then when we come to the matter of expense,—most of us that like flowers can keep ourselves poor enough in getting them and constantly in the matter of expenditures on peonies you can go the limit or you can do very well with little money. The expenditure of a little money will give so much in return that we cannot say that the peony is a luxury that we can't enjoy. For instance, last evening a catalog came and our good friend Festiva Maxima was listed at 45¢. That is cheap enough. You pay that for a geranium and how long will that last? We can select some very fine varieties that will give rich return for a very small outlay. In the average yard there is not room enough to put in a great number. You talk of putting peonies in hedges. I think it is too bad to plant them so when single specimens are much more beautiful. I am speaking from my own experience on those that have proved the greatest joy in growing. Nothing can be of greater satisfaction than Festiva Maxima for white and Monsieur Jules Elie, in pink, the silvery pink that has much the shape of a beautiful chrysanthemum. Then if you wish another pink, take Venus. Every flower grown being perfect. And a red that will go along with the same group, is Felix Crousse; a beautiful red that will bloom about the same time as these others. Then the Edulis superba for a darker pink, that has the rose odor.

That matter of odor is another thing that we have to consider with the peony. I think there are four standard flowers that will give splendid satisfaction. Then, if you want to just take a fling, you can just go the limit. I think Mrs. Edward Harding is quoted at one hundred dollars a small division, and from that on down. There may be some quoted higher than that but these high-priced divisions do not mean that they are so much better quality of flowers, just simply the rarity of it,

and peony fans, like tulip crazed people in times past when any price paid for a rare tulip was a good investment, may go as far as they wish.

There has been so much developed in the shape and size of the flowers by the growers and breeders of peonies in the last generation that it is extremely interesting to see what has been developed. Not only the size and wonderful color but the odor has come to be another element in the selection of peonies. The old, strong odored peonies will soon be a thing of the past because they are being passed by. The peony with a rose or delicate odor is now being grown to the exclusion of those with a rank odor.

Another thing that is of so great satisfaction—you know we can raise beautiful flowers and they may be beautiful in the garden but when we want to give them to somebody some will be simply carted away and ought to be thrown in the ditch because of wilting so soon after cutting. You know there are some things so perfect that you can't find fault with them. It seems that is what we find in the analysis of the peony. It is so all the way through. Cut them and what wonderful decorations peonies can be. Not only in the home but on any occasion. I must confess that one of the things that encouraged me in enlarging the peony garden was the fact that it bloomed just when commencement exercises came on and people wanted flowers. It was after Decoration Day and flowers had been wanted in quantity for decorations. It is a joy to see it in the stage decorations, usually as the main flower. Last summer of course they developed late but I think I threw out the last peony the last week in August. Those had been cut the last of the first week in July and had developed from buds so that the full bloom came out about the first of August. Now can you imagine that with any other flower? And this is not with expert care. This was the foolest kind of care of an ordinary dub in the matter of taking care of flowers. A person can love flowers and yet not know what should be done to get the best out of them. So there we have another quality that endears the peony to those who grow it. It is not something you have to use only in your home or for your own people but something you can pass on to your friends and let them enjoy.

REPORT OF DELEGATE TO ILLINOIS CONVENTION

MRS. C. E. STRONG

The sixty-ninth annual convention of the Illinois State Horticultural Society met at Urbana, Illinois, December 16 to 19 in the Urbana Lincoln Hotel, with a goodly attendance of men present and one lone woman, the delegate from Wisconsin.

After a short address by the president, at the close of which he emphasized the fact that all meetings would begin promptly at the hour specified in the program, whether there were few or many members present, Dean Mumford of the Illinois College of Agriculture, gave the opening address on the Place of Horticulture in the general Agricultural Program of the State, in which he placed Horticulture in the front rank and urged a more general getting together in this work of those interested.

The Illinois Society differs considerably from the Wisconsin Society, in that the majority of its members, or at least a very great majority of the members, who attend the meetings, are interested solely in commercial orchards, and it was for these members that the greater part of the very interesting program was prepared, on the planting and care of orchards, insects, spraying and marketing. The planting and care of orchards was gone into thoroughly by Dr. M. J. Dorsey of Morgantown, West Virginia. Prof. Laurenz Green of Purdue University; William H. Stiles, of Henderson, Kentucky; F. E. Carver of the University of Illinois, and our Dr. Roberts of Wisconsin all urged consistent care from the very beginning; while old and new ideas and experiments in spraying and prevention of diseases of orchard and fruits were given by Dr. H. W. Anderson of the University of Illinois, Dr. W. A. Ruth and R. L. McMunn, also of the University of Illinois. Dr. Alvah Peterson, New Brunswick, New Jersey, announced that because of the crowded conditions in that state, numerous members of the Oriental fruit moth family were on their way to Illinois, Michigan and Wisconsin. No one was particularly joyful over the announcement, as the larvae of this moth refuses to be killed by any poison dope set out for them, never swallowing any of the outer layer or covering of fruit. Judging from Dr. Peterson's general description of the habits of this moth, I should call it the most

ornery pest a horticulturalist would have to deal with. Let's hope they all froze to death in the cold weather of December.

They have one habit in the Illinois society that I particularly enjoyed, that was the thorough discussion of nearly every paper or talk given, often a member who did not quite get a point made by the speaker would interrupt and ask that he give it over again, sometimes someone would even disagree and there would be a lively discussion for a few minutes.

Dr. J. W. Lloyd of the University of Illinois, who has been spending some time on the Pacific coast, gave a very interesting talk on the contrasts between Illinois and the Pacific Coast as a fruit-producing region. He emphasized the fact that they worked twice as hard to produce a crop of fruit on the coast and that the distance from a good market and the high freight rates were distinct handicaps. Yet they were selling their fruit in Illinois, and evidently at a profit. He reminded his hearers of the old saying that in union there is strength and that the fruit growers of the coast were well organized. Right here came a most amusing interruption. A husky member of the society got up and said, "Well, now; those coast fellows must be something like me and my seven brothers. Once when I was a youngster a bigger boy just everlastingly thrashed me. I complained to my father and he said, "Couldn't you lick him?" "No," I sniffled. "Well then, get one of your brothers to help you, if one isn't enough, get two or three." I took the hint and after that the word went round that when you pitched onto one of us you had to lick the whole eight of us boys and we got along fine without much fighting. Perhaps if the fruit growers of this section got together we might be able to lick those coast fellows in our own markets."

Because of rain I did not get around as much as I would have liked to but I saw Illinois and western apples on display in some of the stores and some of those Illinois apples were a sorry looking lot. We see similar ones at times in Wisconsin.

A very interesting illustrated lecture on nut growing in Illinois was given by Dr. A. S. Colby, of the University. The thought he wished to impress on his audience "that there was a field wide open for the growing of butternuts, hickory nuts and filberts since the clearing out of the native nut-bearing trees" would apply to Wisconsin.

The market gardeners who belong to or attend the meetings

of the Illinois State Horticultural Society are very few, judging by the appearance of the room on Wednesday afternoon when talks on Disease Resistant Strains of Vegetables, by Prof. Sayre; Practical Methods of Controlling Insects on Truck Crops, by C. C. Compton, assistant entomologist of northern Illinois, and growing cauliflower by Fred Baker, the cauliflower king of Kankakee, were given. The talks were excellent and though the audience was very, very small they were appreciative and there was considerable discussion.

There were three evening meetings. Tuesday evening was given over to the Student Horticulture Club, who gave an amusing burlesque on the farmer fruit grower and his ignorance of the proper methods of spraying and packing fruit, even pumpkins got by in the barrels. I was happy to tell them we had gotten past that stage in Wisconsin, Professor Moore had taught us better. After the entertainment the students served the audience with sweet cider and doughnuts. (They have made and sold $1500 worth at the University so far this year.)

Wednesday evening was devoted to an interesting illustrated talk by Professor Peterson on his recent summer in Europe, and a very short paper on Flowers for the Home, by the Wisconsin delegate. I was very glad indeed that my paper was going to be short when I heard one member tell about a speaker at some meeting who had had several very fine opportunities to stop talking and hadn't taken advantage of them.

Thursday evening was given over to the annual banquet, which was quite well attended and a very enjoyable affair, with singing by the University Glee Club, several very fine solos and jolly, hearty community singing led by Prof. Peterson. Prof. Blair was a genial toastmaster, the speeches were short, interesting and enjoyable and President Burrows sent us all away smiling with his delightfully humorous plaint on not being allowed to introduce the toastmaster.

The Illinois Society had no exhibit of fruit at the convention, as they had used up all available funds in putting up a show at the Chicago exhibit, believing there was the best opportunity to advertise Illinois fruit. The students' horticultural club had a small exhibit of fruit, also an educational exhibit consisting of fruit from different sections of the country.

There were no flowers on display as the florists of Illinois are not members of the Horticultural society. But I noticed in a

number of the addresses as well as in Professor Blair's talk on Thursday evening, an urging to reach out and gather into the society all who are horticulturists.

There was much in this convention, as there is in every convention, that one gathers to oneself, that somehow cannot be passed on easily in a short time, much that is helpful. You who attend these meetings year after year will understand, will know that in a report like this I can only touch the surface.

I cannot close this brief report without mentioning the courtesy and the efforts made to make my visit an enjoyable one by the officers of the Illinois Society and faculty of the University of Illinois. My first visit to the Illinois Horticultural convention will always be a pleasant memory. Being a woman, I would have to add a postscript. I just can't quite figure out yet why President Toole sent a woman delegate to the Illinois convention. If he gleefully intended to surprise both the Illinois society and myself, he surely succeeded. The shock to the Illinois society I think will be far-reaching for two Illinois women ventured into the meeting, seeing one woman already there, seemingly at ease. They stayed, they enjoyed the meetings and enthusiastically vowed they were coming again and bring more women. There were topics they would like to hear discussed before the society. What has been done in the Wisconsin society can surely be done in the Illinois society, perhaps even better—so *they* say.

SUMMER MEETING OF THE WISCONSIN STATE HORTICULTURAL SOCIETY

Gays Mills, Wis., Auguust 20, 1924.

Called to order by the President, W. A. Toole at 2 p. m., who announced that on account of the state of the roads and the weather the forenoon program had been carried over until the afternoon.

HOW FIVE ACRES OF APPLE ORCHARD GREW TO SEVEN HUNDRED ACRES

MR. CRANEFIELD

To those of you who know about the orchards here, who are familiar with them, it seems to you an absurdity, an almost unnecessary thing, to tell about how these orchards came to be planted on the hills, until we stop and realize that some here are strangers and that they might wonder how, in a somewhat remote part of the state, away from a main line of railroad, up in this valley there should be planted seven—nearly eight—hundred acres of orchards; the largest orchard section in the state outside of Door county.

It came about this way. Some 17 or 18 years ago we had in Madison an editor of a paper who was a great hiker and starting up this valley he would walk from Wauzeka to LaFarge and back. He told me repeatedly about the wonderful apples that were grown up this Kickapoo valley. I had heard about Kickapoo medicine and Kickapoo cheese but did not know of any apples grown up here. You could come in by train, stop at Barnum and then up to Gays Mills for an hour or two and wander around. I did so and found the most wonderful apples being brought to the stores in sacks and lumber wagons and sold at 25¢ a bushel. That was before apple scab and other things had been brought in. It took me five years to convince the hard-headed men in our society that such things were true. I brought them out here singly and in pairs and made them climb these

hills on foot and bump their heads against those apple trees. Finally they were all of one mind and said "It can be done." Now it has been done! We boast about our state horticultural society. It is one of the bright spots in the work of the society. That it has been able through its efforts to encourage the planting of an orchard two miles or two and one-half miles long up on these bluffs, and plenty of land for several more. I hope to see the time when there are several thousand acres instead of several hundred.

The first step was planting the trial orchard—five acres. We leased the land from Mr. Hays. There were seventy-five trees each of Northwestern Greening, Newell, McIntosh and Wealthy. About 1906 I received a letter from a man in Milwaukee who was a mail carrier and who had several friends who were also mail carriers. They each wanted a little farm of their own and had about decided on fruit farms. I told him there was good apple land in Manitowoc county and in Door and in Crawford county. Then later I heard that they had jointly bought a farm and planted forty acres of apple orchard.

The apple trees on the hills around are owned by about three hundred people. By that I mean various companies with stockholders which have developed the orchards and own them. So from that four or five acres planted by the state Horticultural Society there has grown an orcherd of 750 acres, which I wish were seven thousand five hundred acres.

DISCUSSION

MR. KELLOGG: What year was the trial orchard planted?

MR. CRANEFIELD: 1908. Mr. Kegel of Milwaukee began writing letters and from that developed the fruit farm. There were about eighty acres of land cleared. The rest of the 750 acres was all brush.

MR. WM. TOOLE: Of course we are really proud of the development of the orchards and Mr. Cranefield's effort. The world has been shown the possibilities of fruit growing in this side of the state and yet I do not understand why there has been so little said about cherries and grapes and yet from what I have seen I think that it is very manifest that if people had their minds on growing cherries, to a limited extent, as they do at Sturgeon Bay, I think the possibilities are as good here as in that country. We tried to demonstrate the possibility of growing grapes up at Sparta. That failed. But it has been demonstrated that they can be grown here.

MR. CRANEFIELD: Door county was known as a cherry county for years. It is still known as a cherry county. Apple orchards are increasing there all the time. If I were a prophet I would make this prediction—that within ten or fifteen years there will be more apples grown in Door county than cherries. If I were to offer another prophecy it would be this: There will be more cherries grown in the Kickapoo than apples. Also grapes thrive well.

AN EXPERIENCE IN VINEGAR MAKING

MR. J. C. SCHUBERT

Mr. Cranefield called us up about making some explanation here as to what we were doing up on the hill in vinegar making. Now I will say that we have not progressed quite as far in vinegar making as we hoped we would by the time of this meeting.

In getting started and installing new equipment and machinery we have been delayed and we have not actually made any vinegar, while all our equipment is here. What we know about making it and what we say is from the theoretical side and also from some experiments that have been made by others before we have started.

We might say that the Kickapoo Development Company is composed of twelve or fourteen different corporations and in addition several individual owners of property. They elect a board of directors. That board consists of twelve men and twelve is too many to supervise and to operate any project of that kind so we have an executive committee composed of three men. One is Mr. Schnell of Milwaukee; and another is Dr. Boyce of Madison; and the third is myself. We divide up somewhat on the work although we do it pretty well together, in the line of fruit juices that has been left to Dr. Boyce and myself largely.

Now in handling the fruit up here we found that we had enormous quantities of fruit that was going to waste. Unfortunately, last year we had severe hail storms and our fruit was practically ruined. It could not be sold as first-class fruit. While we sold something like thirty cars it was not A. 1. because of the hail marks. We installed a hydraulic press which made for us last year about sixteen thousand gallons of fruit juice. Of that we put between three and four thousand gallons into sweet cider. We put in a filter, a clarifying xxxx tank, and then filtered the

juice; then we put in our bacilli and then we put in a continuous sterilizer heated with steam so that as the fruit juice came from the filter it went to the sterilizer and then went to our various containers such as we were using for sweet cider or for storing the juice for vinegar making purposes. We saved nothing that was not filtered and sterilized, so that what we have in the cider mill at the present time has all been sterilized so that the bacterial action would be retarded and we put in a trifle of acid to start that which we were keeping for vinegar into hard cider. It seems that the safest way to handle the fruit juice is to sterilize it. You can handle the raw fruit juice if it is handled carefully and if the apples are carefully washed and kept in a clean place, but the safest, the most modern way is to sterilize that fruit juice and then propagate the bacteria such as you want in the juice for the various purposes.

There are a great many ways of generating vinegar from the fruit juice which makes hard cider. We find also that in converting the alcohol into acetic acid that the safe way there is also to propagate the bacteria for the conversion from alcohol into acetic acid. The methods for doing that are quite numerous. The most modern way of converting is by using a vinegar generator—a tank six feet in diameter and sixteen feet high—filled with basswood shavings. These shavings are not the same that come from an ordinary planing mill or from an ordinary plane. They are made with a machine so that they are cut and rolled, thin slices of basswood through which the air and the fruit juices percolate. A tank that size will convert approximately 124 gallons in 24 hours of hard cider into vinegar. The strength of this vinegar depends on the strength of the alcohol in the fruit juice. Your strength of alcohol is again dependent upon the amount of sugar which is in the apple. It will generate approximately fifty per cent of alcohol from the sugar so that if you had twelve per cent of sugar in the apple juice you would get a solution of six per cent of alcohol content. That, when converted into vinegar, would give you a vinegar ranging from six to six and one-half per cent acetic acid. The commercial vinegars are sold at from four to four and one-half and one or two different ones are selling it at five per cent of acetic acid, so that a dilution is necessary in order to make of that vinegar a commercial product and for that reason it becomes a profitable thing to convert the fruit juice into vinegar.

We find it will be about as profitable to handle it as vinegar as for sweet cider, for to handle it as sweet cider we have to put it into air tight sealed containers. That would be glassware. Vinegar can be stored in barrels, but they have got to be about as full as you can get them because if you do not keep those barrels full these bacteria will attack (when all the alcohol is consumed) will attack the acetic acid so that you need to take your fruit juice, run it through your generator into vinegar, then run that through your generator and make it a neutral solution, so that you have nothing but the milder solution left. In making it for home consumption or on the farm that same thing is true. You can convert the sugar into alcohol and the alcohol into acetic acid. It is a perfectly natural process and it will do it itself in the barrel. Dr. Boyce will tell you a few things about that from an investigation at the University. The generators are not hard to operate, although in converting into alcohol it does generate heat and that must be kept at 68 degrees. You can convert vinegar in an ordinary cellar which runs about 68 degrees. You can generate your own vinegar in a barrel. At about 104 degrees of heat the action is stopped.

That is about as much as I care to say in connection with making the vinegar but I want Dr. Boyce to say just a few words about an experiment which they are making at the University by converting hard cider into vinegar.

DR. BOYCE: The University conducted some experiments last year on converting apple cider into vinegar. They have a number of barrels placed in their basement and they filled the barrels about 2/3 full so as to admit a circulation of air. They have not sterilized it but placed it in the barrels in fresh condition and allowed it to undergo natural fermentation, as it would on the farm. They have kept it about living room temperature, the ideal temperature for the alcohol fermentation, merging the sugar into alcohol, would run about 70-90. About 86 is perhaps an ideal temperature for the conversion of sugar into alcohol and for the conversion of alcohol into acetic acid. Like other chemical processes, the higher the temperature the faster the chemical processes take place but if you use too much heat in conjunction with the production of vinegar you are apt to lose a good deal of alcohol and acetic acid by evaporation.

They are conducting these experiments, I understand, with the idea of demonstrating whether it is practicable to produce vinegar on the farm. A number of their samples have been examined recently and showed good vinegar produced since last fall. Some of their samples are below standard but some show

8.34% acetic acid. If they have that they must have a very high sugar content in their apples. You can't get—practically, any way—as high a per cent alcohol as sugar. Apples are said to contain all the way from seven to fifteen per cent sugar but those must have been greater, if that is possible, they must have had sixteen or seventeen per cent. Anyway, they are producing some good vinegar and some that is not good. It means that you can produce good vinegar in that way; they are doing it; but with not as great a certainty as though you pasteurize the cider and completed your alcoholic fermentation before allowing any acetic acid germs to get into them and so the real practical and sure and commercial way to produce vinegar is to sterilize it and carefully guard against any acetic acid fermentation because the acetic acid and alcohol ferment are antagonistic to each other and if introduced at any time you will not have—you are not so sure to have—a good product. Make sure that the alcoholic fermentation is complete and then introduce your acid fermentation and complete your vinegar.

DISCUSSION

MR. TUTTLE: In 1871 we used to get empty whiskey barrels from saloons, cleanse them, put on a coat of paint, and have a big rollway right from the press, right in the sun and put our cider barrels upsidedown. When cold weather came they were put into the cellar; next spring put out on this rollway again and about the middle of July we were ready to use it. The people on the farm succeed in making good vinegar.

MR. BOYCE: Undoubtedly you can make good vinegar that way but our market requirements are that it shall contain not more than ten per cent acetic acid. You are apt to get some grounds in it and if you want to be sure and get a good flavor it is necessary to control fermentation. It seems that without sterilizing it the yeast fermentation will take place and whatever is well established seems to control the situation. If you keep it warm of course you will get a good alcohol content. If you roll it into the cellar, fermentation is retarded and some germs may begin to grow.

MR. TOOLE: How do you find out what percentage of acetic acid you have?

DR. BOYCE: You have to analyze it, of course. In the hard cider they estimate the alcohol. You can get at it loosely with a hydrometer. The percentage of sugar in the cider can be determined with a hydrometer. If the juice contains fifteen per cent of sugar the hydrometer will read 15, and that is practically sufficient for cider to make vinegar from. If you have a cider that contains less than 10% of sugar as shown by the hydrometer you should get four or five per cent of vinegar.

MR. MOYLE: In this experiment have they taken different

varieties of apples and tested them out as to the ripeness of the fruit?

DR. BOYCE: They have not gone into that definitely. This is known: Apple juices have been analyzed and in a general way summer apples have a low sugar content, fall apples an intermediate sugar content and winter apples a high sugar content. The juice is more concentrated the slower an apple develops.

HOW WE PUT THE APPLES AND CHERRIES ON THE TREES

R. L. MARKEN

I am going to tell you what we are doing for the trees, although we did not succeed in putting many apples on them this year. We are trying to develop and maintain a vigorous growing tree as free from insect and disease injury as we possibly can. To do this we cultivate and mulch, fertilize, prune and spray. We believe in cultivation. We would like to follow the clean method of cultivation if we could but we cannot do that on account of washing so we cultivate between the rows and leave a narrow strip right in the row to prevent washing. Where it is too rolling we cultivate alternate rows and where it is too steep for that we do not cultivate at all. Our cultivating is done with tractors and discs either with the tree row or diagonally across the row. We do our pruning in winter. We have not done very heavy pruning and will not do very heavy pruning until they get into heavier bearing. Experiments indicate that they bear earlier with just a moderate pruning. We have found out naturally, that the more we cultivate the more the soil washes. We have followed the cover crop system and now are sowing sudan grass in the larger portion of the orchards to be plowed under next spring, preparatory to seeding it down. About thirty acres were seeded this spring and about 120 will be seeded next year. I think that in the future we will adopt a sod mulch practice. It seems that we cannot cultivate the orchard and keep the soil. I think we will have to seed to clover and try and maintain a good clover sod, turning that under as soon as the clover fails. I believe that we can maintain a vigorous growing tree by doing that and fertilizing. Up

to the present time all the land that has been too steep to cultivate has been mown and the grass used for mulching the trees. Those trees have received about a pound of nitrate every spring. Trees that have borne a couple of years or longer, depending upon the vigor of them, have received up to 2½ lbs. of nitrate per tree, cherries as well as apples and with the sod mulch system the nitrates will probably be increased.

In spraying we follow the regular program. The McMahon and Snow being the most susceptible, receive the five full sprays. The other varieties receive only four.

DISCUSSION

MR. E. W. SHELLING: What do you use for spraying?

MR. MARKEN: Lime sulfur and arsenate of lead entirely for the apples and both the lime sufur and the Bordeau mixture for cherries with equally good results.

MR. SHELLING: How many acres would a person with a sprayer with two leads of hose be able to take care of?

MR. MARKEN: Forty acres. You could possibly take care of more. We took care of seventy acres last year with an old Bean one-lead outfit but this year it fell down on us.

MR. POWERS: What kind of winter varieties for this state give the most satisfactory yield?

MR. MARKEN: I do not know of any better variety for winter than Delicious. The Delicious seems to be coming through very nicely. We have also had two or three nice crops of Johnathan. The Greenings don't bring so much on the market.

THE PRESIDENT: We have here a question box, Perhaps it would be a good time to bring up the questions. The first one is: "In regard to apples and cherries. What should spray cost for sixty trees or more, to give man a fair price for labor, materials and use of apparatus?" I presume that is in case someone is doing commercial spraying around for neighbors, etc. Have you any figures on what it costs per tree for spraying?

MR. MARKEN: No I have never figured that out. You can't give anyone an estimate that will hold for everybody. There are so many rules for spraying. Farmers come around and you tell them what to get and they use a hand sprayer and don't use so much.

MR. KELLOGG (Janesville): I belong to a spray ring down in Rock county and one of the rules they laid down in that organization—and in fact that holds pretty true in all the spray rings—25¢ a tree is charged to every member of the ring according to the number of trees he has and last year the additional cost brought the cost up to 30¢ and 32¢ a tree, putting

on the three sprays. That would apply to trees medium size. Where larger and older trees were sprayed the cost would run up to half a dollar for each tree. We used lime sulfur and arsenate of lead. That covered the cost of materials and labor. It did not include any interest on the investment but was simply the actual cost of applying.

DEHYDRATING PLANTS FOR FRUITS AND VEGETABLES

M. B. GOFF

(From Reporter's Transcript)

With respect to dehydration or drying, it means that you can condense a fruit or a vegetable and take out so much of the water that it is the cheapest thing in the world to ship long distances and makes the cheapest thing in the world to transport. I do not want to pose as a dehyrating expert because what little experience I have had has been over a comparatively brief time. As applied to horticulture, the dehydration of fruit and vegetables is one means of marketing. Canning is also one means. Shipping these products to the fresh markets for immediate consumption is another means and the subject should be viewed entirely from that light. That is, to say that hydration has a place wherever the drying of products will facilitate the marketing of those products. In the present state dehydration is not a standard practice in the way that canning has become. Any group of men who want to start a canning factory can hire competent men to plan and operate the factory for them and to be sure that they will put up a good product. The dehydrating industry has not yet reached that condition. In the first place, there are a great many types of dehydrating machinery. The idea of taking the water out of products and making them keep for years, being able to ship them anywhere because they weigh so little, has made people so enthusiastic that they have at once started on some method of dehydration. Some of them use hot air, some use steam, some are heated by hot oil, some by oil burning furnaces, some of them have used fans for driving air through the products and some have used just an ordinary furnace. And so to dis-

cuss dehydration plants would be almost entirely out of the question because it brings out such a variety of devices, so few of which have been tried out to commercial success.

The hydration of apples is perhaps one of the most promising at the present time. There is a fair market price for the grade of apples that can be used in the canning plant or for dehydration. Dehydration will not use the low grade of apples with any great economy. There is a market for such a chopped up product such as is made from cores and peelings and scabby fruit but it will not pay any more than the cider mill or the vinegar factory. I know of no plant that is trying to put those products on the market. It is only done where the work is carried on with other grades of fruit. In other words, it is a by-product of dehydration the same as with other products. The process itself simply is the matter of taking water out of the fruit and reducing it to a dry state. Theoretically speaking, the faster this water is removed under conditions which in no way destroy the product the better the final product is. The more moderate the temperature the better the final product is; the slower and hotter the poorer the product is. You are all familiar with the dried apples which we used to have in the stores more than we do now and probably have the same taste in your mouth that I have when you think of them. Something to use when no other fruit is available. Many of you who have come from the east and spent some time there are familiar with the apple evaporators that used to be on most of the fruit farms and that still are operating in abundance. Dehydration is probably just as far away from the old dried or evaporated apple from the standpoint of being a good product as it can be. It has frequently been said that a dehydrated product was merely an old-fashioned evaporated product with a college education. In a sense it is true. Any plant product dries by giving off the moisture from each one of its separate pores. That is the method regardless of what machinery is used. The old evaporators used to dry with the hottest heat and the structure was broken down and the final product was dead. A high grade product should when cooked take up the water it has lost and swell back to its original shape and firmness. I have seen instances of a dehydrated potato which, when soaked you could take up in your hands and find just

as firm as when originally dug. It is a little difficult to get an apple so firm as that but it is the readiness with which it takes up moisture again after it has been in a dry stage that counts.

Perhaps the best type of machine for dehydration purposes for the ordinary output is a type used in California. It is a tunnel of concrete or hollow tile, 30 to 40 feet long. At one end is a battery of furnaces. These stand in a room and the outlet pipes circulate around like the old-fashioned heating drum on the stovepipes. Then a fan is installed and sucks this warm air through the tunnels. In many cases the apples are split into small pieces and put on a tray, wire or wooden, loaded on carriages and placed on a railroad track that runs through the tunnel. These carriages are propelled mechanically toward the fan. Sometimes propelled away from the fan but the most accepted type of plant propels them toward the fan. As the product comes closer to the dry stage it comes closer to the type of heat. In many of these plants the air is again forced back or part of it is, so that the heat is saved and the moisture content is raised. Roughly speaking, a current of air bearing a large amount of moisture acts as a cushion. Using a very large amount of air tends to form a skin which we call case hardening and this prevents rapid drying and makes an inferior product, so, outside of economy, there is a very good reason for re-circulation.

I do not want anyone to take my very brief description as being a statement that this is the ideal or right kind of plant. I do not believe there is any answer to the question of what is the right kind of plant without also having a discussion of the type of conditions and products which must be started before the right type can be decided upon. Personally, I am a little in favor of a steam plant. It gives you faster drying and a better control over the conditions of temperature. It is somewhat more costly, if efficiency of the final plant depends on what the cost of fuel is, taking into account other things.

Seven-eighths of the question of dehydration is a question of marketing. There is a comparatively ready market for dehydrated products if they are put in the right commercial form with the right kind of dryness. The hand work that is done on the apples in the matter of peeling and coring, influence the

final profits. The less amount of moisture the greater the dehydrator's profit. There are different methods of keeping the quality of the apple during the dehyrating process. Some use a steam blanch, which gives the fruit a partial cook before it is put into the dehydrating plants. Some use sulfur. Probably some of you are familiar with the use of sulfur. I am not going into a description of the best method but would say it depends on the condition. The steam blanch makes a higher grade product than sulfuring. It makes a slightly better flavored product. It is a question whether it can be kept quite so long as the sulfur product. Steam blanching makes a very much dryer product and makes it necessary to charge more money for it and introduces again the question of marketing. Roughly speaking, dehydration has not arrived at a point where it is possible to use two qualities of fruit. At present the hotels and restaurants, lumber camps and institutions form the largest market for dehydrated fruits as well as for dehydrated vegetables.

The vegetable subject is not one that onght to be touched on in a brief talk of this kind. It is possible to dehydrate almost any fruit or vegetable. It is possible to dehydrate them with almost any degree of success but whether in the present state of the market it is a practical thing to go into the dehydration operations to any scale at all except in apples and some other fruit and in vegetables for soup, provided that the concern has found an outlet for vegetable soup.

What I have said is not with the idea of throwing a wet blanket on the subject but to convey a caution that it is still a new industry and that any operations should be begun only after most careful consideration. I have no hesitation in saying that with the apple industry, where there are large quantities of apples poorer than A grade and better than cider, it is not better to wait until some future day before operations are commenced.

DISCUSSION

MR. MOYLE: Are we to infer that one of the prime objects of dehydrating is to use up our poor fruit, our poor grades?

MR. GOFF: I did not mean to convey the impression by speaking of a poor grade that it is necessary to use articles which are not fit for food. The point is that a dehydrating

plant, like a cider mill, will not pay a high price for poor grade apples. No canning factory makes a business of buying A grade apples. They must use an apple which for one reason or another has blemishes, are not colored sufficiently, or for some reason or other does not make A grade. A second grade vegetable in an ordinary understanding of the term is one which is not quite so fit for food as a first grade vegetable, but that does not mean that it is decayed. A dehydrating plant can make more success of buying and putting up high grade vegetables than a canning plant. A product is never any better after it is processed than before so that it is entirely a question of the market for the particular produce involved.

MR. TOOLE: You could not use quite as poor a grade of apples for dehydration as you could work into vinegar, could you?

MR. GOFF: It takes too much expense to pare and core small apples and lop-sided apples. You must have fruit that is regular and of fair size in order to operate the paring and coring machine successfully.

MR. W. A. TOOLE: It would possibly be best to have both a vinegar plant and a dehydrating plant in any large fruit growing section.

MR. GOFF: That is a combination which logically would work together because the dehydrator has considerable use for the grade of apples not particularly acceptable for other uses.

GEOLOGY OF SOUTHWESTERN WISCONSIN—HOW THESE HILLS WERE MADE

C. E. BROWN

(From Reporter's Transcript)

I might say in explanation that I am not a geologist. My profession is historian and archeologist, yet we are compelled to have a certain amount of geology and when Mr. Cranefield asked me to take this particular title, I did not refuse.

We find ourselves gathered here today in a part of our Wisconsin, famous the country over among geologists, and known as the "Driftless Area", a region untouched by the great ice sheets of past ages.

This unglaciated area 15,000 square miles in extent, 13,600 square miles of it located in western Wisconsin, "preserves to us a large sample," says Lawrence Martin, a former geologist

of our state, "of what the rest of Wisconsin and the northern and eastern United States were like before the glacial period."

The Driftless Area, according to our geological maps, is a wedge-shaped region, lying all in Wisconsin except a narrow strip along the western bank of the Mississippi in Minnesota and in northeastern Iowa and a small part in northwestern Illinois.

It extends from just above Wausau, on the Upper Wisconsin River, southward to Savanna near the Mississippi, in northwestern Illinois, a distance of 210 miles. Along the Mississippi its extent, from Alma, in Buffalo county to Savanna, is 190 miles. Its greatest breadth, east and west, from Alma eastward to just beyond Grand Rapids on the Upper Wisconsin River, is about 120 miles. In this immediate region (Gays Mills) its breadth is 90 miles.

Flowing through the Driftless Area are the Mississippi, Wisconsin, Black, Trempealeau, LaCrosse, Kickapoo, Pecatonica, and other rivers.

The story of the Driftless Area, briefly told, is this:

Long ages ago there moved southward from the grim shores of the Arctic Ocean two great ice sheets or glaciers, together known as the Continental Glacier. One of these, named by geologists because of its place of origin, the Labrador ice sheet, moved southward toward the St. Lawrence valley and the Great Lakes, grinding and crushing and bearing away on its surface portions of the rock formations over which it passed.

A part of the other, the Kewatin ice sheet, having its origin near the Arctic shore, west of Hudson Bay, moved southward to the region of the Upper Mississippi and the Missouri River.

Advancing over Wisconsin the Continental Glacier was divided into several lobes or tongues, their character and position being determined by the pre-glacial configuration of the land. These were the so-named Lake Michigan and Green Bay lobes on the east and the Superior and Minnesota lobes on the west.

On the north two minor branches of the Lake Superior lobe one from the bay at Ashland and the other from the bay east of Keweenaw Point, united to form the so-called Chippewa Lobe.

The movement of these ice lobes of the Continental Glacier is known by the glacial scratches or striae found on the surfaces of rock ledges and by the transported rocks which geologists

have traced to their sources, in Canada, Michigan and Minnesota.

These several lobes of the glacier advanced over the land until they were completely united.

There were several advances of these ice sheets, the earlier advances being known as the Illinoian, Iowan, Kansas and pre-Kansas. The latest was the Wisconsin advance stage of glaciation. Their deposits of soil, gravel and boulders are collectively spoken of as the Older Drift.

Thus an examination of a geological map of Wisconsin shows our Driftless Area hemmed in by the Green Bay glacial lobe on the east, an area of the Older Drift to the north, and beyond (north of) this the Chippewa and Superior glacial lobes, on the west, in Minnesota and Iowa another area of older drift.

The ice sheet east of the Driftless Area advanced down the preglacial valleys now occupied by Lake Michigan, Green Bay and Winnebago and continued its progress to a point in southern Illinois, 300 miles south of the Wisconsin boundary. It spread westward in the state nearly as far as Wausau and Madison.

The lobe of the Labrador glacier in the lowland now occupied by Lake Superior advanced more slowly. It was retarded in its southward movement by the highland lying between western Lake Superior and the northern part of the Driftless Area. Before its two lobes could override the Driftless Area, glacial movement ceased.

If the glacial movement had lasted a little longer the several lobes of the Continental glacier would have completely covered the Driftless Area. Time however, did not occur. Forward movement ceased and the ice borders melted back. It is uncertain whether the Driftless Area was ever surrounded by ice more than once.

FEATURES OF THE DRIFTLESS AREA

The soil of the Driftless Area is a residual soil varying considerably in depth. Its average thickness is a little over two feet. In the remainder of the state the Continental Glacier has carried away nearly all of the residual soil and left in its place a sheet of transported soil.

Residual soil in this region consists cheifly of a fine brown

or reddish clay representing more or less insoluble residue from the decay of the local limestone.

Among the outstanding geological features of the Driftless area are its picturesque rocky crags and pinnacles (the results of weathering and erosion by the wind). Such features are generally absent in glaciated regions.

Some of these are Stand Rock, at the Dalles of the Wisconsin; Turks Head and Devil's Door at Devils Lake are recently separated from rocky precipices. Others are Monument Rock, in Vernon county (2 miles S. of Viroqua), Devils Chimney and Picture Rock in Dane county, rise above the level of the surrounding country as solitary rocky towers.

There are also large crags, chimneys and towers as Roche a Cris in Adams county (225 ft. high) Mosquito Mound in Portage county, Pilot Knob, Rattlesnake Rock and Petenwell Peak in Juneau and Adams counties. Necedah Mound is a quartzite hill.

There are three natural bridges — Rockbridge — eight miles north of Richland Center; Natural bridge, near Leland, Sauk County; Natural Bridge, near Devils Chimney in the township of Primrose, Dane county.

Sinkholes are produced by underground water which has dissolved rock, and by the falling in of cavern roofs.

There are at least twenty of these in Vernon, Richland and Crawford counties alone. Some are sixty feet in diameter and twenty feet deep. One near Blue Mounds is 100x200 feet and 20 ft. deep.

There are numerous caves in the Driftless Area. Some of the best known are Eagle Cave, northwest of Blue River, a cave near Wauzeka, others near Blue Mound, Rockbridge, Boscobel, Highland, Shullsburg, Mazomanie, Viroqua, Wilson, Castle Rock, Platte Mound, Viroqua and Castle Rock.

These caves are small as compared to the great caverns of Kentucky, Tennessee, Indiana and Virginia. Eagle Cave, the largest cave in the Driftless Area, near Eagle, in Richland County, has a total length of 960 feet, its width is 70 feet and height 7½ feet. It has one room 100 feet wide and 30 to 40 feet high. Some of the Wisconsin caves contain stalactites and all are more or less filled with mud. In Wisconsin, caves are more or less limited to the Driftless Area.

The Driftless Area is one of the most beautiful regions of our state. Edward Daniels, our first state geologist, thus described it in 1854:

"About one third of its surface is prairie, dotted and belted with beautiful oak groves and oak openings. The scenery combines every element of beauty and grandeur—giving us the sunlit prairie, with its soft swell, waving grass and thousand flowers, the sombre depths of primeval forests, and castellated cliffs rising hundreds of feet, with beetling crags, which a Titan might have piled for his fortress."

The Area is as a whole not higher than the surrounding regions:

Near Wausau—1400 feet; Near Necedah—900; near Alma 1200; near Richland Center 1160; near Devil's Lake 1400; near Mt. Horeb and Blue Mounds—1200 feet.

The discovery and explanation of the driftless Area was made by a number of United States and Wisconsin geologists. By W. H. Keating, with Long's expedition in 1824; D. D. Owen visited it in 1839; J. T. Hodge in 1841; S. A. Lapham in 1844; J. G. Norwood in 1847; Edward Daniels in 1854; J. G. Percival in 1855; J. D. Whitney in 1862; Charles Whittlesey in 1864; Moses Strong in 1874; N. H. Urnchell in 1877; T. C. Chamberlain in 1878; W. J. McGee in 1878; Chamberlain and Salisbury in 1885, and Samuel Weidman in 1907.

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