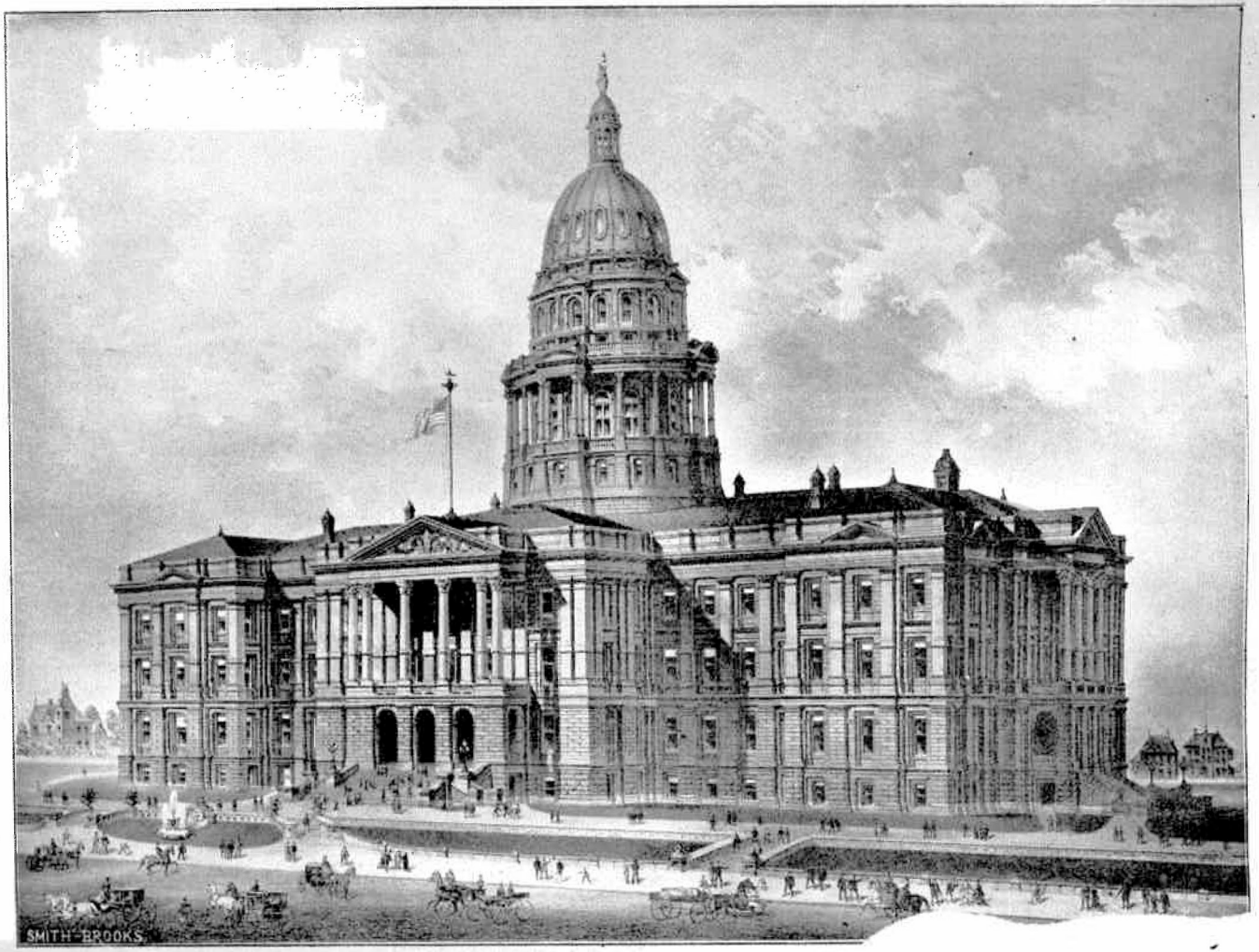
SMITH-BROOKS

SEMI-ANNUAL REPORTS

OF THE

COLORADO STATE BOARD

OF

HORTICULTURE

FOR THE

YEARS 1893-1894.

VOLUME VII.

JOHN TOBIAS,

SECRETARY.



DENVER, COLORADO:
THE SMITH-BROOKS PRINTING CO., STATE PRINTERS.
1894

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John Wilmore..... Denver
J. T. Heath.....Montrose
J. T. White.....Arvada
John Tobias..... Denver
J. E. Reynolds.....Colorado Springs
J. H. Crowley.....Rocky Ford
H. A. Billow.....Rocky Ford
L. G. Carpenter.....Fort Collins
C. S. Crandall.....Fort Collins
C. P. Gillette.....Fort Collins
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Chas. E. Schaap.....Fort Collins
Chas. E. Pennock.....Fort Collins
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Ben. Honnett..... Arvada
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Lute Wilcox..... Denver
O. C. Millison.....Denver
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H. Knight..... Littleton
W. E. Alexander.....Denver
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Brown, H. C ..... "
Bird, F. E ..... "
Bell, Judge J. C ..... Montrose
Braum, G. J ..... Denver
Crawford, R. T ..... Colorado Springs
Coburn, W. S ..... Paonia
Corning, George C ..... Denver
Cornforth, Joseph ..... "
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Craig, Mrs. W. B ..... "
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Dana, F. A ..... "
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Frazier, Jesse ..... Florence
Grimes, David S ..... Denver
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Gallup, C. R ..... "
Hanna, J. R ..... "
Hallack, Mrs. Charles ..... "
James, Robert ..... "
Kountz, C. B ..... "
Lane, John H ..... "
Lee, Henry ..... "
Lessig, W. H ..... "
Londoner, Wolfe ..... "

Lower, John P..... "
McClure, Mrs. Kate B..... "
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Newcomb, Mrs. J. H..... "
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Peabody, Mrs. A. L..... " "
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Pitkin, Ex-Gov. F. W.....Pueblo
Pierce, Gen. John.....Denver
Rushmore, H. ..... "
Richardson, George .....Argo
Shaw, Dr. Alexander.....Denver
Short, Prof. S. H..... "
Sloan, W. S..... "
Van Camp, J. M..... "
Wolf, H. G..... "
Wolf, Mrs. H. G..... "
Wood, S. N..... "
Wolcott, E. O..... "
Wade, Samuel .....Paonia

HONORARY MEMBER.

Bracket, G. C....Kansas State Horticultural Society

ANNUAL REPORT

OF THE

State Bureau of Horticulture

FOR THE YEAR 1893.

EDWARD S. HOUSEL, Secretary.

LETTER OF TRANSMITTAL TO SECRETARY OF STATE.

Denver, Colo., May 23, 1893.

HON. N. O. McCLEES,
Secretary of State.

Sir—In compliance with the law, I have the honor of submitting herewith the first semi-annual report of the State Board of Horticulture for the year 1893.

JOHN TOBIAS,
Secretary.

Filed May 23, 1893.

NELSON O. McCLEES,
Secretary of State.

LYMAN B. HENDERSON,
Deputy.

REPORT.

Secretary's Office,
Denver, Colo., August 27, 1893.

Executive committee met pursuant to call.

Present—W. B. Osborn, David Brothers, John Tobias and Alex. Shaw.

W. B. Osborn in the chair.

Secretary Shaw gave a short review of his visit to several of the large fruit farms in Mesa, Delta, Garfield and Montrose counties; mentioned the good prospects for fruit; also the desire of the Denver real estate men and other citizens to have a fruit exhibit at Denver this fall. The society being short of funds, the citizens have undertaken to raise the necessary amount of cash to pay premiums and other necessary expenses.

Mr. W. E. Alexander, the leader in the movement, being at present out of the city, on motion a committee, consisting of W. B. Osborn, John Tobias and Alex. Shaw, was appointed to see the gentlemen interested and report what arrangements can be made, and call together other members of executive committee to conclude and make final arrangements.

Sub-committee to meet in secretary's office, August 31, at 2 o'clock p. m.

ALEX. SHAW,
Secretary.

Secretary's Office,
August 31, 1892.

Sub-committee appointed August 27 met.

Present—W. B. Osborn, John Tobias and Alex. Shaw.

The following resolutions were adopted:

Whereas, The citizens of Denver are raising the sum of $1,200 to hold an exhibit of the present growing crop of this state, in Denver on September 28, 29 and 30, 1892, under the auspices of the Colorado State Bureau of Horticulture;

Resolved, That the secretary of said bureau is instructed to prepare a classification and premium list, making premiums as noted in classes E and F of the premium list of the Pueblo state fair for 1891.

Resolved, That the matter of details in arranging for the exhibition be referred to the secretary for execution, and that he report to this committee for ratification at an adjourned meeting, September 17, 1892.

W. B. OSBORN,
JOHN TOBIAS,
ALEX. SHAW,
Committee.

Secretary's Office,
September 17, 1892.

Sub-committee met pursuant to adjournment.

Present—W. B. Osborn, John Tobias and Alex. Shaw.

Committee rented hall in Equitable building, in which to hold exhibition, agreeing to pay $40 for same.

Secretary was directed to have 2,500 copies of programme printed and attend to all details pertaining to exhibition.

On motion adjourned.

ALEX. SHAW,
Secretary.

Equitable Building,
Denver, Colo., September 28, 1892.

Executive committee met and appointed the following committees:

John Tobias to have charge of tickets at the door.

Nomenclature—Mr. Page, W. B. Felton, W. S. Coburn.

Awards on Fruits—W. B. Osborn, J. E. Reynolds, John Tobias.

Awards on Flowers—John Berry, H. Rushmore, Mrs. Hiram Wolff.

Awards on Pantry Stores—Mrs. J. C. Lewis, Mrs. B. H. Bayles.

On motion adjourned, to meet daily during progress of show.

ALEX. SHAW,
Secretary.

September 29, 2 p. m.

Executive committee met.

On motion the following was adopted:

Resolved, By reason of the demand of the citizens in general, and through the courtesy of the manager of the Equitable building, that our exhibition be continued over Saturday and Saturday evening.

On motion adjourned.

ALEX. SHAW,
Secretary.

September 30, 1892, 10 a. m.

Executive committee met.

Present—W. B. Osborn, John Tobias, W. S. Coburn, J. E. Reynolds and Alex. Shaw.

W. B. Osborn in the chair.

The following letter was read by the secretary:

Mayor's Office,
City of Denver, September 29, 1892.

MR. ALEXANDER SHAW,
Denver, Colorado:

Dear Sir—The magnificent display of Colorado fruit made under your auspices at the Equitable building in this city justifies us in asking of you an extension of the time of exhibition. Many of our working men and their families will be unable to see the display during the week, and we think it would be justice to them, as well as beneficial to the state, to open the exhibition on Sunday.

Nothing but the noblest sentiments are inculcated by the contemplation of the kingly fruits of the earth which bear evidence of the presence in Colorado of prosperous and happy homes.

We are, with great respect, yours, etc.,

JOHN L. ROUTT,
Governor.

PLATT ROGERS,
Mayor.

Dr. Shaw moved that this letter be incorporated in the proceedings of this meeting, and that the prayer of the petitioners be granted.

Motion carried.

George B. McGranahan was added to committee on nomenclature.

Adjourned to 10 a. m., October 1, 1892.

October 1, 1892.

Executive committee met as per adjournment.

Present—W. B. Osborn, John Tobias, J. E. Reynolds, W. S. Coburn and Alex. Shaw.

On motion the secretary was instructed to request each exhibitor having fruits on the tables, to send such samples as they may desire, to H. E. Van Demen, chief of the Pomological Department at

Washington, D. C., that he may make fac-simile representations of the fruits grown by them to be used in the National Museum as representatives of the State of Colorado.

On motion, the secretary was instructed to get all bills contracted for this exhibition and present them for auditing and payment at our 2 o'clock meeting, and that if any bills shall be left unadjusted after to-day, that the secretary and treasurer be authorized to audit them, and the treasurer pay them and send a list of same to president, who will issue a warrant covering the amount.

The secretary submitted a schedule of premiums awarded by the awarding committees, as shown by the register of entries and awards, and on motion he was directed to draw warrants on the treasurer in favor of the respective persons in payment for same.

Adjourned to 2 p. m.

Executive committee met as per adjournment.

The secretary submitted the various bills for labor and material furnished for this exhibition, also per diem and expenses of executive committee, which were passed upon and allowed, and on motion the secretary ordered to draw warrants on the treasurer for their payment.

On motion, adjourned sine die.

ALEX. SHAW,
Secretary.

FINANCIAL SUMMARY OF EXHIBITION SEPTEMBER 28, 29, 30, OCTOBER 1 AND 2, 1892.

Receipts—

Subscriptions by citizens	$552 00	
Receipts at door	908 30	
Total receipts		$1,460 30

Disbursements—

Warrants issued for premiums.....	$575 00	
Warrants issued for bills.....	662 04	
Bills paid by treasurer.....	203 87	
Total disbursements		$1,440 91
Surplus		$ 19 39

Secretary's Office,
December 19, 1892.

Executive committee met on call of president.

Present—W. B. Felton, David Brothers, W. B. Osborn, J. E. Reynolds, John Tobias and J. E. Shaw (who represented his deceased father as secretary).

Programme for annual meeting was formulated and adopted, calling meeting for January 12, 13, 1893, at Mining Exchange building.

Secretary was directed to have 500 copies printed and circulated to friends of horticulture.

On motion adjourned to meet at annual meeting, January 12, 1893.

ALEX SHAW, Secretary.
Per E. J. Shaw.

PROGRAMME

ANNUAL MEETING No. 12

COLORADO STATE BUREAU OF HORTICULTURE

TO BE HELD IN THE

MINING EXCHANGE,

CORNER FIFTEENTH AND ARAPAHOE STREETS,

DENVER, COLO.

Thursday and Friday, January 12 and 13, 1893.

All interested in horticulture are cordially invited to attend.

THURSDAY, JANUARY 12.

2 o'clock P. M.

1. Address of welcome.....Gov. Davis H. Waite
2. Response.....Lute Wilcox
3. Secretary's report.
4. Treasurer's report.
5. President's address.....W. B. Felton
6. Culture of Small Fruits.....W. W. Wilmore

EVENING MEETING.

7:30 o'clock P. M.

7. Raisin Growing in Colorado....Mrs. Kate Harlow
8. Blight—What Do You Know About It?
   Prof. C. S. Crandall
9. Codlin Moth and Other Injurious Insects,
   Prof. C. P. Gillette

FRIDAY.

10 o'clock A. M.

10. Election of officers.
11. Packing and Marketing Fruit....J. T. Cornforth
12. Horticultural Exhibit at World's Fair.

2 o'clock P. M.

13. Fruit Culture on the Western Slope,
W. S. Coburn
14. Pruning Trees.....Fred Halverhout
15. Miscellaneous business.

7:30 o'clock P. M.

16. Culture of Rose Bushes.....Emil Glauber
17. Analysis of Soil Best Adapted to Fruit Culture .....Prof. B. O'Brine
18. Best Variety of Winter Apples for Profit.

The day meetings will be held on the seventh floor of the Mining Exchange, and the evening meetings on the second floor of the same building.

W. B. FELTON, President.
Canon City, Colo.

ALEX. SHAW, Secretary.
Room 39 Barclay block, Denver, Colo.

DEATH OF DR. SHAW.

Dr. Alexander Shaw, who as secretary of the State Horticultural Bureau is well known all over the state, died last Tuesday, January 3, at 1:30 p. m. His illness of nearly two months was watched with especial anxiety by the fruit men of the state, for it was felt that on him more than on any other man depended the success of Colorado's fruit exhibit at the World's Fair.

No other man is so thoroughly acquainted with the horticultural resources of every fruit producing county, for he had visited all the leading orchards and knew their owners and what contributions could justly be expected from each.

Horticulture has always been his passion, and during the five years he has been secretary of the Colorado society he has discovered untiring energy in his work and unusual ingenuity and fertility of invention in the show room. It was the exercise of all these qualities that made the recent fruit show such a pronounced success.

February 18 of last year he received his commission as superintendent of the Colorado department of horticulture for the World's Fair. He was eminently fitted for the place, having served in a like capacity both at New Orleans and Philadelphia, though at the latter exposition he represented Iowa. The enthusiasm with which he went into the work was doubtless instrumental in shortening his life, for he could not realize that 77 years rendered him less

able to endure the strain of travel for collecting samples, and the intellectual exertion of forming and executing plans.

He had already made two trips to Chicago as well as numerous journeys about this state, and the general prosperous condition of everything, from the trees set in Jackson Park to the strawberry vines at Bellevue, had raised his hopes to a high point. His whole soul was enlisted in the work of introducing Colorado to the world in a new and expected light, as a fruit producer. Could he have accomplished his end in this respect, he would have been ready to die, or, as he himself expressed it, "done." That he was cut off in the midst of his plans is a misfortune to the state, for another man of equal experience, enthusiasm and felicity in execution cannot be found. Moreover, were the man at hand, it would be impossible for him to gather up the skein of threads that start from every orchard in our state and focus in the horticultural building in Chicago.

Dr. Shaw was born in Camden, Del., October 13, 1815. He graduated from the Jefferson Medical College of Philadelphia and soon afterward removed to Woodsfield, Ohio, where he married Miss Huldah Holland. Nine children have been born to them, only three of whom are living. William Shaw lives at Des Moines, Iowa, but was with his father during a part of his last illness, returning home two weeks before the end. James E. lives at Montclair, and has been his father's assistant in much of his work. The daughter, Mrs. Warren Hussey, of Spokane Falls, Wash., and her mother were most faithful attendants at the bedside during the entire trying illness.

At Woodsfield, Waynesburg, Pa., and at Des Moines, Iowa, the doctor followed his profession for an aggregate of forty years. He came to Colorado in 1879, and at once identified himself with horticulture. In 1880 the horticultural society was organized and he was a member of the first executive board. In 1882 he was chosen president of the society, and was in charge of the Centennial fruit exhibit. In 1888 he

was made secretary, which office he continued to fill till his death, at which time he was also superintendent of the horticultural department, a member of the World's Fair board and of the auditing committee.

In 1862 he entered the army as assistant surgeon of the Fourth Iowa Infantry, and afterward served as chief surgeon of the Twenty-ninth Iowa, and later of hospital No. 1, at Vicksburg. The immediate cause of his death was a kidney trouble contracted during the war. He was a member of the G. A. R., of the M. E. church, and of Capitol Masonic lodge, No. 110, at Des Moines.

His remains were removed to Des Moines and buried with Masonic rites, the ceremonies being conducted by his old lodge. In him the newest and most promising industry in the Centennial state loses an able and far-sighted champion.

PROCEEDINGS

OF THE

State Bureau of Horticulture

HELD IN

DENVER, COLORADO,

JANUARY 12 AND 13, 1893.

Convened in Mining Exchange Building, 2 p. m., January 12.

Called to order by the president, W. B. Felton.

Address of welcome by Governor Davis H. Waite.

Mr. President, Ladies and Gentlemen:—I have not come prepared to make a speech. I was notified that there was something connected with the World's Fair going on here and it was important for me to be present. I came to inform myself of the importance of the subject rather than to give information, and really I am not posted enough on horticulture to attempt to interest the gentlemen who are before me, who, I suppose, are very well posted in that business; in fact, they are making it the business of their life.

I have, during the last three or four months, had occasion to travel over the state pretty extensively, and I have been very much astonished and pleased to see how much has been done in the way of horticulture in the various portions of the state.

I myself was raised in Chatauqua county, N. Y., which we call a fruit country, but, after all, the raising of fruit there was simply that the different farmers raised about what fruit they wanted to use, and that was about all there was to it. Since that time, however, our farmers in Chatauqua county have, to some extent, made the raising of apples, in the southern part of the county, a sort of business. Man farmers there have shipped considerable amounts of the apple; and I understand that in the northern part of Chatauqua county there are some fine, beautiful fruit farms. There is one section which includes the country from Cattaraugus county on toward Erie, which has become quite celebrated throughout the United States as a great fruit district.

I left Chatauqua county in 1876, and it was some time before that that the culture of the grape began to be of great importance. It was found that all this ground in the northern part of the county was beautifully adapted to the culture of the grape and the plum, so that kind of fruit has become a prominent interest in Chatauqua county.

A good many years ago the northern part of Chatauqua county and the southern part presented entirely different characteristics in the way of horticulture. When I was a boy, where I lived all the gardens had plenty of plums, a few potatoes and pears and apples. Chatauqua county has always been a heavily timbered region, a good deal of not only what we call hard wood but a good deal of pine. But after that timber was cut off—and it was finally cut off—and there was nothing in the county in the way of timber except a few reserved lots, the power of the ground to produce fruit seemed to be almost used up. In the southern part of the county there is to this day nothing produced in the way of fruit of any kind except apples. Pears and things of that description are not raised, and peaches they have never been able to raise there to any extent. In the northern part of the county, where they had raised peaches once in large quan-

tities, they failed entirely to cultivate them. I do not think there are any cultivated now in the county.

Now I found in traveling over this state, in the valley of the Grand river and of the Gunnison, very extensive localities, fifty, perhaps a hundred miles in extent, and the width of the valley, beautifully adapted to fruit. I went with Mr. McDaniels to his fruit ranch and I was greatly surprised. I must confess that of late years I have had very little to do with horticulture. But when I went into this fruit ranch, some thirty-five acres, and I do not know but a little more, all in fruit, I was astonished. There were all kinds of fruit that you can imagine almost, growing, and it happened to be in their season, too. There were peaches, plums and apples and everything, some of them ripe upon the trees. He had some five acres in grapes that were full size but they had not attained their color. I was perfectly astonished to see what a business it was. On forty acres of land he had all the arrangements for preparing this fruit for market, and I could see that it was an important business amounting to a great many thousand dollars. And I understood that there were other fruit farms in the vicinity equally as good as Mr. Daniels'.

I found up the Animas river, from Durango to Silverton, a beautiful section of land adapted to fruit. The valley was some considerable width, and the best land adapted for fruit seems to be that bordering upon the sides of the valley. I understand, too, that in Fremont county there is a very extensive country beautifully adapted to fruit.

Where I live, at Aspen, we do not pretend to raise fruit. We do not pretend to raise any garden stuff of any kind—a few potatoes and things of that kind, maybe. We are 2,300 feet lower than Leadville, but either because our people do not take an interest in that matter or because we have not the proper soil, we do not succeed with fruit; but we do succeed in raising flowers. Our gardens are flourishing, and to people from Leadville seem to be almost a paradise,

and yet they are nothing, I suppose, to those in the more southern parts of the state. These lofty portions of the state that are 7,500 feet above the level of the sea are, perhaps, too far up for the raising of fruit. But, as I said, I was very much pleased in going over the state to see what an important element horticulture was and what it might yet become.

Now there is another thing in relation to this state of which, I think, we hardly as yet realize the importance. We have in all parts of the state vast districts of land beautifully adapted, so far as the fertility of the soil is concerned, to the raising of both grains and fruits. Those lands at present are not, and perhaps for some time to come will not be improved, because they need irrigation. But I believe this irrigation question will in time, solve itself in some way, so that the people of the state can get the benefit of it, and get the benefit of it without going through corporation hands, and all that sort of thing that takes all the profit. When that time comes, when the table lands of this state are irrigated, Colorado will blossom like the rose; there is no mistake about that.

I hope, gentlemen, you will all live to see this prosperity that we all ardently hope for, and which you yourselves are practically engaged in bringing about. (Applause.)

Response by Mr. Wilcox:

Mr. President, Gentlemen:—The enthusiasm with which you have received Governor Waite is as good a guarantee as could be made of your appreciation of his presence here to-day, and I believe that now he is taken into full fellowship with you.

He tells us a few things about fruit culture as he knows them and refers to his old home. He is right, so far as my information goes, about Chatauqua county. I have been there a good many times in my early days. I was there a few years ago and I noticed a great change. There used to be a great many stone houses all through the country, but when I was there

last time I saw but very few. I asked what brought about the change and they told me that grape culture and the culture of small fruits had brought it about, and in connection with that, a great many in that section have gone into dairying. But the finest industry of the county seems to be the fruit industry, and from this industry they seem to be very prosperous people and get along very nicely, and Governor Waite is to be congratulated in being from such a county.

He tells us that he has made some observations around the state of Colorado in the past few months that have surprised him, and before his term of office expires he will see a great many more. He may yet be a fruit grower himself, because the aim of all public men is to get a farm; I find that to be a fact. Our retiring governor was a farmer, and I expect Governor Waite will have his own vine and fig tree some time. He has to-day faced a representative body of the farmers of Colorado. They represent one class of the farming industry, they were the crutches of the original farmers of Colorado. And he sees before him to-day a number of the pioneer farmers, and men who have been through all kinds of troubles that are found in a new country, and he sees them to-day representing especially an industry that is bound to grow into a still greater industry.

We have a great deal of work to do in many ways. While we grow fruit to supply our local markets in Denver, we are shipping very little. The shipping facilities are improving every year, and I expect the time will come when we will send carloads to California and to the east. Another feature of the business that is bound to come out in time is the canning factories. Last summer I spent four weeks in California and I noticed the most prosperous fruit districts in the state were those that had large canning factories. I found that some of the largest farms in those districts had perhaps only five acres—some were larger—but the average was five acres. I learned furthermore that these canning factories took all the surplus of the growth of the orchards that was not shipped. Of

course there are seasons when here is a surplus in the market, and this is taken down to the canning factory where it brings a good price.

I expect all these things will come to Colorado, and before Governor Waite goes out of office he will see the industry grown to double what it is to-day. I think that is the appearance of things to-day in Colorado. As he addresses you to-day he does not know the vastness of the business, but all this he will see for himself as time goes on.

We welcome Governor Waite and feel very much gratified by his distinguished presence here to-day, and I believe I voice the sentiment of the audience when I say we feel he has done us proud. We hope he will succeed in office, and give us a fair and just administration, as I have no doubt he will do.

The secretary's report is called for.

Mr. J. E. Shaw states that there will be no secretary's report for the reason that the secretary is gone. He had compiled a report of the finances, however, which he read.

On motion of Mr. Millison the report was received and ordered to be placed on file.

The treasurer's report was received and placed on file.

Mr. DeVinney moves that Mr. John Tobias act as temporary secretary, which motion is unanimously adopted.

President W. B. Felton's address:—I have prepared no written address, but I shall make a few remarks that seem to me to be appropriate to the occasion.

I will say that we meet to-day under much more favorable circumstances financially than we met a year ago. We have unexpectedly received a thousand dollars that was appropriated for our use for 1892, which enables us to get out of debt and have a little balance on hand. There appeared to be no probability of our receiving that money until the decision of

the Supreme Court, which declared the bounty laws unconstitutional, and which left in the treasury a certain amount of money from which we got our appropriation. Had it not been for that we would not have had the thousand dollars and would have been in debt at this time.

The law has created a Horticultural Bureau and provides that an appropriation of a thousand dollars a year shall be made to it under certain conditions, which we have to carry out. The appropriation two years ago was made, but without the emergency clause, which placed us at the tail end and made it very doubtful both years of our receiving the money; in fact, until about the very last of the year we were told we could not get a cent of it, but circumstances arose each time so that we did get it, but it came at so late a day that we could not plan work and accomplish things that might have been done had we received the money sooner.

A year ago in my address I devoted my remarks to three or four branches of the subject which seemed to me to demand most attention from the horticulturists of the state, namely, the cultivation of proper varieties for commercial use, the proper care and attention to canning, marketing and packing, and attention to the suppression of insect varieties injurious to our fruit. I still think those the most important matters for us to deal with. Of course those not engaged in the fruit business think it a kind of poetry—flower business—but when we go into it as a business we have to attend to all these things, like the shipping of poor fruit, improperly packed and wormy fruit which impairs the value of our products. Now to rectify these things we have to have concerted action, and to-day I am going to read to you some extracts from the statutes of California to show you what they have been forced to do, and what we have got to do in this state in order to reap the benefit of our labors. It is no use for one man single-handed to fight against these injurious insects; if his neighbor is harboring them they will constantly find their

way over to his own trees and vines and very little is accomplished. To meet those circumstances, California has enacted laws which have been in operation for several years. I saw one of the members of the legislature to-day who had also been studying these laws and has prepared a bill, drawn up somewhat in accordance with the provisions of the California laws, and which he will present to the legislature during this session. Now I am going to bring this matter up at this time, before it is brought to the attention of the legislature, in order that we may look into the matter thoroughly and see if the bill embodies the legislation we desire, and I want the co-operation of the horticulturists in order to assist to this end. (Reads extracts from the California statutes; portions of sections 1 and 5.)

Now the question of the constitutionality of these laws was brought before the highest courts in the state, and the laws were sustained as constitutional and pronounced to be proper for the protection of the most important interests in the State of California. Now under this first law which provides for this commision, giving them power to make regulations, they require certain proceedings to be carried out in order to comply with the law. They publish those regulations which have become a part of the law under the act, and they give formulas for treating trees under certain circumstances. For instance (Extract from law of California and recipe, also extract in regard to codling moth, recommending recipe.)

Two years ago when Mr. Faurot was president of the association, he presented a bill which he had drafted and proposed to enact as a law, and at that time it occurred to me and I made remarks about it, that I did not see how we could legislate on the matter unless we were prepared to state the remedies we wanted to have applied in all cases. They have got around it in California by having this commission make these formulas and publish them and making them a part of the law. That appears to me a better thing than to have it incorporated in the law; that is

to have a board of commissioners make progress in the knowledge of such things and they can regulate those things and make improvements and additions thereto.

Now, as I said before, I happened to meet Mr. Page this morning, and he tells me he had drawn up a bill embodying, I should judge, the important points of these laws in use in California. It seems to me that this society should co-operate with any steps that are taken in the legislature to enact laws similar to them, to effect the same purpose. It is one of the most important things, as horticulturists, we have to deal with to-day. If we spend all our time and money in raising fruit, we want to have it perfect fruit, marketable fruit; and unless it is, we are defrauded out of a large share of our labor.

Before closing I desire to say that quite recently our old friend, Dr. Shaw, who has been secretary of this association for several years, has passed away—gone to the other life. He was the most enthusiastic horticulturist we had in this state, always ready to devote his time and energies to the advancement and interest of horticulture. To meet here without him to-day must be to you, as it is to me, a very sad event. I miss him very much; I presume you all do. I hope before this meeting adjourns, that some appropriate action will be taken to have embodied in the next report resolutions of respect for Dr. Shaw, that will be suitable to his memory.

Mr. Brothers had placed a box of larvae on the table, and a recess of fifteen minutes is here taken in order that the members may examine the same.

Meeting again called to order.

Mr. Housel—This seems a good time to appoint a committee to draft resolutions for our secretary who is gone. I move that such a committee be appointed.

Motion unanimously adopted.

The president appoints on the committee Mr. E. S. Housel, chairman, Mr. W. S. Coburn and Judge W. B. Osborn.

Mr. DeVinney—I would say, Mr. President and gentlemen, that I have been engaged in small fruit growing for some time. It has an importance that few people comprehend. It is calculated to establish work amongst us which would employ a great many people, not only in the production but in the marketing of the fruit. The principal profit of the small fruit is in canning. Of course, early in the season, they have a ready market. But I rise more to point out the principal kinds of fruit best adapted to the climate of Colorado.

The strawberry grows to perfection; no climate is better for the growing of strawberries than Colorado, for the simple reason that it is a cold climate and the strawberry lasts from two to three weeks longer than in any other country. On clean ground the strawberry will last six weeks longer. Then the gooseberry grows to perfection; even the English gooseberry grows to advantage. Also the currant grows to perfection; perhaps no country grows better currants than we do here. The only reason they are not grown more extensively and largely is because the demand for them is not sofficient for the farmers to give the proper amount of attention to make their growth perfect.

The President—I understand there was an organization here last summer for the handling and marketing of strawberries.

Mr. DeVinney—Yes, sir; there was, and I belonged to it. There is an organization for the purpose of handling fruit and they had great success. The success was such that they had a meeting not long ago and had a jollification and a good time it was so successful. We are going to ship some of our strawberries to Omaha and Kansas City this year. We shipped a few last year but did not make any money, but we kept up the home market and kept up the price. Our strawberries can be shipped east for the simple reason that our season is from three to four weeks later, and when they get out of them at Kansas City

they have only to telegraph out to Denver and we will send them down a carload.

Mr. Brothers—I think Mr. Tobias can give us a little information on that.

Mr. Tobias—You have me in as one of the directors, but not one of the working directors because I have no fruit of my own to sell. But I think I can say that the organization has been a success, that is for the first year. They kept out ten per cent. first to cover all expenses. Afterwards they returned to fruit growers, I believe, about 5 1-2 per cent., making the cost of selling about 4 1-2 per cent. They have gone ahead and elected new officers. I was not there, but understand they were all very enthusiastic for another year. I think it will be a great success.

Mr. John Wilmore—We started last season to ship berries to Omaha and Lincoln, but we did not get started soon enough; we did not know anything about it until late. What we shipped there gave us good returns. They sold there for $3.00 a crate. We have orders now for next year for about eight carloads a week—about as much as we can supply.

Mr. Housel—What success did you have in marketing fruit here in the local market?

Mr. Wilmore— Very good. We did fully as well as those outside of the association.

Mr. Housel—I understood the merchants and commission men had run opposition to you in order to keep the prices down.

Mr. Wilmore—There was a good deal of opposition. The commission men were against us and a good many of the merchants were against us, but when we got through they were all with us, and if you speak to the merchants to-day, I think they will tell you that they would rather deal with us than outsiders.

Mr. Housel—You think you can command their trade for another season?

Mr. Wilmore—I think we can.

Mr. Housel—It seems to me one of the main things to do is to hold the fruit growers together.

Mr. Wilmore—Well, I think we had all the opposition against us that we could have, and we got through all right.

Mr. Brothers—I am like Brother Tobias. I am not a very good working member, but I once in a while go down to see the boys; and I want to say that from what little experience I had with them they did far better than any one of them expected. When they started their association they had their doubts of its success. They supposed they would have all the commission men against them, but, as Mr. Wilmore says, there might have been a little of that spirit at first, but afterwards there were but very few of them but were glad, especially the grocerymen were glad that the association had started, because they could go down there to the association and pay one price. Now the great trouble with the market before there was any organization was that when the farmers brought their products to market, one man would be afraid his neighbor would sell out first, so he would drop a little below his neighbor, and so it would go on through the market and the grocerymen could not buy at a uniform price. When this association was organized they were determined to try to establish uniform prices, and I want to say that they made the grandest success of it, far beyond what any of them expected. They started it as a new thing entirely to them. If Mr. W. W. Wilmore had been here this afternoon he would have given a good report on that, and if he is here tomorrow I suggest that we ask him to tell us a little about it. He would give us the inside track on it. We have now something like 95 members and we have only about two or three kickers in it, but you know there are always a few kickers and I suppose that is all right—they stir the others up.

I want to say to you, gentlemen, if you live in a place where there are half a dozen who raise small

fruits, and you will organize, you will find it will be a great benefit, and the grocerymen, as I said before, will be glad of it too. They go down to the association now and get just the berries they want, and every groceryman gives the same price.

As far as I am concerned, I say the boys did splendidly. They have got some young men there who are just going to make a grand success of it, and then they are opening the way for shipping.

And there is another thing we learn, and that is that we have got to pick our berries differently for shipping than we do to bring them down to Denver.

The President—How do you pick them?

Mr. Brothers—Pick them greener so they can ship better. But Mr. Wilmore will be here to-morrow morning, and if the society sees fit it will be well to ask him to speak to us about it. He knows all about it.

Mr. Brothers—Pick them greener so they can ship strawberry market there was a good deal of kicking. I will tell you what I know. My best currants I had to sell at $1.35 while someone else sold theirs at $3.00 a crate. But I did not know about the association then. I tried the market, but I could not find a buyer. I went round from one place to another and felt sorry I did not now where to dump them, and after a while I took $1.35 when I might have had $3.00. When I became a member of the association they bought my berries and I made a big thing of it. My gooseberries the year before, I got $5.50 a————for, and thought I had done a big business, but this year I sold gooseberries for 37 cents a gallon by being with the association, so by that experience you can see what I did. I had less currants than the year before and made more from them.

A Voice—Do you know what raspberries sold for?

Mr. Carlson—$5.00 a crate.

Mr. Millison—Mr. Chairman, I would like to ask a question. I would like to be instructed as to what

is the most profitable blackberry to plant this spring, that is, in small gardens for home use?

Mr. Tobias—Mr. President, my advice would be the Wilson Early. I do not know anything better than that for home use.

Mr. Brothers—If I was going to grow for home use I would grow a part Ancient Britton and a part Early Wilson, and when you go to buy that berry you want to ask for the Early Wilson.

Mr. Millison—Why need we send east for them?

Mr. Brothers—I have known some men to east for apple trees when they could get them right from their next door neighbor. I did not know but you were one of that kind. I want to say here that we fellows are getting a little discouraged on the blackberry question. I do not know what is the matter the last few years, but they have not done so well for the last three years. Some of our friends are digging all their Wilsons up. I have examined some of mine and I find there is a worm in the middle of the blackberry eating the pith right out. I never examined the raspberry, in fact, I don't raise any except just enough for my own use. My Wilsons for the past few years have not paid me for raising. One year the reason was the hail struck them, but last year I cultivated them the very best I knew how but they did me very little good, and I know a good many other people who were in the same fix. How long it is going to last I do not know, nor what is the cause for it all, nor yet the remedy. But Mr. John Wilmore has three or four varieties of blackberry. What have done the best for you?

Mr. Wilmore—I think the Ancient Britons do the best.

A Voice—Has anybody tried the Early Harvest?

Mr. Tobias—Mr. President, I have some Early Harvest, but never had a heavy crop from them. I find them very hard to lay down. It is a very nice berry for something early because the whole crop is gone before the Wilson comes in. It is a very pretty berry.

Mr. Coburn—We have started the Early Harvest over our way. But we do not have to take these precautionary measures of covering. I grow them in tree form, and when they bear they lay almost right over, heavy with fruit. They are a fine, solid shipping berry. The name is the Early Harvest.

Judge Osborn—Mr. Chairman, two years ago I sent to Wisconsin, and wrote that I wanted a few of the best blackberry plants that grew in America; I emphasized it. They sent me the Erie, and I believe that the Erie is the best berry that I have seen, take it under every circumstance. The Kittatinny is a good berry, very prolific, but they grow stalks as thick as my wrist, and you cannot lay them down without breaking a great many of them. The Early Wilson is a good berry; but of the three, I would take the Erie and the Early Wilson. The Erie bushes grow about three feet high. They are very bushy, but I laid them down this fall, covered them with dirt, and have had no trouble whatever. The Kittatinnies it was almost impossible to lay down, and I do not know how high they would grow if the tops were not cut off. I would like to hear from someone who has tried them.

Mr. Gallup—I have cultivated the Erie for three years and find it the best berry for flavor, but I do not think it is quite as good a bearer as the Wilson. But for home gardens I should say the Erie. Taylor's Prolific is very good, and I know that some have met with great success with the Taylor. My experience with the Ancient Briton has been that out of three years those that I have left uncovered have done full better than those I have covered. It is a smaller berry than some others. I do not bury it at all any more and have never lost it yet. My location is in University Park with nothing whatever to protect it. The Ancient Briton is not as large as the Wilson or any of these other varieties but it is a very nice berry. I do not think the Wilson, Jr. is any better than the Early Wilson. I think the Ancient Briton and the Taylor's Prolific are very much alike. I had

a hundred plants of Taylor's Prolific and I had twelve on the end of that row of Ancient Briton, and to save my soul I could not tell the difference between the two berries.

Mr. Millison—I would like to know the best variety of strawberries to plant on two plats about an eighth of an acre each.

The President—The culture of strawberries depends so much on locality and soil, and not knowing about the locality and soil, I could not tell anything about it.

Mr. Millison—One patch is loose, high, gravely loam, and the other is a low, heavy loam.

The President—On low, heavy loam I should think the Jucunda as good a berry as you could put into it. The other you can take your chances on. What I mean by that is, the soil ought to bear good berries of a hundred different varieties.

Mr. Steele—It seems to me that we are devoting a good deal of time to one of the least important, and I think to the Colorado grower, one of the least profitable of all the small fruits that are grown, namely, the blackberry. I have been wishing to hear the grape question discussed. That is a fruit among the small fruits, next only to the strawberry in importance.

Mr. Housel—Grape culture in this part of the country is almost a failure. We cannot count on a good crop more than once in five or six years; and blackberries, I want to say, is one of the best crops raised about Boulder, and generally it is the most prolific crop and the most certain, though there is one thing in regard to the small fruit crop there the past season I want to speak about. Along in June there was a west wind that blew about forty-eight hours. The result was that nearly all the small fruits in most of the fruit patches there dried up. A great many berries were dried right up on the bushes and a great many were blown off. There are many of the men there who raise a great many raspberries and black-

berries every year, and count on them, who this past season did not have a quarter of a crop on account of this wind. Besides being hard on the bushes it killed the berries.

Mr. DeVinney—Last year I made a specialty of grapes, and I want to tell you what success I had. The success has been fair. I have never been able to raise more than about six, seven or eight, and perhaps in rare cases, fifteen pounds of grapes to the vine; the average, perhaps, in the vineyard would be ten pounds, and that does not pay to battle with the insects. And another reason is, that on this side of the range the season is so short there are only a few grapes that you can grow successfully.

Mr. Crowley—I have been in the fruit business five years. I have planted grapes extensively and many varieties, and I have for two years gathered on an average of twenty pounds to the whole vineyard. I have never protected my vines in winter. I have this year eighteen varieties bearing. The best varieties so far is the Concord for black, the Agawam for red, the Niagara and Lady Washington for white. The Worden with me is a shy bearer. The Delaware for our market is too small.

In regard to trellises, I have investigated that matter thoroughly. The natural growth of the grape is to hang, and where it rests on the ground the bunch is small and short. This does not look well, the bunch does not fill well; consequently I would recommend trellises that are not too high.

So far as the season is concerned, we mature the Catawba grape, thoroughly mature it, so that it is a good grape.

Mr. Steele—The Massasoit is one of the grapes I would recommend to let alone. My vineyard is largely experimental. I have too many varieties for market purposes, but I have had experience with all the standard varieties. I claim that the best white grape is the Niagara. The best red is the Brighton. The Delaware does not yield pounds enough, and the

Brighton sells just as well in the market. The best black grape is the Worden; we get it into the market earlier and get a better price for it. I should call it an improved Concord.

Mr. Page—I am interested in blackberry culture, and I have been considerably disappointed. Three years ago from Missouri, I shipped over $800 worth of blackberries to Denver, Colorado Springs and Pueblo, and wishing to get the profit that the railroads were getting I came out here. Last year I set out 3,000 blackberry plants. I venture to say I have not got a thousand live plants in Grand Valley, and I would like to know if there is a blackberry that we could raise over there. There are other locations where blackberries can be cultivated profitably but they cannot be in my locality. Do not understand that I am running down Grand Valley; I have never been ashamed of it, nor have I ever had one regret that I went there, because I believe there are fruits that can be raised there that cannot be raised in other parts of the state. I would like to know now if there is a blackberry that will stand the warm, hot sun.

Mr. Millison—I would ask the President whether the neighborhood of Canon City is profitable for the production of grapes?

The President—In answering the question I do not think there is any locality in the state, except possibly over on the western slope, that is better adapted to grapes than Canon City. The Catawba grape matures well every year. In the thirteen years that I have been familiar with fruit growing about Canon City there have been two failures of fruit crops; the others were abundant crops.

Mr. Millison—There is another thing that has come to my mind. In thinking of the membership of this association it occurred to me that Mr. R. S. Edwards has passed away since our last annual meeting, and I would suggest that there be provision made for his name by the same committee that was appointed for Dr. Shaw.

The matter is placed in the hands of the committee.

Mr. Coburn—About this blackberry business. I would say that I am of the same opinion in regard to the peach. Down in the low, flat valley below Grand Junction you will find that the blackberry country is not always a good peach country, but you will find all around the cedars of the Rim Rock that that is the place to raise blackberries. I saw five rows, 300 feet long, planted in Mr. Wade's orchard. He sold a piece of land to a man from North Dakota, and he got these five rows of blackberries, and they stand there just as thick as possible and he did not pretend to cultivate them. This year he sold a little over $100 worth without any extra care. He sold them out there at his place; a great deal of our fruit is sold right there. Our red raspberries also do just as well; they bear just as full as they can hang. There are some persons there who have thought that the wild berries of the mountain were so much finer flavor that they would grow them, but every winter they were killed right to the ground. The way we account for it is that the red raspberry is always on the north side of the mountain and protected from the sun, but where you bring them down into the valley and the sun shines on them it kills them. The same with the blackberry.

Mr Brothers—I have been having a good deal of trouble with blight. I don't know what to do about this blight business.

Mr. Crowley—I want to say for the information of the house that there are 1,200 acres of fruit in our county. I have collected the World's Fair exhibit for our district this year, and I will say there is absolutely no blight in the county, and so far as Rocky Ford is concerned, I live there, and I invite every member of this association to meet me there next melon day.

This horticultural society brings together people from all parts of the state, and it is pleasant for us

to have reports go out and for us to demonstrate to the people who live here that we have in Colorado different climates and different localities where all these different kinds of fruits can be raised with profit.

Mr. McClelland—I do not know as I ought to say anything. Now I am willing to give our friends over the range all the credit their fruit bears, but I can tell them that we can raise better flavored, better apples than berries. I will compare apples with them at any time. Peaches and those things I don't make any remarks about. I have examined some fruit from down about Canon City, and I must say that some fruit coming from there looked very hard. As far as the apple is concerned, we have got the codling moth to fight, but where is the man in California with a vineyard or an orchard who does not have to spray some during the season? I would give the gentlemen on the other side of the range to understand that when it comes to that, that the time will come when they will have to spray, too.

Mr. Hannaman—I want to ask the privilege of entertaining the members here assembled just a few moments, as you are discussing the apple question. I have something here that will concern you all. If there is no other business before the house I would like to show some pictures for a few minutes.

A picture is displayed of apples from the other side of the range; also a picture of apples from Larimer county that were at the Equitable exhibit, and another of apples from Delta county.

Meeting adjourned until 7:30 p. m.

EVENING SESSION.

January 12, 1893.

Meeting called to order at 7:30.

Judge Osborn presiding.

Mrs. Kate Harlow's paper on Raisin Growing in Colorado called for.

Mr. Steele—Mr. President, Ladies and Gentlemen: I have an essay here which I was requested to read on this occasion. Over in our section of Colorado we are rather proud of Mrs. Harlow. She has proven that in her case at least, in the field of horticulture, the woman is the equal of the sterner sex.

RAISIN GROWING IN COLORADO.

Paper by Mrs. Kate F. Harlow.

When the first settlers of the Grand Valley made their pre-emption locations in the winter of 1881 and 1882, but few realized the great possibilities in store for the home builder. It was years afterward before the mild climate and uniformity of temperature gave general confidence that the home of the peach, nectarine, apricot and other half-hardy fruits would be found in the valleys of Western Colorado. And less did we think that the tender European varieties of grapes would here find a congenial home; surpassing in size and quality the productions of California. My first planting was in the spring of 1888 and consisted of 700 vines, and the year following I planted 3,000 vines, consisting of Seedless, Sultana, Emperor, Flame Tokey, Black Morocco, Black Ferrera, Muscat of Alexandria, Muscatella, Gordo Blanco and Cornichon. I covered the vines the first winter after planting, uncovered them in the spring and tied to wire trellis. Have given no protection since, leaving vines through the winter on trellis. My vineyard is located on Rapid Creek, 15 miles east of Grand Junction, and about 600 feet higher altitude. The soil is a dry, gravelly loam, and frost is seldom known between March and November. On heavier soil where much water is given, elsewhere in Grand Valley, it is found better to cover the vines in winter to insure them against injury. In 1891 I first experimented in raisin making, using the Muscat and Muscatella grapes. Sent a quantity of raisins to Califor-

nia for analysis and the report came showing the specimens were larger and richer in saccharine than any ever before tested in California.

Thus encouraged, I made several hundred pounds of raisins the past season, and think raisin making one of the coming profitable industries of the Grand Valley. The location most favored is beyond all question that section lying about Palisade and along the southern slope of the Little Book Cliffs and to sixteen miles east of Grand Junction.

I have not experimented with drying in the sun, as I dried in the house by simply spreading on cloth placed on the table. The grapes shrank but little in drying, perhaps one-third, three pounds of grapes making two of raisins. I used barnyard manure and pulverized bone; have a bone mill run by water power. The barnyard manure makes the greater foliage and ranker growth. I estimate the yield of grapes at five tons per acre. I sold grapes, Cornichon and Emperor, in the Grand Junction market at $1.00 per seven-pound basket up to the first of January. They were kept in a cool storage building built of loam with 20-inch wall.

Grapes require very little water; the foreign varieties less than any other. A dry, sandy or gravelly loam with good drainage and where the plants can have the benefit of heat from the surrounding hills and cliffs is best. These advantages are more fully secured in the region of country skirting the Book Cliffs heretofore mentioned. In 1891 September frosts killed vegetation in the lower Grand Valley, while in this section grape leaves were unimpaired until the morning of the 7th of November.

The fact of my having seven successive crops of peaches shows practically a perfect immunity from frosts.

Prof. C. S. Crandall reads a paper on Blight—What Do You Know About It?

DISCUSSION.

Mr. Brothers—I would like to ask the professor why the disease strikes a tree when it is in full bloom, and another one of the same kind that has no blossom it does not touch.

Prof. Crandall—That is a question that I and no other man can answer. The disease is exceedingly erratic. Some trees are afflicted and some are not. My observations and experiments in inoculation seem to show that crab apples and varieties that come closely to the crab, are more liable to it than many other varieties. I think the reason that trees are oftener struck when in blossom is quite plain on account of the easier access at that time. In the flower cup the stigmas are not covered with cuticle; they are covered with a viscid substance, and thus offer conditions favorable to the germination and growth of the organism. And when we look at the base of the pistil we will find that the nectariferous tissue is all loose just like the tissue of the stigma, and I think it is for this reason that the organism gains entrance through the blossom oftener than anywhere else.

Mr. Brothers—The reason I ask the question is this: On some apple trees that were standing close together one would be full of blossoms and the other would not have any blossoms on it; but the tree that was full of blossoms the blight seemed to strike easier and not meddle with the other, and then the next tree might be full of blossoms again, and that would be more easily blighted. It was generally on the Jonathan and some on the Wealthy, and I came to the conclusion it was something in the blossom that caused the blight. In my young orchard, where my trees were just covered with blossoms and I was figuring on a big crop of apples, the blight struck them all at once, and in about four days my hopes were blasted —there was not a blossom on the trees; all were dead.

Prof. Crandall—Would not that look as though it were because the tree was in blossom that it was

struck by blight? Over at Eaton I noticed a case of immunity from blight in some trees. There was a row of crab trees, a Martha and then a Whitney, a Martha and a Whitney, and so around, and when I was there the Whitneys were every one dead and not a Martha had been touched.

Mr. Brothers—I am greatly interested in this blight business, for it took all my pear trees. I have only two little things five years old left. But my bearing pear trees—I had about fifty of them—they are all dead. Now, Mr. Henry Lee did not do a single thing to his pear trees, and they died. There was a theory that if you cut off the diseased limb that that would stop the blight, so I kept a couple of men in my orchard by the month, going from one tree to another, and told them when they saw a limb diseased to cut it off. Before they got around they found they had to go over it again, and I might have kept ten or twelve men in my orchard that season cutting off limbs, and then they would not have kept up with the blight. Finally, I said "If it is going to take them, I guess we will stop taking the limbs off," and we did. Mr. Henry Lee's pear trees died; he did not do a thing to them. I trimmed every branch that I could see the blight on, and mine also died down to the ground; so I came to the conclusion that my labor was pretty nearly in vain. But I still want to learn something about it, for I am greatly interested in this thing. I do hate to cut a tree up after it has been six or seven years growing, and plant another in its place.

Now, in regard to the crabs. The blight is severest on the Alexander, the Siberian crab, the Whitney No. 20 and the Pewaukee, and it is pretty severe on the Duchess, but of the Duchess I have not had one tree entirely killed yet; but my Pewaukees are all gone. It is a serious thing. All the information I ever got or ever read—they all seem to know the cause, but no one I ever heard of yet can give us a remedy. I have some trees where it starts at the top, and others where it starts at the bottom, right around the bottom against the ground. It looked to me just as though

where were some insects working up between the two barks of the tree. I followed it up with a microscope, but never found any insect.

Prof. Crandall—In pear blight the organisms are too small to find with any ordinary microscope.

Mr. Brothers—Is it an insect working up between the two barks?

Prof. Crandall—No, I think not. As to the size of this microscopic organism, its measurement is about one and one-half of a mu one way and from two to three mu the other way. The mu is the unit of microscopic measurement, and is 1-25,000 of an inch.

Mr. Brothers—Now, about rich and poor soil. Mr. Gallup was saying this afternoon he thought it might be cultivation. On my old place that I sold I had, I think, four nice large pear trees on sod in front of my house. I found they were not exempt any more than my cultivated pear trees; they all died just the same, so that knocked that theory. Then we thought that on Prospect, where the market gardeners raise strawberries and raspberries and all small fruits they water very heavy and more than we do where we raise only trees; they have to. Then we came to the conclusion that it was from cultivation and too much water that the disease sprang. A little further south on the hill, where I raised no small fruit, my trees that year were not so bad as they were on Prospect, but this year I could not see any difference, so that spoiled my theory in that direction. I have about come to the conclusion that I do not know anything at all about it.

Professor Furness was asked his opinion on the blight question, and he said: Gentlemen, there are just two things about this blight: nobody knows the cause, and nobody has found a remedy, and when I have made that speech I have just about finished it in those few words.

Mr. McClelland—Has the Professor ever experimented any in regard to the mixture of an insecticide that will kill the bloom?

Prof. Crandall—I have not individually.

Mr. Halverhout thought one of the causes of disease might be found in the roots. He advocated a better system of rooting and planting. If trees were properly planted there would be less trouble with disease. Care should be taken in plowing an orchard not to plow too close to the trees, and in digging an irrigating ditch not to dig it too close to the trees. It is important that the surface roots should not be too much disturbed. If less attention were paid to science and a little better real work done growers in this country would have better success with their orchards.

Mr. D'Arcey—I would like to tell of an experiment I made in California on a kindred disease, namely, that of leaf blight or curly leaf in the peach trees. It was recommended to me by a doctor, a medical man, and I tried it on one tree and I found it very successful. Whether it stopped the blight or not I am, of course, not able to say, but it had that effect on that tree while every other suffered from curly leaf. The experiment was to bore a hole in the trunk of the tree and fill it with sulphur at the time when the sap was running, and the theory was that the sap would carry the sulphur through the tree and kill the blight.

Prof. Crandall—There is one subject that I would like to say just a word about if I may. You see pear leaf blight spoken of in horticultural journals, but it does not always refer to this blight we have been talking about to-night. There is another blight which seems to be traveling west, and it may reach us in time. It began at the Atlantic coast, and they have it on the Mississippi river now. It is the pear leaf blight, and it is worse on nursery stock than it is on orchard trees. It is a fungus, a plant of a much higher order. Its start on the young leaves is first shown by discolored spots which extend, and the young leaves all curl up and drop off; but the older leaves will not curl up; they will die and drop off.

There are large nursery stocks that have been entirely defoliated by the first of July. There is a remedy that is very effective, and that is the Bordeaux mixture. Franklin, Davis & Co. used it at their nursery near Baltimore and at Vineland, N. J., on a young bearing orchard. They made the first application on the 5th day of June, the second on the 15th day of June, and three applications after that at intervals of ten days. This was on nursery stock, I think on budded stock, and the young trees held their foliage during the season. Three rows were reserved —were not sprayed—and these three rows were entirely defoliated by the first of July. The sprayed trees held their foliage right through and the others lost theirs, so that if this disease should strike here the Bordeaux mixture would prove an effective remedy.

Mr. Brown—Does this show the colored spots on the foliage?

Prof. Crandall—It is dark green when it first starts, and when it ruptures the cuticle it becomes black, and when it is black it is in the fruiting stage. This fungus consists of a very minute mycelral thread or stem that does not penetrate the cells, but grows between them. These threads throw little suckers into the cells and absorb the nourishment in that way.

Mr. Brown—Are there, to your knowledge, any experiment stations trying to destroy this by inoculation?

Prof. Crandall—No, sir; I know of no experiments of that kind.

Mr. Brown—Is it worth while to try it?

Prof. Crandall—It might be worth while to try it, if there is time to devote to it. I will say that I have no confidence in the transfusion of sulphur.

Judge Osborn—We have another very important question here. We want to know more about the codling moth and other injurious insects, and we gave that to Prof. C. P. Gillette.

Prof. Gillette—Inasmuch as I had a paper last year on the subject of the codling moth, and have read several other papers on the same subject, I have taken the liberty to write upon a different topic. I hope when I am through, any one wishing to ask questions on the codling moth will do so, and I will be glad to answer them.

INJURIOUS INSECTS AND THEIR REMEDIES.

Paper by C. P. Gillette.

The number of insects that inflict severe losses each year upon the horticulturist and agriculturist is very great. To consider each species separately, giving its habits, life histories and special methods of treatment, would require volumes. Yet it is important that the tiller of the soil should know how to combat and destroy any of the insect pests that may at one time or another attack his crops without the large amount of time necessary to study thoroughly the habits and remedies for each species. To be sure, this information would be of great service to him, but it is not absolutely necessary in order to enable him to apply remedies successfully in the great majority of cases.

Insects are all animals and quite similarly constituted and, as a rule, what will destroy one will destroy another if the application can be properly made, though this is not always the case. For example, if a certain substance taken into the alimentary canal of one insect would cause death, it is probable that the same substance would cause the death of any other insect that might eat it, though there might be exceptions to this rule. If this were always true, we should very often be unable to destroy a pest because we could not get it to eat the poison. It is possible, however, to make such a classification of insects and of the more important remedies as to enable us in the great majority of cases to know what to do to destroy the pest and avert serious injury.

INSECTS CLASSIFIED.

To serve our purpose in this case we may separate insects into two classes, those that have sucking mouth parts and those that have biting or gnawing mouth parts.

INSECTS WITH BITING MOUTHS.

Insects with biting mouths always gnaw into and devour the tissues of the part of the plant on which they feed. They are easily detected by the injuries that they inflict, or, if large, by an examination of their mouthparts. Everyone, for example, has seen the jaws of a grasshopper, and knows that he gets his food by biting off and devouring the tissues of various plants; and probably there is no one who has not observed a mosquito enough to know that it takes only liquid food, which it extracts from its host through a sharp, hollow beak.

Biting insects would include all of the order Coleoptera or beetles, all of the caterpillars, commonly called worms, whether hairy or naked, all of the so-called slugs, the grasshoppers and crickets and some others.

As a rule, any of the insects in this class may be destroyed by an application of one of the poisons, London purple, Paris green and hellebore, to their food. In order to be certain of success, however, it is often necessary to know something in regard to the habits of the species to be destroyed. To poison the larvae of the codling moth the application should be made very soon after the blossoms have fallen, so that the particles of London purple or Paris green, as the case may be, will not find lodgment in the calyx of the forming fruit.

To destroy leaf-rollers the application should be made before the leaves have become very much curled as they will then retain more of the poison and the larvae, being younger, and have a longer time to feed, will stand a better chance of being poisoned. For the destruction of cut worms with arsenical preparations,

it is necessary, first, to plow, harrow or otherwise work the ground to rid it of all green vegetation that can serve the worms as food. Then, by poisoning freshly cut grass, clover, alfalfa or other green stuff and scattering it over the ground in the evening, great numbers of worms will be destroyed.

There are many insects that feed where it is unsafe to apply poisons, and still others where it is unsafe to make an application that will reach their food material. The former can usually be killed by the methods given below for the destruction of suctorial insects, while those of the latter class, mostly borers, have to be reached by special methods.

BORERS.

These are often very difficult insects to manage. Some work in the twigs, some in the trunks and others in the roots.

About the only remedy for twig borers is to search out the affected parts and destroy them by fire.

Of the borers that infest the trunks of trees, some never go deeper than the sap wood, as, for example, the flat-headed apple tree borer. The presence of such borers can usually be detected by the dark color of the bark over their burrows. Borers of this sort can best be removed by the use of a pocket knife during fall, winter or early spring.

There are others that go deep into the heart wood. These may sometimes be destroyed by thrusting a wire probe into their burrows, but probably the best method in most cases is to use washes on the trunk of the tree for the purpose of repelling the female or destroying her eggs after they have been deposited. A good wash for this purpose is prepared by dissolving soft soap or whale oil soap (any soap may be used) in water, until of the consistency of a rather thick paint and then adding one pint of crude carbolic acid to every fifty gallons of the preparation. It may be applied by means of an old scrub broom or whitewash

brush to the trunks and large branches once a week during the last half of June and the whole of July.

For the destruction of the peach and plum borer that works from the crown down into the roots, it is recommended to mound the trees with dirt or wrap them with tar-paper to the height of one foot about the middle of June. The protection may be left the year through or may be removed in September. There is usually a gummy exudation through the bark over the burrow of this insect and by cutting it with a knife the larvae can often be removed.

INSECTS WITH SUCKING MOUTHS.

In this group comes some of the worst pests. Familiar examples are plant-lice, scale-lice, leaf-hoppers, squash bugs, parasites on domestic animals, etc. Insects in this group do not take solid food but feed upon the liquid juices of plants and animals which they extract by means of a sharp, tubular beak.

From the manner in which food is taken by members of this group it is evident that it would be useless to attempt to destroy them by the application of poisons that have to be taken internally. The substances to use against such insects are those that will kill by external contact but will not injure the plant or animal upon which the insect is a parasite.

The most important of these insecticide substances are: Kerosene emulsion, Pyrethrum or Bubach, whale-oil soap and tobacco.

PREPARATION AND USE OF INSECTICIDES.

London purple and Paris green are the most useful of all the insecticide substances for the destruction of biting insects and should be first used, where it is safe to do so, and some better remedy is not already known. They may be applied in water in the form of a spray in the proportion of one pound to 200 gallons. If applied dry, they may be mixed with flour, plaster, ashes or other dilutent in the proportion of one to 100 and lightly dusted over the plants from

a cheese-cloth sack. This is best done in the evening or early morning when the dew is on.

Use these substances against the codling-moth, the leaf rollers, potato-bug, beetles, flea-beetles and plant defoliators in general.

WHITE HELLEBORE

Is specially useful for the destruction of the larvae of saw-flies. The slug that infests the leaves of the pear and plum trees and the green larvae that defoliate the currant bushes are probably the most common insects of this sort in Colorado.

Hellebore is applied in water in the proportion of an ounce to three gallons or is dusted from a cheese-cloth sack as in the case of London purple or Paris green. If applied dry it may be diluted with an equal part of common flour or may be applied pure. If applied pure, a very light application will be sufficient. It should be used in the evening to be most effectual.

KEROSENE EMULSION.

This substance I consider most useful of all the insecticides that are applied for the destruction of suctorial insects. It is prepared as follows:

Dissolve one pound of soap in one gallon of water. Heat the solution to boiling and while boiling hot remove from the fire and immediately add two gallons of kerosene and agitate the whole briskly until all is a frothy, creamy mass. This mixing is best done by using a force pump and pumping the mixture back into the vessel that contains it. Dilute with thirty gallons of water and the emulsion is ready for use. Smaller amounts may be made in the same proportions.

This is an excellent substance for the destruction of plant-lice, scale-lice when they first hatch, squash bugs when young, grape leaf-hoppers, etc.

WHALE-OIL SOAP

Is used for the destruction of the same insects as kerosene emulsion and is usually prepared by dissolving one pound in eight gallons of water. It is best applied while warm. Whale-oil soap is often chosen in preference to other soaps for the preparation of kerosene emulsion.

TOBACCO

Is also used for the same purposes as the above substances either in the form of a fine powder or as a decoction prepared by pouring boiling water over it. The stems of the leaves or the sweepings of cigar factories are usually employed for this purpose as they can be obtained very cheaply. The decoction is much used for the destruction of parasites on domestic animals and the fumes of tobacco are very useful in ridding indoor plants from the lice that so often attack them.

PYRETHRUM OR BUBACH

Is also used for the destruction of insects by external contact and is prepared in water in the proportion of one ounce to three gallons or is dusted dry upon the insects. On account of its greater cost it is little used except on house plants where it is objectionable to use other insecticides. It is most used for the destruction of the house-fly, plant-lice and that most unwelcome guest that is too often found frequenting sleeping apartments in this fair state of ours.

It is, of course, totally impossible to cover the whole field of economic entomology in one short paper but it is believed that the information given above will enable the intelligent, observing, thinking horticulturist to successfully combat the majority of the insect pests that attack his crops.

DISCUSSION.

Mr. Crowley—I would like to ask if this London purple is good for insects of all kinds. I have experi-

mented on grasshoppers and it has been an entire failure. I sprayed the leaves thoroughly, Russian mulberry trees especially, and continued to do so until the trees were three years old. Three rows of those trees that were sprayed were the first struck. I did not use the preparation as directed, I made it four times as strong and applied it every day, and they still ate them and went over to my orchard and ate three thousand apple trees. Now I would like to know what remedy you have for grasshoppers.

Prof. Gillette—You will notice I did not say London purple would kill all insects. It is interesting if you have found that Paris green and London purple will not kill grasshoppers. I never have known London purple or Paris green to be recommended especially for grasshoppers. The best remedy is to use "hopper dozers." These consist of a frame, usually 15 or 20 feet in length, covered with canvas. The canvas is saturated with kerosene oil and arranged so that in carrying it over a field the grasshoppers will jump up against it. In jumping against the canvas they come in contact with the keresene oil which kills them very quickly. There are several kinds of these "dozers."

Mr. Brothers—The only thing I know of that will kill grosshoppers is to get them into water, if you can, and keep a little coal oil on top of the water; that will kill them. They don't drown; you can't freeze them, I have tried that. Without stretching it at all, in 1864 I could have filled twenty wagon loads, and I don't know but forty. I could find them in ditches a foot and two feet deep for a space 20 or 30 yards long. I took some one morning from a snow storm. I took about fifteen or twenty of them to my window sill in the kitchen and it was not half an hour before those little fellows were jumping around just as lively as though they had never been in the snow.

Mr. McClelland—I know that grasshoppers can be taken care of by the use of keresene oil. At the head of our ditch we used to set up a can with a little

hole in the bottom and a string run through it. The oil in the can would drop from the string on the water, and just as soon as the grasshoppers jumped up and touched the kerosene they were dead.

Mr. Brothers—In 1874 we got a barrel of oil especially to put on our big ditch, and I was appointed to go up every morning and tap that barrel. I used to go up about nine o'clock and tap the barrel so it would drop slowly. At about three o'clock in the afternoon I would go up and shut that off, and I tell you we saved lots of people's crops by not letting the grasshoppers get across the ditch. Those little fellows, just as soon as they jumped in and touched that coal oil, they were dead.

Prof. Gillette—I might add that coal oil will kill any insect, no matter what it is. It is one of the best insecticides for killing the squash bug. And I will also say that you can also drown any insect if you only keep it under water long enough.

Prof. Crandall—Is there any danger in putting arsenites on cabbages?

Prof. Gillettte—That is a matter of opinion. In applying arsenites to cabbages the poison only gets on the leaves that are all the time opening out as the cabbage grows. I use Paris green on cabbages in my garden without fear of being poisoned.

Mr. Brown—I would ask if the Professor ever had any experience with the mealy bug. I have concluded they cannot be drowned.

Prof. Gillette—The mealy bug can be drowned as well as any other. It is covered with a waxy secretion that protects the body from immediate contact with an insecticide. I would like to ask if this mealy bug that you speak of was on your apple trees?

Mr. Brown—No, sir; on green house plants.

A Voice—What is your remedy for that?

Prof. Gillette—These insects are covered with this waxy secretion which protects them so well that you have to apply the kerosene emulsion with a good

deal of force; but you can kill them with this preparation. There are two forms of this insect, one on the roots and one on the branches. One remedy for the root form is to make a hole in the ground with a crowbar, and put into the hole bi-sulphide of carbon and then close the hole quickly. You can also kill them by removing the earth from the roots near the base of the tree and pouring on hot water, not hot enough to kill the roots but hot enough to kill the insect.

Mr. J. W. Goss—I would like to ask the professor a question or two about the codling moth. Last year I had hardly any worms from three times spraying. This year I did the same thing and have no worms except in some of the Ben Davis trees. I would like to ask if the Ben Davis should be sprayed differently from the ordinary tree? What is the proper way?

Prof. Gillette—I do not see why any difference should be made with the Ben Davis. It is true that the codling moth has a preference for some varieties. I have had hardly any experience with the Ben Davis, but it is very possible that this is one of the apples that the moth has a preference for.

Mr. Crowley—There is talk before the legislature of compelling people to spray trees. We have no codling moth in our county or anything of that kind. Now I would like to get the sense of the meeting as to whether they want that bill or not. If so, give your recommendations. We want to know; we want to investigate, we do not want to make any legislation that is not needed.

Mr. Brothers—I was down at Rocky Ford this fall, and I visited Mr. Swink's orchard there. I think he had scarcely an apple in his orchard that was not wormy. When I went through with him he said he was sorry his apples were so wormy, so I told him what I was doing for mine, and we tried the same thing there. I took a gunny sack and put it around some of his trees. In the morning we took the bands off the trees and under some of these bands we found

five or six of these little fellows. He told me he was going to put bands on all of his trees. I told him if he did I thought he could do away with a great many of those worms.

Mr. Crowley—I have not had any experience with these worms or seen any on my trees. I had 150 barrels of apples this fall and I never found a worm. All along the railroad, say within two hundred yards of the railroad, the codling moth is found; outside of that line, so far as we have found, there are none. That is why I spoke of the spraying business. Is it necessary now, or is it not, for us to commence spraying?

Mr. Brothers—Now Mr. Goss says he sprayed three times and he had no wormy apples except in the Ben Davis. I don't think I had an apple tree but what had some wormy apples on. I sprayed three times. I sprayed one time just after the blossom was off, another time before the apple turned and another time when they were no bigger than walnuts, and I want to say that out of about 500 or 600 barrels of apples, I got at least 50 barrels, or between 50 and 75 barrels, that were wormy this year. And I not only did that. I had some codling moth traps and I had this gunny sack around all my trees. In these gunny sacks we caught from five to twenty-five of these little fellows under each band every week. I had the boys go through and I went myself. It took us just about a day every week to go through my orchard. We took these bands off the trees and killed the worms and put the bands on again. I did that all summer, and my neighbors told me they had five wormy apples where I had one, and they did not band their trees. Now there is no use in raising apples and having them spoiled by codling moth if we can help it. For my part I would be in favor of our legislature doing something for us on this question. I am told that the law of California regarding the codling moth is so severe that they have committees who go around and cut your trees down for you if you don't attend to your codling moth yourself. On Wheat Ridge very few

people attend to their trees as they should do. If my microscope tells no stories I counted forty eggs from one of these little moths, and if she will deposit forty eggs, one of them, it wont take them long to destroy a few apples, and especially when we have millions and millions of them. Now at Wheat Ridge they are getting worse and worse every year, and if I do say it, there are very few of the fruit growers who take any steps to get rid of them, and they raise small fruits as well. They have to attend to the small fruits and get them to market, and so they neglect the apple trees to a great extent which makes it worse for those who do attend to them. I had a neighbor who had an orchard adjoining mine. He did nothing for his apples and they were wormy where I had no worms on my side. But if he does not do anything what is the use of my working on my trees? I certainly do think we ought to have some law about it. And I want you friends who have no codling moth to help us who have them. I used to think that Colorado was such a country that it would never have any codling moth. I was just that foolish.

Mr. Page—I have drawn up a bill to present to the legislature in regard to this very matter, and the reason why I did not present it this morning was because I met Judge Felton on the street and he asked me to bring the bill up here, or send it up to this society that they might look it over and see if it met the wants of the fruit raisers of this state. Now in the lower Grand valley there is no codling moth, but in Grand Junction they have it. Of course by spraying our orchards we will stop the devastations of the codling moth to a great extent, but unless there is a law compelling our neighbors to do the same it is useless for us to do anything.

My bill is drawn largely after the California bill, and I would be glad if your society would appoint a committee to look it over and pass upon it and make recommendations as you think advisable. If the society will now select a committee for that purpose, I will most gladly and cheerfully have inserted in this

bill whatever the horticulturists of this state demand, and place it before the legislature at the earliest opportunity. I have quite a number of friends who are interested in it. That is my business; it is what I have been engaged in for a number of years past, and I would like to see this law placed upon the statute book, or some similar law prohibiting the introduction either by the transportation of fruit in fruit packages or in any other way of these noxious pests into the State of Colorado.

A motion is made that the chair appoint a committee of three to look into Mr. Page's bill. An amendment is offered that the committee consist of five. Motion carried as amended.

Mr. Wilcox—Brother Crowley, of Otero county, asked if we wanted that law passed. There is one clause in it recommending the appointment of county commissioners. The question is: Is it in the jurisdiction of the house thus to direct the county? There are counties in the State of Colorado that have no fruit trees whatever, Lake county for instance, so they would not have to go to the expense of having this commission appointed. I think the bill could be productive of much good in many counties. There is no doubt but that the insects are here in large numbers.

Judge Osborn—I will dispose of this committee while I have it here: Mr. Gallup, chairman, Mr. Coburn, Mr. McClelland, Professor Gillette and Mr. Wilcox. I have divided them over the state as well as I could conveniently. When can you report?

Mr. Gallup—To-morrow, sometime during the afternoon.

Meeting adjourned until ten o'clock Friday morning, January 13.

SECOND DAY—MORNING SESSION.

January 13, 1893.

The association met pursuant to adjournment.

Judge Felton in the chair; Mr. John Tobias, secretary.

Mr. Wilmore—I move that we proceed with the order of business—that we proceed to the election of officers.

Motion adopted.

Nominations for president: Judge Osborn and Judge Felton.

Judge Felton declining, on motion, Judge W. B. Osborn was elected by acclamation.

The retiring president, Judge Felton, introduces the incoming president, Judge Osborn, who responded as follows:

Ladies and Gentlemen:—I thank you for the response you have given me in making this vote a unanimous one. I scarcely expected it. But I feel like saying to you that while I shall occupy this place for the next year I intend that there shall nothing lag on my part. I feel the responsibility of the position. My friend who has occupied this position for the last two years has been with us at all times and under all circumstances at our meetings. He has never lagged, he has been faithful, and I cannot be more so; but I will try to follow out the wishes of this organization to the best of my ability. I am not here for the money there is in it; I am not here to fill the place for any fee I can see in the future; I am not here to fill this place for anything that I can possibly see that might benefit myself financially. But I am here in the interest of the State Bureau of Horticulture; I am here to do my duty, and I shall do it without fear or favor to the best of my ability.

This year is going to be one of the most responsible years that the State Bureau has ever experienced. There is much to be done, and I must have the hearty co-operation of every part of the state; from every horticultural corner, and every horticulturist in the state. This is a year in which Colorado is going to advertise herself in the various branches of the Horticultural department. This year will help us out wonderfully.

Now a good deal depends upon you, friend and horticulturist, and while we must have a head there must be something more than that. I believe that the horticulturists of this state have that interest at heart. I believe that while we are making an effort for an exhibit at Chicago, that that effort and that exhibit will be a success. Why? Because I know that the horticulturists of this state have the push to make it so. I know what they have done in the last five years. I know I have been attending all the horticultural fairs in the state; I know I have been Dr. Shaw's right hand man in all of them. I know just what the people of this state can do; I know just what they will do. I know the people on the other side of the range. I have stayed with them; I have eaten with them; I have been at their exhibits; and I know that while we were there from this side we were cordially received. We were welcomed and treated in such a manner that we could not help but respect them for their push and energy in the horticultural interests which they represent. I have attended horticultural fairs on this side, and we have received just as sincere a welcome. I remember the fair we had at Pueblo, it was a grand success. It was virtually the exhibit from Montrose. And I know this: That whenever I may call on the horticulturists of this state, they will respond. I know the men; I know their orchards, more or less of them. I know that during this year they will be called upon to respond, and I want them to see that the fruit is raised if it is possible, and that we have it when the proper time comes to forward it to Chicago.

Now, gentlemen, I could say much more. There is much to be said, but I understand that we will hear from a gentleman this afternoon on this subject of the World's Fair, who will give us full details. Mr. Faurot, I know, can tell us of the plans fully and what is expected, and we certainly expect to carry out all plans that will be necessary for the interest of this great exhibit to be held at Chicago.

Now I will say in conclusion that I do heartily thank you for the welcome and for the hearty response from you in the way of the vote which you gave me. It was really unexpected; I will not say wholly unexpected, but it was in part.

Further, I wish that every horticulturist represented here, when he has anything to bring before me, will not be backward about it. Come to me for counsel. I shall come to you for counsel. If there is anything needed, let me know; if anything I want I will call upon you, and I know you will respond. Now I think you understand me in my few remarks. Do not be backward about making any request; do not think you are putting yourselves forward. I am very easy to approach—very easy to get acquainted with. I am not here simply to stand behind the desk or merely to keep order; I am here for use, and I want you to use me. I want to use you, and I must do so in order that we may co-operate together. Thank you, gentlemen.

J. E. Reynolds was elected vice-president.

Mr. Ed Housel elected secretary.

Mr. Housel—Mr. President, Ladies and Gentlemen, fellow workers in the horticultural cause: I thank you heartily for your support. In entering upon the duties of the office which has been filled by a man of life-long experience, as Dr. Shaw had, you will recognize that it will be out of the question for me to perform the duties as well as they were performed by the Doctor, but I trust in the performance of those duties that I may have your hearty support. Trusting that you will help in the horticultural work, and thanking you for your support, I will close.

Mr. John Tobias elected treasurer.

Mr. Housel reads resolutions of respect for Dr. Shaw and R. S. Edwards.

The vote for members of the executive committee resulted in Mr. Steele of Mesa county, receiving 29; Mr. Coburn of Delta, 14; Mr. Gallup of Denver, 8; Mr. Crowley of Otero, 24; Mr. Pennock of Larimer, 16; Judge Felton of Fremont, 14; Mr. David Brothers of Jefferson, 17.

Mr. Steele, Mr. Crowley and Mr. Brothers elected members of the executive committee.

Mr. Housel reads resolutions drawn up in memory of Mr. Van Camp.

Meeting adjourned until 2 o'clock.

AFTERNOON SESSION.

January 13, 1893.

Mr. Cornforth:

Mr. President, Ladies and Gentlemen:—I am sorry that I have not prepared a more elaborate report on the "Packing and Marketing of Fruit," but if any lady or gentleman here would suggest any question to me that I can answer, I shall be pleased to answer it.

Of course the most momentous part is the packing and marketing of fruit. I claim it is far better, if the acreage is large enough, to invite buyers from all sections of the country to come and bid on the fruit as it stands in the orchard, and let the buyers market it themselves. In this way there is a greater profit to the grower, for a man who grows fruit cannot very well market the fruit. It may be of an inferior quality to his neighbor's, but still he feels that it should have as great a value. The trouble with the horticulturist is that each thinks his fruit a little better

than his neighbor's; but invite the buyers to come there, and they will soon tell you if your fruit is better than your neighbor's.

This plan of disposing of fruit is better than to take the chance of shipping the fruit. It has been proved to be the best way to realize the greatest amount of money from the acreage. In Florida this last season, they decided that no fruit should be shipped on commission, but that all fruit should be sold at the orange groves, or at places designated by the union. The prices were also fixed, but in this they made a signal mistake. After they were organized they said how much they would take for their fruit without regard to the prices offered by the buyers. The consequences were that while perhaps two million boxes were sold, the balance was left on hand. Undoubtedly the best fruit was sold, but the person with a poorer fruit had it on his hands. It proved its injustice to him. The result to-day is a serious depreciation in the value of fruit.

The progress to-day being made in the storage of fruit and the keeping of fruit is very different than a few years ago. To-day oranges are being taken from the state of Sonora and other districts, and carried to Chicago and put in cold storage to be sold during the World's Fair. Oranges are being held in California for the World's Fair. Large quantities of the best grades of goods in the United States, for which high prices have been offered, are being held in storage for enhanced values this year, knowing there will be such large numbers of people in Chicago, and consequently great demand. Even during last season, as high as $4 per barrel was paid in the eastern orchards for fine qualities of apples to go into cold storage for the World's Fair, showing that the finest fruits bring the highest price.

No one organization can establish fixed values for all grades of fruit. If the poorer grade is worth as much as the higher grade there is given no incentive

to the business to raise a higher grade; and if the higher grade brings no more than the poorer, you can see the injustice of cultivating first class stock.

PACKING AND MARKETING FRUIT.

J. T. Cornforth.

If fruit is properly gathered and packed it is half sold. Nothing will pay the grower so well as to properly assort his fruit to a uniform standard. Each package of fruit must be of uniform ripeness, for should ripe and half ripe be placed in the same package, the half ripe will soon destroy the ripe.

Fruits for market should be gathered when fully matured, do not wait until fully ripe, for going through the sweating or curing process ripens it very quick. All fruits sweat soon after being packed. If sweated too heavy it soon rots, but if treated right it will cure or dry out, so that it will keep for a reasonable length of time. Two conditions exist after fruit is gathered; the rotting or the drying. The drying condition is far safer. Fruit should not be picked within twenty-four to forty-eight hours after a rain. It is not fit to ship; it will rot, not cure.

Peaches and pears for packing should be cut from the tree; prunes, plums, apricots and apples can be pulled; but if prunes are intended to be dried they should be left on the tree until they drop. Grapes should be placed in the shipping basket direct from the vine, then placed in the shade for twenty-four hours without the cover. Afterwards fill the baskets, for they will have shrunk much in curing, they are then ready to be closed for market. Shippers have found the eight pound basket most desirable. In conveying fruit from the orchard to the market or railway station, use a spring wagon, never use a farm wagon, for jarring and jolting bruises the fruit. It is well to have a canvas to cover the load; it is protec-

tion from sun and rain. See to it, that when at the station, it is placed in the shade and under a roof if raining.

Baskets should not be used except in packing from the tree, for carrying from the trees to the packing shed use boxes, they will not spring or give with each motion of the body, or jar of the wagon. Take care not to fill the boxes over three-fourths full.

I have invented a compartment carrier on the order of an egg carrier, that will carry stone fruit long distances. The cells of this carrier conform to the size of the fruit, holding it firm and in position, a peach decaying in one cell does not affect its neighbor. Alexander peaches have carried sound for ten days, other varities, such as early and late Crawfords and Clings, have carried from thirteen to eighteen days. Stone fruits sweat and cure perfectly in this carrier; the paper being an absorbent, takes up the moisture, the fruit being held in suspension in its cell is kept cool but close, so that the sudden change of temperature or dust does not affect it. This filler will carry good peaches, in good order, to the London market.

We have a fine market in the east for late strawberries. It is safe to say that the crop of ten thousand acres could be marketed at handsome profit to growers.

The apple crop of Colorado would produce much more money if properly handled and packed; the Ben Davis is the most valuable for very late market. The price this season has been very high from the fact that the crop averaged about forty per cent. of its maximum, but this percentage was equal to the average of the United States.

The grape growers of the east, for the first time, were fully organized the past season. The result was profitable, the California Fruit Associations have been organized for some years with good results, and when our present trees that are planted, bear fruit, it would result in great benefit for each district to have

a local organization, governed by a State Fruit Growers Association, thus giving much information as to the most desirable markets for certain kinds of fruits.

The most important thing our Board of Horticulture should give attention to, is that the present legislature pass a bill giving protection to our orchards. If something is not soon done it will result in untold injury to the fruit interests of the state. The pests and blight so far have not taken possession of our fruits, but they soon will if no laws exist to evade and destroy them.

Large moneys are being invested in acreage in our state. If these men are willing to come from the east and put large amounts of money and labor into this work, does it not seem right that our state should give them protection in their investment? We are protected as far as possible from burglars in our homes. All classes of business are protected except the horticulturist; he has no protection. He spends five or six thousand dollars besides five or six years of time and labor, and yet a few diseased trees allowed to stand in an adjoining orchard may destroy every acre of his large investment. See well to it that this is properly explained to the governor and officers of our state.

Mr. Spears—Mr. Cornforth, four years ago, when I was in Chicago, the St. Joe and Ann Arbor people shipped their peaches to the wharf in Chicago and sold them at auction to commission men. Do you think your suggestion would be better than to let buyers buy the fruit direct from the freight depot here?

Mr. Cornforth—I made the assertion that in all cases where the acreage is of sufficient quantity it is better to ask bidders to come in and offer prices.

In regard to peaches: While eastern peaches were selling from 15 to 20 cents per basket, the Cali-

fornia peaches were bringing at the rate of from $4 to $5 per bushel. There is a new district—Georgia—coming into the market. Their peaches are netting $1.50 and $2.00 per bushel. But the Michigan peaches referred to were of such a character that they had to go to the canneries.

The largest shipping fruit raised in California is raised in the higher altitudes. The Bartlett pear is coming to be a very important fruit there. It seems to be freer from pests and more profitable to investors. In some districts they have abandoned their peaches and are cultivating only Bartlett pears. These pears are of extreme value for shipping purposes.

Judge Osborn—Mr. Cornforth has such knowledge of shipping and receiving fruit, he has had that which none of us has had, so it seems to me we cannot very well argue a case with him. We have nothing to say. But if there is any point in his paper in which any one is particularly interested, there is time to ask questions, if not, we will proceed.

W. W. Wilmore—I heartily endorse what Mr. Cornforth has said in regard to the packing of fruit, but I hardly speak from experience. But I can speak about the quality of berries we have grown in the vicinity of Denver. I have long known that many of our growers are very careless in the manner in which they put up berries for the market, but I never knew to just what extent the evil prevailed until the past season. During the last season while engaged as inspector, about 125,000 crates of berries passed under my inspection, and it was surprising to see the number of fine, large berries that came in put up in such a manner as to make them look decidedly off. A good many of our people ought to pay perhaps less attention to the matter of growing fruit and more attention to preparing it for market. It is a matter to which one ought to give a little more careful thought.

Where the crates are filled unevenly they do not look well. Then sometimes green ones will be placed on top, and the natural supposition to the buyer is

that if there are green ones in sight there are probably more underneath. But there is a way of putting up this fruit to one experienced in handling it. The boxes should be filled about the same fullness, not over full and not under full. Berries get smashed by being over full.

I think a great many of our growers are growing berries when they are not prepared to handle them after they are picked. A crate of berries has no business standing under a shade tree for three hours as a great many let them do. The caps on the strawberries wilt, and the color of the berry fades, and when brought to market they look really a day older than they are. They should be put away in a cool, damp place. Not necessarily where it is wet but where the atmosphere is a little damp. If this is done, you would be surprised to see how much sweeter and fresher your fruit will look.

The packing and marketing of fruit should receive the greatest care.

The committee appointed to consider the bill drawn by Mr. Page, to be presented to the legislature, make their report. Mr. Gallup, chairman of the committee, reads the bill, which was generally discussed.

Mr. W. S. Coburn reads his paper on Fruit Culture on the Western Slope.

FRUIT CULTURE ON THE WESTERN SLOPE.

By W. S. Coburn.

Ten years of experience on the western slope has established the fact that there is no better section of the United States for the successful growing of all the fruits of the temperate zone than the three counties of Montrose, Delta and Mesa.

These three counties having taken the initiative step in planting small experimental orchards and vineyards, as soon as the Indians were removed and

the reservation was opened up for settlement, has perhaps given them some advantage of the neighboring counties of Pitkin and Garfield which have a large area along the valleys and foothills suitable for the successful growing of a large list of fruits, which they have within the past two years begun to realize and many small orchards have been planted. These orchards are doing well and seem to be in a thriving condition, and within a very few years we may expect to see a large addition to the fine fruits from these two counties of the western slope. The three older counties in fruit culture, above mentioned, are enthusiastic over the success already attained, having never had a failure since the trees were old enough to bear. The old orchards are being enlarged and new ones put out in tracts of from ten to three hundred acres all over the three counties, aggregating thousands of acres each year. We have more talk of how, and when, and where and what kind of fruit, for the most profit, to plant, than we do of all other industries combined. In fact the new gold fields of southwestern Utah have no charm for the fruit growers. It is no longer an experimental business and our people are determined to embrace the golden opportunities presented. The adaptability of soil and climate are so perfect and the freedom from disease and insects have not only been a great boon to the fruit growers, but have enabled them, with no extra expense, to produce fruit that has no superior and but very few equals. It also encouraged amateurs without a thorough knowledge of the business to attempt and make better success than they otherwise would have done. We cannot expect perfect immunity from all pests always and our fruit growers are now making investigations as to the best methods of treatment when they appear.

Some mistakes have been made in planting through the influence of eastern tree peddlers, conveying the idea that nothing but Ironclad apples, Ironclad peaches and plums could withstand the vigorous

winters of Colorado. The Ironclad part of it was used with much emphasis to convey the idea that they were very scarce and consequently came very high, and without them, any attempt at fruit growing would prove a failure. This erroneous idea has long since been exploded and planters are now using good common sense and what they do not know themselves they consult those who do. I am inclined to the opinion, however, that many of our western planters are making some mistakes in planting largely of a few of the most prolific varieties of the apple without regard to quality, and the few who anticipate this and plant largelyfor quality will always find a ready market at good prices, while those growing great quantities of apples of poor quality will, in a few years, find they will be a drug on the market at any price. They will no doubt realize considerable profit from these prolific, poor quality apples for a few years while fruit is scarce, but I am inclined to think when fruit becomes plentiful, as it inevitably will, their large profits will come in long deferred payments without interest.

I refer more especially to the Ben Davis and Missouri pippin, which sold this year at 4 1-2 cents, when Jonathan and G. G. pippins sold readily at 7 cents. Then there is the Rome Beauty, Sutton Beauty, Baldwin, Rox. Russett, Northern Spy, Walbridge and many others, all of good quality that always command good prices and the market hardly ever overstocked. The time is fast coming when small, poor fruit of any kind will not pay for the packages and freight, and the man who exercises all the precautionary measures by pruning, cultivating, fertilizing, carefully picking and sorting, putting his fancy fruit up in nice packages will receive fancy prices.

Mr. Coburn—We feel that we have the finest prospects on the western slope that we have had since the country was settled. Our fruit went into winter in better condition than ever before, and all fruit buds

are still in fine condition; and we have promise of an abundant crop. I have a few specimens of apples that I would like to put on the table and show to the people if there is room.

Rawles Janet—These are very large, very prolific.

Missouri Pippins.

Orange Winter—That apple originated in Wisconsin, about fifty years ago, was a fine winter apple and the state named it the Orange Winter. Afterwards, the county horticultural society of the county in which it originated, changed the name to Newall's Winter, and that is the name by which it is now being introduced by some eastern dealers. You will find a full description of it in the issue of the "Rural New York" of November 26. It keeps pretty well, and it is of good quality.

Walbridge.

Roxbury Russett—In Massachusetts, where I was raised, they are rusty all over, but here they have only very small spots of rust around the stems sometimes. They are prolific and fine keepers.

Grimes' Golden Pippin—They are a peculiar shape; one of the best quality apples there is.

A poor colored Rome Beauty.

Baldwins—That apple I have always insisted to be a fall apple, consequently I planted only about a dozen trees and have had them five years. They never bore a single specimen until this last season, and this season they had about six bushels.

Mr. Page—In regard to that Grimes' Golden, what age were your oldest trees?

Mr. Coburn—About four years. I know of trees in Missouri ten years old that had as high as 16 bushels to the tree this year; no blight and not any insect. It is considered a January apple.

I have no Jonathans here.

English Golden Russett—High quality, good keeper, but they have to be kept where it is moist or they will shrivel.

Mr. Coburn offers these apples to the convention to sample and taste.

Mr. Brothers—Mr. Wilmore, I told our friends yesterday that you were secretary of the Fruit Growers' Association and if you were here I thought you would tell us how you organized and what success you had during last year.

Mr. Wilmore—The object of the association is not to form a trust in the common acceptation of the word "trust." We are not trying to hold anybody up, but we are trying to keep our markets even. There has always been such a fluctuation in the prices of perishable fruits. We organized with the intent of keeping the market a little more even, stimulating the shipping trade, carrying off the excess as far as possible, and keeping things even at home. We also thought we could get a reduction in box material. After getting to work we found that our expectations were not altogether visionary. Instead of $3.50 a thousand as before, we got a bid of $2.65; and on crates that had cost us $11.50 per hundred, a bid came in of $7.85 per hundred, so in this respect we felt well paid for organizing.

We had a much better crop of fruit than any one anticipated. We did the best we could, and we think we came out with flying colors. The whole business cost us 4 1-2 per cent. to manage it. We were very fortunate in getting out without any bad bills on our hands. We thought the principal obstacle in our way would be that we might run against a good many people who would not be as good pay as we might wish to find, but we were happily dissapointed in that direction. We are now revising our by-laws. We see where we can improve on our methods of handling our products, and hope to be in better shape another year.

During the flush of the season we experimented in shipping to a distance. We sent berries as far as Omaha, the first, so far as we know, shipped from Colorado. The price was as good as we could have gotten in Denver. The second car was a greater success than the first. We sent one car to Lincoln, Nebraska; we expressed quite a number to Kansas City, Mo. We just did this for experiment, to see what we could do. We think we see our way clear for the coming season.

I will be glad to send a pamphlet containing our by-laws to any one who wishes and who will give me their address.

Mr. Coburn—I would like to ask, Mr. Wilmore, if you ever tried the Cuthbert and New Marlboro berries.

Mr. Wilmore—I tried the Cuthbert, and for a few years I could not recommend anything else. It is one of the largest and best shipping berries, and an all-round good berry, with one exception. At the end of four years it began to crumble; to fall apart, seed by seed. I thought it might not continue so, but the fifth year it was worse, and the sixth year they were not good for anything. On inquiring about it I found it was a common thing.

Mr. Coburn—Five or six years ago I sent to New Jersey and got a dozen plants, and have quite a lot of them now. They are very prolific. I never use any protection; they stand right out in the open air, and they bear every year.

Mr. Honnett—The Marlboro is one of the best new berries around Boulder.

Mr. Wilmore—We have a new variety in our neighborhood. It is a much larger berry than any I have seen—larger than the Cuthbert—the Pride of Kent. It is very much like the Antwerp. It is too soft for general purposes.

Judge Osborn—It is suggested that the old board and the new board meet at 6:30 to finish up necessary

business. If there are no objections, we will consider that an appointment.

Meeting adjourned until 7:30 p. m.

EVENING SESSION.

January 13, 1893.

The meeting called to order at 7:30 by the president, Judge Osborn; Mr. Housel secretary.

Prof. D. O'Brine:—Analysis of Soil Best Adapted to Fruit Culture.

Prof. O'Brine spoke without notes, as follows:

Mr. President, Ladies and Gentlemen—The first notification that I had to appear before you and to present a paper was the program that was sent to me. If I had selected the subject I think I might possibly have selected one that would have been of more interest to you than what I have to say to you to-night; namely:

The Chemical Analysis of the Soil Best Adapted to Horticulture.

You have all read Gulliver's Travels by Dean Swift. He makes a clear statement there. He says: "And he gave it for his opinion, that whoever could make two ears of corn or two blades of grass to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together." (Applause.)

Chemical analysis, in what it conveys to the farmer, in my judgment, does not amount to much. In the first place it is technical, and in the next place when you add up a column of figures that presents the chemical ingredients of the soil, of which the average farmer knows but little, and the sum comes to pretty nearly a hundred, it conveys to him very little information.

The chemists of the country are about evenly divided in regard to the practical utility of the chemical analysis of the soil. Dr. Hilgard, who has made a great many analyses of the southern Pacific states, claims considerable for soil analyses. He says that chemical analysis of the soil of every new country ought to be made, so that settlers in going there can select the soils best adapted for any special work they propose to engage in.

All of you, I take it, came from the east, or most of you, and you can recall in your imagination the character of the soil by the timber that grew on it. You know the black walnut and butternut bottoms; you know the character of the soil of the sugar maple. Dr. Hilgard's idea is that the forest trees convey a great deal of information in regard to the chemistry of the soil. On the other hand, we are met by Dr. Johnson, the author of "How Crops Grow and How They Feed." He says he would rather have the judgment of some good, experienced farmer who has gone out and looked at the soil than all the analyses from the best chemists. So there seems to be a great diversity of opinion in regard to the utility of the analysis of the soil. Let me name some of the difficulties that come in the way of soil analysis.

An acre of soil a foot in depth will weigh about four million pounds. The average chemical analysis, if they come within one-tenth of one per cent., is about as accurate as they can make it. That is, if they get say 99.9 as the sum of the chemical ingredients in adding a column of figures together, it is very good work; in fact, when they get 100 it is an accident, it comes once in a lifetime. There are about 43,000 square feet in an acre. When a chemist analyzes a soil the most he can get is about a cubic foot to represent an acre. He may take it from two or three parts of the acre and mix it. In ten or fifteen feet you can get almost as many different kinds of soil, and the analyses of those different soils would not agree at all.

Now the best gauno, which you know is one of the best fertilizers we have, contains about 150

pounds of nitrogen, about 150 pounds of phosphoric acid and about 30 pounds of potash and perhaps the sum total of the ingredients would be about 330 pounds of fertilizing material to the thousand, Scattered over an acre of ground it does not amount to much or is within the limits of the error of chemical analysis.

In regard to what the chemical analysis will tell: There are certain things it tells beyond all question of doubt, and certain other things it cannot tell. If we take the ordinary grain we can say, roughly speaking, that about five per cent. of this grain is ash. This five per cent. is obtained from the soil; the other 95 per cent. is obtained from the atmosphere. Now it is this five per cent. that the crops take year after year, thus exhausting the soil of those ingredients that make it so desirable for their growth. You can count the important constituents of the soil on your fingers; they are three: nitrogen in some form, phosphoric acid in some form and potash. All the other ingredients of the soil and of the ash are in the soil in abundance—you cannot exhaust them—and it is this taking away the potash and nitrogen and the phosphoric acid constantly from the soil and not returning it that impoverishes it.

During last summer the secretary of the Connecticut experiment station was visiting in this part of the country, and I had quite a chat with him. He told me something of what they did in Connecticut regarding fertilizers. Now I would like to have you tell me in that tobacco country, how much fertilizer they have to apply to an acre to get a good crop. How many dollars worth of fertilizer to the acre do they have to apply in that state in order to get an average crop of tobacco? He told me about $60 was the average cost of fertilizer to manure an acre of tobacco. He says it has come to such a pass there that you cannot raise any crop of any kind without putting in a great deal of fertilizer.

The people of Colorado are blest; they have a virgin soil, but that is not going to last. The time is

not far distant when you will have to manure your ground or you will be left in the shade, and outdone by your successful competitor.

Now the chemical analysis of the soil which I will give you the details, is as follows: When the chemist gets the soil he puts it into the cellar, where it waits perhaps a week, to let it dry out. He pulverizes it. Then he takes and sifts it so that it is very fine, and he takes maybe four or five drams, about 75 grains, of that soil of the average for the analysis. Now here comes in another question that makes it a difficult thing for the chemist to apply it to the horticulturist or farmer of any description. He treats the soil with hydrochloric acid, while the soil the plant uses is not so treated. The question is, does he get the same soluble matter by his solution that the plant does? I do not think he does. Chemists have agreed to use diluted hydrochloric acid and treat it for about a week, constantly renewing it as it evaporates, and from this acid solution dissolved in water he makes his analysis. Now the plants do not have this corrosive action. The plants have a corrosive action; that has been long known. Sach's experiment in botany is well known to you, of taking seeds and puting them upon a polished marble slab and starting them to grow in a sponge, so that as the minute little rootlets run along over the slab, they corrode it and the outlines of the rootlets are distinctly traceable. Even the acid they secrete is well known, so that we can hardly get at what the plants take from the soil as compared with what the chemical analysis will show.

In regard to the kind of soil for small fruit and for an orchard, I should say it is altogether different. For small fruits you want a sandy loam, and for orchards more of a clayey loam. They would not agree at all as to the best results. Of course this would be modified by the under stratum. The ground may be so sandy as to be leechy; on the other hand, you can have that ground so stiff with clay that it will be almost like hardpan. Now the medium will

do the best. If you have the clayey soil, put the loam on it and mix it up; if you have a sandy soil, mix it with clay and it becomes desirable.

I might say that in nearly every state in the Union, except Colorado and some of the western states, they have what is known as the fertilizer law. This must come to Colorado sooner or later. That is, every man who offers a fertilizer for sale must first send a package to the station to be analyzed, and the station chemist must certify that it is up to the standard analysis published by that manufacturer; if it is not up to that standard, it is condemned and not allowed to be put on the market. There can be no doubt but that a law should be enacted in this state in the interest of horticulture. I do not believe there are many fertilizers used in this part of the state, very few, if any. But the time will come when such a law must be introduced in order to protect ourselves from dealers who will put fictitious labels and analyses on packages. So many represent that these packages contain a certain amount of nitrogen, a certain amount of potash, etc., which, when examined by the chemist, are condemned.

I have had some difficulty in looking up the average yield of small fruit to the acre; in fact, I cannot get an average yield per acre of many of the small fruits in order to see how much of this fertility is taken each year or exhausted by the crop. I venture to say if I should ask the gentlemen here how many pounds of apples could be raised on the acre there would be as many opinions as answers. Let me ask for information? Who will venture an opinion as to the number of pounds of apples that can be raised on the acre? Put it in bushels if you wish, and then multiply by sixty. Would 300 bushels to the acre be an average to the orchard?

Mr. Coburn—I have taken particular pains to weigh apples from trees as they advanced in years. From trees that have been planted seven years I have

picked 12 bushels and 29 pounds, counting 50 pounds to the bushel; 69 trees to the acre, 25 feet apart.

Prof. O'Brine—Here are some of the difficulties: The age of the tree, the distance apart and the quality of the apples. Now you may think that you could get some facts that would be reliable on this, but I have tried it since being put down for this talk, and the more I have tried to investigate it the less I know about it. Well, say 600 bushels. Let me tell you how they get at it. I say when you take any grain, if you want to get at the ingredients desired you burn it, destroy it, until the ash is white and constant in weight. Then you analyze that ash. Then you find what that ash is composed of. There is plenty of iron, lime, magnesia and things of that kind in the soil; but three things are essential to a fertilizer in the soil. Now how do they get at this fact? They get at it by what is know as water culture. That is, they take pure water and plant a seed in it. They find that the seed develops in a certain direction, depending on what they use in the solution, and in that way they find out what special property or power each element has in it. We can sum it up in a few words and say, as before stated, that three things are essential: Nitrogen, phosphoric acid and potash. I have the ash analyses of the commoner fruits but not the average yield per acre owing to the different quality of the fruit, distance apart and age. I cannot get such figures and suppose it is almost impossible to get them.

Of the ash of the apple, when it is burned, about 35.68 per cent. is potash; there is 12.34 per cent. phosphoric acid. Now you can figure that the ash of most things will be, say from one to five per cent.; of fruits it is less than of grains; in grasses about five per cent. Then you can readily calculate for yourself how much is taken each year from your orchard and how much you have replaced in the shape of fertilizers, or will, sooner or later.

Of the ash of the grape there is about six per cent. potash, and 23.50 per cent. phosphoric acid.

Now I have not been able to find the yield of grapes per acre. I think it would be a desirable thing for the Horticultural Society to give the average yield of these fruits so that others might get such information when they desired, or a close approximation. Now I have searched a good deal for this information and have not been able to find it; possibly because it is out of my department of work and belongs to another department.

Of the gooseberry the per cent. of ash would be about two-tenths of one per cent.; that is, 500 pounds would make about one pound of ash. Of the ash, the potash is 38.65 per cent., and phosphoric acid 20 per cent.

You can get some idea of the proportion in which to apply the fertilizers to the ground from these analyses. It is the only systematic way to get at it if you want to make every dollar out of the manure that you put into the soil.

Of the plum I lack the same information; the yield per acre of the different varieties, etc.

Mr. Coburn—Plums are usually planted about 15 feet apart each way, and my yield has been about 250 pounds to the tree after five years old, of the Wild Goose plum, and there would be 225 trees to the acre.

Prof. O'Brine—Now in the ash of the pear the potash is 55 per cent.; phosphoric acid is 14 per cent. In strawberries the potash is 21 per cent; phosphoric acid, 8.59 per cent; 300 pounds make one pound of the ash. Of the cherry, the potash is over half of the ash; phosphoric acid 14.21 per cent.

Now take desirable soil, what you would call about the average. What per cent in this soil analysis would be phosphoric acid; what per cent. potash; what per cent. ammonia? To give you an idea of the relation between the potash and phosphoric acid and the ammonia in the soil, and what is yearly taken out? There is from 1 to 1 1-2 per cent. of potash in the best vegetable mould soil, about .3 of 1 per cent. of phosphoric acid, and about .08 of 1 per cent.

of ammonia. I do not suppose Colorado would average 1 per cent of potash. What we lack in Colorado is vegetable mould. This, now, is not an average soil, but one of the best soils for the horticulturist to plant an orchard or to raise his small fruit on, and I am sorry that I cannot give you in round numbers or definite figures what is yearly taken off of the acre by these small fruits or from the orchard. What you consider a very desirable soil is one in which the potash, ammonia and phosphoric acid are in the above proportions.

Now I have tried to make as plain as I could the difficulties in the way of the soil analysis, and the difficulties in the way of the farmer understanding it. As I said before, had I selected my own subject I might have taken something which I could make more interesting. The only thing that I can say is, if you have any questions that I can answer I shall be pleased to do so.

A Voice—Do not iron and lime enter largely into the growth of our fruits?

Prof. O'Brine—Yes, sir; there is no use of adding to the soil what is already there in abundance. Iron is supposed to provide the green color to the leaf.

Mr. Coburn—Which depletes the soil the most, the fruit or the seed?

Prof. O'Brine—There is more ash in the seed relatively than in the fruit; as to the weight, the most of the fruits, you may say, are 90 to 95 per cent. water.

Mr. Coburn—Then the seed depletes it the most?

Prof. O'Brine—Yes, sir. In the Carolinas and Florida and along the Atlantic slope in that section of the country, there are immense quantities of rock phosphate, that is found in immense beds that are being used for phosphatic fertilizers.

A Voice—I would ask what would be the most natural home fertilizer that we have?

Prof. O'Brine—Barnyard manure is good. It is desirable to add potash. Ground bones, I think, for Colorado, would be one of the most desirable things to put on for small fruits. Ground bones contain about 60 per cent. phosphate of lime. If these ground bones are treated with sulphuric acid, forming a super-phosphate of lime, it would be richer and more valuable. If you could add ground bones year by year it would be preferable, but the super-phosphates act quickly.

A Voice—How does the value of bones burned compare with that of bones pulverized and not burned?

Prof. O'Brine—That depends upon what you mean by burned. Burn them in a closed retort and they will make what is commonly known as animal charcoal. Last year when I was in Canon City, they were using a phosphate known as the "slag phosphate." When they make iron it is desirable to eliminate the sulphur and phosphorus. The sulphur makes the iron brittle when hot, and the phosphorus makes it brittle when it is cold. The railroad companies, when they make a chemical analysis of the iron, require that the sulphur and the phosphoric acid must come within certain limitations or they will not take it. They make a slag in which most all the phosphoric acid of the iron is taken out and the slag is ground up and used as a fertilizer, and known as the Thomas slag.

Mr. Faurot—What would you do if you had too much alkali in the soil?

Prof. O'Brine—I would under-drain it. Put in tile drain about 25 feet apart and 2 feet deep to prevent the water coming to the surface.

A Voice—Is all alkali ground wet ground?

Prof. O'Brine—Not necessarily; you have to keep washing it out. The alkali—sodium sulphate—is what is commonly known as glauber salts. Now the water coming to the surface brings this with it,

and in evaporation leaves it on the surface of the ground. The College farm is the best example I know of in regard to alkali; it used to be as white as the mountains over there.

A Voice—What are the ingredients in this stuff known as marl?

Prof. O'Brine—Marl is an impure limestone. Some of it may contain phosphorus, but it is like gypsum or something of that kind.

Mr. Coburn—Are there any fertilizing qualities in this gypsum?

Prof. O'Brine—Gypsum is good for grass lands. Gypsum is a sulphate of lime, and it has sulphuric acid combined with the lime. Sulphuric acid is the strongest acid we have. The tendency of the acid is to combine with potash and form a soluble sulphate of potash. For that reason it is desirable upon grass land. It has fertilizing property there. It is the same as land plaster.

Mr. Coburn—We have large bodies of it over in our country, and the reason I asked the question was to know whether it would pay to apply it to the land.

Prof. O'Brine—No, sir; it would not pay to apply it to anything except grass land. It was formerly much used in Michigan and Ohio, but I do not think it is so much used now. Gypsum, when it is fibrous, is called satin spar. It is sometimes polished and used for decoration, and is then called alabaster. In some places it is put on the ceiling with fine effect. They have a very nice variety of it at Canon City. Cut in thin slabs it is used for decorating the inside of buildings.

A Voice—What is the particular deposit in Kentucky that produces the blue grass?

Prof. O'Brine—That is peculiar to the limestone countries. Limestone countries the world over are noted for their grain and grass. The blue grass re-

gion in Kentucky and along the Ohio is very desirable land. Limestone land has a world-wide reputation for wheat and grass.

Mr. Faurot—Another question. In the mountain, when you cut down timber which is indigenous to the soil, what causes the quaking ash to spring up? I supposed that Nature was self productive.

Prof. O'Brine—That belongs to another department. You possibly remember in the east, where you cut down the timber, that you would have a large second growth of hazel brush. If there is any explanation, the same holds good in the one case as in the other. The same is true of a great many things. Where you cut down one kind it will be succeeded by another almost universally. Two explanations are given: One is that the seed is in the ground and, when the desirable conditions are produced, it grows; the other is that the seed is carried there and grows. Mush speculation has taken place about the agents that carry it.

A Voice—You say that when we see different kinds of timber we can tell the different kinds of soil.

Prof. O'Brine—That has been advocated by Hilgard. It is a fact that the beech tree and maple tree grow upon certain kind of soil. You know it from the fact that the pines grow upon a certain place in the mountains and you have hard work to make them grow in the valley.

Question—About this alkali: If there is no water, no moisture, to keep coming up from the ground, but there is alkali, does it come sometimes from the water irrigating, or is it injurious only where it is wet underneath?

Prof. O'Brine—There is what we call ground water. If you dig a well you come to water; that is ground water. This ground water comes to the surface. When it comes to the surface the solution of the alkali or whatever mineral substance has been gone over, will be dissolved. There is nothing in-

soluble in water. Now lime and all these other ingredients are soluble in water, and when this water comes to the surface it is evaporated. The alkali is brough to the surface by the evaporation of the water and that is the reason it is injurious.

In California the alkali is of two kinds. The alkali here is relatively harmless to what it is there. There it is a carbonate of soda, and this carbonate of soda has a corrosive action on the crown roots of the plants and makes them black, and for that reason is known as black alkali. This black alkali is from ten to twenty times as injurious as the alkali we have here. The best remedy is to under-drain where you can. Put in tiles or under-drain tile, or what you please, but the thing is to wash it out of the ground. The alkali usually comes from seepage water that contains a strong solution of it, caused possibly by repeated washings out from other places.

A Voice—Suppose it is high and dry ground where it needs no draining?

Prof. O'Brine—Well, that does not make any difference. They have found in the east that it is practicable to put in drain tiles in hills as well as in valleys. A great many of the eastern people lay it in parallel lines through their farms. They do it to prevent this moisture from coming to the surface and being carried off.

A Voice—Is there any danger of engendering fungus by putting in tile?

Prof. O'Brine—No, sir; I think not. The soil is noted the world over for its power of arresting everything of that character.

Mr. Faurot—I tried a piece of ground once where the soil was a black loam, the sub-soil a very tenacious red clay; underneath the clay was gravel. We cleaned out the ditch and it began seeping. I put in 2,500 feet of tile draining by running main laterals through the ground; and I ran sub-laterals off to each side of the main drains until I had put in 2,500 feet. Instead of stopping my seepage I made it worse. In

certain localities where I ran the main laterals, the water seemed to come to the surface. I did not succeed in overcoming that, but, on the contrary, the water seemed to percolate through the soil and rise to the surface, and entirely ruined it.

Prof. O'Brine—It may be possible you did not put in enough.

Mr. Faurot—The laterals were 20 feet apart and the main under-drains 40 feet apart. The tile on the top of the clay did not affect it, nor did it affect it when I put it below the clay.

Prof. O'Brine—I do not know that I have just a clear, sharp idea of the locality. It is possible, if you put the drain tile down where it caused the water to come up, that you put it too deep.

Mr. Faurot—It is right at the foot of the mountain. The ditch runs around the base of the mountain, and the black loam is from 14 to 18 inches deep; the red clay is from 12 to 14 inches deep, and I don't know how far you would have to go through the gravel before striking bed-rock. This ran along at an angle sloping to the east about 32 degrees. The drain was above that. Neither one drained the soil. The capillary attraction brought the water to the surface and I could not bring it down to the tiles.

Prof. O'Brine—That is a very difficult matter to answer unless you are there to look at it.

Mr. Nelson—I could answer it in one respect. You ought not to allow the fellow to clean out that ditch. I don't allow them to touch my ditch. When it needs cleaning I clean it myself. I see where the trouble is, if you disturb the nature and formation of the soil. My soil is dark on the surface; the subsoil is clay, and beneath that is gravel. The ditch is dug first through the sandy loam, then through the clay, clear into the gravel formation even, and the very minute you break the surface there out comes the water. You cannot drain it off, it is impossible. I understand from Mr. Faurot's explanation that this is the cause of the seepage on his ground, and it

is impossible to drain that ground, the seepage will continue if he allows parties to go on there every season and break into this gravel formation. There is a sediment that forms a kind of cement and fills this porousness in the soil, and when this is broken through the water comes up; but if the under-drain is undisturbed the seepage will be very little.

Judge Osborn—We have one more subject, the best variety of winter apples for profit. That can be answered in a short time. Some one give us five or six different varieties.

Mr. Brothers—There is only one best variety and that is the Ben Davis.

Mr. Coburn—The Ben Davis and Walbridge.

Mr. Housel—I believe the Missouri Pippin beats any one of them. It is the most profitable winter apple to raise in Colorado.

Mr. Steele—The Missouri Pippin will pay more for the first ten years after planting than any one on the catalogue.

A Voice—The Rawles Janet.

A Voice—For the Missouri Pippin I will say that the apple clings very tenaciously to the tree, but I consider it a shy bearer for Colorado.

Mr. Coburn—The greatest fault we have to find with the Missouri Pippin is its tendency to overbear. It commences at two years of age, and unless it is thinned it exhausts the tree, and I believe will bear itself to death in ten or twelve years.

Judge Osborn—I met a Wisconsin man when I was in Chicago in the interest of the State Bureau of Horticulture two years ago. When I was called upon to respond for Colorado, a Wisconsin man kept me on the floor nearly half an hour answering questions. "Away out there on the great American desert, can you raise fruit by irrigation?" You cannot imagine the number of questions they asked me. I felt very ready to answer them all because I had been here a many years and had a good deal of expe-

rience, and I found that they did not know anything about this "great American desert" and what it will do. "You raise fruit?" "You got a horticultural society in Colorado?" Orange Judd was there, of course he knew. I accompanied him back to Lincoln, Nebraska, where they were having their fair at the same time. We enjoyed ourselves on the train together, talking upon the fruit question and he begged me to get off at Lincoln and see what they were doing there, but I could not because we had the fair at Montrose on our hands at that time.

I think this has been one of the most interesting meetings we have had since I have been a member of the State Bureau or the Horticultural Society before it was a bureau. I will say to you before we close, as I said to-day, that I shall be with you, and I want you with me. I need you, and you perhaps need my service, weak and feeble as it may be. But I shall not let anything lag on my part that will be of interest to the State Bureau of Horticulture, or to horticulture at large throughout the state. I am not speaking for Larimer county, where I have been a resident for thirty-two years, but I am speaking for the whole state.

I hope this will be one of the most profitable years for the fruit growers of this state that they have ever seen; and I hope that, whilst we have enjoyed here two days very pleasantly together, that you may enjoy yourselves upon your fruit farms and in preparing your fruit as it grows for the great coming World's Fair.

Now, gentlemen, as president of this state bureau, I will say that we stand adjourned sine die. Let us come together another year on the call of the president.

Meeting adjourned sine die.

Whereas, In the providence of God, the honored secretary of the bureau, Dr. Alexander Shaw, has been called from his labors in this earthly vineyard to the fields of glory above; and

Whereas, We are deeply sensible of the great loss to the state and to the cause of horticulture in general in this bereavement; and

Whereas, We who have labored so long with the deceased in this organization desire to express our esteem for his sterling qualities; therefore

Resolved, That this organization has suffered an irreparable loss in the death of Secretary Alexander Shaw;

Resolved, That we appreciate his great services to the horticultural interests of Colorado and deeply regret that his life could not have been spared to complete the preparations for the horticultural exhibit at the Columbian Exposition in which he was so much interested;

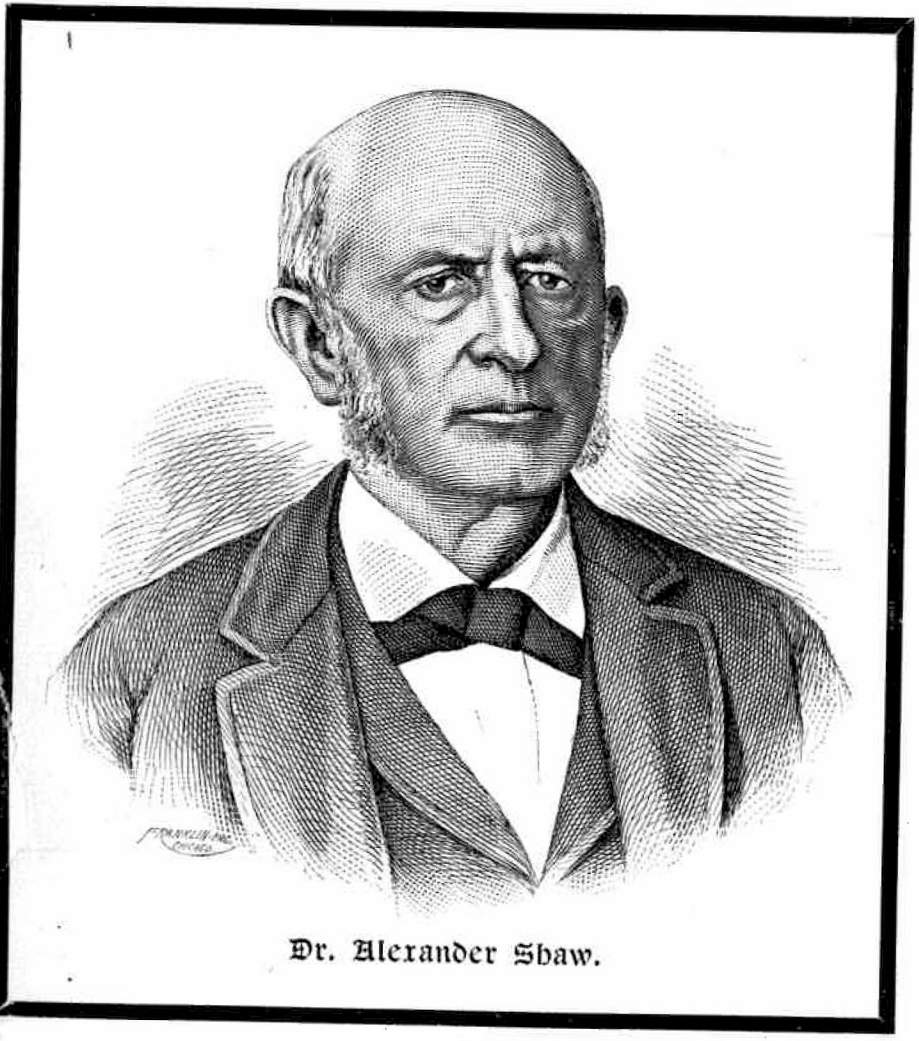
Resolved, That the executive committee be and is directed to have prepared a biographical sketch and suitable engraving of the deceased, and cause the same to be printed with these resolutions and the proceedings of the bureau.

Resolved, That we tender to the family of our deceased brother our heartfelt sympathy.

Resolved, That these resolutions be spread upon the records of the bureau and an engrossed copy be furnished to the family and to the press for publication.

E. S. HOUSEL,
W. S. COBURN,
W. B. OSBORN,
Committee.

Whereas, R. S. Edwards, a member of this organization, was stricken down in the prime of his usefulness;



Dr. Alexander Shaw.

Resolved, That we deplore the loss of a valuable worker in the horticultural cause.

Resolved, That we tender to the family of the deceased our sympathy in their sorrow. That these resolutions be spread upon the minutes of this bureau and a copy furnished the family of the deceased and the press.

W. S. COBURN,
E. S. HOUSEL,
W. B. OSBORN,
Committee.

Whereas, Death has taken from our midst our fellow worker, John M. Vancamp, who was one of the earliest growers of small fruits in Colorado and an active member of our society; therefore

Resolved, That this society deeply regrets its loss in the death of John M. Vancamp. That these resolutions be spread upon the records of this society and a copy furnished the family of the deceased and also the press for publication.

E. S. HOUSEL,
W. S. COBURN,
W. B. OSBORN,
Committee.

SECRETARY'S FINANCIAL REPORT FOR 1892.

Receipts—

Annual state appropriation for 1891	$1,000 00
Membership fees turned over to treasurer	117 50
Surplus left entertainment fund, Nebraska Horticultural Society	6 00
From fruit exhibit Sept. 28 to Oct. 2, 1892	1,460 30
Annual state appropriation for 1892	1,000 00
	$3,583 80

Disbursements—

Balance overdrawn last report	$714	63
Per diem and expenses members executive committee	117	20
Printing, typewriting, etc	60	50
Paid janitor	6	50
Secretary's salary	500	00
Rent hall, annual meeting, 1891	9	00
Postage, express charges, etc	25	75
Premiums fruit exhibit, Sept. 28 to Oct. 2, 1892	575	00
Expenses fruit exhibit, Sept. 28 to Oct. 2, 1892	865	91
		$2,934 49
Balance in treasurer's hands		$ 649 31

ALEX. SHAW, Secretary.
By J. E. SHAW.

TREASURER'S REPORT.

Denver, Colo., January 12, 1892.

1892—

January. Balance on hand, annual meeting, 1891	$	42
February 13. Received state appropriation for 1891	1,000	00
May 17. Received, Alex. Shaw, secretary	101	50
October 3. Received at door, fruit exhibit, September 28 to October 2, 1892	908	30
October 3. Received on subscription to fruit exhibit, October 2, 1892	552	00

December 19. Received state appropriation for 1892.	1,000 00
December 19. Received, Alexander Shaw, secretary.	22 00
Total	$3,584 22
1893—	
January 12. Paid warrants to date	$2,937 16
Balance on hand	647 06

JOHN TOBIAS,
Treasurer.

LAS ANIMAS COUNTY—VICE-PRESIDENT'S REPORT.

Trinidad, Colo., January 9, 1893.

No county organization of fruit growers exists in this county. The few persons devoted to horticulture live far apart, some close up in the snowy range, at an altitude of 8,000 feet, and others as low down as 5,000 feet.

The acreage of orchards was slightly extended in the year 1892. Most farmers now have orchards. The apple is more planted than all other fruits combined. A very few add small fruits. Not one person in this large county makes a specialty of the strawberry. Grapes are grown sparingly. The hardy varieties do well in sandy soil.

On reasonably full information I estimate that orchard stock to the cost of $2,000 has been contracted for spring planting in 1893.

The "whole root" phase of fruit tree culture has been urged by some of our traveling salesmen, and a few have been persuaded to pay a dollar apiece and various prices less than a dollar each for such trees.

The fruit crop of 1892 was light. Late spring frosts killed nearly all the native plums and most apples. As to peaches and apricots, the trees live and grow, but fruit results at long intervals and in insignificant quantities.

The cherry has not yet been produced to any significant extent, though isolated trees here and there have occasionally shown full crops of fruit. As a rule, cherry trees, through a cracking bark or other cause, show gum exuding; then a dead spot appears on the trunk of the tree; the tree becomes a weakling, and finally perishes prematurely.

As to apple blight, none has been observed except occasional dead spots in the crotch of a few trees, and sometimes on the side of a straight trunk. The Transcendent crab still remains healthy, though not much planted any more, because of its propensity to bud and blossom early.

Hail storms are frequent in some localities. Narrow strips of country seem peculiarly subject to hail. On some farms no destructive hail has fallen during twenty years past; on others several damaging visitations have occurred during that time. One fine orchard was beaten by hail in 1891, that one-third of the trees died in 1892.

The number of irrigated farms cannot be increased, except by storage of water. Already there is more land under ditch than the normal flow of streams will irrigate. In the western third of the county, among the mountains and foot hills, are numerous small farms, which have no irrigation. These may be increased indefinitely. The soil is rich, timber plentiful and water the best. Large returns are shown from some of these small unirrigated farms.

The codling moth appeared the past summer among apple trees set in the year 1881. About one-fourth of the apples were observed to be wormy; this, too, in an orchard separated by ten miles from any other orchard.

The apple tree borer is present and kills a few young trees each season.

S. W. DeBUSK,
Vice-President Las Animas County.

REPORT OF THE COMMITTEE ON IRRIGATION.

By Prof. L. G. Carpenter.

We are beginning to realize more and more that the water question is a fundamental one in the prosperity of Colorado, and that what seemed to us not many years ago to be easy of solution is full of perplexities, and yet that upon our solution of the question rests much of the peace and prosperity of the generations who follow us. We have reason to bless the wisdom of those who formed our constitution in grasping better than those who formed the constitution of our sister states some of the essential conditions for a commonwealth where irrigation is a necessity, yet at the same time we are beginning to realize that there is still much to do in the way of legislation and in the formation of custom before the question is on a basis best for the citizen and the general community.

The day of ditch construction on an extensive scale has practically passed in Colorado. The northern part of the state has reached the stage of development which the other sections are rapidly approaching, where the new primary ditches utilize sources of water which before were thought worthless or too small to utilize, and ditches to collect flood and seepage water form the greater part of those now built. We are being forced to the consideration of the better utilization of the water which we have. Our water supply is such, coming from the melting snows, that it is very variable in quantity, usually highest in June, and thirty to fifty times higher than it is in August. From the peculiar character of the regime

of our streams, we cannot utilize the full flood flow, for then there would be a larger acreage than the low waters could perfect. It has consequently happened that in almost every year, and from almost every stream, that more or less water runs to waste in the flood time, while in the years even of greatest supply there is a scarcity in July and August. As long as agriculture was confined principally to the cereals and alfalfa, the disadvantage of this state of things was not so much felt, but with the desire to grow later crops and the development of our fruit industries, the absolute importance of late water, and its money value, becomes immediately evident. Hence the development of our reservoirs. There are already hundreds in the northern part of the state. Their number is rapidly increasing, and is bound to increase. We may never reach the development of some parts of India, where, within a radius of fifteen miles, are 3,000 reservoirs, but we shall cease only with the use of the last reservoir site, and the lack of more water to store. We do not yet realize the amount of benefit that will come with storage, or the amount of water which may be saved but is now lost. Every foot of water is of money value, and we shall be pressed before many years to consider the saving of the many small wastes which now go uncriticised as too small for trouble. Better management in the ditches themselves, the adoption of the time system of rotation, the perfection of a system of measurement, the use of the telephone in distribution in the districts and in the larger ditches, better and more intelligent management of the streams by the water commissioners, all of these will increase the work we get from the water without lessening the amount which any one gives to his crops. The amount which goes to waste in the most of our streams from want of a close supervision, it is safe to say, is far more than is realized. The possibilities of saving water in this way in certain lines has become evident to me only as the result of some of our experiments of the past summer, of which I hope to have more to report

at the end of another year. The water commissioner, besides the infinite tact with which he should be gifted, and the rights and needs of each ditch, needs also to know intimately and thoroughly the peculiarities of the stream which he is to divide, how much longer it takes for the water to pass from one ditch to another in low than in high water, how much is lost or gained on the way, and where; when the daily rise in the river is to be expected at the different stages of the stream, and how much it is, and numberless other points which require time and intelligence to gain. He should have means of quick communication so as to save every rise that may come, and to take advantage of the daily tide, which, even in the best managed district, is still largely lost, or not used to the best advantage; and to do this he needs to be able to know the stage of the river at any minute, which can only be done by some self-registering device which will record automatically the height of the river in his office. In several of our districts the expenses of this kind have already been found to be well spent, and in all it will not be long before it will be found profitable, and to seek for the best class of men to be had for water commissioners, and to pay them better and to keep them. When the community realizes the importance of the office, and the amount of skill required to manage a district so as to make the uttermost saving of water, it will not tolerate the frequent changes or the use of the position as a political office. Even the position of ditch patrol is looked on in the European countries with greater importance than we view the water commissioner, and the terms are longer when a good man is secured. On one ditch in France which I visited the past summer, and which has been built for over two hundred years, the man in charge of the headgate now is a lineal descendant of the headgate man of two hundred years ago, and the family has been in charge during all that time. But to secure the full saving, a system of reservoirs is necessary, so that water, whenever not needed, can be turned into them and preserved.

I am gradually forced to the belief that the system of ditches and reservoirs can be managed to the greatest advantage for the community, and with greatest economy of water, only when they can be under one management, which would have to be that of the public. After seeing the government management of the canals in Piedmont and the advantages it permits in making one canal supplement another, the vestiges of such objections as I had to public management have been overcome.

The increase in number of reservoirs is to be encouraged, and is an advantage, but we should also not forget that it may subject localities to grave dangers. So far Colorado has been free from any breakages of dams with serious consequences. But every dam, unless well constructed, is a menace, and may cause serious disaster. The present laws do not prevent careless construction, which in the case of reservoirs is almost criminal. The approval of plans in advance of construction by the state engineer is not alone sufficient, for the manner of carrying out those plans is of all importance in water construction, and the public interest in their safety is sufficient to justify inspection during the course of construction, and see that it is such as to minimize the dangers which are inherent in large bodies of water suspended in reservoirs as these are.

The importance of the seepage waters is becoming more evident and more generally appreciated. In all the older communities there are many places in which it has been looked upon as an annoyance, and in some places farms have been considered ruined. But more than one of these have been reclaimed by the drainage of the land, and the water itself has been sold to lower lying lands, and has proved a valuable acquisition. In one place where several years ago three neighbors united in paying $5,000 for a small stream of drainage water, this year one of these three from his farm of 160 acres took a product which brought him over $12,000, largely due to the same drainage water, which not long ago would have been

considered worthless. Other seepage ditches are being constructed, and generally are proving profitable. It may not be out of place to suggest to the members of the society who may be situated below the towns of the state that a valuable source of wealth is going to waste in the sewerage of the cities, which could be utilized to great advantage on market gardens, and is worth making considerable expense to gain. Only two cities of the state, so far as I know, are disposing of their sewage in this manner. Besides overcoming the objection to pouring the filth into our streams, it turns it into a harmless form, and makes it a source of wealth which is worth making considerable expenditure to possess.

Besides their great richness, these waters are nearly constant in flow, and would furnish the gardener with water at all seasons of the year with a supply, and which in the early spring would generally be warmer than any from the river, giving an additional advantage to the grower for the early markets.

The amount of return waters to the streams from the series of measurements which have been carried on by the successive state engineers and the state agricultural college are giving us more knowledge of the peculiarities and the amount of the return. It is too soon to make any definite statements regarding it, other than that the return, on the Poudre at least, is nearly constant from year to year, and amounts to about one-third of the whole flow of the stream. The return varies in different years in different portions of the river, the causes of which are not yet clearly seen, though light seems to be coming. On the other streams the return waters are probably as great in amount. Their importance is in the fact that thus in the older districts, after the ground once becomes saturated, a large portion of the water which is applied returns to the stream, and may again be used.

The chairman of your committee this summer visited Europe and the northern portion of Africa in quest of information regarding their irrigation sys-

tems and engineering. As they have practiced the art so much longer than we, time has taught them many lessons which it would be wise for us to consider, as our experience is following in the same path as theirs.

Time will not permit a description of the points worth noticing in this report. But it may be said, however, that, considering the few years in which the experience in Colorado has been gained, that the progress that has been made is a subject for congratulation, and especially that we have made so few serious blunders.

Secretary's Office,
908 Equitable Building,
Denver, Colo., April 5, 1893.

Executive committee met as per written notice.

Present: C. W. Steele, J. H. Crowley, J. E. Reynolds, John Tobias, David Brothers, W. B. Osborn, E. S. Housel.

President Osborn in the chair.

Minutes of annual meeting read and adopted.

Received engrossed copy of resolutions on death of Alex. Shaw. Secretary ordered to have them framed and present them to Mrs. Alex. Shaw.

On motion, a committee of three was appointed to wait on the governor in regard to the appointing of a new board of horticulture as provided by a bill recently passed by the legislature. Committee appointed as follows: W. B. Osborn, C. W. Steele and David Brothers.

On motion the "World's Fair Department of Horticulture" were allowed to take the "Register of Fruit Exhibits" to Chicago in charge of Mrs. Shute.

Committee retired to wait on governor.

At the request of the governor, the following resolutions were adopted:

Resolved, That whereas, House Bill No. 224 providing for the creation of a "State Board of Horticul-

ture" does not limit the time in which the said board may be engaged in the performance of their official duties,

Therefore, be it known, that it is the sense of this the "State Bureau of Horticulture" that in no case shall the incoming "State Board of Horticulture" exceed in total annual expenditure the sum of $2,500, as provided by appropriation in said House bill No. 224.

Adjourned to April 6.

Executive committee met as per adjournment.

Motion made and carried,

That all property belonging to or in possession of the "State Bureau of Horticulture" be turned over to the new "State Board of Horticulture."

The committee passed on and allowed all bills and indebtedness against the society, and ordered warrants drawn in payment of the same.

Secretary and treasurer made their final reports and turned over all property to the new board as appointed by the governor.

On motion, adjourned.

E. S. HOUSEL,
Secretary.

REPORT OF TREASURER.

Denver, Colo., April 6, 1893.

1893—

January 12, balance on hand		$647 06
April 6, received, E. S. Housel, secretary		47 50
Total		$694 56
April 31, paid executive committee's annual meeting	$111 40	
April 31, paid rent of hall, annual meeting	10 00	

February 27, paid printing bill, annual meeting	11 75	
March 14, paid stenographic report, annual meeting	65 00	
March 20, paid engrossing resolutions	5 00	
April 6, paid secretary's salary to date	143 00	
April 6, paid office expenses	6 55	
April 6, paid executive committee this meeting	97 70	
		$450 60

Balance cash on hand turned over to secretary of new State Board of Horticulture. $243 96

JOHN TOBIAS,
Treasurer.

REPORT OF SECRETARY.

Denver, Colo., April 6, 1893.

Receipts—

Received for membership fees..... $47 50

Disbursements—

1893.

April 6, paid John Tobias, treasurer..... $47 50

E. S. HOUSEL,
Secretary.

FIRST SEMI-ANNUAL REPORT

OF THE

STATE BOARD OF HORTICULTURE

FOR

THE YEAR 1893.

LETTER OF TRANSMITTAL TO SECRETARY OF STATE.

Denver, Colo., November 29, 1893.

HON. NELSON O. McCLEES,
Secretary of State:

Sir—In compliance with the law, I have the honor of submitting herewith the semi-annual report of the Colorado State Board of Horticulture for the six months ending November 30, 1893.

JOHN TOBIAS,
Secretary.

State of Colorado,
Secretary's Office.

Filed November 29, A. D. 1893, at 2 o'clock p. m.

NELSON O. McCLEES,
Secretary of State.

By LYMAN B. HENDERSON,
Deputy.

MEMBERS OF THE BOARD.

W. B. OSBORN, Loveland ..... Six years
C. W. STEELE, Grand Junction ..... Six years
W. S. COBURN, Paonia ..... Four years
BENJAMIN REED, Rocky Ford ..... Four years
DAVID BROTHERS, Denver ..... Two years
JOHN TOBIAS, Denver ..... Two years

OFFICERS.

W. B. OSBORN, President.
JOHN TOBIAS, Secretary.

Colorado State Law Relating to Horticulture.

AN ACT

To create state and county boards of horticulture; define their duties and compensation; to protect and promote the horticultural interests of the state, and to repeal an act to establish a bureau of horticulture, approved March 8, 1883.

Be it enacted by the General Assembly of the State of Colorado:

Section 1. That a state board of horticulture is hereby created, which shall consist of six (6) members, to be appointed by the governor from the fruit growing sections of the state. Said board shall be non-political, and all members shall be practical horticulturists. Immediately upon the taking effect of this act the governor shall appoint two (2) members for a term of two (2) years, two for the term of four (4) years, two (2) for the term of six (6) years, and biennially thereafter he shall in like manner appoint two (2) members for the term of six (6) years; their term of office to begin within 30 days after appointment, and vacancies shall be filled as in the case of original members.

Sec. 2. Said board shall have an office at the state capitol, to be maintained at the expense of the state, and shall meet and elect a president and secretary from their number. The state treasurer shall be ex officio treasurer of the board. The secretary shall receive a salary not to exceed one thousand ($1,000)

dollars and mileage, and the members of the board shall receive five dollars ($5.00) per day for each day actually in the performance of their duties and mileage not to exceed ten (10) cents per mile for distance necessarily traveled.

Sec. 3. The board may receive, manage, use and hold donations and bequests for promoting the objects of its formation. It shall meet semi-annually, and as much oftener and at such places as it may deem expedient, to consult and adopt such measures as may best promote the horticultural industries of the state. It may, but without expense to the state, select and appoint competent and qualified persons to lecture in each of the horticultural sections of the state, for the purpose of illustrating practical horticultural topics and imparting instruction in the methods of culture, pruning, fertilizing, and also in the best method of eradicating disease of fruit and fruit trees, cleansing orchards and exterminating fruit pests. The office of the board shall be kept open according to the directions of the board, and shall be in charge of the secretary during the absence of the board.

Sec. 4. For the purpose of preventing the spread of contagious diseases among fruit and fruit trees, and for the prevention, treatment, cure and extirpation of fruit pests and diseases of fruit and fruit trees, and for the disinfection of grafts, scions, orchard debris, empty fruit boxes and packages, and other suspected material or transportable articles dangerous to orchards, fruit or fruit trees, said board shall make such regulations for the inspection and disinfection thereof, which regulations shall be circulated in printed form by the board among the fruit growers and fruit dealers of the state, and shall be published in at least three (3) issues of a paper of general circulation in the horticultural counties of the state. Such regulations, so published, shall be held to impart notice to all persons within this state, and shall be binding on all persons.

Sec. 5. Whenever a petition is presented to the board of county commissioners of any county, signed by fifteen (15) freeholders and possessors of an orchard, or both, stating that in their opinion a necessity exists for protecting the horticultural interests of said county, diminishing and destroying fruit pests and diseases injurious to fruit trees, plants, vines and shrubs, the said county commissioners shall appoint three (3) competent and experienced practical horticulturists, who shall be known as the county board of horticulture of such county.

Said county board shall be auxiliary to the state board in the extermination of fruit pests and diseases injurious to fruit, fruit trees, shrubs and vines, and to promote the horticultural interests of the state. The members of said board shall hold office for two years, or until their successors are appointed and serve without pay.

They shall select from their number one president and secretary, and shall hold their meetings as often as they may deem advisable.

Said board shall appoint a competent, experienced horticulturist, a person who shall be known as the county inspector. Said inspector shall receive three (3) dollars per day and ten (10) cents per mile for each mile necessarily traveled when in the performance of his duties, to be paid out of the county treasury, but his total compensation for one year shall not exceed two hundred (200) dollars. Said county commissioners shall fill any vacancy that may occur in said board.

Sec. 6. If, upon the report of the county boards of horticulture, or from well-attested facts otherwise before it, said board shall be of the opinion that any locality, orchard, district or place is infested with fruit pests, or infected with contagious disease, injurious to trees, plants or fruits, and liable to spread to other localities to the injury of other persons or places, said board shall, by an order entered upon its minutes so declare, and such infected orchard,

nursery, section or places, shall be under the quarantine regulations of the board. As soon, however, as in the opinion of said county board of horticulture the damage from such locality has ceased, they may suspend such quarantine regulations, and shall immediately report the fact to the state board, who may approve or disapprove such action.

Sec. 7. It shall be the duty of the county board of horticultural commissioners in each county, whenever they shall deem necessary, to cause an inspection to be made of any orchard, nursery or trees, or any fruit packing house, store room or sales room, or any other place within their jurisdiction, and if found infested with pests or diseases injurious to fruits and fruit trees, vines and plants, they shall notify the owner or owners, person or persons, in charge or possession of the trees or place as aforesaid, that the same or any of them are infected with insects or their eggs or larvae, and they shall require such person or persons to disinfect the same within a certain time, to be specified in said notice. If within such time such disinfection has not been accomplished, the said person or persons shall be required to make application of such treatment for the purpose of destroying them, as the said commissioners shall prescribe. Said notices may be served upon the person or persons owning or having charge of such infected trees or places or articles aforesaid by any commissioner, or by any one deputized by them, or they may be served the same as summons in a civil action. If the owner or owners, person or persons in charge or possession of orchard or nursery, trees or places or articles infested with said insects or any of them, their larvae or eggs, after having been notified as above by said board to destroy the same or make application of treatment as directed shall fail, neglect or refuse so to do, he or they shall be guilty of maintaining a public nusiance, and shall be punished by a fine, finable in a sum not less than five (5) nor more than one hundred (100) dollars; and any such orchards, nurseries, trees or places or articles

thus infected after such conviction, shall be adjudged and the same is hereby declared a public nusiance, and may be proceeded against as such.

If defendant be found guilty, the court in its judgment shall order the said county board of horticultural commissioners to abate the same, and the expense thus accrued shall be taxed up as costs against the defendant.

The district and county courts shall have jurisdiction in such cases.

Sec. 8. It shall be the duty of every owner, possessor or occupier of an orchard, nursery or land where fruit trees are grown within this state, or any importer of trees, shrubs or vines, to disinfect, as may be directed by the county boards of horticulture, all fruit trees grown on such lands infested with any insect or insects or the germs thereof, or infected with any contagious disease known to be injurious to fruit or fruit trees, shrubs or vines before the removal of the same from said premises for sale, gift or distribution or transportation.

Sec. 9. In counties not having a county board of horticultural commissioners, the state board shall possess the same powers and perform the same duties as devolve upon the county board.

Sec. 10. The state board shall have power to authorize the holding of state horticultural exhibitions and shall determine the time and place for holding said exhibitions with power to arrange for premiums and awards and perform such other duties as may be necessary in conducting such exhibitions.

Sec. 11. The said board shall make semi-annual reports before the first day of June and December of each year to the secretary of state, embracing the proceedings of the board for the past six months, and statistics showing the general condition of horticulture throughout the state, together with such essays and statements of facts, and recommendations from state and county horticultural societies as they may deem useful to the horticultural interests of

the state; said report to be fully prepared for publication, and the secretary of state shall cause the same to be published in phamphlet or book form biennially by the state, under the supervision of the board.

Sec. 12. The number of copies of said report shall be two thousand, all of which shall be bound in a uniform style every two years in one volume, and shall be distributed by the secretary of state as follows: Ten copies each to the governor of the state, secretary of state, state auditor and state treasurer; five copies each to the supreme judge and attorney general; two to each member of the legislature; one copy to each judge and clerk of district and county court; one copy to each newspaper office in the state; ten copies to the state university, school of mines, reform school and warden of the state penitentiary; two copies to each college of learning in the state; fifty copies to the state agricultural college and two copies to the state historical society, and the remainder to the state horticultural board, to be distributed as said board may direct.

Sec. 13. For the purpose of carrying out the provisions of this act, five thousand ($5,000) dollars is hereby appropriated out of any money in the state treasury not otherwise appropriated; two thousand five hundred ($2,500) dollars to be paid in the year 1893 and two thousand five hundred ($2,500) dollars in the year 1894.

After the said board of horticulture shall be duly qualified and accept the provisions of this act, they shall certify their acceptance of the same to the secretary of state and state auditor. After said acceptance, the state auditor shall annually, on the 1st of June, on the order of said board, signed by the president and secretary of said board, draw a warrant on the state treasurer for the aforesaid sum of two thousand five hundred (2,500) dollars; Provided, should the said horticultural board fail to carry out the provisions of this act during any one year, after

the passage of this act, then and in event the aforesaid warrant shall not be drawn for that year.

Sec. 14. That an act to promote and encourage horticulture and forestry in the state of Colorado and to establish a state bureau of horticulture, approved March 8, 1883, is hereby repealed.

Sec. 15. In the opinion of the general assembly an emergency exists; therefore, this law shall be in force and effect from and after its passage.

Approved April 5. 1893.

REPORT.

Office of State Board of Horticulture,
908 Equitable Building,
Denver, Colo., April 5, 1893, 4 p. m.

The newly appointed members of the State Board of Horticulture met in the office of the former "State Bureau of Horticulture." There were present W. B. Osborn, David Brothers, C. W. Steele, John Tobias.

On motion W. B. Osborn was elected president; John Tobias, secretary.

C. W. Steele offered the following motion seconded by David Brothers, which was duly carried:

That the secretary be declared custodian of all properties of the board, also moneys that may be come in the possession of the board by bequest, donation or otherwise, and disburse the same as directed by the board.

Adjourned to 9:30, April 7.

April 7, 1893.

Board met as per adjournment.

President Osborn in the chair.

Consulting authority and formulating rules and regulations for the prevention and destruction of fruit pests as required by law.

The board as a committee waited on the general passenger agent of the D. & R. G. R. W. to solicit transportation to visit the fruit sections of the state in the interests of horticulture.

Adjourned to 9:30, April 8.

April 8, 1893.

Board met as per adjournment.

President Osborn in the chair.

Finished rules and regulations.

Appointed the following county inspectors. Secretary to notify each one and receive their acceptance:

C. W. Fawcett, Paonia, for Delta county.

C. W. Upton, Montrose, for Montrose county.

D. C. Travis, San Isabel, for Saguache county.

Chas. Waters, Grand Junction, for Mesa county.

Elwood Easley, Golden, for Jefferson county.

C. S. Faurot, Boulder, for Boulder county.

J. V. Hurlburt, Parachute, for Garfield county.

Adjourned to April 10.

JOHN TOBIAS,
Secretary.

Office of State Board of Horticulture,
Room 908, Equitable Building,
Denver, Colo., April 10, 1893.

Board met as per adjournment.

Present: C. W. Steele, David Brothers, W. B. Osborn, John Tobias.

President Osborn in the chair.

Board preparing for publication remedies for prevention and destruction of fruit pests.

Adjourned to 9:30, April 11.

April 11, 1893.

Board met as per adjournment.

Continued work on remedies for destruction of fruit pests.

Adjourned to 9:30 o'clock, April 12.

April 12, 1893.

Board met as per adjournment.

Revised regulations and recommendations and closed contract with printer for publishing same three times in weekly paper, as provided by law.

Also for 2,000 copies in pamphlet form for distribution throughout the state.

Planned a visit of inspection to the orchards of the western and southern part of the state.

Audited bills of members for attendance and expenses, for which warrants were drawn, and on motion adjourned to May 2, 1893.

JOHN TOBIAS,
Secretary.

Office of State Board of Horticulture,
Denver, Colo., May 2, 1893.

Board met as per adjournment.

Present: W. B. Osborn, C. W. Steele, John Tobias, David Brothers.

President Osborn in the chair.

Minutes of last meeting read and approved.

Secretary read communication from Elwood Easley, declining appointment as inspector for Jefferson county. Also communications from D. C. Travis, Saguache county; Chas. Waters, Mesa county and J. B. Hurlburt, Garfield county, accepting appointments.

Prof. W. H. Brown, of Seattle, Wash., being present, on motion, further business was suspended to allow the professor to lecture on insect pests and give practical illustrations of the work of insects, and his method of destroying them.

Exhibited currant wood: Badly infested with imported currant worm, best remedy, cut out wood and burn; also exhibited peach borers and their work. Claimed to know the cause and cure for blight on apple trees. Exhibited specimens of an insect he called multi-transparent blight parasite, working on the roots of the apple trees and easily destroyed with a remedy of his—covered by letters patent—will also destroy nearly all other insects to which it may be applied, without damage to the tree.

Adjourned to 1:30 p. m.

Board met as per adjournment.

Elisha Millison was recommended and appointed as county inspector for Arapahoe county.

A communication was read from W. S. Coburn in regard to the appointment of a representative from Colorado at the World's Fair.

C. W. Steele offered the following resolution which was adopted:

Resolved: That the State Board of Horticulture hereby endorse the action of W. S. Coburn, in the recommendation of our president, W. B. Osborn, as representative of the state of Colorado, in the horticultural Department of the World's Fair at Chicago.

Arrangements were made for the inspection of orchards on Wheat Ridge, Jefferson county, on the morrow.

The passenger agents of the Midland and U. P. R. W. were visited in regard to transportation.

On motion, adjourned to meet in orchard of David Brothers at 9:00 a. m., May 3.

Wheat Ridge, Jefferson county, May 3, 1893.

Board, in company with Prof. W. H. Brown, inspected orchard of David Brothers. Found plenty of blight and proof of disease at the roots; also found insects referred to by the professor in his lecture.

Professor gave an example of how to treat a blighted tree. Operated on a specimen of wealthy apple tree with one-third of roots dead, top about same condition. Tree had been bearing several years, but not in last two, blight killing blossoms. Also found borers in plum trees grafted on peach roots, many trees having died in last few years from apparently same cause. Also found woolly aphis on roots of apple trees apparently doing much damage.

In orchard of Henry Lee, half mile from above, found same disease at roots of blighted apple trees, also some on dead pear tree. On other pear trees, nearly dead, found roots apparently in good condition.

Professor found, and exhibited to board, on last year's twigs of pear, eggs in quantity of what he claimed to be the cause of pear blight. Also found wooly aphis in quantity at roots of. apple trees Cherry trees badly sun-scalded and infested with centre wood borer. A few red spider and currants badly infested with European currant borer.

Owing to the backwardness of the season, the proposed visit to the orchards of the state was postponed until some future time.

Bills for attendance and expenses of members were allowed and warrants drawn in payment.

On motion, the board adjourned to meet on call of president.

JOHN TOBIAS,
Secretary.

REGULATIONS.

Established by the Colorado State Board of Horticulture for the inspection and disinfection of grafts, scions, orchard debris, empty fruit boxes and packages and other suspected material, or transportable articles, dangerous to orchards, fruit or fruit trees, in compliance with section 4 of an enactment by the general assembly of the state of Colorado, entitled "An act to create state and county boards of horticulture; define their duties and compensation; to protect and promote the horticultural interests of the state."

Article 1. It shall be the duty of every owner, possessor or occupier of an orchard, nursery, or land where fruit trees are grown within this state to disinfect all fruit trees grown on such lands infested with any insect or insects, or the germs thereof, or infected with any contagious disease known to be injurious to fruit or fruit trees, before the removal of the same from such premises for sale, gift, distribution or transportation.

Fruit boxes which have been used for shipping fruit to any destination are hereby required to be disinfected previous to their being used for any purpose.

All boxes returned to any orchard, store-room, salesroom or any place used or to be used for storage, shipping or any other purpose, must be disinfected within three days after their return.

All packages known as free packages must be destroyed or disinfected before being again used.

Article 2. It shall be the duty of the owner, lessee or occupier of any orchard within this state, to gather all fruit infested by the insects known as the codling moth, peach moth, red spider, plum weevil, or kindred noxious insects, their larvae or pupae, which has fallen from the tree or trees, as often as

once a week, and dispose of or destroy the same in such manner as to effectually destroy all such insects, their larvae or pupae.

It shall be the duty of county inspectors of fruit pests to inspect fruit packages and all trees and plants, cuttings, grafts and scions known or believed to be infested by any insect or insects or the germs thereof, or their eggs, larvae or pupae, injurious to fruit or fruit trees, or infected with any disease liable to spread contagion, imported or brought into this state from any foreign country or from any of the United States or territories, and if upon inspection, such trees, plants, cuttings, grafts, scions or fruit packages are found to be infested or infected, the same shall not be offered for sale, gift, distribution or transportation, unless they shall be first disinfected.

Article 3. Every person shipping fruit trees, scions, cuttings or plants from any orchard, nursery or other place where they were grown or produced, shall place upon or securely attach to each box, package or parcel containing such fruit trees, scions, cuttings or plants, a distinct mark or label, showing the name of the owner or shipper, and the locality where produced; and any person who shall cause to be shipped, transported or removed from any locality declared by the State Board of Horticulture to be infested with fruit tree or orchard pests, or infected with contagious diseases injurious to trees, plants or fruits, unless the same shall have been previously disinfected, shall be proceeded against according to law.

When disinfected, the fact shall be stamped upon each box, package or separate parcel of fruit trees, scions, cuttings or plants; and any person who shall cause to be shipped, transported or removed, any such box, parcel or package from a quarantine district or locality not bearing such stamp, or who shall falsely cause such stamp to be used, or shall imitate or counterfeit any stamp or device for such purpose, shall be proceeded against according to law.

Article 4. It shall be the special duty of each county inspector to see that the provisions of these regulations are put in force and effect within his jurisdiction and all offenders punished according to law.

Article 5. All fruit trees infested by any insect or insects, their germs, larvae or pupae, or infected by any disease known to be injurious to fruit or fruit trees, and liable to spread contagion, must be cleaned or disinfected before the first day of May, 1893, and on or before the first day of April of every succeeding year thereafter. All owners or occupants of land shall comply with the provisions of this section.

All fruit packages, trees, plants, cuttings, grafts and scions that shall not be disinfected within twenty-four hours after notice by the county inspector of fruit pests or the county board of horticulture, shall be liable to be proceeded against as a public nusiance.

Article 6. The county inspector in each county shall, whenever it may be deemed necessary, make an inspection of any orchard or trees, plants, vines or fruits, or any fruit-packing house, store-room, salesroom, or any other place or article in his jurisdiction, and if found infested with scale insects, or codling moths, or other pests injurious to fruit, plants, trees or vines, or with their eggs or larvae, he shall notify the owner or owners or person or persons in charge or in possession of said places, or orchards or nurseries, trees or plants, vines, fruit or articles as aforesaid, that the same are infested with said insects or other pests, or any of them or their eggs or larvae, and he shall require such person or persons to eradicate or destroy them, the said insects or other pests, or their eggs or larvae, within a certain time to be specified by him. Should such owner or owners, person or persons in charge or possession of orchard or nursery trees, or places or articles infested with said insects, or any of them, their larvae or eggs,

after having been notified as above by said county inspector or county board of horticulture, or the state board of horticulture, to destroy the same or make application of treatment as directed, shall fail, neglect or refuse so to do, then proceedings shall be taken against such person or persons for maintaining a public nuisance, as provided by law. Whenever any such nuisance shall be found to exist at any place within the jurisdiction of any county inspector, or on the property of any non-resident, or on any property the owners of which cannot be found by the county inspector after diligent search, within the county, or upon the property of any owner or owners upon which notice aforesaid has been served, and who shall refuse or neglect the same within the time specified, it shall be the duty of the county inspector, acting under the orders of the county board of horticulture or state board of horticulture, to cause such nuisance to be at once abated by eradicating or destroying said insects or other pests, or their eggs or larvae, and shall make an expense bill thereof and present same to board of county commissioners for payment.

Article 7. Disinfection as provided by these regulations shall be to the satisfaction of the county board of horticulture having jurisdiction.

Article 8. Any person or persons, or corporation violating any of these regulations shall be proceeded against according to law.

Passed at a meeting of the board of horticulture held at the secretary's office in Denver, Colorado, this the 8th day of April, 1893.

W. B. OSBORN, Pres't, Loveland.
JOHN TOBIAS, Sec'y, Denver.
C. W. STEELE, Grand Junction.
DAVID BROTHERS, Wheat Ridge.
W. S. COBURN, Paonia,
Members Colorado State Board of Horticulture.

REPORT

OF THE

State Board of Horticulture

ON

A VISIT OF INSPECTION TO THE FRUIT SECTIONS OF THE STATE,

MAY 23 TO JUNE 17, 1893.

At the call of the president the members of the northern part of the state assembled in Denver and proceeded via the D. & R. G. R. W. to Grand Junction, where they were met by C. W. Steele, who acted as pilot in visiting Grand valley. Found the orchards generally in very good condition; scarcely any insect pests, such as usually trouble fruit trees. Near Fruita the grasshoppers had been destructive the two previous years, having killed many trees, notably in the peach orchard of Rose Brothers, of which one-third of the trees were dead, and the balance of the eighty-acre orchard were so badly damaged that the crop of fruit will be small.

The grasshoppers were again making their appearance, and threaten to do much damage. The board instructed the fruit growers in the use of hopperdosers and other means of destruction, and strongly advised their immediate use for the saving of the crop.

Peach trees in this county were much damaged in tops by freezing, an unusual occurrence from what we could learn, the opinion being that the trees made too late a growth last fall, going into winter with

unripe wood. The most promising peach crops were in favored localities near the foot hills, the higher ground being more favorable than in the bottoms.

Plum trees were very generally full of fruit. Wild goose and several of the European varieties, also prunes, were well thought of. Marianna was condemned as being a poor shipper and uncertain bearer. Sour cherries do very well. Sweet varieties are very uncertain. Apricots are very promising, the trees generally bearing very full crops. Apples and pears make a fine growth, and bear abundant crops, with no blight to mar the fine appearance of the trees. European grapes, where covered in winter, bear good crops, without protection, are very uncertain except in favored localities. American varieties, also blackberries and raspberries, do fairly well without protection, but do much better with it.

Among the orchards visited were those of Messrs. C. W. Steele, who had a good showing of fruit; Dr. F. R. Smith, Canon. Robert Orr, who has 6,500 trees with a fine crop of a variety of fruit, besides a good showing of vegetables raised between the trees, reports 200 peach trees as yielding an average of 200 pounds per tree. Caswell and Hoyt have fine peach trees, damaged somewhat by grasshoppers. Charles Waters has two acres of grapes of foreign varieties, which promise well, having been covered during winter. Sellers and Canon have a very fine three-year-old orchard of 6,000 trees, consisting of apple, pear, plum, prunes and peach, but little fruit this year, excepting peaches.

William Bergan, near the river, had some very fine large trees; fruit prospects good.

Mrs. Kate Harlow, in the foot hills, has trees well laden with fruit of all kinds.

Many fruit trees are being planted in this valley, some without previous preparation of the soil.

At Whitewater, R. W. Shropshire has some very fine trees and good prospects for a crop of apples, plums and cherries. The old orchard is seeded to red

clover. Also visited orchards of J. R. Penniston, ——— Snyder and others; found some currant borers; some of the orchards neglected as to cultivation and trimming; ground for orchard purposes limited.

Near Delta visited the orchards of W. M. Hastings and O. P. Standish; fruit not very plentiful; peaches short crop. Geo. B. McGranahan's orchard is more sheltered from the winds; trees well loaded with fruit; about 3,000 trees planted, all looking well; grapes and raspberries winter killed; had no protection.

W. S. Coburn, near Paonia, has a fine orchard, with a good crop of fruit. Peaches do well here. European grapes, blackberries and raspberries were winter killed, having no protection.

G. W. Fawcett, at the head of the valley, north fork of the Gunnison, 38 miles from Delta, has a small orchard doing very well, consisting of apples, peaches, plums, etc.

Hon. Samuel Wade, on opposite side of the river, near Paonia, has an orchard of about 5,000 trees in good condition; grapes better than the average in this section; raspberries killed; Snyder blackberries, fair crop; were not protected. Mr. Wade does not think European grapes are a success without protection.

At and near Hotchkiss were the poorest kept orchards in the valley. Stock being allowed to injure the trees; were headed high and sun-scalded, with borers working in the trunks. Other orchards visited were those of J. W. Hurst, Frank Talbot, Henry Carr, Daniels' Fruit Farm and many others, whose names were not learned.

The people certainly have great faith in the industry, as fruit trees are being planted by the thousand all over the valley, from the banks of the river to the edge of the cedars, sometimes moving the rock and the cedar to find room for the more profitable apple, pear, peach, plum or cherry, and often twenty to forty miles from railroad transportation, but they

have hope of the iron horse coming their way before the present planting of trees comes into bearing.

Have been informed there were unloaded at Delta this spring 32 carloads of fruit trees, besides the home-grown stock. It is estimated that 500,000 trees were planted in the county this spring. Peaches do fairly well, but as in Mesa county are more certain in favorable localities, generally on high ground near the hills, and on sandy, well-drained soil.

Montrose county claims a setting of 300,000 fruit trees in spring of 1893, and room for millions more, the only limit being the water supply. On the mesas fruit trees are doing very well, and several large orchards visited are very promising. Hon. J. C. Bell has two orchards, four and six miles from Montrose, aggregating 116 acres, which promise grand returns when the trees arrive at bearing age.

W. B. Upton has a well-kept orchard on the mesa near town, which has yielded good crops.

With the exception of grasshoppers near Grand Junction, the western slope is very free from injurious insects; found some peach and apple borers, and learn the codlin moth have gained a foothold along the railroad from Montrose to Delta. Growers cannot be too careful about transporting barrels and boxes from the towns to their orchards, as in that way they introduce codlin moth and many other injurious insects, which, in a few years, will greatly damage their crops and trees. Growers generally start the branches on their trees near the ground (about two feet), which plan is to be recommended in that land of bright sunshine.

In orchards with bare, exposed trunks were to be found the most injury from sun-scald, thus inviting the borer to deposit its eggs and continue the destruction of the tree begun by the sun's scorching rays on the exposed bark. One million is the estimated number of fruit trees planted on the western slope in the spring of 1893.

In the Las Animas valley, near Durango, are growing several orchards at an elevation of 6,800 feet, where planted on high ground, away from the river, are doing well.

The largest cherry tree we saw was in this valley, eleven years planted, and yielded one year eleven bushels of fruit; variety, Early Richmond. Mr. Kerr's orchard, where Hermosa creek flows into the river, was the most promising, having considerable fruit of plums, apples, cherries, etc., being protected from late frosts by the breeze coming down the canon from the mountains at night.

At the Home Ranch is an old orchard, somewhat neglected, borers and tent caterpillers doing some damage; trees on low ground dying, water being too near the surface; had some blight last year. Also visited the orchards of Messrs. Burns, McNally and Dudley, in same vicinity. The next point visited was Canon City, where we were joined by W. S. Coburn.

Canon City has suffered the loss of early fruits by a late frost; winter apples generally a good crop; also some pears and plums; grapes also looking well, and strawberries being marketed at paying prices. Peaches are an uncertain crop, Judge Felton having several trees, which he yearly lays down and covers, thus securing a good supply for home use. His orchard of apple and pear trees is looking very thrifty, as are most of the many fine trees around the city. B. F. Rockafellow having 75 acres of eight-year-old trees, mostly apple and pear. A few orchards are not well cared for, and some of the older trees are infested with red spider. Noticed some blighted crab-apple trees. Wooly aphis is also bad in some orchards, and codlin moth is general, or has been. Bands of sacking around the trunks and wire screen moth traps are much in use, and spraying is done by most of the orchardists.

Dall Deweese has a fine nursery on the mesa near town, which is kept in a systematic manner.

At Florence is perhaps one of the oldest orchards in the state, consisting of about 35 acres. Jesse Frazier, the owner, keeps his trees in better shape than many of the younger fruit growers. He does not spray his trees; in fact, it would be most impossible to spray the tops, as the trees are planted too close together, and the branches are much interlaced. His orchard, however, is very free from insects, with the exception, perhaps, of codlin moth, his remedy being to keep the trunk and large limbs clean by scraping off all rough bark and washing annually with the following mixture, applied with a brush or swab: One pound lye (Red Seal brand) to ten quarts of water. Has in his orchard several of perhaps the largest apple trees in the state—a Smokehouse, Yellow Belleflower and Red Astrachan. The latter, at two feet from the ground, measures 63 inches in circumference, with a spread of branches of 38 feet, and all in a fine, healthy condition; thinks well of the Jeffries apple; also Colorado orange, a seedling of his own raising.

Rock Ford and vicinity is almost entirely without fruit this year, on account of a late freeze destroying the blossoms and young fruit. Many young orchards are being planted. The trees are very much exposed to strong winds; would suggest more wind breaks; have a good start of codlin moth in town, and the board suggested to the friends there the probability of starving them out and being almost free from them next year, if the precaution were taken to destroy all worms found in the few apples now on the trees.

Hon. G. W. Swink has the oldest orchard in the vicinity; trees are making a good healthy growth. Visited the orchards of Ben Reed and others; also the experiment station in charge of Prof. F. A. Huntley. The grounds were lately graded and new walks and roads laid out, and in time will show up well.

Near Longmont visited the orchards of E. C. Phillips, Geo. McIntosh, James Ackerman, John Goss

and others; found a few red spiders on the oldest trees. Woolly aphis are bad, some leaf hoppers and plenty of leaf roller doing damage; some new blight appearing, but not as much as the previous year; fruit of all kinds very scarce.

Around Fort Collins the leaf roller is doing much damage, having completely defoliated the young trees. J. S. McClelland having sprayed his older orchard, was free from their depredations as far as the spraying was done. Currant borers are fast destroying the currant bushes in this part of the state. Visited the college grounds; also the orchard and nursery of Charles Pennock, six miles from town; fruit in vicinity very scarce; very little new blight appearing.

Near Denver the leaf roller are doing damage, where the trees have not been sprayed. Blight is again making its appearance, but not as bad as the previous year. Apples are a light crop; will be some plums, also cherries; pear trees nearly all killed by blight. The 93-acre orchard of Stark Bros., at Littleton, grown without irrigation, has every indication of being made a success. The ground is kept clean by continual cultivation, the mellow surface soil acting as a mulch to prevent the evaporation of the moisture from the subsoil. The trees are making a good growth and are looking well. The apple and pear crop is very light, as it is all over the eastern slope in Colorado outside of Canon City; some fruit on plum and cherry trees. A few leaf roller still at work. The trees had been sprayed with white arsenic, but was not strong enough. Blight is appearing on crab apples; none on pears. Learn that the trees in Joseph Bowles' orchard, near by, had been somewhat blighted, some of the pear trees having been killed by it.

JOHN TOBIAS,
Secretary.

Office of the State Board of Horticulture,
908 Equitable Building,
Denver, Colo., January 10, 1893.

The state board having returned from their visit to the west and south part of the state, a meeting was held in the secretary's office.

Members present—W. B. Osborn, president; David Brothers, John Tobias, C. W. Steele and W. S. Coburn.

The bill of Field and Farm for printing and advertising regulations was allowed, and vouchers ordered drawn on state auditor for payment.

Arrangements were perfected for trip of inspection to northern section of state, and transportation secured over the U. P. R. W.

On motion adjourned.

JOHN TOBIAS,
Secretary.

Denver, Colo., June 15, 1893.

The state board returned from their visit to the north and inspection at Littleton and near Denver, and held a meeting in office of secretary.

Members present—W. B. Osborn, president; David Brothers, C. W. Steele, John Tobias.

The matter of a state fruit show this fall was very generally discussed, without any definite conclusion.

On motion adjourned to next day.

Denver, Colo., June 16, 1893.

Board met as per adjournment.

All present as per yesterday, with addition of W. S. Coburn.

On motion the following resolution was passed:

Whereas, The fruit growers of the western slope being desirous of having a fruit show this year; and

Whereas, On account of a very general late frost destroying most of the fruit on the eastern slope; therefore, be it

Resolved, That we hold our annual fall show at Grand Junction, provided it can be done on the same conditions as the holding of the show at Montrose September 25 to 27, 1890.

On motion C. W. Steele of Grand Junction was appointed a committee of one to present the subject to the people of Grand Junction and report later.

On motion the salary of the secretary was fixed at $750 per annum.

On motion adjourned to June 17.

Denver, Colo., June 17—10 a. m.

Board met as per adjournment.

Members present—W. B. Osborn, president; David Brothers, C. W. Steele, John Tobias, W. S. Coburn.

On motion 300 copies of Orchard Bill No. 224 were ordered printed by Field and Farmfor ten dollars.

Bill of Field and Farm for printing and binding 300 vouchers, as ordered by the board, was allowed.

The bills of members for per diem and expenses were presented and allowed, and vouchers ordered drawn on auditor for respective amounts.

The following resolution was presented, and on motion unanimously adopted:

Whereas, Through the courtesy of the railroad companies, we have been enabled to visit the various fruit growing sections of Colorado in the interest of horticulture; therefore, be it

Resolved, That the thanks of this the state board of horticulture be extended to the Denver & Rio Grande, Atchison, Topeka & Santa Fe, Rio Grande Southern and Union Pacific Railroad Companies for the courtesies extended while on our tour of inspection.

On motion the meeting adjourned sine die.

JOHN TOBIAS,
Secretary.

Denver, Colo., August 2, 1893.

Secretary experimented with an insecticide (furnished by W. W. Benson, Denver), on grounds of David Brothers, but found it too expensive for practical use; also prepared kerosene emulsion (recipe of Prof. Cook, Mich.), applied to squash bugs, diluted to 1-30 kerosene, with good results, killing insects and not injuring foliage.

August 11, 1893.

Visited the gardens and orchards of J. T. Litchfield and J. W. Talcott, south of Denver; found very little blight; young pear trees were healthy; red spider were starting on currant bushes; also found a few currant borers; some leaf rollers had been on fruit trees, and plenty of eggs were laid for a good supply the coming season; gave the best remedies for destroying them. Onions were badly damaged by onion thrip, a small insect working on the tops and checking further growth.

Grand Junction, Colo., September 15.

This being Peach Day, an annual occurrence in Grand valley, the board were present, as per previous arrangement, to meet with the fruit growers and partake of their free bounty of peaches, melons and other products. A large tent had been erected for the occasion, in which were arrayed the choicest specimens of peaches, grapes, apples, pears, melons and other fruits in season. Fine music was furnished, a few speeches indulged in, and the doors were thrown

open, and all present invited to sample to their fill of the generous supply of peaches and melons furnished for the occasion by the people of the vicinity. Some of the best specimens of the fruit was selected and forwarded to the World's Fair at Chicago.

In the evening the board met for the transaction of business.

All present.

The subject of future action was discussed, and it was agreed to have a general meeting in December or January, the time to be determined later, each member to send to the secretary such subjects as in his opinion his section of country would like to have discussed. Secretary to prepare a programme from subject matter sent in, and to assign different topics to those best qualified to write upon them, a general discussion to follow each essay. Meeting to be held at Denver.

It was also decided to use more rigorous measures with the fruit growers in the northern part of the state to enforce compliance with the law.

The opinion was expressed that the section of country north of Denver should be more thoroughly visited and the people awakened to their interests.

On motion adjourned to September 16.

JOHN TOBIAS,
Secretary.

Grand Junction, September 16, 1893.

Board visited the orchards in vicinity and noted their condition; found the codlin moth was gaining a foothold in and near town. No other insect pests were discovered, the grasshoppers having been destroyed early in the season.

In the evening the board met in the parlors of the hotel.

All members present.

The bill of Field and Farm for printing envelopes and letter heads was presented and allowed; also bills of members for per diem and expenses, and secretary ordered to draw vouchers on state auditor for the same.

On motion adjourned, sine die.

JOHN TOBIAS.

Denver, Colo., November 9, 1893.

President Osborn, David Brothers and secretary met in office at Denver, as per agreement, and planned a visit to northern part of state, as follows: Leave Denver November 15; meet with the fruit growers one evening at each of the following places, viz.: Boulder, November 15; Longmont, November 16; Loveland, November 17; Fort Collins, November 20; Greeley, November 21, and visit orchards during day when time and weather permit.

Secretary to send notice to fruit growers in time to insure attendance.

Denver, Colo., November 22, 1893.

As per arrangements made, all the members excepting W. S. Coburn left Denver for Boulder November 15, the U. P. R. W. kindly furnishing free transportation. At Boulder found fruit trees in better condition, with less blight than farther from the mountains. Grapes were being dug up, as unprofitable at present prices. The same may be said to a certain extent of raspberries and blackberries; very few leaf roller here. The white cricket was getting destructive on raspberry canes. At Longmont and Loveland nearly the same conditions prevailed, with exception of more leaf roller and effects of the blight. At Fort Collins, where in spring the leaf roller had been so destructive, the eggs laid for another year were not so plentiful as we expected to find them, it

appearing that a parasite was at work on the insect. At Greeley we again found the eggs laid in abundance, and the effect of the blight showing very severe. From observations made it would appear that the blight had about run its course north of Denver, being less as we proceeded north.

Some orchards showed intelligent care, and were in a healthy condition. Many others were sadly neglected, and good harbors for insect pests. At the meetings held each evening much interest was manifested by those present, and many things were discussed of interest and benefit to fruit growers. Owing to the inclemency of the weather at some of the meetings, the attendance was not as large as it otherwise would have been.

On return to Denver the board met at the office of the secretary.

Those present were W. B. Osborn, president; David Brothers, C. W. Steele, Ben Reed, John Tobias.

On motion it was decided to have a general meeting of two or three days at Denver early in January, time to be decided on later.

Secretary was instructed to correspond with prominent fruit growers throughout the state to solicit essays. Upon receipt of replies the president and secretary to arrange programme, procure hall and make final arrangements.

Members were urged to have a display of fruit on hand for free exhibition at that time.

The per diem and expenses of members were allowed and vouchers drawn on state auditor for same.

On motion adjourned sine die.

FINANCIAL STATEMENT.

1893. Voucher.	
June 10, No. 1, to Field and Farm, printing.	$ 78 00
June 16, No. 2, to David Brothers, per diem and expenses	36 25
June 16, No. 3, to C. W. Steele, per diem and expenses	57 75
June 16, No. 4, to W. B. Osborn, per diem and expenses	47 55
June 16, No. 5, to W. B. Osborn, per diem	115 00
June 16, No. 6, to David Brothers, per diem	100 00
June 16, No. 7, to W. S. Coburn, per diem	70 00
June 16, No. 8, to C. W. Steele, per diem	115 00
June 16, No. 9, to John Tobias, 3 mo. salary, $187.50; office expenses to date, $20.45	207 95
June 16, No. 10, to John Tobias, expenses five members	236 10
June 21, No. 11, Field and Farm, printing	21 25
Sept. 19, No. 12, W. B. Osborn, per diem and expenses	41 85
Sept. 19, No. 13, Ben Reed, per diem and expenses	44 60
Sept. 19, No. 14, David Brothers, per diem and expenses	40 15
Sept. 19, No. 15, C. W. Steele, per diem	5 00
Sept. 19, No. 16, Field and Farm, printing	17 50
Oct. 3, No. 17, John Tobias, 3 mo. salary, $187.50; mileage 900 miles, $12.30	199 80
Oct. 9, No. 18, W. S. Coburn, per diem and expenses	29 15
Nov. 22, No. 19, C. W. Steele, per diem and expenses	86 10
Nov. 22, No. 20, David Brothers, per diem and expenses	61 20

Nov. 22, No. 21, Ben Reed, per diem and expenses	81	75
Nov. 22, No. 22, W. B. Osborn, per diem and expenses	64	00
Nov. 22, No. 23, John Tobias, salary to Nov. 30, $112.50; mileage, $16.20; office expenses to Nov. 30, $13.25	142	05
Total	$1,898	00
State appropriation	$2,500	00

TRANSCRIPT OF PROCEEDINGS

OF THE

STATE BOARD OF HORTICULTURE

AT DENVER, COLO.,

January 11 and 12, 1894.

LETTER OF TRANSMITTAL

Denver, Colo., May 31, 1894.

HON. NELSON O. McCLEES,
Secretary of State.

Sir—In compliance with the law, I have the honor of submitting herewth the semi-annual report of the Colorado State Board of Horticulture, with supplemental papers for the past six months.

JOHN TOBIAS,
Secretary.

STATE OF COLORADO,
Secretary's Office.

Filed May 31, A. D. 1894, at 2:10 o'clock p. m.

NELSON O. McCLEES,
Secretary of State.

By Lyman B. Henderson,
Deputy.

TRANSCRIPT OF PROCEEDINGS

OF THE

STATE BOARD OF HORTICULTURE

AT DENVER, COLO.,

JANUARY 11 AND 12, 1894.

Meeting called to order at 11 o'clock by President W. B. Osborn, as follows: We have delayed a little on account of numbers, we wanted to get a congregation before we commenced. I have not on the onset, anything special to say, as I have my piece this afternoon in the form of my annual address.

In the opening I have this to say: I anticipate, and I know that we have some valuable papers and information that people want to know, in regard to these horticultural interests of Colorado, and we trust we will make it so interesting that you will be willing to stay with us during the session as much as possible.

The first thing on the programme is the report of the secretary, and we will now hear from him.

REPORT OF SECRETARY.

The members of the state board received their appointment from the governor on April 6, 1893, and proceeded at once to the election of a president

and secretary, and to formulating rules and regulations to prevent the introduction, and aid in the destruction of insect enemies to fruit culture; of these regulations, 2,000 copies were published in pamphlet form, and distributed throughout the state; they were also published in three issues of a weekly paper, as the law requires. County inspectors were appointed for Delta, Montrose, Saguache, Mesa, Jefferson, Boulder, Garfield, Fremont and Arapahoe counties, these to act until said counties had a county board of horticulture. Some of these declined the office for various reasons, and others were appointed in their places. It is to be hoped that all the fruit counties will soon have a county board, and an inspector of their own selection, as more satisfactory work can be done in this way.

To properly carry out the work it was considered necessary that the board become acquainted with the the needs of the different fruit sections of the state, and accordingly an extended visit was made, covering the most important districts where fruit is grown, and representative orchards in each section were examined.

Frequent visits were made by secretary to orchards and gardens in vicinity of Denver. Several experiments were made with insecticides, furnished for trial by agents interested in their sale. Most of these were found to be too expensive for general use. Being a dry season, the red spider multiplied very rapidly and were found to be doing much damage to blackberries and currants, causing the leaves to fall very prematurely.

No fruit exhibition was held last fall by the state society for several reasons, one being on account of the exhibit at the World's Fair at Chicago, which called many of our fruit raisers out of the state at the time an exhibit should be held here;

another reason being the almost total failure of the apple crop in northern Colorado, caused by late frosts and cold winds at time of blossoming. The panicky condition of the financial market was also taken into consideration.

The law requires the secretary to make semi-annual reports to the secretary of state before the 1st day of June and December, embracing the proceedings of the board for the previous six months. These reports have been filed as required.

The acreage of fruit lands planted is rapidly on the increase, and a conservative estimate places the total of large and small fruits now in the state at 45,000 acres, and judging from the inquiries being made for lands suitable for fruit raising, these figures will be largely increased in a few years. There is one thing in this connection that should be taken note of—as, if continued, in a few years time it will do the state a great harm, it is the manner of doing business of some of the large land companies, who pretend to plant trees, and then sell orchards, on paper, when the facts are, the trees planted will never be worth as much as when taken from the nursery.

Insects most troublesome at present are in the order named: Codling moth, leaf roller, currant borer, woolly aphis and red spider. There are other insects, but not numerous enough to cause any serious injury. The depredations of the leaf roller are at present confined to northern Colorado. Western Colorado has only a few insects but will soon be overrun with the codling moth, unless rigorous measures are used to exterminate it.

Some disease has appeared among the blackberry plantations near Denver, supposed to be blackberry rust, which is playing havoc with the yield of fruit. It is to be hoped that at these meetings the disease may be determined, and a safe and sure remedy suggested.

The white cricket is also damaging raspberry canes near Boulder, but has not yet become numerous elsewhere.

There are well known and cheap remedies for all of these insects, and it would appear to be good financial policy for every orchardist and fruit grower to make use of them.

Over 100 reports have been sent out, mostly of the last volume. Those outside of the state have gone to Kansas, Nebraska, Illinois, North Dakota, Missouri, New York, Pennsylvania, Ohio, California, Washington, D. C., Iowa and state of Washington, twelve states and two foreign countries.

Our library has been increased by reports from Washington, D. C., Michigan, Missouri, Massachusetts, California and state of Washington, also numerous bulletins.

FINANCIAL SUMMARY.

State appropriation for 1893	$2,500 00
Vouchers issued	1,898 00
Warrants drawn in payment	1,462 90
Due members of the board for services rendered*	$ 435 10

At the conclusion of the secretary's report the president spoke as follows:

Mr. Osborn—There is one thing I wish to say as regards the report of the secretary. Perhaps many questions might be asked in regard to insects and one thing and another, but we have papers on these subjects, and they will come at their proper time. All insects in Colorado, as far as is known, injurious to fruit trees will be discussed. Perhaps many here might think that this is the time to ask some question in regard to the report of the secretary, and of

* This has since been paid.

course we do not propose to cut off any discussion. This is a free meeting for all and we at any time will consider any question. The reason I mentioned this about insects was, because papers on insects will be brought up at the proper time.

Mr. Grimes—I rise to a point of information. Since I have been here this morning, something came in my hands that I have never seen before, and have had no idea of its existence. I supposed until this morning, that I was a life member of the State Horticultural Society, and was not aware that the society had ceased to exist. It was organized many years ago by people who have done very much to promote the horticultural interests of the state, and that it had fallen into the hands of the governor, I was not aware of. I find that the State Horticultural Society, or board, is now appointed by Governor Waite who is reported to be a crank on silver and ignorant on agriculture.

This seems to me, inasmuch as horticulture is to our state, that this board should be in the hands of the people, in the hands of practical horticulturists; but I find in this bill that is now a law, that the people are no longer a State Horticultural Society, but that the governor is the state horticultural society, and such men as Messrs. De Vinney, Brothers and others who have done much toward developing the fruit interests of this state, they shall have nothing to say as to who shall be appointed on the board. I wish to inquire who these six members are?

Mr. Tobias—They consist of Messrs. W. B. Osborn, W. S. Coburn, C. W. Steele, David Brothers, Ben Reed and myself. These are the ones appointed by the governor.

Mr. Grimes—It is a very excellent selection.

Mr. Tobias—I will state here that the governor (I do not know whether he claims to know anything about agriculture or not) left it with the old board to do the selecting, and that he would appoint them.

If there is anything wrong in the selection, you will have to blame the executive board.

Mr. Grimes—Regarding the report of the secretary, I move it be received and placed on file.

Mr. Brothers—Second the motion.

Carried.

Mr. Osborn—In answer to Mr. Grimes there has been answered all that is necessary I presume, but I will say this: At our annual meeting we discussed this subject somewhat, and also discussed the question of who were members, and who belonged to this society. I took it the same as Mr. Grimes regarding all the old members. We wanted to recognize them, and that is the reason we appointed this meeting. We wanted a kind of love feast here among the old members and we wanted them in. We cannot do anything without co-operation. Our hands are tied. What would our annual meetings amount to, if it were not for the horticulturists in the state and those interested in horticulture? Why, we should be of no use whatever. We would come, meet, do our business and go home. That is not what we are after. We are here to receive knowledge from others, and to impart knowledge which we have picked up, traveling over the state and getting all the information we could; so we appointed this meeting, just the same as it was before. Why, we are not here for the purpose of ignoring them at all; nothing of the sort.

Of course the law provides for our meetings; it is for the benefit of every section of the state that grows fruit. We have invited men from every portion of the state where they raise fruit, and we have asked for papers from every section. Some of the men could not be here, but they have sent their papers, most of them, and we expect others here, and so we will now go on just the same, and we do not want you to consider yourselves out, but we want you to consider yourselves a life member yet. Full reports of the meetings will be published and distributed free; won't cost you anything. I cannot say how these things

came about but I can say, we have been made a state board of horticulture in a minute, and the legislature did it. I do not know that you can blame the governor very much for that. We came and met at our last session as executive committee of the state Bureau of Horticulture. What did we do? Here we were. Here was this bill. Of course we were the old state bureau until the others take their seats, and there we were to settle up. But who would we settle up with? Nobody to turn the books over to, so we went down by request of the governor to recommend (as the secretary read over to you) the names of the board. We scattered them all over the fruit districts of this state, the north, south and west, and I will say that our meetings have been well represented by the board whenever we called a meeting, and we want to make this as interesting a meeting as it is possible, or that we ever had, and I think when we get through you will say it has been good for you to be here.

Mr. DeVinney—I was one of the incorporators of the Horticultural Society. I do not know what happened on November 1; but I understand from the Constitution of the United States, that a man, or a body of men, can't make a law that would do away with rights already acquired. The State Horticultural Society has been in existence as an incorporated body, and we now have certain rights and privileges, and whether the governor can do away with them is a question of doubt with me I was not aware that I was kicked out of this affair at all. As I said, I was one of the incorporators of the State Horticultural Society, and I cannot understand what is the purpose of this thing. If we have all the rights and privileges we had before, what is the purpose? What is the object to be gained.

Mr. Tobias—This came about through the legislature one year ago. Mr. Page, representative from Mesa county, had prepared a bill which was intended to put this society in better shape to work for the interests of the fruit grower. A committee from this

society was appointed to assist Mr. Page in modelling and having the bill passed. Now you will see that section 14 of this bill repeals the act of March 8, 1883, and shuts off all state aid, without which the State Horticultural Society cannot well exist. This bill makes a larger provision, only in another way, and provides for the appointment of the officers by the governor. We are carrying on the business of the Horticultural Society and the people are receiving greater benefits.

The members of the society have the privilege of carrying it on as before if they see fit, but there is no $1,000 appropriation from the state for them to fall back on.

Mr. Grimes—When we organized the State Horticultural Society a great many years ago, it was thought that fruit could not be grown here to any extent. In fact, the editor of The Colorado Farmer compared the fruit growing section of this state to a ribbon stretched along the foot-hills of these mountains. Mr. Meeker, who was afterwards murdered by the Indians, was then editing the paper at Greeley. I always had maintained that fruit could be raised here and raised very extensively. He said "Mr. Grimes, you are visionary, we can never grow anything in the way of fruit, except currants, gooseberries, etc., and we can never grow any trees except those indigenous to the country." But my vision has proven correct; there is nothing impractical in it, and nothing can debar me from the interest that I take in horticultural matters of this state. It is my hobby, it is my theme to see the great state of Colorado growing the luxuries of life as well as the necessities, and when we organized the State Horticultural Society, we did it without money, we ran the society for several years without pay, and I have never received, nor has Mr. DeVinney ever received, one dollar for any service rendered the state in a horticultural matter. Hon. W. H. Ragan, of Indiana, who has been for a number of years in the legislature, he served for a great many

years as secretary of the American Horticultural Society. First it was the Mississippi Horticultural Society, and then it was merged into the American Horticultural Society. That man got up the finest report I have ever seen made, and the greatest amount of money that man received was $350.00 for his work, and the larger part of that was expended in his expenses incurred in traveling to the meetings of the society, and what we need in this state is how to teach our people to grow fruit. I admit there are a good many misleading statements set forth by a great many people here, and it requires a certain fitness to be successful. It is not every man who plants trees that will grow fruit, he must have an adaptation for it

I am very glad to accept our president's invitation to take part in this society, but my theory has been, and my plan has been and my wish has been, that this organization could be made to spread all over the state; that instead of $1,000 being appropriated for the salary of one man, or two men, to let it be divided between the state societies, and let the secretary of the state society have enough more than his average to be able to weed out, compile and condense these reports for publication. I was not aware when this change was made, or that it had been made.

Mr. Brothers—I do not wonder at Mr. Grimes asking the information. I am glad he has. I have known Mr. Grimes a good many years, and he used to stand out on the street and talk to people about fruit, and he used to get ridiculed. I do not know but that they called him a worse crank than they do our governor now. I will never forget the time I saw Mr. Grimes standing on the street with a few trees, and everybody laughing at him, and saying that we could not raise fruit here, there was no use trying; but he did not believe them. He seemed to have gotten the notion that fruit could be raised generally in Colorado and stuck to it, and I suppose he will stick to it.

In regard to changing this thing, I really think that it is in a better shape than it was before. Mr. Grimes knows, and the older members know, that we have worked at a disadvantage all the way along. We tried for several years to get along, and we did get along. I spent three of four weeks in the course of the year in the interest of the society and paid my own expenses, and I know that he has paid a good many dollars out of his own pocket that he never received anything for, but we got tired of all that, and thought the state should do something, so we managed to get $1,000 by "nip and tuck," but after awhile the state got tired of this, and in fact if it had not been for Mr. Reynolds three years ago, we would not have gotten the $1,000 even.

I want to tell you that our legislative bodies have stood against us as a body, and it has been the hardest kind of work to get a bill through the house and legislature, and I do think, Mr. Grimes, that it is a good move, and I hope you and every one of us will feel perfectly at home here, and if there is anything that we can do to improve this law, our chance will be in the next legislature.

I hope we will have a real good time here together, and I do not understand, as Mr. Tobias says, that this society is at an end at all. I believe it exists in the spirit more than ever, and I am very sorry (as it was in the papers all last winter) that Mr. Grimes never saw this thing.

Mr. Stone—I belonged to the society two years without paying a dollar, and while I try to keep up in general matters, and try to read a little, yet I never knew a thing about this until I saw it in "The Field and Farm."

In speaking of Mr. Tobias as secretary, this matter is new to me; about a year ago we elected some one else, and I was puzzled; it was said there was a change made by the legislature.

I went up to see Mr. Tobias lately, and he gave me a copy of this sheet, and I felt very much as Mr. Grimes did, that I was not a member.

I want to ask a question: Do I understand the secretary to say that there is no provision for any more money? Is our money at an end?

Mr. Tobias—Do you mean the state appropriation?

Mr. Stone—Yes, sir; the state appropriation.

Mr. Tobias—The old appropriation? That bill has been repealed.

Mr. Stone—Then they appropriated how much?

Mr. Tobias—$2,500 per annum.

Mr. Stone—Then we have no appropriation beyond the present legislative term of two years?

Mr. Tobias—No, Sir.

Mr. Stone—Then would it not be well for us to look to the next legislature, and that we have somebody there to secure some. I find a good deal of valuable information in these reports, and the only thing that I can criticise about them is, that it is so long before we get them; it will be next January before we get reports of this meeting; this is too long to wait, and the thing gets stale. This is the only thing I have to criticise; but we must not lose sight of the good things that we do get, and must devise some way of getting money a year from this coming one, to carry us on.

I am glad to feel myself a member of the Horticultural Society. I feel like Mr. Grimes, that this is a fruit state. When I first came here, there were parties along the foot hills who were raising fruit, just enough to give the idea that it was possible, and for a long time I felt that the question of raising fruit was more than possible; and I believe it is to be one of the great industries of this state, and if it is, at every meeting of the legislature, we should be there, just the same as the state agricultural college, and all the

state institutions are, and thus help secure aid for one of the largest interests in Colorado.

Mr. Osborn—I have all the time thought that they might have made provisions in that bill to have the old organization; have it the same as it was before and I do not see why they cut them off, I do not see why they needed to cut them off; they get the same provisions now as they did before, except that they have no choice in the election of officers. The governor does that; but you will get your reports, you will get them somewhat stale perhaps, it will be a year or 18 months before you will get the words that our reporter is now taking down. I think myself this is too long, but the remedy is not in our power.

Mr. White—It appears from section 2 of this bill that provision is made for the salary of the secretary, certainly the appropriation is made for two years, and when the legislature meets it makes it for all of our state institutions, but it will be made year after year according to law, and also for this Board of Horticulture; but it seems to me that perhaps it will be well at this annual meeting to recommend to the governor, who the State Board of Horticulture should be, but I see from a reading of this bill that they are elected, 2 for two years, 2 for four years and 2 for six years, so there will be none going out for a year, and I think it would be well for this annual meeting to recommend to the governor two to take the place of the retiring members. That, I think, would give us recognition.

Mr. Spear—I think Mr. White's suggestion would be really out of place at this time. The next annual meeting will be before or during the time of the next legislature. Something might be suggested or recommended, that it would be impracticable to fulfill, and I think it might be attended to at the next meeting as well.

Mr. White—This is all right, Mr. Chairman, I did not mean that we make a recommendation now, but simply meant at the proper time.

Mr. Osborn—Mr. DeWeese wrote the secretary, that two members of his family being sick, it would be impossible for him to attend, but he sent a paper.

PROFITABLE ORCHARDS.

(By Dall DeWeese.)

Among the numerous letters that reaches our desk, many ask the question, "What Shall I Plant for a Profitable Orchard?" This is a difficult question to answer. In short, our advice is rendered almost entirely on the locality in which the inquirer lives. In this mountainous country of Colorado, the conditions are so varied as to soil, climate, etc., that a difference in varieties are required for one side of the range to the other, although the altitude may be the same. For example we will take the peach. Almost invariably, regardless of variety, this fruit is better adapted and is more profitable to the lower valleys of western Colorado than it is to localities of the same altitude in eastern Colorado. This is also the case with some varieties of plums, cherries and grapes. The cause is more largely due to more extreme exposure or isolated locations than it is to altitude or soil. However, this is by no means infallible with other fruits, for as a general rule, when peaches and some more foreign fruits succeed best, apples are not so well adapted. I have seen this fully demonstrated in the leading fruit sections of our country; namely, in Colorado, southern Illinois, southern Tennessee, southern Michigan, southern Missouri and Arkansas, northern Alabama and Georgia, Maryland, eastern Pennsylvania, Delaware, New York and in the Cornwallis valley of Nova Scotia. It is also the case with California.

In my former observation before coming to Colorado and my eleven years experience here has led me to fully believe that we have the best apple country in the world. At our great Columbian Exposition the decision of competent judges were that Colorado apples had no peer as to size, quality and color. Our state has proven to be a natural home of this fruit

and could make herself rich in a commercial way by growing this product alone. While the apple is so well adapted, I further believe that there is no state affording so great advantages in varied altitudes, soils and conditions for the successful cultivation of so great a number of fruits as our Colorado. This is no longer a question but a demonstrated cold fact.

Many of our profitable orchards to-day are the results of good guessing, for our early pioneers had nothing to guide them in the selection of varieties, for these treeless and uninviting localities which they had selected for their plant, save what little knowledge they brought with them from their eastern homes, yet they had faith and ventured. Many thanks and great praise are due them for their persistent efforts, that has justly made many of them independent and blazed the trail through barren horticulture that has made it more easy by their success or failure for us to start right.

To have a profitable orchard, first decide what you want to grow, then go to the locality where that fruit has proven most successful.

Several sections of our state have proven admirably adapted to both standard and small fruits. This is indeed a great condition and advantage to the general fruit growers for many reasons. First, he selects his location on gradual sloping ground with best of water privileges, the soil consisting of good sandy loam or black loam, with heavy clay subsoil. Without natural subirrigation, the apple trees can be planted 28 or 30 feet each way or 24 by 36 feet, and a pear, cherry, plum or peach planted between the apple trees in the 36 foot space; then raspberries, blackberries, gooseberries and currants can be planted between the trees in the rows, as they require about the same irrigation; then strawberries can be planted in rows 4 feet apart between the tree rows. Some will say, oh, that means a ragged looking orchard. It does if the trees and bushes are never trimmed and were planted with no order or system. I can show you 75

acres of my orchard planted in this way, which compares favorably with orchards planted otherwise, while the planters should have an eye open to the respectable and inviting appearance of his orchard. It is the profitable feature we are after. An orchard planted as described commences at once to be remunerative; the cost of cultivation and irrigation of the small fruit is comparatively nothing, for the man who attempts to grow his orchard without cultivation or irrigation, every foot of it, makes the fatal mistake that is most general.

Some of our more able and worthy members have papers on the care of the orchard, therefore I will not dwell on that, only in passing will say, after the right selection of location and varieties are made, everything thereafter to attain success, depends on the judicious pruning, irrigation, after culture and intelligent management of the orchard, in every one of the minor details. On the other hand, your location may be right, soil the best, growth superb, management excellent, everything looks fine, but your orchard is not profitable, and you discover after all these years you have made the mistake of planting unprofitable varieties, simply because you were persuaded to believe by some one not acquainted with our varied conditions that this and that was just the thing. I say to the amateur planters, that demonstrated facts of others' experience are such to-day that you need not make this second greatest mistake. It is not presumed, however, that the orchard described above is the only profitable method of planting. All things being equal, location, soil, varieties and management of any of our standard or small fruits are profitable, separate as well as in combination, and will mention a few orchards in this vicinity as proof. The 10-acre combination orchard of Mr. W. B. Felton, planted 12 years ago, has produced $24,000, the net profit last year being $5,000. Mr. J. H. Harrison's apple orchard, consisting of 14 acres, planted 11 years ago, has produced $16,000 net profit; last year, $5,300. Mr. G. W. McRay has sold $1,200 from 1 acre of grapes.

Mr. J. H. Martin and H. B. Ready last season sold $3,400 from 9 acres of strawberries. My home patch of berries yielded me $360 per acre. There are many other orchards throughout our state that have equally as good records. Isn't this good enough? What more is the ambitious fruit grower looking for, and where will capitalists find better securities for profitable investments? Some cry over-production. This is absurd. If every available acre in Colorado suited to fruit culture, were planted to commercial varieties, its product would find a profitable market. We must remember that hundreds of square miles of our once favored east are failing, and that our state sends from its borders over $1,000,000 annually for green fruits; we should keep this money at home, and can do it by planting trees. I predict that in the near future horticulture will be second to no other industry in favored Colorado.

DISCUSSION.

Mr. Grimes—There are a few things in that paper, while in the main it is correct, that should be discussed. The idea of planting other fruits in the orchard, while it is all right for the southwest, it would be disastrous in the northern part to plant either strawberries or raspberries in the orchard. While it might do for two or three years, it would not do for a longer time, as we have to cover up, north, which requires deep ploughing and deep shoveling, and as the roots get large, I think the destruction of the roots would be disastrous to the trees, and I think also that the rubbish that would accumulate from the dead canes etc., would make a harbor for insects. I have planted strawberries and other small fruits in the orchard, but have gotten rid of them now.

The matter of profit in the orchard, referring to Judge Felton's orchard, I think is an unfair comparison to make. The conclusion that we would draw from that is, that anyone having an orchard, would receive a like reward from it, which I think is not the case.

W. W. Wilmore—I know some years ago, I was requested to make a statement as to a crop of strawberries that I took from two acres; it amounted to to nearly $1,800, and it went the rounds of the papers, which I think was very unfair. Yet I made the statement under protest, as it was a phenomenal crop, as many of my neighbors had nothing. Many people after that thought that by planting a few acres of strawberries they could do the same thing; but instead of getting $1,800 from two acres this past season, they were lucky if they got $18; many of them would have been glad if they could have gotten out even. The largest and best planting was done by Charlie Combs; he is a man very careful about his cultivation, manuring, etc., and he told me that of the 9 acres he marketed, he was $1,000 short of paying his expenses. I do not doubt his statement, as he is a very conservative man.

Again, I had a crop of two or three acres, and figuring everything exactly, if I counted my time out, I came out even. If I counted my time as being worth anything, I lost money. It is a class of fruit that won't bear handling, and for this reason—we cannot reach a very distant market.

Mr. DeVinney—I approve of everything that Mr. Wilmore says.

Mr. Steele—Circumstances alter cases, and in some cases, I could readily see how, where a party has only a few acres of land, it would not only be advisable, but profitable to grow mixed fruit in an orchard. I think the most profitable ten acres of land in the state of Colorado, considernig its horticultural production, is ten acres owned by Robert Orr on Fruit Ridge, near Grand Junction, and Mr. Orr is growing among his trees, strawberries, raspberries, pie plant and vegetables. In fact he gives it intense cultivation, and while I say that his land has produced more in horticulture than any other ten acres in the state, yet I do not think Mr. Orr would recommend that method. There are several objections that

he has found. It is very exhaustive to the soil, and in addition to that, last year he found that the grasshoppers bothered him more than they did his neighbors, his orchard was so thick with this underbrush that he could not do anything for them; they had so many places to hide, that he found his little plot of ground was a breeding place for them. As long as his trees were small, strawberries were profitable, but now that his trees are growing larger, the culminating point of profitable production has been reached, and from now on, they will yield less and less each year. The quality of the fruit grown on the trees is inferior, and he is considering already the advisability of digging them up and throwing them away, and I say the only exception that I would make to having one class and one variety of fruit in sections, is where a man has a very small plot.

I do not believe in planting peach and apple together, plum and peach together, etc., but plant them in sections by themselves. I do not believe in mixing classes, but I do believe in mixing varieties of the same class, because you will find that most classes of fruit of different varieties do better in order to come at the advantage of cross fertilization; but to mix the different classes has not proven satisfactory at all, but where a man has only two or three acres, it is different.

Mr. Brothers—We saw Mr. Orr's orchard last year; he has a nice one, and he is a hard worker, and as Mr. Steele says, has made a great deal of money out of it, but he says his trees are getting so now that he will have to remove some of them, and of course where a man has only four or five acres and is poor, he wants to get all he can out of it.

I started in planting this way, four or five years ago, and I found I was very foolish; a man who has as much land as I have, to get all these things in, is absurd. I will say that Mr. DeWeese is a fruit man and sells trees. He has one of the best nurseries I ever saw anywhere, and kept in the best shape, I be-

lieve without exception for a nursery, as old as his is; but I must say these figures he has in there are enormous, they cannot be put into practical operation. Nine out of ten men who start in on that line won't make the same amount of money out of the same ground, and I hope we will make allowance for these big figures and not go into anything that is unreasonable. This meeting is not for that purpose; it is to give us good practical knowledge of what we can do and get a living at, and these extraordinary figures, I hope, will not lead these young men away and make them think they can make the same amount of money on the same number of acres, especially during the present depression.

I do believe, however, that Colorado is good enough, and I believe that with all these hard times we are as well off in Colorado, as they are anywhere in the United States to-day.

Mr. Daniels—If we cannot all get to the top of ladder, it is a good plan to get as near to it as we can; if these figures are large, they should not be ignored by any one. We do not think a man should come here and tell his worst failures; he is quite apt to tell the best story he can on his side, and while we may not get three thousands of dollars per acre, let us get what we can. Suppose we can get $300 or $500; that is the best business in Colorado to-day. We should not be discouraged if we all do not get these figures. We should by all means try and get as near a crop as we can, and if we can get $300 or $500, let us do that.

As far as mixing varieties is concerned, all of us have a large amount of land, and if we can get along and make a living until our tree fruit bears, we can put in smaller fruit to fill in with. As a commercial orchard, it is not desirable in my opinion.

Mr. Brothers—I will say that I can tell as big a story as any one. Ten years ago I got five barrels per tree from three trees, and I got $5 per barrel, and these trees stood 16 feet apart.

I want to say that in Judge Felton's orchard, his trees are 18 feet apart, I think. Judge Felton to-day is thinning his trees. He is compelled to do it. He is cutting every other one out.

CULTIVATION OF THE ORCHARD.

(Paper by O. D. Shields.)

The subject of after cultivation covers one of vast importance and is one upon which we can not be too well informed. Colorado people are becoming awakened to the fact that we are not dependent upon gold and silver alone, but have more sure and profitable mines in growing fruits. But, says one man, that will soon be overdone. Let me assure such a man that the day when fruit growing in Colorado will cease to pay is a long way in the future. But as to cultivation: No fixed rules can be applied, as the difference in soils is so great that what would benefit one orchard might injure another. Rest assured, however, that for the first two or three years no one can go amiss by too frequent cultivation, but we can go amiss by too much water, and especially if the soil should be of the clayey or adobe nature, and I take the ground that as many trees are killed by too much water as from the lack of it. The past season I had a block of two-year-old apple trees which I irrigated but twice during the summer, but gave frequent cultivation. I never saw a finer or healthier growth, many of the trees having now one inch stem and being six feet high. Heretofore I have irrigated at least five or six times during the summer and we all know that last sesaon was extremely dry. I think that in ordinary seasons, in ground not too sandy, that good success may be obtained with only one irrigation, provided the soil is stirred with a shallow cultivator, say to a depth of three inches, not less than three times a month on an average. This rule would not apply to ground of a dry, sandy nature, which should be watered more frequently, say at least once every three weeks. Another great aid to after-cultivation and success is, in all stiff

soils, to thoroughly sub-soil the orchard before planting. To illustrate: A certain farmer in Larimer county complained to me that he had no success with trees. He had bought eastern trees and Colorado trees, and had spent a great deal of money with no success. He claimed that the soil was all right and that he planted carefully, and intimated that it was the fault of the trees, thus giving the much-abused nursery-man a dig. I told him that I would go out to his place and see if I could find out where the trouble lay. Selecting a tree that was dead, we dug it out, and it only took a glance to show where the trouble was. His soil was a stiff adobe and he had dug holes about fifteen inches deep and eighteen inches in diameter. The roots had commenced to grow but were butted up against this hard wall, and finding it impenetrable had lingered along a couple of years, and had then given up the ghost. I told him that the only way for him to grow trees in that soil was to dig his holes not less than two and one-half feet deep and four feet in diameter, then to go down on the bottoms and haul up some sandy loam and mix with this adobe soil and plant again. Then he would be successful, as by the time the roots reached the hard walls they would have vitality sufficient to penetrate them. This was three years ago, and he has to-day as healthy and thrifty a lot of trees as can be found anywhere. Unless the trees are properly planted no amount of cultivation will make them a perfect success. I think that after orchards have grown and produce fruits they should be seeded down to clover or bluegrass. Another great aid to successful fruit raising, is a good windbreak, which should be planted when the orchard is set or a year before. I think that the three best trees for the purpose are the Russian Mammoth willow, Carolina and Lombardy poplars. I do not believe in heavy pruning of bearing trees, as my observation has been that those who prune severely have not met with as good results as those who have pruned moderately or not at all. Better results can be obtained by a judicious thinning

of fruit. I believe that ashes, either coal or wood, scattered under trees is a help, and I see that some horticulturists advise the use of salt also. I well remember a pear tree at my old home in Ohio, under which we used to dump the ash-pan quite frequently. There were perhaps two feet of coal and wood ashes for a distance underneath it. I never remember a failure, but the tree was always loaded, while others near frequently missed entirely. Trees of the same variety and age were not half as large as this one. The point that I wish to draw is this: Heavy pruning of mature trees must necessarily give them a shock from which they must struggle hard to maintain their vitality, and this struggle is often more than they can stand and they die much the same as does a human being while undergoing a severe surgical operation. The best time to prune is to pinch back new wood in the growing season, and this is advisable principally in shaping the character and in beautifying the tree.

Mr. Coburn—In view of the fact that we have so many papers before us this afternoon, would it not be well to call the meeting at 1:30 instead of 2?

Mr. Osborn—We could then hear Mr. Spears' paper before 2 o'clock. I am in favor of it.

Mr. Grimes—Would that be treating Mr. Spears fairly?

Mr. Brothers—Would it not be better to extend the meeting a half-hour?

Mr. Osborn—If no objection, we will hear Mr. Spears' paper after lunch.

Mr. Spears—I have no objection.

Mr. DeVinney—I move that we adjourn, and that we meet again at 1:30 p. m.

Carried.

Recess until 1:30 p. m.

AFTERNOON SESSION.

January 11, 1894.

Mr. Osborn—We will now hear the paper on "The Apple," by Mr. George J. Spears, of Greeley.

THE APPLE.

The apple is the first fruit of importance, and the only fruit we can have in a fresh state every day in the year; some varieties keeping not only until early ones ripen, but from twelve to fifteen months, if care is taken in selecting, handling, picking and packing, and keeping in cool places. In history we have no older fruit, and none that can be put to more uses. None that, if properly used in reasonable quantities, will cheat the doctor out of more of his business.

If we would devote more time to the study of horticulture, and not depend wholly on our own knowledge, reading more thoroughly and being able to profit by the experience of others, not only of others' success but of their failures, it would be better than to have to pay as dearly as we often do for new ideas that are old to those of more experience, or that have tried to accomplish that which we desire, and which would enable us to begin where they left off.

Show me a family that has plenty of apples, and perhaps I had better include fruit, and I will show you healthy, robust, rosy-cheeked children as one could ask to see. We can live longer on a bushel of apples than the millionaire can on a bushel of dollars. Who has ever heard of good, well ripened fruit being excluded from the sick room. The old proverb that I have heard ever since I can remember is equally as true to-day:

Eat an apple before going to bed,
And the doctor will have to beg his bread.

When the Great Architect created the universe, and looked upon his handiwork, and saw it was very good, he peopled the seas with fish, the air with birds,

and the land with beasts, and formed man after his own image to rule them all. He placed in the garden of Eden every fruit bearing seed of its own kind and gave to man the labor of love to dress the trees and eat the fruit, making him, the first man, a nurseryman.

When tempted by the beauty of the forbidden apple, he ate and was banished from the garden; but he carried with him the taste and inclination for fruit culture. As a punishment for his disobedience in eating from the forbidden tree, the apple stuck in his throat, and this mark has followed all of his posterity to this day. As fruit was his only and sufficient food in Eden, so it is his best and healthiest diet yet, and he who makes "two trees grow and bear fruit where one grew before, is a much greater benefactor than he who makes two blades of grass grow where one grew before."

To be successful in the cultivation of apples, and to have a nice orchard, some consideration must be given to location and surroundings. An elevated location is necessary. There is no place that I have been able to find where they can grow apples successfully on river bottoms, or in low, seepy land, especially where the drainage is poor. An elevated location with good natural drainage and good atmospheric drainage, and properly protected against the south and east winds, a wind break on the north and west will be beneficial, but not one-half as much as on the other two sides, and with reasonable attention, any one can raise apples as successfully as wheat or potatoes.

When I say any one, I mean any one who will give it some thorough and practical study. While there are in any location some so-called farmers who have not ambition enough to plant a tree if it were prepared and a hole dug, I do not believe we have many in Colorado that are lacking a reasonable amount of brains. But, should there be, I would suggest that they eat plenty of this best of all "brain

foods," and next year they will be in comfortable shape to plant a few trees, and for the beginner, I should advise him to plant only the hardiest varieties that are freest from blight.

Perhaps the greatest cause of failure is with that class of people that never patronize their home nurseries, but invariably buy of the agent that comes along representing that only "blown-in-the-glass died-in-the-wool" nursery, whose location was established "B C." or about that time. They are the only concerns that produce trees that do not blight, winter kill or spring scald; their trees are only propagated by the "Old Oak" process, and as hard to kill by abuse as the box elder, are guaranteed to live two years, and theirs are the only trees that were ever known to live twice the allotted age of man, etc.

Because an elevated location, protected from the south and east winds is preferable, I would not advise an elevated, cold, bleak location, but would take it in preference to river bottoms, or near swampy or seepy lands.

Atmospheric, as well as underground drainage, is necessary. There is often a degree of difference in four feet of elevation, the cold air setting into the ravines and low lands, while the warm air rising prevents a frost in the higher locations. When there is frost in these places, sixty feet away it often escapes, especially if there is from 8 to 12 feet of elevation. Our damp, cold winds, coming as they do from the south or east, (and we usually have more or less of them every spring), prevent pollenization; the bees do not work, therefore, by all means have a good wind break on these sides.

A peculiarity of the apple is the variety of uses to which it may be put. Both in its fresh state, and canned there is an enormous demand here and abroad, and the quantity of evaporated apples consumed is astonishing, the figures reaching millions of pounds annually.

Not only the best, but the poorest quality is sliced, the water evaporated, and the product is packed for exportation to France and other countries, where it is manufactered into cider and apple brandy. Then again, the apple is being more extensively used for distilling purposes. Its richness in sugar, and its easy convertibility into alcohol, together with the excellent quality and bouquet of the product, renders it especially valuable and desirable for blending purposes. A profitable business a thousand times the present volume, could be done in this direction.

Any consolidation for the manufacture of alcohol, or the advance of the prices thereof, must inure largely to the advantage of the distillers of apple brandy. Fully one-half of the dried fruit exported to France is used for this purpose, and it has made the base of a very profitable industry to French manufactures.

All of these things are of great interest to growers and a direct interest to growers of nursery stock and to dealers. I might go further, and allude to their use in manufacturing jelly. Who would not give more for a tumbler of apple jelly than for a gallon of the factory glucose preparation called jelly.

I believe that a young orchard should be planted thick in the rows, and have the rows run north and south. In this way they will be prevented from sun scald while young. When they get too crowded, every other one can be cut out, and those cut down will have paid for the whole orchard, and no one need fear of producing more apples than there will be a demand for, and at good prices, if he sprays and grades carefully.

In New England, the orchards are practically played out, although in some sections there are yet good orchards, very few new ones being planted. Last summer I traveled over Vermont, New Hampshire, Massachusetts and Connecticut, and did not see a dozen newly-planted orchards of apple trees; but of pears it was different in Massachusetts and Connec-

ticut. It is true, I saw but little of these immense territories, those states being almost as large as some of our counties, but what I did see was with the eyes of a tree man watching for young apple trees and young orchards as none but tree men will, and if this was not the case in a great sweeping rule, I surely would have seen some exceptions worthy of notice.

When one considers the enormous amount of apples shipped every year to European countries, where they tell us that we can't raise apples, that all they have to do is to stick a sprig in the ground and it will grow and soon bear fine crops, far better than we can raise, yet every year we are bombarding them with shipload after shipload of western apples. The fall of 1891, Nebraska shipped over a million barrels of apples to England alone. When all these facts are considered, can we longer neglect planting apples? I understand that Judge Felton sold from a five acre apple orchard, $5,800 worth, and I would like to see the 500 acres of wheat that has yielded as much profit as this five acres of apples. It is in rare instances that Greeley's famous potatoes can make any such showing from 80 acres with spuds at $1.25.

For those who have none of the more desirable locations, I would advise putting a flat stone, piece of zinc or a joint of old stove pipe at the bottom of the hole to prevent the tree from sending down a tap root. This is not an expensive experiment, and orchards have been grown this way where they were unsuccessful before.

DISCUSSION.

The President—Is there any discussion on Mr. Spears' paper?

Mr. Grimes—In delaying discussion on this paper, it seems to me that we are not only doing ourselves an injustice, but we are also doing an injustice to those who have prepared these valuable papers. In my experience in matters of this kind, the most val-

uable part is the discussion that follows, and if I had the honor of reading a paper here, and it was passed without discussion, I would feel very badly. It has been the rule heretofore, if the owners of the papers were not present, to pass them by for the time being, and if there were others present, to request them to read their papers. In the last three papers read, they seemed to be connecting links, one between the other; they seem inseparable and seem to cover the same ground.

A few years ago, perhaps three years, I had the pleasure of receiving a bulletin from the State Agricultural college, on fruit growing in Colorado. This had been carefully compiled from reports sent from all parts of Colorado, and I discovered that there were about three thousand standard varieties of fruit grown in the state; and right there is the key to the lack of success. It is in planting too many varieties of fruit. How many people depend upon the recommendation of the salesman? Or they will take a catalogue and take one or two varieties of fruit of each kind, and then they have an orchard of fruit of mixed kinds that they cannot dispose of, that they cannot keep together and that is unprofitable. The most profitable orchard in New York, or in fact anywhere in the United States, is an orchard of a few standard varieties.

There are a great many people in horticulture that I do not know, but they resemble the churches. I do not know but what we have the Methodist in horticulture. They get very enthusiastic over just such reports as we heard to-day. They want to be horticulturists; they want to get rich over it. They plant with a great deal of enthusiasm, but in a short time they get tired of it, and everything goes to grass. Yet I would be a Methodist in horticulture in a certain respect. I believe it is the best occupation on earth. If I made a mistake I would correct that mistake; I would attend these "Love Feasts" and get my strength to renew my efforts.

I would not be a Baptist and swamp my trees with water, neither would I be a Presbyterian, and let them dry up for want of it; but would try to be consistent in everything. If I made a mistake, it does not stand to reason that fruit culture is a mistake. I have learned more from men's mistakes than I have from their successes.

I would like to see in our meeting this evening, some discussion on the papers already read; we have had some very valuable ones.

Mr. DeVinney—It seems that papers have been rushed on to the time so much, that we have not had time to discuss them. I agree with the gentleman who has just addressed you, that one of the chief things is to know the sentiment of the different members of this body. It is not an individual man's opinion in planting a certain kind of tree, or his success in his locality, but what is the general success as represented and presented here by a majority of those present. What we want to get at, is the truth of these things; but how will we do it if the papers are going to take up the whole of the afternoon.

Mr. Osborn—We will give a limited time to each paper. We do not want to cut off any debate; that is not our intention. There are some papers that are more interesting than others, and it might bring out the idea in the minds of some one that he wants a little further information. I have no disposition whatever, and we have shown none so far, that we will cut off any debate.

CHANGE OF SUBJECT.

If there is nothing further on this question, I will make a suggestion here, and I do not know but what this is a good time. We have a gentleman here from Kansas, who will address us a few minutes; he cannot talk long, and I for one would like to hear from him.

Inasmuch as our "Question Box" comes five times this meeting, we will have a chance to ask all

the questions we want, and if agreeable, I would suggest that we hear from this gentleman; he is here now. Not that I want to take up anybody's time, but we would like to hear from strangers.

Mr. Coburn—Let us hear from him?

Mr. M. L. Thompson, of the Missouri Valley Horticultural Society was then introduced, and spoke as follows:

Mr. President, Ladies and Gentlemen—When a stranger comes before you, just as I do this afternoon, one of the first things that is expected of him is that he make some flowery remarks to the audience before whom he appears. I am too old a man rather, for such business, and so you will excuse me. Yet, I might remark in another sense, that whenever I am in the presence of horticulturists, no matter where they are, I feel that I am in the presence of those who outrank any other employment that God has ever allotted to man. (Applause.)

It is supposed that we ought to have respect for certain persons' characters, and we certainly must respect the Great Architect of our Universe—our Creator—from the fact that the very first employment that he gave to man was in the horticultural line, and hence, I always feel that when I am in the presence of horticulturists, I am in the presence of those who outrank all other employment that mankind has ever been engaged in.

Let me say one thing further: I am a member of the Missouri Valley Horticultural Society; its center is Kansas City, Missouri, and it embraces among its members, horticulturists from both the states of Kansas and Missouri, that society has been in existence for 26 years, and it is one of the most important societies in the whole nation. Its president, J. C. Evans, president of this local society, I mean, is also president of the state society. Its secretary, L. A. Goodman, is one of the most intelligent horticulturists we have in the United States, and you people who are familiar with the Missouri horticultural reports,

will find that they have been carefully prepared by him, and they are the most creditable products that emanate from horticulturists anywhere in the nation. These gentlemen are recognized authorities.

I am not a representative man of that society; I am a listener among them, and when I listen to people of that character who give out their ideas on insects, insecticides, etc., I listen to men who understand the thing from "A to Izzard," and so on, all authorities. Mr. Aspinwall is an authority on stone fruits, and when he says anything, we are well persuaded that it is of the most profitable nature, and profitable to those who listen.

We have our meetings every third Saturday, year in and year out, from the 1st of May to the 1st of November. These are held on the open lawns, at the residences of the different members of the society, and they are interesting, every meeting represented by from 100 to 150, and we bring out the articles that are prepared, and that are authoritative on every subject. These articles are written by gentlemen that are perfectly able to write them, are thorough investigators on all these points. They are written by ladies who are well prepared for their duties. We have among us, graduates of Vassar and of other celebrated institutes of the country, and these articles, all interesting, are published from time to time. I am glad to be associated with such people, and I wish to say that if ever you are in the neighborhood of Kansas City on the third Saturday of any month, and make inquiry for our society, you will find a place where you will be most cordially welcomed, and be well instructed at the same time.

In conclusion I will say that I am more than glad to be with you. I take an interest in these articles, and I am in Colorado myself with the expectation that I may become a member of this scoiety; that I may become a fruit grower, as I am in my own home in Kansas City, and I am sure that after a residence of eight or nine weeks, I am sure that I will find

society in Colorado that will be congenial, and with whom I may become associated from time to time.

In Kansas, the men there are the parties who have gone to the legislature, and have decided that women were intelligent enough to vote in the school districts, but you men in Colorado, have decided that they are intelligent enough to stand side by side with you in any question. (Applause.)

PLUMS FOR PROFIT.

Paper by Hon. J. S. McClelland.

The many wild plums of our foot-hills, mountains and valleys, indicate not only that this is the natural home of the plum, but also indicates to us the species best adapted to the climate, the locations most suited to their growth and the conditions of moisture under which they thrive most luxuriantly.

A careless pot hunter may gather bushels of most magnificent fruit without noticing the conditions under which it has been produced, but not so the experienced fruit grower. At a glance the latter will take in the conditions of soil, exposure, protection, moisture and distance apart of the trees producing the best results. From these careful observations made at each plum patch he visits, he will learn many of the secrets of successful plum culture. He will not have failed to notice that among the most successful conditions are a rich alluvial soil, constant moisture and close planting. Under these conditions he will find the largest and finest fruit, and the most heavily laden trees. In our plum orchards it is well to remember these observations and to follow them closely as may be. This will give us an intelligent basis for our experiments. There are three great families of plums which comprise most of the trees planted for fruit.

First—There is Prunus Domestica, a native of Europe. Of this class are all the California plums. Not quite hardy in northern Colorado, and the fruit

buds are apt to be killed in winter. Fruit generally purple or blue in color.

Second—P. Chicasa, the Chicasaw plum. This is a red plum; the branches of trees are generally fine and small and the leaves small and finely cut. An American plum, but not hardy in the northern part of the state.

Third—P. Americana. This class comprises nearly all the hardy plums of this state, including our wild, indigenous species. There are some crosses of the Myrobolon and other species, but practically nearly all can be placed in one of these three general classes.

For profit, I find the red plum far ahead; and of these, the American class is much the more promising. From my own experience, I describe the following varities as doing best with me:

Wolf—A free stone of large size, bearing heavy crops of handsome fruit. Excellent for cooking and sells readily at good prices.

De Soto—A very handsome plum of medium size and excellent quality for eating out of hand. Too heavy a bearer is the greatest fault of this variety.

Forest Garden—Very early, of medium size and of good quality. When over-ripe will shrivel slightly and is then almost as sweet as honey. A heavy annual bearer. One year ago I took six dollars' worth off one small tree, and four dollars' worth the past year.

Weaver—A large free-stone plum of excellent quality and good keeper. The flesh is very dry and it preserves most excellently. Tree is fair bearer, but in very severe winters the fruit buds will sometimes all kill.

The latest of all is the Old Miner, which still ripens after the first frosts of autumn. Tree is a good grower, very robust and vigorous. The fruit does not ripen evenly, but is so solid that you can shake them off the tree without injury, and thus get the ripest. The fruit is dark red, and very handsome. There is no

plum sells more readily nor for a larger price than this. I might describe many more varieties, but these with me are the plums for profit. We have the entire market for these red varieties, and they are the only ones of which jelly and the finer preserves can be made. Some other varieties are perhaps equal or better for table use, but as we have to compete with the California grown fruit for this purpose, prices are apt to be lower.

Of all the Domestica or European species, the Lombard seems to be the hardiest in tree and fruit bud, though there are many that are much superior in flavor and richness of juice. A severe winter, however, is apt to kill all the fruit buds. For profit there can be little doubt that the Wolf, Weaver, De Soto, Forest Garden, the common wild plums and a few others of this class of native fruit will furnish the grower more dollars and more satisfaction than triple the acreage of any other kinds.

DISCUSSION.

Mr. Steele—I think Mr. McClelland has described the conditions of plum culture on his side of the range, but his remarks would not apply to the west side. He has omitted entirely the varieties we put at the head of the list. Among red plums, there are none that will give better satisfaction to the grower than the Wild Goose. We are placing the Wild Goose at the read of the list, and yet I have found in canvassing different sections of the state last week, that Wild Goose plum culture is very limited. It is limited to Mesa, Delta and perhaps a small portion of Montrose county.

I agree with Mr. McClelland, that the red plum is the most paying one for us to grow.

When I first commenced plum culture, I got me the plums ripening first; the Green and the Imperial Gage, I thought I would be able to get 30 per cent. more, but to my surprise, I found that I had to quote

them at the same price, and then I could sell ten boxes of red plums where I could sell one box of Green Gage.

After these better varieties of red plums for profit comes in the Blue Damson, the most salable of this class of plums, and has a demand almost equal to the red plum. Their principal advantage is this, that they ripen late, they ripen for the miner, they are hardly good for use until the frost comes, and I think it will be years before we can raise enough to supply the demand from the surrounding camps.

Of the European varieties, we have some that I think can be raised successfully in this climate and do well. I have an orchard set out last year. I put 400 trees per acre, some trees produced as low as 50 cents perhaps, but the average of the acre was $600. There were quite a variety of red plums, and some Japanese varieties. These Japanese varieties are now getting to be very popular with horticulturists, some of them are very large, the Filgun (?) especially. The Satsuma also is very large, blood red flesh, very small seed, seems to take well in the market, but none of them will compare in profit with the red plum, unless it is the Damson, because the ladies all seem to want the red plum to put up for jelly.

Mr. Brothers—How big is the Wolf plum?

Mr. Steele—That is pretty hard to outline. Are you acquainted with the De Soto or the Weaver?

Mr. Brothers—I am acquainted with the Weaver.

Mr. Steele—Well, it is about the same size.

Mr, DeVinney—Which of these varieties is the earliest?

Mr. McClelland—The Forest Garden.

Mr. Steele—I would like to ask particularly about that Forest Garden plum. In my orchard I have allowed the trees to kill themselves in over bearing, they commenced bearing when they were two feet high. I have known in the neighborhood of 100 plums on a very small tree, consequently when they

bear so full, they make but very little growth, and I believe if I allow that condition to continue, the tree will die.

Mr. McClelland—You will remember in the article, I stated that I took $6.00 from my tree a year ago, and $4.00 the next year. The plum that bears that way every year, will not last long.

Mr. Steele—How long will they last?

Mr. McClelland—About seven years. There are several disadvantages to the Forest Garden; in the first place, the plums are not large enough, the ladies will call them all wild plums. But the greatest disadvantage is that the trees grow in such a shape that the limbs break down. They have to be trimmed very carefully. Those acquainted with the apple tree, will know that in the ordinary varieties, it is very difficult to split off a limb, while in the case of the plum, the limb breaks off itself.

Mr. Brothers—How many trees does Mr. McClelland put on an acre?

Mr. McClelland—I put them 12 feet apart, 308 or 310 to the acre.

Mr. Brothers—Twelve both ways?

Mr. McClelland—Yes. I have noticed the plum patches in the hills, that they were very close together. One thing I did not say in the paper is this: The more varieties you plant, the more fruit you have. It is absolutely necessary, especially the Old Miner, to have other kinds of plums near it.

Mr. Spears—I think that heading back the plums when the trees are young will make these branches stand.

Mrs. Wright—I would like to ask a question, and it is: Is there any way of preventing the killing of the buds by frost? This seems to me to be a most important part of plum culture, to save the young buds. In California, I have seen whole families turn out, start a smoke in the orchard, and in a short time entirely destroy the effect of a frost.

Mr. McClelland—The lady misunderstands me. It is not frost, but freezing that does the damage. When the thermometer gets down to 30 or 40 degrees below, all the smoke in creation would not do any good.

Mrs. Wright—I understood that the most dangerous time was when the bud began to grow in the early spring; it was then that I thought that smoking would be of advantage.

Mr. Brothers—I have noticed for a great many years in Denver, where the smoke is, that their fruit is not killed near as much as it is with me on my place, especially plums, and like Mrs. Wright, I know from experience that smoke helps wonderfully in the spring.

Mr. Perrin has tried this experiment in his orchard, but in a large orchard, I do not know how it would work; but in an orchard of say ten acres, a little coal and a few logs of wood will keep a wonderful sight of frost away from the trees.

My experience has been, that the most damage done to my plum and cherry trees has been just before they burst open in the spring. I have cut my buds open many a time in the winter, and they have been nice and green, but along in February, or the beginning of March, just before they burst open, I have found them black. You can easily see at this season of the year whether or not the buds are killed. If there is a little black spot in the middle they are gone, but if they are green, they are all right.

I believe I will try that experiment when I have a good crop of plums. I will try a little smoke.

Mrs. Wright—As I understand it, it requires a very small proportion of smoke to destroy a very large proportion of frost, and where I have seen it done personally, it was with very good results. These sharp seasons of frost do not last over three or four hours.

Mr. McClelland—Speaking about keeping off the frosts in the spring: Three or four years ago (this has reference more particularly to my apple orchard than my plum orchard), I thought I had noticed that when we had a very severe frost when the fruit is in bloom, little or no damage was done; it is only when the bloom is over that the frost kills and the only time. I thought I knew that the frosts came from the north, and in consequence, I would build my smoke to the north, I thought 1,100 barrels would make a good deal of difference for one night's work. I waited until 10 or 11, started my fire, all this time the wind was blowing from the north, when all of a sudden it changed to the south, and blew all the smoke to the other side of the orchard. All the same, it did not make much difference in the crop.

Mr. Brothers—Has Mr. McClelland tried this experiment all through the winter? My fruit buds have always been killed in the early spring, and I think it happens about 3 or 4 o'clock.

Mr. McClelland—You ask how I know that my fruit buds are killed in the winter. I have two Weaver plums near my kitchen door, and when I can go to these trees, and with my hand rub off all the buds, or when I can shake the tree and have half the buds drop off, I know that all the buds are dead, and it is the very severe weather we have about this time of the year that kills them.

Mr. Daniells—I am very much interested in the Japanese plums, and I really feel that it is an acquisition to our plum raisers. I expect to set them out more largely this season, and if anyone has had any experience in regard to Japanese plums, I would be very glad to hear from them in that line. I thought if we could raise the small plums, we could raise the larger ones. I see no reason, from what I have learned, but that the Japanese are as hardy as some of these varieties we are growing on this side of the Continental divide.

I have been so much interested in plum culture, that I have been a frequent visitor to our fruit dealers for the last three or four months, not on account of plums but other kinds of fruit, and I found that the first plums that came into this market of any value, was the Peach Plum, and we have not had any plum that sold for as much as they did, as long as they lasted. Then came on the Bradshaw from Washington, and then the Gros Prune which was very large, larger than the Peach Plum, and these plums seemed to carry the market more than anything else.

Regarding the Wild Goose plum, there was one time that there were so many of them here that they did not know what to do with them; however, it was only for a few days. These other plums have been selling up to perhaps ten days ago. We have been having these plums from Washington and Oregon, and I feel very much interested in this class of fruit, and I am always glad to hear from anyone who will throw any light on the subject.

Mr. Coburn—I think Mr. Daniel is hitting at me when he speaks of Japanese plums. I expect I was the first one who ever started them in Colorado. I got some eight years ago, and the second year after I got them they began to fruit. I have the Boton, the Yellow Boton and the Ogon. The Ogon is the earliest of any of them; it is large, yellow and very prolific, and all horticulturists claim that these Japanese plums are the greatest acquisition to the plum family.

But when we come to "Plums for Profit," I have to agree with Mr. Steele, it is a very tender plum, and I don't think you will have any success with it on this side of the range. I think Mr. McClelland names the best plums for extra hardihood, but I do not think anyone on the western slope will ever regret planting more largely of the Wild Goose and these Japanese plums.

The Peach Plum is a California plum, and is of European origin; it is a very fine plum and a very

early one. It comes in nearly as early as the Ogon, and the Ogon is the earliest plum that I know of.

Mr. DeVinney—Is the Prunus Simoni of any account?

Mr. Coburn—It is a fine grower, but produces very sparingly, and when you do get any fruit from it, it is of little value. I do not think it is of any value whatever.

Mr. Osborn—Has anyone had any experience with the Pond Seedling plum? It has been very highly recommended.

Mr. Coburn—I have the Pond Seedling, or the Hungarian Prune. I think it is the largest plum that grows. It is very prolific, an annual bearer, and with us, very hardy. I understand it was also very prolific out at Littleton last season. Mr. Page was telling me a little while ago, that it was the largest he had ever seen.

Mr. Grimes—I had some very satisfactory experience with the Pond Seedling, in fact it has given me more satisfaction than any plum I have ever tried to raise in Colorado. As before stated, it is hardy, a prolific bearer, and I found it almost entirely free from the curculio. We had a number of these plums on my place, and it was a very difficult matter to keep them from breaking the branches. They will keep for several weeks after being gathered, and being very large, they are very salable.

Mr. Osborn—Is it hardy with you, Mr. Grimes?

Mr. Grimes—Very hardy.

ADDRESS OF PRESIDENT.

Paper by President W. B. Osborn.

(Note—Discussion on this paper embraced in that of "How I Raise Peaches.")

Another twelve months has been measured to us by the wheels of time, and we are now verging into

the dawn of another of bustle and activity. If the past year has been an experimental one with most of us, coupled with the anxiety to improve on the knowledge previously obtained, how much better we, as horticulturists, ought to be qualified to launch out into the future with the new ideas we may be able to obtain from the various topics for discussion that are contained in our very valuable and well arranged programme, for this, our annual meeting.

I may safely say that we are all on the anxious seat, and none of us expect to return from this meeting without being able to say that it has been good for us to have been here.

We are here to get ideas from each other, so as to be able to impart those ideas to others; how to set our house in order to supply that which is lacking, so that the imperfect may bear upon its face so much the aspect of faultlessness that we may indeed be gratified; that we may be instrumental in calling forth the undeveloped and hidden powers of nature, and by the touch of the horticulturist's magic hand, we may be able, by the assistance of nature's hand, to develop the undeveloped, a treasure from the hidden treasure that lies dormant in nature, and springs into new life and beauty.

Undoubtedly the planning for the future is already interwoven within the minds of many of us, and we have all resolved and re-resolved, to enter into the new fruit season, well armed and equipped to war with the great army of insects and fruit pests which are so rapidly making great inroads upon us.

It was through the orchard bill, introduced by Representative Page, of Mesa county, and passed March 20, 1893, and approved by Governor Waite, April 5, that the State Board of Horticulture was created, which took the place of the State Bureau of Horticulture and Forestry.

The main object of this bill is fully explained in section 4, where it says: "for the purpose of preventing the spread of contagious diseases among fruit

and fruit trees, and for the preventive, treatment, cure and extirpation of fruit pests."

For the purpose more particularly of carrying out the provisions of this act, the State Board of Horticulture made two distinct tours of inspection in different fruit growing districts of the state.

On the 23rd day of May last, four of the board left Denver for Grand Junction, Montrose and Delta. Here we met the balance of the board who accompanied us. At each of the above places we visited many orchards. From Delta we took the train for Durango, arriving there late Saturday night. Monday we visited many orchards in the valley of the Animas river. Here we found as large, or larger, sized apple and cherry trees as we found west of the range, at an altitude of 6,800 feet, comparatively free from insects.

Tuesday we left for Canon City; there we visited many orchards and nurseries. From Canon City we proceeded on to Florence, where we visited the splendid orchard of Uncle Jesse Frazer, which contains some of the largest as well as the oldest trees in the state. The tips of some of the branches were 31 feet from the trunk, making 62 feet from tip to tip of the branches. Under the branches of the trees we could travel and wander around—scarcely seeing the sunlight.

From Florence we went directly to Rocky Ford, and there remained one day. We found at this locality as fine and healthy looking fruit trees and nursery stock as we found anywhere in our journeyings. From here we left for Denver, and upon our arrival there, we concluded we would visit the Stark Brothers' orchards at Littleton, and here we found the finest cultivated and cleanest orchard, healthy looking trees, fine growth, as is to be found anywhere in the state. Cultivation substituted for irrigation as an experiment, in this orchard, has proved a success. A few of the State Board of Horticulture, in company with

Prof. Brown, visited the orchard of David Brothers and Henry Lee on Wheat Ridge, in Jefferson county, one day prior to our departure on the above tour of inspection. The profesor taught us more that day, what, where and how to find the insects, than we ever knew before, and we felt much better equipped than we otherwise would have been for the journey we were about to take.

On an on! The state board met again, November 15 at Boulder city, spent one day there visiting orchards and fruit gardens, and in the evening had a very interesting meeting, discussing various topics relative to the fruit insects of the state, and more particularly to this immediate locality. Further, we have visited other fruit districts in the northern part of the state, holding meetings every evening for discussion. While our visits have been very successful, when all points are considered, I feel in many respects wherein, during the coming year, great improvements can be gained. To the lack of enthusiasm among many of the fruit growers do I credit what might appear to many, the unsuccessful results of some of these visits and I think that a word or two here on the condition of affairs might not be amiss. I believe there is too great a desire in the minds of many to stand alone in the matter of fruit culture. That is to say, a lack of organization in every locality of the state, and it is only through a determined organization that we may hope to achieve better results in horticulture, so strongly desired.

On and on! I would not have it understood by this that we have, at any place we visited, been treated discourteously or coolly. On the contrary, at every point we have met with most generous and hospitable civility by those generally interested in horticulture. But aside from those most interested we have failed to note that idea which should always and everywhere prevail: In unity there is strength.

A general may be a good commanding officer, but lacking the body of men filled with the ambition

and desire to conquer, he is helpless. So it is with our board, our mission and our hopes.

On and on! To battle with these insects and to gain success is our aim. I would not only suggest but strongly urge the formation of county boards of horticulture in every county and fruit growing portion of the state, to act in harmony with the state board and the horticultural department of the Agricultural College. Such bodies would not only aid every horticulturist, by interchanging of ideas, but would prove strong adjuncts to the state board. Under the direction of the sub-organization could be held meetings at convenient intervals; meetings not only of a local interest, but of a character so broad in scope, that a large attendance would follow every call.

On and on, I say, meetings of such a tenor as to interest the amateur, as well as to absorb the professional—meetings which might draw into their audiences as well as into the horticultural field active intelligent and energetic men, and prepare them to slip into the sandals of those who have labored so strongly for the upbuilding of the fruit industry of our state. For these reasons, as well as many others, I do now urge and repeat that there be county organizations in every fruit growing county of the state, so as to enable the State Board of Horticulture to cooperate with the county organizations in carrying out the provisions of the Orchard bill to that extent that we may be able to say, "Well done thou good and faithful servant; thou hast been faithful over a few things; I will make thee ruler over many things; enter into the joy of thy Lord."

On and on! I say. If it were not for the insects that are making such great inroads upon us, we would have clear sailing in the fruit industry of the state. In my opinion the codling moth is, of all the insects, the most injurious and destructive, for it manages to baffle the ingenuity of man, and is able to get his work in amidst all skill and opposition.

Nearly all the orchards on the eastern slope are more or less infested with these great apple pests. On the western slope in the great fruit belt, the codling moths are filibustering around there, and the fruit men have quit offering $5 for every apple found with a worm in it. It is not the purpose in my address to discuss the various insects, their habits, where found and the remedies for extermination, but will leave that for those who have given these subjects their individual thought and attention, but more particularly to urge the horticulturists to action in the forward march upon our enemies.

A concerted and united action of all horticulturists of the state with the State Board, in trying to carry out fully the provisions of the Orchard bill will make us move forward to conquer.

Blight—It is hardly worth my time to mention this subject, as it has baffled the minds and ingenuity of the most skilled of horticulturists. From whence it came, and whither it goeth, we know not. One thing we do know, that we can trace its foot prints—discern its ravages. We have tried remedies and listened to theories; no two agree. Surely we know the blight has been with us, as we can readily see its effect.

In the northern part of the state it is comparatively the thing of the past, while other portions of the state were quite severely affected with it the past season.

I shall say no more on this subject, as this is quite sufficient, for we are comparatively in the dark, and cannot prevent its ravages, no more than we can prevent a child from taking the diptheria or a cold, or a robust man (like some of us), from having the grip; it comes when it will, and leaves when it pleases so to do.

On and on! In our tour of inspection over the state, we found there was a good deal of careless planting of fruit trees, so much so that if there were

a million of trees planted, it will take many thousands to replant. One may say that I disgress from the subject, inasmuch as the Orchard bill makes no provision for careless tree planting and neglect, nor for those that were not planted at all.

True; what's the difference, whether a tree dies from carelessness in planting and neglect or by the apple tree borer or leaf roller?

One class of men are benefitted by this kind of planting, and only one, and that is the nurseryman. Horticulturists, consider this well. You may kill the insects, but you cannot resurrect dried up trees nor replenish the depleted purse.

I will add here that I saw one model nursery in our journeys and meanderings over the state. I forbear mentioning names, for fear some nurseryman may claim the honor who is not entitled to it and would hurt his feelings. Is it yours, or yours, my brother nurseryman?

I'm quite sure it is not mine, and will own up.

I believe the board will bear me out in saying, that in our opinion, there are too many varieties of the different kinds of fruit planted in the state for profit, especially apples. For profit (and that is what we are raising fruit for), the apple should be early bearers, prolific, long keepers, especially the winter varieties.

A market for fruits—This is a good place and timely, too, to make this suggestion, that we should better try and take care of the fruit pests first, in order that we may be able to raise the fruit fit for market. It has been the experience of horticulturists that they have to hunt a market for poor and wormy fruit, while good fruit does not need to go begging, but finds its own market.

To sum up the matter in a few words, while perhaps there are some unnecessary points in this, my annual address, yet I feel there are many points on which, perhaps, I am qualified neither by my position

nor investigation, to dwell. I would that the conditions were otherwise; that my highest ambition and most enthusiastic ideas had been reached by us, both individually, and as state board. So far as our ability has permitted, just so far have we advanced, sorrowing where condemnation has been thrust upon us, and pleased at fair criticism. While by some, I know our best intentions have been misconstrued, yet I believe the injustice has been more from ignorance than from malice. While the question of finance oftentimes tends to lessen the chances of success with a board of this kind, we have been making strenuous efforts the past eight months to conduct our work upon an economical basis, and I believe we have been successful. It is to be hoped, therefore, that future appropriations may be increased rather than diminished, in order that we may broaden our field and extend our labors to the betterment of all concerned.

I firmly believe that what seed has been sown, has not fallen on stony ground or among thorns, but upon highly cultivated soil, where the yield will be measured to a marked degree.

Let us in the future as we have in the past, ever strive before the goal of perfection, seeking the cooperation of every fruit grower within the borders of our state, not as a broad dictatorial, but as man to man, social, communicative and ready at all times to accept or tender advice, ever bearing in mind that the best informed is not beyond the point of learning from his neighbor.

As the trunk of the tree would be of little use to man were the branches and twigs removed, so that the flow of sap would cease, just so is it that the state board may prove to be an incumbrance more than an aid without these branches throughout the state.

HOW I RAISE PEACHES.

Paper by W. B. Felton.

Read by secretary.

The raising of peaches on the eastern slope of the Rocky Mountains in Colorado is so uncertain that artificial protection of some kind is necessary to insure a crop. At Canon City, where the climatic conditions are probably about as favorable, one year with another, for the raising of peaches as at any point of the state on the eastern slope, a crop of peaches cannot be depended upon oftener, on the average, than once in five years. In any year from 1880 to 1889 there was no crop of peaches here. In some of those years there were some peaches, but nothing like a crop. In 1888 and in 1891 every peach tree was loaded; in 1890 and 1892 there were no peaches and in 1893 there were a few. It is not the severity of the winters here that does the damage, but the reverse is the cause. February is usually so warm that the buds start, after which they are easily killed by subsequent cold weather. If the buds escape and the trees bloom, the crop is destroyed by a cold spell after the trees are in bloom. In the fall of 1886 I commenced laying down peach trees as an experiment to see if I could not have a few peaches for my own use. I laid down two trees and in the following summer had two trees loaded with peaches while there were none on my other trees, and none in fact in the vicinity. The next fall I laid down all the trees I had, thirteen in number; and have continued the practice ever since, and have had my trees loaded with peaches every year. The majority of people, until they see the process, think it a marvelous thing to lay down a peach tree. The fact is that it is a very simple thing, easily and quickly done. The roots of peach trees naturally grow mostly on two sides opposite each other. In setting the young tree which is to be laid down, the roots should be arranged on the two sides so as to intensify the natural inclina-

tion to grow that way, thus the roots form a hinge which permits the laying down of the tree without damaging the roots or hurting the tree. The tree tree can be laid down at any time after the leaves have fallen. When ready to lay down the tree, the land should be irrigated so that it is thoroughly saturated. It is a good plan to lay the tree down while the water is still running. As the ground gets soft the tree should be worked back and forth which will let the water follow the roots and so softens the ground, that in a minute or two the tree will go down without any trouble. After getting the trees down it should be left until the ground has dried out sufficiently so than one can work on it, then the tree should be covered with hay, straw or any litter, and then enough dirt should be put on to hold it there. The trees should be allowed to remain covered until they commence blooming, when the covering, without removing it, should be loosened so that air will be admitted freely. The trees must not be uncovered entirely until all danger of freezing is over, or if they are uncovered, and a cold spell comes on, the straw or hay should be replaced. When all danger is passed the tree should be raised up and propped to hold it up, leaving it propped all through the season. That is all there is to it, and it is much less of a job than one would imagine. It is well to lay the tree down every year after setting it out, as, while young, it is easy to form the habit of going down. The cost is slight. My thirteen trees that I commenced laying down in 1887 are now from twenty to twenty-five feet high; they have borne a crop every year and mad ea good growth. Two men can lay them down and cover them in half a day. Being so well pleased with the result of covering my trees, I set out seventy-five more three years ago this spring. Many of these trees bore peaches last season and next summer will be full of peaches. My thirteen large trees and seventy-five three-year olds were, last fall, laid down and covered by two men in two days. I do not suppose that a tree several

years old which had never been laid down could be handled in that way without seriously injuring it. The method I have given is the best and cheapest of which I have any knowledge for securing a crop of peaches in an unfavorable climate, and enables one to enjoy the luxury of eating peaches ripened on the tree, which are 100 per cent. better than those usually to be obtained in the market. If anyone desires to engage in the business more extensively, he will find it profitable to follow the instructions I have given. While I do not claim originality for this system, I do say that I have found it a successful method for eastern Colorado horticulturists to adopt, and the trifling amount of labor that it requires could not be more profitably expended in any branch of the business with which I am acquainted, and it opens up a future of an industry that has heretofore been considered out of the question, if not entirely unpractical. My plan has made many dollars for me.

DISCUSSION.

Mr. Grimes—I believe I voice the sentiment of every one in this assembly, when I say that the address of our president was extremely interesting, and that it was more than we could reasonably expect. It shows that our president is a man who has done his full duty.

In regard to raising peaches in Colorado I will tell you that I raise peaches in Denver, or rather in Highlands. I do not go to the trouble that Judge Felton does, but I believe I have gotten the thing down to perfection. Peach trees are like men; if their bodies and limbs are well clothed, their faces and hands will stand a great degree of cold. Acting upon this principal I wrap my trees with gunny sacks as far as they will bear. It takes five or ten minutes to the tree, and I have never failed to raise a crop of Crawford's Early, the finest, sweetest peach you have ever tasted. The principal difficulty I had was in the

trees breaking down; but protect your trees in this way, and you can raise peaches in Denver and Fort Collins as well. My oldest tree is 24 years old, and lately when the thermometer went down to 24 degrees below, not a single bud was hurt. If this method was followed, we could grow peaches on this side of the range, almost as well as they could on the other.

In my grounds in Highlands I have a magnolia that has been here for 16 years. We wrap it the same way. We all know the magnolia is exceedingly tender; they have the largest flower and the handsomest flower of any tree that grows. If we can grow magnolias by wrapping the trunks, there is no reason why we cannot grow peaches.

Mr. Spear—I would like to ask Mr. Grimes if he ties in any of the branches?

Mr. Grimes—No, sir; I did not tie up the branches, I wrapped them up near the branches. The bodies only were protected.

Mr. DeVinney—I think our time is well spent in discussing this matter. The peach is one of the most beautiful of fruits, and the most delicious, and we should try and raise it if we can.

The way I grow peaches is: I graft them on the native plum; it is very easily done. The wild plum of Colorado is natural stock to the peach, and the effect is good. I have peaches that have grown for ten years. I graft them on a late stock, and in consequence, I do not get as many as I should. I root graft generally, or they can be body grafted, either one. They can be root grafted by setting the plum root a little high, so they stand a little above the ground. The grafting on the plum dwarfs the tree, and makes it more subject to control. It will only grow six or seven feet high, and I would recommend those people who wish to try an experiment with the peach to graft them; it is easily done, or you can bud them. I would recommend budding them on the branch, making every peach branch come out of the stem of the plum and I

think we can grow peaches very well near home or on this side, without the trouble of laying them down.

I have tried laying down, and it might be very successful, but the gentleman does not tell us in his paper how much fruit he has gotten in consequence. It is quite well assured also, that when a storm strikes a tree, it will take a good many guy ropes to hold it, and I wish the gentleman had told us that part of it, how he holds his tree up; but let that go. If you lay a tree down, and it comes a wet season, and there is a wet spring in March, and there comes a heavy snow on that hay and stuff, the blossom will develop itself from excessive moisture, and it will bloom in spite of anything that you can do; it will bloom under ground. I have tried it, and I know it to be a fact.

Mr. Coburn—For Mr. DeVinney's information I will say that I saw this orchard last August when the Judge's trees were full of peaches, and he raised them up on an angle and put a fork on either side so that the wind could not sway them in either way, and his trees were just as full as my trees were on the western slope, and I think you will find in the report that from 13 trees he sold over $16 worth of peaches when he did not have a half bushel of apples in his whole orchard.

Mr. McClelland—I dislike to differ with Friend Grimes; I dislike to differ with anybody (laughter), at the same time, I do not like to see hopes held out that will cost people a great deal of money and difficulty, and if he had not referred to Fort Collins I would have forgiven him.

For the last twenty-two years I have experimented with peach trees; I have tied them up in gunny sacks, corn fodder and barrels of earth, and with all that different kind of doctoring, I have never raised a peach, and I know that I have done that as carefully as Mr. Grimes. I did, however, raise two crops of peaches from one tree, and that tree has never been covered a particle. It stands out just like a

plum or apple. I do not think one tree out of a thousand will do it, but that tree did.

I do not think that I would recommend anyone near Fort Collins to raise peaches for profit, because every one that I raised cost me $5.

Mr. Grimes—I will take back what I said about Fort Collins, but here I have the evidence. But there is one point that I should mention. We all know that fruit buds are formed the year previous. In August I take my fruit clippers and clip back all the outer branches; that checks the growth and causes the tree to ripen up, harden its wood and ripen its fruit buds. I learned this lesson from Governor Furnase of Nebraska. He has a fruit orchard on the west bank of the Missouri river; there is nothing in the way to stop the wind, and he has the finest peaches I ever saw, and he told me he clipped the branches, checked the growth, and made his peaches grow close to the bodies, and by checking the growth and covering the bodies he was able to grow, as I said before, the finest peaches I have ever seen.

Mr. Brothers—I would like to ask Mr. DeVinney, what time he buds his trees?

Mr. DeVinney—The latter part of August. They bud very late.

I would say in reference to budding, that it dwarfs the tree, and brings it into ripening earlier.

Mr. Osborn—I would say, in making our tour of inspection over the state, that we visited some places in Boulder county, where they are successful in raising peaches, and I believe I learned the whole secret. (Laughter.) We visited one place; the man's name was W. L. Scott, and he has peaches every year. His trees are fifteen feet high. I asked him: "How do you do this?" and he answered: "I planted them there from the seed, and they have grown there as you see them; they do not winter kill, and I have as fine peaches as they have anywhere." Now I believe the whole secret of his success is in the water, not partic-

ularly different water there from anywhere else; but it is water. His trees are planted right in the bend of a little ditch, and that water runs there until midwinter, and the ground is therefore thoroughly saturated. I believe it is the water that protects them, and I believe the reason that our trees in the northern part of the state do not thrive, is that they dry out. I have a good deal of faith in that place and Mr. J. Wolf's. I have been trying peaches, and I know they have just dried out; but from the ideas I got, I have planted some peach pits, and I am going to have them thoroughly saturated with water, and give them as much water as is possible. I believe not only our peaches, but our other fruits do not receive water enough. Along Lake Erie they raise splendid peaches, also in New York, where it is cold enough to freeze the horns off of a cow; but I believe it is in the ground; saturate our peaches thoroughly, and let the wood harden up.

Mr. Thompson—It occurs to me that in this description you have given of the water coursing around them, that it is not so much the fact that the soil is kept moist around them, but it is the running water right in the vicinity of these trees. I should say that was the protection against frost. It occurs to me that might be one of the reasons.

Mr. White—Were these seedlings?

Mr. Osborn—Yes, sir.

Mr. White—I attribute it largely to their being seedlings. I have had quite a number tell me that where they planted the seed in Colorado, and waited for the result, they could grow peaches.

Mr. Steele—I do not think that the impression should be made on the minds of this community, that the seedling peach is any hardier that the budded peach. Many of the best peaches that we grow have been selected on account of their hardiness, and if you grow peaches from the seed, you get some very hardy and some very tender. My experience has

been that the hardy budded varieties are more reliable, more sure of bearing, than the average seedling. Not one in a hundred of the peaches you would grow from seed would prove as hardy as some of the hardy budded varieties. There are some sections of Colorado certainly, where peach culture has been a success; but I think from some other reasons than given by our president. Our peach orchards this year, all over the state, have been injured; Whitewater, Mesa, Gunnison and others, and it has been invariably laid to excessive irrigation, keeping up the growth too late in the season, keeping the wood from ripening, making the limbs full of sap, and in nine cases out of ten, where trees have been injured by winter killing, it has been laid to keeping the ground wet too late.

Consequently, experience has taught us, that in order to grow peaches successfully, we must turn the water off the last week of August.

I listened to this discussion about peach growing in eastern Colorado, and it seems to me that the moral is not difficult to reach: If you want to grow peaches, come over into western Colorado.

Mr. Smith—They are growing peaches though, quite close to Denver; I have a tree 20 feet high from which I have not missed a crop.

Mr. Osborn—I would say, just by way of explanation, that I would not recommend that trees be irrigated at certain seasons of the year. What I meant by late irrigating, was to irrigate them after they are grown, and not while they are growing. I meant to stop irrigation all of August and the last of September, but wet them later on.

CHANGE OF SUBJECT.

Mr. Osborn—If there is no objection, we have invited Mrs. Wright to speak a few words to us.

Mrs. Wright—I thank you for the invitation. I can imagine that there are a few of the gentlemen

here who are somewhat curious to know what the women will do with the ballot, now that they have it.

I am one of a committee appointed by one of the women's political clubs of Denver, to attend this meeting.

The club proposes some sort of entertainment. I do not know what the meaning of it is, but I do know that it is to encourage home production, and I feel that the cultivation of fruit comes under the head of "Manufactured Articles," and whether I have forced the matter or not, I do not know; but it stands just in this way: Two weeks ago, I stated before the club that my interest was in manufacturing our climate, scenery, etc., into food. I think the whole matter could better be covered by a committee being appointed from this society to co-operate with the committee appointed to meet you. We have had no opportunity for consulting together as we should have done, and bring the matter before you in its proper shape; but it simply means that when an exhibit of anything that is manufactured here, is made, that the horticulturists will be represented.

Mr. DeVinney—Allow me to ask you, Do you want a committee to co-operate with you in making a joint exhibit? and that you desire a committee, that whenever you do make an exhibit, that we shall be represented along with you?

Mrs. Wright—I think the ladies are just considering this matter. The Manufacturers' Exchange are very much delighted with the idea, and you will never know what good help we are until we are along side of you. (Laughter.)

Mr. DeVinney—If the chairman is willing that we should take this up some other time, we are. You will need a little time to appoint those members who will be of most advantage to your own interests.

THE PEACH BELT OF COLORADO.

Paper by Mr. W. S. Coburn.

Mr. Coburn, Delta county—Mr. President, I expect this article will conflict with your ideas about that water business.

Mr. Osborn—You do not need it over there, but we do on this side.

Mr. Coburn reads paper.

A method practiced by Judge W. B. Felton of Canon City, comes under my observation this season, which certainly commends itself to those who live in sections where the winters are too severe for open culture: That of laying down the trees and covering with hay or straw and then with dirt. Anyone can do this part, but the knowledge of when to raise them in the spring might not be attended with the same success with which the judge has been blessed for the past few years. However, I believe that with close attention this plan can be successfully practiced in growing peaches for family use and this, too, with good satisfaction throughout most of the counties east of the range where late frosts seem to be the principal obstacle to growing the fruit without protection. I don't wish anyone to misconstrue my meaning, and get this protection mixed up with the kind they are parleying about in Congress. On the western slope we have a great variety of soils that are not all adapted to growing peaches. Especial care in the use of water, experience and close observation have taught me that nine peach trees die from the excessive use of water where one dies for the want of it. This is especially the case in deep, rich, heavy soil. In irrigated countries, when the top of the ground looks dry, the majority, without any examination of the condition of the soil around the roots of the tree, turn on the water, when the fact is, if they had kept the water off, their trees would ripen up the wood and produce a crop

of fruit Too much care cannot be exercised in the application of water at the proper time on heavy soils. It is a well known fact, with which nearly all peach growers are familiar, that throughout the east and south, where peaches are raised in non-irrigated districts, the light, sandy soil well underdrained is selected. This is done to control the moisture as far as possible, so the wood will mature. Deep soil is no objection to growing the peach, providing the moisture is carefully and intelligently applied. The western slope, comprising the counties of Montrose, Delta, Mesa and a part of Garfield, contains about all that part of Colorado that can be depended upon for the successful growing of peaches, one year with another, without winter protection. A large portion of the western slope is of a deep, rich alluvial soil, which requires the utmost care in the use of water for the best results. In the absence of this knowledge among the many peach tree planters, the best returns have been from trees planted on a high, quick, sandy soil, well underdrained. The cultivation of a peach orchard should begin with the opening of spring and be kept up until the crop is harvested. "Shallow and often" should be the watchword. Pruning is another consideration to the successful growing of perfect peaches. The yearly shortening in of the new growth and the cutting away of all dead and injured wood is quite essential Raising peaches for profit depends almost entirely on the varieties planted. Nearly all seedlings and a large majority of the extra early kinds are comparatively worthless for shipping long distances to market. The seedlings are usually small and the early ones when ripe enough to ship soon become soft, insipid and tasteless. The white-fleshed peaches of Persian origin are inferior to the European and Chinese strains. The Crawfords and that class of yellow-fleshed peaches are supposed to have originated in Europe; while the Hill's Chili and the Chinese Cling and its long list of worthy seedlings, which have sprung from it, I consider not only the

best but hardiest family of peaches we have in cultivation. A few of this class which I have tested for several years gave me good satisfaction, ripening in turn as follows: Family Favorite, Chinese Cling, Hill's Chili, Elberta and Capt. Eads. The Crawfords are of that class and are fine peaches, but not so hardy in bud as those mentioned. The Foster, St. John, Early Beauty and Bergo Yellow are fine, large and good quality. Referring to the utter worthlessness of a majority of the common seedlings, it will not be out of place to call attention to the great number of seedlings submitted to the United States pomological society for name, where such specimens are given a careful investigation as to quality, color, size, season and all other superior qualities claimed by the originator. To illustrate the advancement in horticulture during the past twenty years, it will also be necessary for me to call attention to the comparative small number of new varieties submitted a few years ago, to find one that was considered worthy of cultivation. At that time there were probably not more than half the varieties of peaches in existence that there are today, and out of three or four hundred, sent to the pomological society for name, they usually found one or two that were pronounced worthy. About eight years ago, when a seedling peach from the Chinese Cling, the Elberta, was submitted, there were over 2,700 new seedlings to keep it company. The originators all claimed great advantages as to size, quality, hardiness, color, good shipping qualities, and, in fact, all sorts of superiorities over any of the old varieties. After a careful examination of all these in their regular order the Elberta was the only one considered worthy of a new name. It is estimated by good authority that out of an average of 2,700 new kinds of grapes, produced by hybridizing in the blossom, there is only one that proves to be worthy of a new name. Should any of my friends desire to undertake to produce a new variety of peach, I fear his ardor will be somewhat checked after hearing of the experiences of

other originators, but should he still be inclined to try it, notwithstanding what I have said, I would advise him to plant the seed of the Chinese Cling, which has produced more new kinds of high quality than any other peach that grows. In conclusion it would be well for me to say to those who contemplate planting orchards, to consult the oldest and most successful peach growers of the section where they intend planting. Do not arrive at conclusions without thorough knowledge and advice from practical men. Don't think a new plan has been discovered by which the methods practiced by the best peach growers can be superseded. "Go slow and learn to peddle." Make selections from varieties already in bearing and proven to be good. Don't be led away by long advertisements and flashy plates of new varieties that cost double and triple the price of old sorts and wake up at the end of four or five years to find that an imposition has been practiced. Wait until these new varieties have been thoroughly tested and come well recommended by a responsible person in the locality of the beginner. The people along the eastern slope foothills may try to grow peaches and may succeed occasionally in securing a fair crop, but the risk is great, and we cannot look for any great results in this direction. There are a number of iron-clad varieties that will stand the rigors of an ordinary Colorado winter, with the mercury sometimes at twenty degrees below zero, but this is not the great point involved. While a peach tree may go through such a winter safely, its blossoms may be caught by late frosts and these will cause the mischief and ruin the crop that year. What the eastern slope wants is a peach that will blossom late and ripen early.

DISCUSSION.

Mr. Kent—I am an old man. I have been a horticulturist for 40 years, and a female suffragist for 50; I have been more successful in that line than I have been in horticulture.

I would like to say that my greatest success in horticulture has been in hardening the trees. I came out here in 1866, and began at once hardening trees, and I did it the most successfully of anything I ever did in my life. They never got over it.

I would like to use the question box a little while: Have all of you that are engaged in the fruit business, taken the pains to plant the trees correctly, get the right kind of stock and take care of them? A neighbor of mine planted trees in 1863, took splendid care of them, ran water all over them and pastured them nobly, and then he wondered why in the world he did not have fruit as I did. I told him that his application of care was all wrong. He left his cattle to take care of them, while he should have done it himself.

There has been considerable said about the different varieties of fruit, and it is all very well; but I have heard less said on the culture of the trees, and I think that is the most important thing.

I noticed in an orchard the other day, knobs of former limbs extending two inches from the trunks. The person who had charge of the trees used to saw them off. There is only one way to prune: If you find your tree is sending out too many limbs, you can easily find out which limb is going to be in the way, the ones that will form crosses and ladders and all sorts of things. Had you taken the pains to insure care, and gone through and pruned your trees as they should have been, this need not happen.

Now I apprehend that a good deal of the lack of growth and fruit depends very much on the matter of pruning. A green hand should never be allowed to go into an orchard with anything that he can cut a limb with. It is your own fault if you permit a limb to grow so long that its weight will split it down. Commence young.

You will find on every limb that grows, a collar, just the same as you will find on a horse; you should

never cut that collar. If the limb is big enough to split down, cut under, and then cut down, right exactly to that collar.

Every limb has a collar, and if you cut that collar, it must be made again, because that is natural growth of the bark up to the limb. If you cut too close to the collar, you leave a tender place that will shelter all the insects that are inclined to inhabit your trees. One of the best things to rid your trees of insects, is to rid them of their place of habitation, and the only way you can do it, is to eliminate the places they inhabit.

It is said it takes a long time to prune an orchard. It does if you let it go for a long time for want of a pruning, but if you take care and prune it every year, it is different.

I have had 40 years practice in the cultivation of trees, and I have found that careful, judicious, interested pruning is one of the best things to keep the trees in good health, to keep them from winter killing, and keep them in fine fruit.

In 1866, I thought we did not have as many raspberries as we should have, so I sent out and got some, 1,000 I believe, from the mountains. They died in October. What was the cause of that? It was the lack of moisture, and that is the cause of the death of many of our fruit trees.

While I would not advocate planting them in the mud, or keeping them in the mud after planting, I would advocate keeping the ground moist.

As I said before, my experience has been, that the lack of proper pruning has been the principal cause of failure in fruit growing in this country. In England, they prune twice as much as we do; the climate is against them there, but I have learned that the more I prune, and the more care I take, the better the fruit is, and I would urge upon you all to take care of your trees.

Now you go out to Mr. Brown's place; go to his orchard anywhere, and you cannot look into the orchard without seeing a row of trees; it is so symetrically planted that the rows present themselves in every direction. That is my idea. That orchard is kept as clean as this carpet, and his trees will bear the same kind of apples year after year, very much better than any around this country, and that is on account of the care he takes in pruning and looking after his trees.

Mr. DeVinney—There seems to be a disposition on the part of some people to experiment in seedlings. Some of the varieties of peaches will reproduce themselves, and to those people who wish to experiment in raising peaches, let them plant the seeds of yellow peaches, and they will get the original.

Mr. Coburn—I have a nursery on the western slope and I presume there are 25,000 seedlings where the buds failed to take, and for the want of time I have allowed them to stand there. Last spring I instructed my men to take them up and burn them, but they were standing there this fall, and I presume there were two-thirds of them that were bearing. I went all through them not expecting, but hoping that I would find one peach that would be of value. They were all seedlings and very small, and not worth while bothering with.

I consider the Chinese Cling and its descendants to be the best that grow. The Family Favorite, the Elberta, etc., are all seedlings from the Chinese Cling, and they are all fine ones. They have been submitted to the pomological society and were named out of, I believe, 15,000.

Mr. White—I would like to ask for information, in planting these seedlings, whether it was for the purpose of getting peaches, or simply for the roots, and whether he gave special care to the planting of the trees?

Mr. Coburn—I was raising them for the stocks; not to get peaches from.

Mr. White—It is my desire to ascertain something about seedlings. You cannot go into a store and get seeds, and make anything out of them, as they may not be adapted to this soil. But if you get good seeds it will be different.

Mr. Coburn—In raising seedlings to bud on, we let our seedlings go one year, and we bud them the next. They stand there during the winter, and out of 25,000 there won't be more than 3,000 that will go through the winter, and the first frost will generally kill them. It may not kill them way down to the ground, but we cut them off.

Mr. Osborn—When we had the state fair at Pueblo, a lady from the Arkansas bottoms, brought several varieties of peaches for exhibit. Also some apples, and they did not compare with these peaches in size, and I do not know that they did in flavor with those that came from the other side; but I do say this: If I could raise such peaches as that lady had, in Larimer county, I should be quite well satisfied, I should not call on anyone from the other side for peaches. They are all right over there; they can raise peaches of every kind, but I tell you that such peaches as they had down there, I would be satisfied with. As regards the seedlings being more tender than other highly cultivated fruit—do they not all come from the seed first? Are they not all seedlings?

You may plant the Weaver plum and you hardly get one of the same variety. You may get some superior and you may get some inferior. You may plant a Rhode Island Greening and you will never get a Rhode Island Greening; on the same idea that I take that there will never be another Washington or Lincoln; there may be men as smart, but never others of exactly the same characteristics.

I take the ground that you cannot make a new fruit, except by seedlings.

Mr. Coburn—The idea I wanted to convey is this: That it takes a very large number of seedlings to get one that is worth the cultivation; and another idea is this: That a majority of the seedlings are tender. Of course, there are a great many of them that are hardier; but when it comes to bearing they are worth but one single good result.

Some of the seedlings are very tender, and the first frost that comes will bite them the same as watermelon, but the principal idea I wanted to convey was, that it takes a very large number to get a single good result, and it is not worth while for a person to expect to get a very superior peach from raising seedlings, as he would likely plant 10,000 and have but one single good result.

Mr. Brothers—I want to say a word in favor of my friend, Mr. Coburn. In our recent trip, our experience was, that in every orchard that we visited trees that were dead on the tips, was where they watered their peach trees too late in the fall, and I wanted to hear Mr. Coburn get up and say what he did, after his experience over there with watering peaches late; and and every orchard that we found where they had alternately one peach and one apple, they did not do as well as if planted by themselves. Peaches do not require as much water as apples.

In White Water, I think the peaches were killed worse than any place we traveled over, that side of the range; they were damp and wet in places, and where they were wet three-fourths were dying, or dead.

Mr. Coburn—You do not want to convey the idea that the ground was wet before it was irrigated, but was made wet by irrigation on a deep, wet soil.

Mr. Smith—Some three years ago I planted out some peaches under conditions mentioned by Mr. Osborn. I planted them as an experiment and several of them grew. I planted them near a ditch, and they have never been killed back but a few inches. The

trees are now considerably higher than my head, and the water is running through that ditch almost all the time, and is kept in until it freezes up; and I will say that these trees are alive and thrifty.

Mr. Brothers—Mrs. Everitt has some trees that her husband planted the pits in '68; he also got some chestnuts, he sowed the chestnuts on the west side of the peaches, and they have been killing down and growing up ever since that time. Some years they have a beautiful lot of peaches. They had this year; and I saw some very nice ones. Mr. Davis had some of the same about four miles from there, and once in a while they will get a big crop of peaches; how long they will live there, I do not know.

Frank Lawson also has some; they stood out on the north side of the hill, two little trees (I have a piece of land just the other side of his), and I do not know how many remarks the Denver people make about these peaches when they come up the hill.

Mr. Spears—While we are harping on this seedling business, I think it is the duty of every fruit grower to select a few nice seeds from choice fruits, and if he plants only 50 or 100 each year, he is that much ahead. All of our best fruit has come from seeds, and if he only gets one good one in five years, he is well paid for his trouble.

The fast horse breeder will tell you that if he gets one fast horse in a lifetime he is well paid, and horticulturists are not taking a back seat now. All of our great discoveries have been by chance seedlings and chance fertilization.

Mr. Thompson—We have had a paper: "The Peach Belt of Colorado." A fair inference of this is, that there is a place in Colorado where the cultivation of the peach can go right along without a hindrance. I have been reading up on this matter a little since coming to Colorado, and I speculated on the one important thing in the history of the peach belt of Colorado, and that is in the matter of early and

late frosts by which the crop is injured. I would like to hear a little from the gentleman on that point.

Mr. Coburn—I have heard a good deal about frosts since being in the meeting to-day, and I hardly know what you mean by it. Over there we have "Freezes" but we do not have any "Frosts." If a frost is a freeze, we have them; but if a freeze is a frost, we do not have them.

My understanding of a frost is, that it is a white frost all over the ground; we do not have that kind, but sometimes when the peaches are as big as my thumb, we will have a thin layer of ice, but it does not hurt them a bit. After we get the peaches in blossom we consider ourselves safe. That is, in my latitude; but in lower altitudes, and near the river where the atmosphere is cold, perhaps it rises higher and perhaps freezes higher on the trees. I have noticed that they have lost their trees by a frost.

If a freeze is a frost, it does not hurt us at all, but it does freeze the ground frequently after the peaches begin to grow.

Mr. Steele—Relative to Mr. Coburn's remarks: In Mesa county very much the same condition of affairs prevails, therefore I realize that it is most difficult for a party coming from the Mississippi or the Missouri Valley country, to understand how we can have freezes and not have frosts.

Last spring it was a very late, cold, backward season with us; there was ice wherever the water was turned out, and you could hear the remark: "This has killed all of our peaches;" and the fact was, peaches were so thick we had to pull off three-quarters of them.

To give our Kansas friend an idea of the value of land, I will say that there are orchards there that have produced eight successive crops without fail, and I think I am certainly safe in saying that the production of peaches in that country is more safe than is the apple crop in any part of the Mississippi valley.

I will say again, that we are near the market. We are 400 miles or more from Denver, over there, yet we are the nearest point to Denver in which peach growing can be made a success, and in which peaches can be grown successfully, so especially for my Kansas friend's benefit, I will say that right over there in that section of the country, are the most valuable fruit lands in the United States for profit.

Mr. Daniels—I know all about how he came by those statistics he alluded to there; they are statistics taken at Montrose, 1,200 or 1,500 feet higher than the point he is. The circumstances are very different at Montrose than in the valley. I was very glad Mr. Coburn said what he did about the frosts being under the trees and the peach blossoms not harmed.

Mr. Osborn—The Question Box is the most important part of our meetings. If you have anything to ask, ask it through the Question Box, and it will not be long before it is answered.

QUESTION BOX.

Question—Does this society do right in giving out the large yield per acre, rather than the average yield?

Mrs. Wright—I think it is the way of the world. It is the right premium given to those who endeavor to excel, and do it by hard, systematic work.

Mr. Steele—We offer a premium for those who excel; those who make the largest return, they get the premium. We are right, and we should exercise that right in a greater degree than we do. We might not only give the yield per acre but the yield per individual tree. In my report of the yield per acre of plums, the average yield was $1.50 per tree, 250 of these trees did not yield 25 cents.

We feel a little diffident about telling the actual facts of fruit production on the western slope. We have as fine a section for fruit growing as there is in the United States. We do not know anything about

the curculio, and have only a few codling moths. We have the California grapes over there with very little to bother them; so you see we can tell the whole truth. It seems to us it is very hard to believe; yet take little trees two years old and see the results; see how soon they come into bearing. It is hard to realize, but any representations we make to you, if you will come over there during the fruit season, when our trees are in bearing, you will say that the half has not been told.

We claim that our section of the country is not surpassed, scarcely equaled anywhere in the United States.

Mr. Brothers—In answer to the question I should say "No." Give it fair and square.

Colorado is good enough if we tell the truth. I would not give a snap for a man, or woman either, who could not take a little piece of ground and make a living off of it.

We can make more money in Colorado in one year than you can, in most other places just now, in three.

Mr. Thompson—I agree with him, that the truth is valuable everywhere. It is just what we want to know; in religion, in politics and in the production of everything, and no one truth in all the Universe of God, conflicts with any other truth.

Well, now then; it occurs to me that there are remarkable things in the horticultural world, and they are certain to find themselves aired in the doings of the horticultural societies, and there should be intelligence enough among the horticulturists to know that there are failures as well as successes.

Let there be a fair record of both successes and failures, and the Horticultural Society of Colorado will never be blamed for any report that is sent out.

Mr. Steele—I think it right that I should make a further reply in regard to the remarks of Mr. Brothers. I do not think that we should take note of the

average yield of orchards in any one section. It is only right and proper that we should consider the average of the successful horticulturist.

If I were to give you the average of successes over there, I should certainly think it right and proper that I should leave out of account those men—and there are such—who have come over there, purchased ten acres of land and expect to make a fortune out of it in four or five years, but instead of taking care of their trees, they take care of themselves in some saloon in Grand Junction. Then there are other men who will come, talk politics all day in town and let his neighbors' cattle eat up the trees.

Mr. Brothers—I want to tell you, that we saw, when we were there last year, hundreds of thousands of trees that were lost through utter carelessness. They sent poor fellows over there who had bought the land at a big price, and when they got there, they had nothing to go on.

Mr. Steele—Mr. Brothers is right; the worst representation we have, is from parties who plant trees and will not take care of them.

Mr. Grimes—While these statements are proved, and worthy of the parties who made the statements, they are in many respects misleading; but the whole thing hinges on the party in power; I do not mean the political party, but the party in power over there. If every one was a McClelland, a Wilmore or a Steele, and used the same intelligence and enterprise as they do, they would have the same return; but it can hardly be expected that a man who scarcely knows which end to plant in the ground, who takes no care, who has no faculty to cultivate trees, can be as successful as these men. It is the party in power; the man or the individual who succeeds more than anything else.

Question—Can any one present furnish information about the preparation of the ground by dynamiting for tree planting?

Mr. Steele—Inadvertently, I suggested that idea a good many years ago. Some Denver people came there as long as 6 or 7 years ago and asked me what was the best method to plant trees on stiff land. I said: "Dynamite them." They asked me what I meant and I told them my experience had been that they could dig for three days and not loosen the ground more than six inches, a hot sun then coming out would soon dry it out, and the growth of the tree will be slow. The sun shining on the tree will scald it and sear it; then the borer moth comes along and by instinct plants some eggs just where the tree is diseased, and the borer finishes what the sun scald commenced, and kills the tree; but the primary cause was the lack of moisture.

Some three years since, I believe, I saw the first account of it that I had ever read of that being put into effect; these same parties had experimented and told about the growth of the trees. Since then I learn that these same trees have come into bearing, and that they have produced splendid crops.

The idea is to did a hole with a digger, place a stick of dynamite in it and touch it off; then put on the water and it makes the ground in such a condition that it will make the growth of the trees uniform.

Question—Is the Industry gooseberry a success in Colorado? Is there any other variety better?

Mr. Coburn—About three years ago I planted about thirty Industry gooseberries, the second year they began to bear; and there were more gooseberries than leaves, and this year they were the same thing over again. The berries are about one inch long, very large and ripen to perfection. Previous to that I had been raising the Downing. I had something like 2,400 quarts of the Downing, but if I could change them now, I would have them all Industries.

Mr. Spears—Mr. Charles Eaton has some Industries, eight years old, and they have borne very heavily.

Mr. Osborn—I am very much interested in that question myself.

Question—What are the best plums for Delta county, and has anyone here tried the Marianna plum?

Mr. Coburn—I am the only one here from Delta county and I suppose I am looked to to answer that question. I will say that I have the Marianna plum, and am perhaps the first one in Colorado. I sent east for the trees, nine years ago, and I paid $1.50 per tree for little bits of June budded trees, eight inches high, and that coming winter they were killed clear to the ground. The next year they started up, made a remarkable growth, and the next winter they were killed about half way down; the third year they made an excellent growth, and only the ends of the limbs were killed. They are now very hardy, and one of the trees is about as large as my arm, another one is very small and has never had a blossom on it, while another right alongside of it has borne two crops of plums. They are, however, not fit to ship, being of very inferior quality.

The first and best plum in Delta county is the Wild Goose. I have but very little choice between the Lombard, the Pond Seedling and the Bradshaw; but I believe I would throw them all out and take the Ogon and the Yellow Botan Japanese plums.

I think the people should let the Marianna plum severely alone. It is practically worthless. It is not a good shipping plum; frequently in packing, a drop of juice will exude, and in 24 hours they will turn black. Plums were scarce last year on the western slope. Wild Goose would bring me $1.50 per box and my Mariannas would bring me 15 cents less freight. They were spoiled, they said; but they were not worth loading.

Mr. Smith—I have ten or fifteen in my garden, and they have not had a bloom on them.

Question—Is The Queen of the West raspberry a success in Colorado?

Mr. White—It is said to be a black raspberry that it will stand the winters from the Atlantic to the Pacific, without being covered.

Mr. Brothers—I know lots of horses that will stand through the winter, but it will take all the summer to get them up.

Question—Is it advisable to hill up the dirt around fruit trees?

Mr. Grimes—No.

Mr. White—It cannot do them any harm.

Mr. Coburn—It will not do them any good.

Mr. Brothers—I tried that method some years ago and I found that when the sun struck the bark of a tree that had been treated in that way, it burst open, and those that I did not hill up, were better than those I did.

Question—When the ground will freeze under a peach tree, without injury to the fruit; would not a vessel of water hung in the tree, show the presence of freezing among the fruit?

Mr. Coburn—I have no doubt it would if it were tried.

Mr. Brothers—It would on this side of the range, but on the other it would not. (Laughter.) When we were at Mr. Fauscett's, if it had been on this side of the range, we would have had everything frozen solid, if it had been as cold here as it was there; yet with that dry wind, they did not suffer at all. That man told me that he had gone out in the morning to pick berries when his fingers ached with the cold.

There is something in that belt that we have not got on this side of the range. The ground will freeze, yet the trees will be all safe.

Mr. Steele—I believe Mr. Brothers is right about that. I do not believe that if there is frost on the ground, that a vessel hung in the trees would show

any ice; there seems to be a warm breeze that keeps the frost off. I noticed that one April, some years ago when there was a very heavy ice on the ground and I had some Russian mulberry trees, that where the limbs hung down low at about the height of my arms, every mulberry had been killed, and above that, the tree was full of mulberries. This is particularly brought about by the peculiar transfiguration of the mountains.

Mr. Coburn—There is a kind of trade wind that is more conspicuous on the North Fork; as regularly as sunrise and sunset, all day it blows up the valley and all night it blows down the valley, and if there is any change or diversion from that wind or breeze, it is a sign of a storm; but it is just as regular as it can be. Out of the 365 nights, it would blow 340 during the year.

Question—Will the writer of the paper on peaches, carefully again name the varieties he recommended?

Mr. Coburn—The varieties are the Chinese Cling and the varieties springing from the Chinese Cling.

The Family Favorite is the first peach ripening; that will be ripe about the fifteenth of August. The next is the Chinese Cling; this ripens about the 20th of August; then comes the Elberta about the 19th of September; and last of all, the Captain Eads about the 20th of September. They are all of the Chinese Cling origin, fruit hardy and very prolific.

Mr. Steele—Permit me to add to your list the Hale's Early, coming in after the Alexander. It is classed among the cling stones, but in reality it is not perfectly so. With us it is a profitable variety.

Mr. Coburn—Had they asked me the name of the best peach, I would have named the Hale's Early first, but I mentioned the peaches of Chinese origin.

Mr. Daniels—I have been examining the peach market, and I desire to find out the best variety of peach for this market, and I found the Alexander gets

here at a time when the California crop is at its height, when California is sending her best, and I have come to the conclusion that I would not raise anything that came here at this season. We would always have these peaches to contend with, and for this reason it seems to me, that for more than what is needed for our immediate vicinity, I would not use any very early peaches.

Question—Will the writer on "The Apple" name those he thinks best for profit, and also those for quality?

Mr. Spears—I think I would hardly be in a position to answer that question. There are fruit growers here; I am a nurseryman, and am not raising fruit to sell; as I advertise all varieties, I must have a larger variety than it is advisable to plant, to meet the demand of my patrons and for profit. I think it would be better for some others to give you a list.

For myself I should advise the Ben Davis for profit, not for the apples, and the Grimes Golden, the Wealthy, the Duchess and perhaps the Red Astrachan, not only for profit but for fruit.

Mr. Stone—Is there not a seedling from the Ben Davis that is recommended more highly than the Ben Davis itself?

Mr. Osborn—There is a seedling of the Ben Davis recommended better as to quality.

Mr. Spears—The Gano by name.

Mr. Osborn—To-morrow we have the Question Box again, and one of us might ask for five or six of the best winter varieties, or early varieties.

You will remember in my address I hinted that we were planting too many varieties in Colorado. If we could decide on half a dozen of the best commercial varieties to grow in Colorado, and stay with them, this is what we need. The answering of a question does not necessarily cut off debate; the very same question may be asked again to-morrow, and I will say that

these very questions and their answers are the most interesting part of our meetings.

We are about to close, and I can say this: That this has been one of the most interesting meetings we have had for years, as well as the best for the first day, and I have attended them for a good many years.

Mr. Spears—I think we had better put in the question asking the society to give the best variety.

On motion adjourned until 8 p. m.

EVENING SESSION.

January 11, 1894.

Meeting called to order at 8 p. m.

The first paper read was one entitled: "Ripening of Wood in Deciduous Fruit Trees." Paper by Wesley Ault, of Paonia. (Paper mislaid.)

DISCUSSION.

Mr. Osborn—This is one man's experience and he recommends late irrigation; I agree with him on that, thoroughly agree with him.

I can state a little circumstance that happened over 25 years ago: A man, a member of the legislature from Boulder, had a little place in his five acre plat that dished like a saucer, and he had trees planted all around the rim, and planted the remainder of his trees in the little basin, and he cautioned his family, that while he was away, not to let the water in the ditch freeze so as to overflow; but it did freeze, so much so that it ran over into this little basin and filled it with six inches of water. Understand that he was very careful about not watering the balance of his trees; however, these in the basin were the only ones living in the spring.

I have often thought of that accidental experience, and that is the way we learn. I have learned

many things merely by accident, in regard to tree planting and tree cultivation. I do not say that my way is correct, but I do say this, that it helps the trees very much to irrigate them, as this gentleman says, the last of October and the middle of November, and in fact I would not hesitate a moment to irrigate them in December if I could get water, but the great trouble in Colorado is, that in the little ditches or laterals, the water is shut off for domestic purposes and they cannot irrigate that late; but of those who can and do, I have seen good results.

Of course I am not in favor of irrigating through August and September for making a new growth. I think we are all agreed upon that to-day; but I do approve of late irrigating. Saturate the ground as thoroughly as you can with water and as late as you can. I would not object to getting it on now if I could, but nine-tenths of the water supply is cut off, and you cannot do it.

Mr. Coburn—I will say for those not acquainted with Mr. Ault, that he is a neighbor of mine, and a very careful, observing man with everything he does about his orchard; he has about 35 acres. It is not the oldest, it is only four years old, but there is no finer orchard for the age than is his. He is a very close observer, and in his experiments he always takes notes of them, so that he can refer to them hereafter.

As regards watering the trees late, or allowing them to remain dry during the winter, I have noticed during several years that where there were some trees that would fail to get water the last watering in the winter, or fore part of the winter, and it had come on to be a dry winter, the moisture would dry out of the soil, and will not furnish enough for the roots in order to keep the branches in good shape during the winter, and where there were dry winds and cold they almost invariably killed the fruit buds, and even killed the wood.

Mr. Osborn—I think it is the same with strawberries and other small fruit; I know I irrigated mine this year and I am satisfied this is the best thing to do. It enables them to winter well and they will be more liable to produce well next spring; with raspberries it is the same thing. Some people have their raspberies so dry that the ground would be like dust; others irrigate profusely, and they are the ones that come out best. In my own mind, I am thoroughly satisfied that late irrigating is what we want.

I was raised in the state of New York where it is cold, and where it is many degrees colder than it is here, but the ground is always moist, and the roots go down below the frost line, where they get their nourishment and retain their vitality.

I think this is a very important question for the horticulturist to consider. I believe I would lose my strawberries if I did not irrigate them late, or else mulch them thoroughly.

Mr. Spears—I think that mulching is perhaps nearly as essential as late irrigating; the people who have but little late water, if they mulch them, can keep what vitality there is there.

In the forests the leaves fall off and make a thick fibrous blanket over those roots near the surface that aids the tree very much, and if the trees are mulched good and thick, it will be a good fertilizer and prevent the tender roots from being subject to the changes of temperature.

Mr. Brothers—How about this orchard of Mr. Stark's, near Littleton? They have no water on that at all. I would have watered my orchard this fall if I could. I watered part of it, but the other part I could not water; I got the water running only part of the way through. I am going to notice this, and a year from now I am going to give you the results. I am like Mr. Smith; if I could have gotten the water, I would have put it on.

Mr. Smith—In central Jefferson, where I live, three years ago everybody mulched; now there is not one patch of strawberries in my neighborhood that is mulched. If I mulched at all, it would be after I finished picking; but I will never mulch again for one reason, it puts my berries in market when they are worth a dollar a crate, and consequently not worth picking.

Mr. W. T. M. Stone—I have had some twenty years' experience with trees, not fruit trees, but forest trees, and I presume all trees in this country are more or less alike as regards their needs in winter and summer. With me, this matter of winter watering is not a theory. Years ago I became convinced that winter watering was as necessary as summer care. I became also convinced that summer watering was overdone.

In Denver, twenty years ago, the water was running down every street in Denver; there was plenty of water; people were setting out shade trees along all these streets; it began a little earlier than the time I mention. Of course anyone who had had much experience would not do it, but generally my neighbors were giving their trees a great deal of water. The ditch would come down with this water and the water was allowed to run, and encouraged to run by the tree all summer. It seems to me it was hardly the thing. I pursued a different course with mine. I watered them more seldom. I had seasons for watering, I kept it away after I had had some experience, and found that by watering my trees carefully during the summer, and giving them very much less water, they were doing better than others, and I can show you trees to-day treated in this way that are superior to the others.

If you can remember the winter of '72 and '73; it was a beautiful one; we had weather very much as this is. There was very little cold weather and very little snow, in fact we had no snow until April, and then it came all in a bunch. I heard people complain-

ing next spring about losing their trees, and it gave me a pointer, and I noticed afterwards, as years went by, that where trees were not watered during the winter, there was a great deal of loss.

The last thing I did this fall in trees I set out last spring, was to give them water. We have had no rain and but very little snow, and if this weather is going to continue; it is going to try our one and two-year old trees. Stark Bros.' trees are a number of years old, the roots have gone down into the ground where the moisture is, and there is not much probability of their trees dying; but the one-year-olds and the two-year-olds are the ones that are liable to be tried.

I am sure that many people have not been in the habit of using enough water in the fall and too much in the summer.

I had a letter from Stark Brothers the other day, in which they said: "You people in Colorado must learn to use less water." That means for the summer.

As regards his orchard, my opinion is this: He makes moisture in his orchard; he does not get it from the ditches; he does not get it from Heaven, but he manufactures it. He keeps up that intense culture that brings to the surface all the moisture that there is in the ground. I went in there last summer and it seemed to me to be as dry as it was possible for it to be; I kicked up the ground with my foot and it went right down to moisture. If anyone had told me that before going into the orchard, I would not have believed it, but I saw it at once, just as plain as the ground itself, and we know the reason now; his trees go into winter quarters well watered, that is, there is plenty of moisture there, and the surface is so smooth that the weeds have but very little chance as compared with our orchards.

I am convinced that winter watering is as important, or more so, than watering in July.

CHANGE OF SUBJECT.

Mr. Osborn—Mr. Coburn has something to present to us.

Mr. Coburn—I have a circular letter which was gotten up in Delta the first of December, in reference to the United States Pomologist. There may be several here who are not aware of the fact that Secretary Morton relieved Professor Van Damen, last spring, as the United States Pomologist, and had not appointed, up to a short time ago, a new man to take his place; and a few friends of Mr. Van Damen's got this letter out and sent it to prominent horticultural societies in 38 states, and the societies were asked to get out personal letters to Secretary Morton, asking the reinstatement of Mr. Van Demen.

I myself wrote him a letter and asked him to reinstate Professor Van Damen. I was home last week and received a letter stating that the office to which I had referred, had been filled; but I suppose it is all off now, and it is hardly worth while to read it here; but as it is very short, I will do so.

Reads letter.

(Continues.) We made an effort, and as I have said, we have just recently learned that we have failed.

MY EXPERIENCE WITH A FEW INSECTS AND INSECTICIDES.

Paper by Mr. John Gravestock.

The first insect I have had to combat in Colorado, among the fruits, was the grape-leaf hopper. I first noticed this insect some ten years ago on a wild grape vine that was growing over a porch. At that time it was not thought by most of our fruit growers that it would ever do any damage; it was only a little

fly and would soon leave; but those that have grown grapes the longest in Colorado, know they have not left yet worth a cent; especially where they have not been kept under. We have tried several methods with more or less success, but have not, as yet, been able to get away with them entirely. A strong tobacco decoction is effective, also coal oil emulsion made 1-15 coal oil. Hot water thrown on at 140 degrees will kill everyone it touches and not injure the vines, but it is a very difficult matter to get it on the vines at just that temperature. The best thing yet seems to be the formula we purchased of Professor W. H. Brown this last spring; but it must be used double strength to be effective, and then it will kill every one it touches.

For the codling moth we have tried different methods, but what we have found most effective is three or four good sprayings of Paris green or London purple or the Climax poison; we have mostly used the latter with good effect when thoroughly applied. We have also used bandages round the body of trees for catching the worms as they descend, and have killed thousands in this way, but it is too much trouble. We have also used the gauze wire netting for trapping the moth, by which means we have caught thousands, but so far we have not found anything so effectual as three or four sprayings with arsenical poisons, one pound to 150 gallons of water, thoroughly applied, first spraying just as the blossoms fall, second spraying when the apples are the size of hazel nuts, again in about two weeks; the last time two or three weeks later.

Another insect of more recent date, that is giving us a great deal of trouble is the woolly aphis. This insect seems to work upon the branches of the apple tree in the summer and goes down to the roots in the winter, where it seems to do more harm than in the branches in summer time. I have seen trees in the middle of the summer look like a snow storm had passed over them. At the base of every twig and leaf

will be, to all appearances, a small hull of wool or cottony looking substance, under which will be found from two to ten flesh colored aphis, some very small and others fully developed. If you press them between the fingers, to all appearances your fingers look to be covered with blood. I have never seen them on any other kind of tree but the apple and oleander. The methods of extermination we have tried are strong tobacco decoction, one pound to three gallons of water, boiled fifteen minutes, coal oil emulsion made with 1-15 coal oil and the formula we purchased last spring of Prof. Brown. Either of them are effective, especially the latter, but must be applied with great force from a spraying machine, so as to knock off the woolly looking substance, that the emulsion may come in contact with the insect or the application will be perfectly worthless. This insect has got to be got away with or apple growing in Colorado, in a few years, will be a thing of the past. I have seen fourteen-year-old trees in our neighborhood so badly infested at the root near the base of the tree, that I have cut enlargements from the root, larger than a gallon measure. It was in what ought to have been a splendid orchard, of about eight acres, but most of the trees looked sickly, as if about two more years would entirely destroy them if something was not done for their immediate relief. I have also found good strong quicklime applied to the roots of young trees to be effectual. Bare the roots at the base for two feet around and shake around the roots three or four quarts of good quicklime and cover on the earth again. I have treated young apple trees in my own orchard in this way with perfect success. This lime application was made in the spring time.

Another insect pest we have lately found playing havoc in our orchards is the red spider. This we only noticed this last spring to be doing any damage. Then it was brought to our notice by Prof. Brown. On close inspection we found many trees to be in-

fested from top to bottom, and more or less scattered through many of our orchards. This red spider seems to infest pear trees worse than any other kind, although we found them on apple, plum and cherry trees, but not in as large numbers. This insect seems to be the most difficult to exterminate of any we have. It only seems as yet to be doing any material damage in our oldest orchards.

The pear slug is another mean insect that will do considerable damage if left alone, but it is very easy to get rid of. Coal oil emulsion with a little Paris green added is sure death if taken in time, but if left alone it will soon destroy all the foliage of a pear tree. This insect I had this last summer for the first time on my dwarf pear trees.

There is also another insect that began working on our strawberries this last spring, which will have to be looked after very closely or it will do untold damage to our strawberry growers. What the name of the insect is, I don't know. If it was not for its color, I would think it was the red spider, but it is a greenish brown color, about the size of the red spider and about the same shape. It cannot be seen very well without the aid of a magnifying glass. It works under the leaves and in a few days saps the plant and makes it look as if it had been scorched. One corner of my strawberry patch was attacked by them last spring when the berries were about the size of the top of the finger; the berries never grew any more, but died off. It was around Canon in different places, but not all over. One of my neighbors lost half his patch before he noticed them. As soon as I found out they were in my patch, I took some of Prof. Brown's formula, made a strong emulsion and gave them a thorough spraying, and stopped their further progress, or I might have lost half my patch. I think a very good name for this insect would be the strawberry mite, if its name is not already known.

There are many other insects which might be mentioned, but those I have already spoken of, I

think, are the worst enemies of the fruit grower in this part of Colorado. In our vegetable gardens we have many insects to combat in order to make vegetable growing a success. First comes the turnip flea beetle; this will soon destroy a large patch of turnips, cabbage or radishes, if not closely watched. On their first appearance, I have used with success Paris green and London purple at the rate of one pound to 150 gallons of water, put on with a spraying machine. This ought to be applied every three or four days for a week or ten days. Two other great pests which work on our cabbage are the cabbage lice and green cabbage worm. This I have entirely kept under, this last year with Prof. Brown's formula. This must be applied early, before the cabbage began to turn inward to heart. I growed last summer, three-fourths of an acre of cabbage and cauliflower to perfection, with three sprayings of the above formula.

There is another insect which attacks our tomatoes. I call it the tomato scale, and if not checked in time it will soon destroy a large patch of tomatoes. This is a scaly insect and adheres to the under side of the leaf, and seems to sap the vitality out of the plant and the plant soon curls up and dies. The Brown formula, above mentioned, used very strong, if used in time, I have found a sure remedy.

DISCUSSION.

Mr. Thompson—The writer of this last article seems to be pretty thoroughly impressed with the virtue of Mr. Brown's formula. It seems to me that if it is so very valuable, it should be known to the horticulturists here to-night; in fact, if this remedy is as valuable as this gentleman thinks, it would be well to have them universally known.

Mr. Osborn—You have to pay to know this. (Laughter.)

Mr. Brothers—I believe it is a very good thing, but I had to pay quite a little to get it. I wish I could

let it be pretty well known, but I do not see how I can.

I went all over my trees last spring, as some of you gentlemen know. Professor Brown got a notion in his head that it would cure blight, but I think he is a little off there, so far as my experience goes; and yet that tree that I saw him fix, it did splendidly last year, but those he told me to fix did not do quite so well. (Laughter.) The tree is there to be seen, and I believe that if that tree could be saved any tree could; it made a beautiful growth last summer. I will say, however, that I did not do all trees as the professor told me to. He cut the top off that tree about three feet from the trunk, made a nice ornamental top out of it, and it spread out and did splendidly.

I do not think that Professor Brown was to blame for most of my trees dying. They were too far gone for any living man to save. I took up this year between 50 and 60 eight and nine-year-old trees.

Mr. Thompson—How much did the formula cost you?

Mr. Brothers—Fifty dollars. I am not sorry that I spent it. I would not take $50 nor $100 for what I learned this last summer; I believe I saved more than that, though I lost lots of trees, and I am going to lose some more. I expect to dig up 25 or 30 more of the same large trees.

Mr. Osborn—What do you claim to be the matter with them?

Mr. Brothers—Blight.

Mr. Coburn—I would like to ask Mr. Brothers, if by paying the $50 it gives him the right to manufacture and sell?

Mr. Brothers—Yes, sir; but before I go any further, I want to satisfy myself that it is really good; if I got taken in myself I don't want to take in anyone else; but I am satisfied it will kill the woolly aphis; but the trouble I found with it is the good Lord

protected these little fellows with the cotton or woolly substance, and the water will run off them juts like off a duck's back, unless you force it.

I went around all my trees and as far as the roots of the trees are concerned, they look in a good deal better condition than they did last spring; a year from this I will be in a better position to say how this medicine acts on the roots.

I believe, like Mr. Gravestock, that in the summer, they are in the branches, and in the winter, down in the roots. I think, between the woolly aphis and the blight, a good many of my trees are dying. I lost every pear tree I had, and I lost all the Pewaukees, Snow apples, Duchess, Yellow Transparent. It seems, however, to affect some kinds a good deal more than others; it affected the Ben Davis a good deal but it stood there.

Mr. Thompson—I am very glad I asked this question. It has brought out some very valuable information. It strikes me, that after what has been said, Mr. Gravestock's article wants to be taken with a good many grains of allowance. He is engaged in the manufacture and sale of this article, and hence he would be more or less enthusiastic about its merits.

Mr. Brothers—I want to say that Mr. Gravestock has no rights here, and if he could sell he could only sell in his own county. He told me that they got him to make it up for the horticultural society for that county, and I do not believe he would lie about it.

Mr. Coburn—I know only what I saw down there. I saw Mr. Gravestock making it, and he assured me that he was making it to distribute around the vicinity, and Mr. Brother's version of the matter is the correct one.

Mr. Smith—In examining the orchards in California last winter, I ran across one in a little valley in which every tree was covered with whitewash; it struck me as the best thing I had seen, and I made up my mind to try it.

Strangers coming into this meeting and hearing that paper, would conclude that we had a great many insects, but we have nothing to what they have in California. I did not see this whitewashing in any other place, but I believe it would be well worth trying.

I believe the apple is like the Jersey cow in that if care is taken of it, you can get something out of it.

Mr. Brothers—I tried that lime business. Professor Gillette gave us an idea on that. I will state that the professor suggested that if you put a little lime in while spraying, he thought it would help, and I tried it this summer. I put a couple of quarts to 200 gallons of water. It did not make the leaves white, but you could tell every tree that I had sprayed and I think it a very good thing. I have also tried lime on the body of the trees; but I do not know that it helped the woolly aphis one way or the other.

Last year, every time I sprayed my trees, we had rain the day after. I sprayed some of my trees four times last year, and every time there would come a shower and wash it off.

Mr. Osborn—There is a good deal about the insect to-morrow, and those who are here to-night, perhaps you are all—I know we are all interested in the welfare of the insect; but we do not mean the success of the insect, we mean to get rid of them.

We want to impress on the minds of the horticulturists that we need an organization in every county and fruit district in this state, to eradicate these insects. I wonder if anyone here can tell the thousands of dollars lost this year by insects, in the fruit industry of this state? I know of two orchards that lost nearly $1,000. How did they lose it? They had apples worth one-half price in one place and not over three-quarters price of first class apples on the other.

Of the apples I raised this year, I lost half by the codling moth. Some might say that I would not

make a very good president of the horticultural society if I could not take care of my own orchard; but I had my reasons why I did not take care of them better. I had all preparations made to take care of the insects and wait on them. I was on the ground and had possession, and they were on the ground also and had possession; but we had a very heavy wind just about the time the trees were in full bloom, the heaviest I have known at that time of the year for 33 years, and about two days after, or three days, I had an appointment to take this tour over the state. I sprayed them before going, but I could not see any apples; but I could see this: that the wind had blown off every blossom. I could not find one, nor could I find any apples. I told Mrs. Osborn that I had made all arrangements for a neighbor to spray them, and he was to do it in a week or ten days. However, she wrote me that there were no apples there to spray; but there were apples and I would have had quite a crop; but I lost half of them and the other half was not good for anything.

Now I say the most important thing for the State Board of Horticulture to do is to devise some means to encourage organization in all the fruit growing districts to help the state board. The state board alone cannot do anything. We must have help, and that is what we are here for.

Mr. Brothers—I have an insect in my orchard that I never saw before. I brought one down to Mr. Tobias, and he sent it to Professor Gillette, and I want to ask anyone here who sees anything new in their orchard in the way of new insects, to send a specimen to Professor Gillette. These little fellows worked on my apple trees like the leaf hopper does on the grape. They bite the leaf a good deal like the vine hopper, but they themselves are altogether different. They are laying in the orchard now, underneath the leaves, and when there is a warm day the little fellows are very lively. They are in the ditches

now where there is no water. The wind has blown the leaves in there, and any day you could find them there by the hundreds of thousands.

The plan I propose is this: As soon as the leaves get dry enough, I will burn them if I can. I would like to ask Professor Gillette, if he thinks that would be a good plan?

Prof. Gillette—I should think it would be a very good idea, as I understand you to say that these hoppers will hop out on warm days. It might be the false chinch bug; your description would apply to the apple hopper. I have not seen the specimen.

Mr. Tobias—I sent it to you.

Prof. Gillette—Oh, yes; I remember now. The specimen I received from Mr. Tobias was that of the false chinch bug.

I have seen the false chinch bugs do a great deal of injury to grass seeds in Iowa, but I do not think there would be a sufficient number of them to injure the trees.

I also want to say that Professor Brown's visit to Colorado has done a great deal of good in getting fruit growers to do something for the insects. I have no idea that his remedies will do any more good than a good tobacco emulsion; I think as much would be gained by spraying your trees with a kerosene oil emulsion; perhaps a little carbolic acid added, would be as well.

Mr. Osborn—I would say here that the Agricultural College has issued some pamphlets treating on insects. I presume there are a good many here who have never received that pamphlet.

Prof. Gillette—I will be pleased to take the names of anyone who will receive the bulletins of the experimental stations. They cost nothing.

CHANGE OF SUBJECT.

Mr. Coburn—Before we adjourn, would it not be a good thing to open our books to new membership in the horticultural society; and in view of the hard times, and the fact that we had some $75 left over from last year, I would be in favor of admitting the annual membership for the coming year free of charge and open the books so that as the members come up here, they can register and become members of the society.

We are desirous of all the fruit growers coming in and registering their names. I will make that as a motion.

Mr. Wilcox—I want to rise to a point of information? I want to know whether the Colorado State Horticultural Society is still in existence, or whether it has gone by the board? I think we should have some additional information as to the final disposition of the old society, to which, I understand, there was a paid membership. The governor seems to have done away with it. He certainly did with the head of it, and we would like to know what has become of it?

Mr. Tobias—Mr. Wilcox was a member of the committee in the legislature.

Mr. Wilcox—But there was nothing said about it in the act.

Mr. Tobias—There is no old society. There is no money to carry it on with, and this State Board of Horticulture is carrying it along with their organization, because the law that created this State Board of Horticulture, took away the appropriation from the State Bureau of Horticulture, and without it, their reports could not be published, and in fact, we did not see how we could carry it separately without an appropriation.

There may be others here, who understand it better. Mr. Coburn can explain better why it is so.

Mr. Coburn—My understanding about this matter was this, that when we became a state department, I was on the committee to try and revise the bill. Mr. Wilcox was on the committee, as well as Mr. McClelland, Mr. Gallup and Mr. Gillette. We worked on each and every section, and adjusted it thoroughly and discussed it thoroughly before we put it down in any shape; and my understanding at the time was, that when we came to this appointing power, some suggested the idea to leave it the same as it was and allow the society to elect, and I said I had my doubts whether it could be made a state department, and retain the elective privileges of a private society; that I thought if it became a state department, that it would have to go to the executive of our state to appoint the officers, and on investigation, I believe, we found it that way. And for that reason, we have the appointing power in the executive's hands, so as to come under the head of a state department.

It was never my understanding that it would interfere with the organization of our old scoiety; that we were to have $2,500 appropriation instead of $1,000, and not get even that much half the time; but if we got this state department, and had an appropriation of $2,500, my understanding was, that the board that was to be appointed would take charge and work with the old society.

According to my understanding, it does not do away with the old society, and I did not think for a moment that I had given up membership in the old society, when I became a member of the new; I believed it would be under the auspices of the state board, and the simple fact of the officers being appointed instead of elected, would make no difference. That is the way I understood it.

Mr. Osborn—I would say to those who leave their names here, and wish to become members another year, that you will get our printed reports free.

The motion is, that we admit the old members and the new, free of charge for the coming year.

Mr. Brothers—I do not think that will satisfy them The old members want the power to choose who they want for officers, and that knocks the state department. I do not know what we can do. You know as well as I do, that there was always some hang about getting that thousand dollars, and frequently it was more bother to get it than it was worth; and I do not believe we would have gotten the last thousand dollars at all, if it had not been for the efforts of one of our friends. They were always growling about it, and saying if there was anything left over, we could get it, and so on; but now there is no trouble for us to get our money.

Mr. Coburn—It puts us in much better shape to go out and develop our interests in the state by having $2,500 per year; and I trust there is no one who is so short-sighted as to draw out. We cannot come together and carry on this business without money from the state, and we have now organized and got it passed through the legislature, and are a department of state, and I see no reason why we should not go on.

Mr. Thompson—It strikes me that in the discussion of this matter, that the appointing power has shown itself very courteous in the appointing of officers of this society.

Mr. Coburn's motion, that all who were desirous of becoming members be admitted free, was then put to vote and carried unanimously.

Mr. Smith—There is one question that I should like to hear discussed, and that is in regard to exposure—proper exposure of orchards in Colorado. The question has already been suggested, I believe.

I thought we had time enough. You know in our old society, people would get up and tell us that we ought to put our apple trees on northern exposures. I have quite an interest in fruit and I have

beside been watching it in many places, and have just made up my mind that we were advised wrong. We were told then, as we were to-day, to "harden" our trees.

I believe we have a climate in Colorado in which we can grow good trees and good apples, and we have no reason why we should harden our trees, and put our orchards on the northern slope. My best fruit trees to-day, are those on the sunniest exposure. I have now twenty acres broken up, and as there is scarcely any frost on the southern exposure, I feel as if I wanted to put that twenty acres in fruit trees. If I was putting out an orchard to-day, I would put up a wind break. I would surround it on all sides. Also, in digging my holes for grapes, I would dig them so deep that the water would never get out.

In Colorado, I think, we should favor our trees all we can, and we should use all the manure we possibly can without burning the trees out.

Mr. Brothers—I do not want to be talking all the time, but I am in favor of wind breaks for a good many reasons.

This is like another climate to what it used to be 25 years ago. When I first came out here, I planted some Lombard trees, Green Gage and several kinds of fruit; but I had no success with them at all and got discouraged and quit on these kind of plums and went to raising wild plums and the hardier kinds, and had good success with them. The wind, as I said, does not act as it used to do. Around Wheat Ridge it is like another climate; get on top of the ridge, and it cuts a man's ears pretty badly, but when he gets a mile further, it is like another country. I think with a wind break around an orchard, we will save enough apples from being blown off, to more than pay for the wind break.

It protects the trees in every form. There is only one thing that I do not know that a wind break is

beneficial for, and that is for blight. I do not think it will do any good for that.

Henry Lee has a beautiful orchard without a speck of blight. But if I was going to plant an orchard out now, I would plant it with a wind break running on three sides of it—south, west and north.

When I first planted trees where I live, I planted English poplars, and to-day they are like a wall, 25 or 30 feet high. I worked there many times before there were any trees; and, as I said before, it is like another country. I do not know of another tree that will grow from the bottom to the top as they do; and as a wind break, they cannot be excelled.

As regards the different exposures, I have given that up. I am like Mr. Smith. If I have a piece of land on the northern slope, it seems to me I would rather plant an orchard on the northern than the southern slope, and yet I do not see any difference in my orchard on that point. I have trees planted on the northeast, northwest and southeast; and, as far as the growth of the trees is concerned, I do not see any difference in them, and yet to-day, I think, I would rather plant an orchard on the northern slope than on the southern.

Mr. Stone—What tree would Mr. Brothers use if he was planting for protection?

Mr. Brothers—The English poplar.

Mr. Stone—Do you mean by the English poplar, what we call the Lombardy?

Mr. Brothers—Yes, sir.

Mr. Stone—Do I understand from Mr. Brothers that the prevailing wind is from the west?

Mr. Brothers—Yes, sir; northwest. From the mountains.

Mr. Stone—I spent a summer in Weld county and have no hesitancy in saying that our prevailing wind was strong from the northwest; but I have changed my mind about winds since I was in Weld county.

I noticed this last spring, that it would blow and dry worse than the sun, if possible. The sun was bad enough, and the next day it would blow from the south; and, I am free to say, from my experience in Weld county, that the winds are principally from the northwest. That is where I would put up my windbreak.

Mr. Spears—The wind that comes from the northwest is very dry, and oftentimes severe; but from the south and southeast, it is usually more bracing, and in the spring, since I have been at Greeley, we have had more or less of it from the south and southeast. I think a protection should be made on these two sides, to protect the trees while in blossom from these chilly, damp winds. The other winds may take off the apples, but I do not think they hurt the blossoms half as much.

Mr. Stone—How about the slope?

Mr. Spears—I would give it to the north.

Mr. Smith—Why would he give it to the north?

Mr. Spears—With a wind break on the north, and planting your trees on a southern exposure, you are practically planting them in a hot bed. I saw Mr. Brothers' trees on the south, and they are practically played out, while those on the north, east and northwest slope are practically free from blight. I did not see any affected from blight. And they were protected on the east by breaks that protected them from the south winds entirely.

Mr. Brothers—That is not exactly a fair test. The ones on the northeast slope, that he speaks of, are Ben Davis; the ones on the southeast slope are the ones I have been telling you about. Several years ago, Mr. Ackerman, Mr. Coburn and myself, experimented in keeping apple trees back in the spring, and I got the opinion that the northern was the best slope, because the frost will keep in the ground longer, and thus prevent the trees from blossoming too soon in the spring.

Mr. Ackerman took some Crabs. I took a dozen or more Duchess. After the snow came, I mulched them; then I stamped them down, and stamped the manure into the snow; then I got some water that fall and I watered them.

Mr. Ackerman's experiment was a good deal like mine, only he had his men water these every morning, six or eight buckets full.

I went around my trees in the spring and the ones I did not mulch came out in blossom, and the trees that I mulched and iced in, blossomed the same day and hour. There was not a particle of difference in them, and Mr. Ackerman gave the same experience. There was not a day's difference between them and you could not tell them apart. Mr. Coburn can no doubt give the very same experience.

Mr. Coburn—I will add a little, perhaps, that you have forgotten, and that is that I mulched three trees in January, after the ground was frozen hard, and packed ice around them, and then covered it up to within four feet of the top with refuse cane, the same as you would any ice house, and in the spring there was not fifteen minutes difference. I took my pick, and found that the covering was as hard as in January; and before the ground thawed out, the blossoms all dropped off, and there was not a plum on the tree, while those on both sides were as good as they could be.

In reference to this slope business. In the place where I live, our whole country slopes to the southwest, the river running down in the center, the whole country sloping from the mountains. On the north side of the river, all the land slopes south, while on the south side, the land slopes north. We have orchards on both of these slopes, and I cannot see one particle of difference, only those on the south slope have peaches and apples ripening probably ten days earlier than on the northern.

Mr. Easley—I will have to give my opinion on slope. As far as the undulation of the ground lies, in the general lay of our country here, I think it makes but little difference what slope we set an orchard on; but if the undulation was very great, I would prefer a northern slope every time. An apple tree loves a cold country. It is adapted to a cold country, and it has every advantage by having a northern exposure. The temperature is more even. The winters in our country are very trying, and a southern slope plays the mischief with them.

I think I have had some trees killed on northern exposures by snow, since being in this country, although on the whole, as the temperature is comparatively even, it rather has a tendency to keep the trees back at a time when they should be kept back; but where we set out orchards generally, it is so nearly level, that we cannot discover any difference hardly; but I would prefer a northern slope.

As far as the wind break is concerned, I am in favor of wind breaks. The greatest reason is on account of the terrible sand storms, especially in the sandy district where the sand and grit has a tendency to bite the trees all to pieecs, on the west side. I should think that would damage a tree very much. A wind break is of great advantage to a young tree, and a very great advantage when they get large, as it protects the fruit when young and prevents it from being blown off.

Mr. Smith—The best orchard I have seen in Colorado was Mr. Stevens', north of Longmont. There is not a spot in his orchard but that you are perfectly surrounded with trees, and I think it was the best I had seen here. His place is entirely surrounded by the largest trees I have seen in Colorado. The varieties of apples he raises are the Ben Davis and the Northern Spies.

Mr. Brothers—Is there any blight?

Mr. Smith—Not a bit. You never find blight where the trees are not bearing.

Mr. Brothers—I would like to know then, how it is that it strikes a tree that never had fruit on it. I have lots of it where the trees have never had an apple.

Mr. Spears—As regards this northern slope question. Mr. McLean had an orchard that had more fruit in it than any I had ever seen, even in New England, except, perhaps, one little orchard that covers about 100 feet. This slopes to the north, perhaps a very little to the west. Generally, in the orchards in Weld county that slope to the south or southwest, I failed to find one that had a great amount of fruit on it. If that was chance, I will take my chances on the northern exposure.

Mr. Gillette—The experiments made by Messrs. Coburn and Brothers, I consider very interesting, relative to getting fruit; but it does not seem to me to have any bearing at all on the slope question.

Mr. Coburn—My impression is, that there is always sap enough in the limbs of the trees to preserve them during the winter and that there is enough sap in the limbs to develop the blossoms and let them come out; but if it is locked up the way I had it locked up, something has got to give way, either the leaves or the blossoms. There is plenty of sap in the branches to develop the blossoms.

Mr. Brothers—I believe Mr. Ackerman's trees are on the south. Mine are pretty nearly level where I tried this experiment—neither north or south, practically on the level—as level as I could get them.

Mr. Wilcox—There have been some deaths in the old association since the last meeting, and I move that a committee be appointed to draft resolutions.

Carried.

Chairman names Messrs. Wilcox, Coburn and Tobias.

On motion adjourned to 10 a. m., January 12.

SECOND DAY—MORNING SESSION.

January 12, 1894, 10 a. m.

The next regular paper is one by Professor Gillette.

Professor Gillette—Although I am down on the programme for a paper on fruit insects, I have thought it best to speak in my paper of only one insect. I brought with me, however, a number of insects in a box, and I shall be glad to have inquiries in regard to any insect. My paper is on the woolly louse, as that seems to be an insect that has caused the greatest attention; I was very much interested in the paper last night, as it brought up this very question. (Reads paper.)

THE WOOLLY LOUSE OF THE APPLE.

(Schizeneura Lanigera Hausm.)

By C. P. Gillette.

A great many inquiries have been received at the experiment station at Fort Collins the past summer and fall, concerning the woolly plant louse or woolly aphis of the apple tree. From the nature of the inquiries received, it is evident that the pest has not "attracted attention" simply, but it has been sufficiently abundant to occasion a good deal of uneasiness as to what its effects might be in the apple orchards in various parts of the state.

This is by no means a new or local pest upon the apple tree. Its injuries were recorded in Europe more than a century ago, and for forty-five years it has been complained of in this country in most localities where the apple has been grown. It occurs in injurious numbers from Maine to the Carolinas and from the Atlantic to the Pacific.

Whether the insect is a native of this or the European continent, there is a difference of opinion.

The first certain record that we have of the occurrence of this insect upon the apple is in 1787, when it attracted much attention in England. The nature of the peculiar affection of the trees was not known, and, on account of some one supposing it must have come from the new continent, it was called the American blight, a name that it still retains in the European countries. There is some reason to believe, though not at all probable, that the woolly apple louse occurred in France long prior to its first recorded outbreak in England.

The true nature of this peculiar affection of the apple trees was not discovered until the year 1801, when a German by the name of Hausmann described the louse and gave it the very significant specific name *lanigera*, which means woolly. At the time the pest was very abundant upon the trunks and limbs of the apple trees in Germany. In 1810 the trees were so covered with the lice in Gloucestershire, England, that the people were greatly alarmed for fear the trees would produce no apples for cider. It is said that the trees had the appearance of having been whitewashed.

In this country we find the first record of the appearance of this insect in Downing's Horticulturist, volume III, page 394, where Mr. J. Fulton, Jr., mentions seeing the warty roots and the woolly lice in the fall of 1848, and says that thousands of young nursery trees had to be thrown away on account of the injuries from the lice. He also mentions the occurrence of the lice upon nursery stock in Virginia, but says the nurserymen there did not know the nature of the affection, nor did they suppose that it did any harm.

In 1849 Dr. Asa Fitch redescribed this insect as an entirely new pest of the apple tree, and gave it the name *Pomphigus pyri*.

The insect is now cosmopolitan, occurring in nearly all countries where the apple is grown. It has been reported as a very serious pest in Chili, Austra-

lia, New Zealand, and in nearly all the European countries, and has lately been imported into India.

From all the reports of injuries from this insect in this and foreign countries that I have been able to find I cannot learn that it has ever caused the destruction of any orchard or considerable part of an orchard. Its chief injury seems to be to small trees; and in nurseries it often does cause the destruction of large numbers of trees. In orchards it is usually only scattering trees here and there that succumb to its attacks. I do not mention this as a reason why we need pay no attention to the presence of this pest in the orchard, but only as a reason for believing that, if due precautions and remedies are used against this insect, there is little danger that it will ever become very seriously abundant in the orchard.

The lice vary in size from the young that are scarcely visible to the naked eye, to the fully grown that are about one-tenth of an inch in length. The body is always more or less covered with a white waxy secretion. In large individuals this sometimes entirely covers the body and is thrown out in long slender thread-like filaments which are most abundant towards the tip of the abdomen. This wax is as white as snow and, on account of its thread-like fibers, much resembles wool, and hence the name woolly louse.

The bodies of the lice, after the waxy secretion has been removed, vary from a rust red to a slaty color. If the lice are crushed in the hand, their juices will stain the hand a dark rusty red somewhat resembling a blood stain. If one examines a cluster of these lice with a hand-lens he will see among them a large number of little semi-transparent spherical objects that might be easily be mistaken for eggs. These are not eggs but only little drops of a transparent secretion from the lice that become covered on their outer surface with little particles of the waxy matter which enables them to hold their shape and not run to-

gether as a particle of water might do on falling upon a surface covered with a fine dust.

Until fall, all the lice are wingless females and the young are brought forth alive, no eggs being laid. In the fall winged individuals occur and also degraded sexual ones. Whether the winged lice are true sexual individuals or not there seems to be a difference of opinion among entomologists and I have had no opportunity to make observations on this point.

As cold weather comes on, most of the lice above ground die, but Thomas, in Illinois, and Comstock, at Washington, D. C., both found that living lice occurred in protected places upon the trees above ground all winter to continue the species the following spring. In the orchard of Mr. McClelland, near Fort Collins, I found large numbers of living lice of all ages on December 23 of the present winter, after a temperature of 13 degrees below zero. The living lice were mostly found about the bases of the trunks or sprouts, where there was a partial protection of grass and leaves.

It is also stated that each female louse in the fall of the year lays a single minute egg, too small to be seen by the naked eye, in crevices of the bark. I can find no statement as to the size, color or shape of these eggs, and I believe that Dr. Riley is the only person that has ever seen them in this country, so far as I am able to discover from published accounts of the insect.

Upon apple twigs sent us a few weeks since by Judge Felton, of Canon City, and also upon twigs taken from Mr. McClelland's orchard, near Fort Collins, we have found what we think may possibly be the eggs of the woolly apple louse. These eggs are not deposited particularly in crevices of the bark or in sheltered places, but are scatered promiscously upon the surface in the vicinity of a cluster of lice. These eggs are globular, about one-fifth mm (1-125th

inch) in diameter, and are deep red in color. Until we can hatch some of these eggs it will be impossible to decide what insect they will produce. It is possible that they may be the eggs of the red spider.

The woolly lice attack the roots, trunk or branches of the trees, but never the leaves or blossoms. Some entomologists have strongly contended that the lice attacking the roots were different from those attacking the tree above ground, but that is now known not to be true. In Europe and in northern New England, and in cool moist climates generally, this insect is said to do most injury to the trunks and branches of the trees; whereas, in warmer and dryer climates the chief injury is to the roots, and that seems to be the case in this state.

The injury occasioned by this insect is due to the punctures that it makes in the bark for the purpose of extracting the sap of the tree. Favorite places for attack above ground are the new growth about wounds made by pruning or otherwise, and sprouts or suckers that grow from near the base of the tree. If the bases of any of the large roots are bare, the lice usually accumulate upon them, probably on account of the tender bark which they find in such places. The lice are not usually very abundant upon the limbs until fall. When a cluster of the lice have remained long upon some particular portion of a twig there may be formed a swelling due to a spongy growth of the outer sap wood. Beyond this, very little injury results so far as I have noticed.

When this insect attacks the roots, it causes an abnormal growth of knotty or wart-like excrescences. The roots are inclined to rot on account of the injuries and the trees die for want of proper nourishment.

I am unable to find any statements as to the depth to which the lice may penetrate the earth to feed upon the roots. My limited experience with this insect leads me to think that it seldom does much harm far from the surface. Nearly all the root inju-

ries that I have seen have been close to the surface of the ground and near the base of the trunk. Where roots have been exposed far from the trunk I have known the lice to accumulate in large numbers. It is also recommended to mulch the trees for a time before making an application for the destruction of the root form, as the lice will then be drawn to the surface, which also goes to prove that they live for the most part, near the surface when on the roots.

Whether the lice migrate from root to trunk or from trunk to root I can find no positive statements by anyone; but there seems to be little doubt but what they do sometimes migrate from the roots to the trunk. That they ever go back to the roots in the fall is not so certain. At the base of the tree, however, just at the surface of the ground, seems to be a favorite place for them to spend the winter, especially if there is plenty of grass and leaves to furnish protection.

One or two of the early writers made the statement that the lice seemed to attack the sweet varieties worse than the others, but later writers seem not to have made the same observation. In orchards that I have visited I have seen no tendency to attack sweet varieties in preference to sour. Mr. Fulton stated in 1848 that trees upon a gravelly or slaty soil were worse attacked than those upon a heavy clay loam.

One of the oldest and possibly one of the best of the remedies for the destruction of the lice upon the roots is to remove the earth from above the roots at the base of the tree and to pour over them a liberal amount of water at or near boiling heat, and in case of infested nursery stock to dip the roots in water at a temperature or 150 degrees Far. On account of the large amount of hot water that would be required to treat a large orchard some of the remedies given below will probably be preferred and give as good or better results.

The following applications for the destruction of the woolly louse have been successfully used by different experimenters: Kerosene emulsion, strong soapsuds, carbolic acid soap in solution, tobacco decoction, carbon bisulphide, and ashes, gas-lime or soot stirred into the soil about the base of the tree.

For the trunk form, kerosene emulsion, strong soapy or alkaline washes, and resin compound as used for the California scale lice, have been chiefly recommended. In my own experiments, I have found tobacco decoction for the root form, and kerosene emulsion for the trunk form very successful. In treating the trunk form, the application must be made with a good deal of force, so that it may wet through the waxy covering secreted by the insect.

After this insect once gets established in an orchard, I believe it practically impossible to exterminate it by a single treatment; but I do not think it will ever be difficult to so keep the insect in check that it will not occasion heavy losses to the orchardist.

There are lady beetles and minute parasites that destroy large numbers of these lice and by aiding them by the use of insecticides it is wholly possible that the woolly louse may be entirely exterminated from an orchard where it was once abundant.

Probably, the best time to make the applications for the destruction of this insect is in the spring just after the eggs have hatched or when the little "mouldy" patches first begin to appear in those places upon the tree that are frequented by this insect.

DISCUSSION.

Mr. Brothers—How do you think they come on our trees, Professor? Do they come by eggs?

Prof. Gillette—By eggs, yes.

Mr. Brothers—What if they do not come from eggs?

Prof. Gillette—Then they come from lice that hibernate during the winter. There is no doubt but that they do come up from the roots. My experience last year in Mr. McClelland's orchard was, they were at first in the roots; later, on the body of the tree, and then on the branches.

Mr. Smith—How could they propagate, except by eggs?

Prof. Gillette—By the living young, by small larvae.

Mr. Brothers—Is there any known thing that preys on them?

Prof. Gillette—Yes, sir; the lady beetle preys on them considerably. I have in the box a number of lady beetles. In Mr. McClelland's orchard there were a great number of these woolly aphis, all covered with white wax. I have seen these beetles go in among them and eat out the last one.

I will pass this box containing them around; they are all named in plain names.

Mr. Spears—In speaking of ashes distributed around the trees, should we use coal ashes?

Prof. Gillette—I think wood ashes preferable. Those who use ashes, use them from wood. Coal ashes do not do much good.

Mr. Spears—Will not lye answer the same purpose?

Prof. Gillette—Yes, I believe it will; concentrated lye will answer.

Mr. Spears—Lye potash?

Prof. Gillette—Yes, sir.

Mr. Spears—Diluted how much?

Prof. Gillette—One pound, I think, to four or five gallons of water; but I would not say that positively without looking it up.

Mr. Brothers—What about the buffalo tree hopper?

Prof. Gillette—We see as many inquiries about the buffalo tree hopper as any insect we have. It does do a good deal of harm in some places, especially on small trees (exhibits specimen). If any one of you have ever noticed the little lumps on your apple trees, they are due to the punctures of the buffalo tree hopper; that is the insect that does the injury, and I do not know of any way to prevent it except to cut off the twig with the eggs on it. The eggs are laid in the fall from September on, and are hatched the next summer. If you do this every year, some day you might get rid of them. They seem to attack fruit trees only; you come across trees occasionally that are all seared by these hoppers, while with others they are not.

Mr. Coburn—Do you mean any special variety?

Prof. Gillette—I do not know whether it is a special tree or not. It may be on account of slow growth. You often find these insects attacking a tree that is almost dead.

Mr. Brothers—Do they hurt an old tree?

Prof. Gillette—Not very much.

Mr. Knowles—Do you know anything about the black death?

Prof. Gillette—It may be a form of blight that often attacks the trunk.

Mr. Williams—I noticed, a year ago last summer, that in some trees, the foliage was completely covered with a green louse apparently like the woolly aphis, only he was green, and they killed the trees, or at least I thought so.

Prof. Gillette—The insect is undoubtedly the apple plant louse, although I have not seen many near Fort Collins. I have brought in some eggs from the plant louse on box elder. They deposit their eggs around the base of the twigs, and if your eyes are keen, you can see the individual eggs. This louse spends the winter in the egg state. Sometimes during the summer, they are entirely eaten up by the lady

beetle and a parasitic growth. If you do not find the eggs, there will be no lice in the summer.

Mr. Knowles—How about spraying for blight?

Prof. Gillette—I do not think it would do any good. There have been many experiments for the purpose of finding out whether blight could be kept in check by spraying, but so far, I think the results have been very unsatisfactory. Some experimental stations have tried it and found no benefit from it whatever.

Mr. Brothers—What is your way of mixing kerosene emulsion?

Prof. Gillette—I would make it in this way: Dissolve one pound of soap, any common bar soap, in a gallon of water by putting it on a fire and heating it to the boiling point; then take from the fire, and add two gallons of kerosene oil, and stir it vigorously; the best way is to get a force pump and pump it right back into the bucket. This should be continued until it froths up like whipped cream. I make it mostly in small quantities. When this emulsion is made up, one part of emulsion in nine parts of water constitutes a proper spray.

Mr. Grimes—Have you ever noticed the woolly aphis on other plants than the apple?

Prof. Gillette—I can find no account of the apple aphis ever occurring on any other plant than the apple.

Mr. Grimes—If you look in the greenhouses, you will find a great many plants all covered by them.

Prof. Gillette—They look like them, but they are not.

Mr. Grimes—They are very fond of the soft plants like the fuchsia, etc., and I can see no difference in them. Cold water has no effect on them, the remedy for slugs has no effect on them, and nothing but this kerosene emulsion seems to touch them. I have always thought they were one and the same thing.

Prof. Gillette—So far as the application of remedies is concerned, it would be the same.

Mr. Grimes—The resemblance also is the same.

Prof. Gillette—If you took the aphis from the greenhouse and put them on an apple tree, you could never propagate them and vice versa. They are entirely different species.

Mr. Knowles—I would like to know how we are going to save our trees with all these enemies?

Prof. Gillette—For blight, I believe from all the experiments ever tried, the best remedy yet was to keep the blight cut out of the trees as carefully as you could.

Mr. Brothers—How can you prevent it from getting into the trunk?

Mr. White—Do you think the blight is caused by the trees being too wet or anything of that kind?

Prof. Gillette—I have no information about that.

Mr. White—Have you found that there was more blight where there was more water used?

Prof. Gillette—It is often stated, and I have no doubt it is so, that blight appears where the tree is making a very rapid growth, but aside from that, I do not know that it makes any difference.

Mr. Knowles—Our orchards around Lupton are all in a heavy clayey loam; we do not know anything about your woolly aphis or anything of that kind, nothing but the black death, and I want to know what remedy to use to keep it off, if there is any.

Prof. Gillette—As I said before, it is a form of blight. Blight in trees is caused by a microcospic germ, the same as cholera is in man. The germ is so small that it can only be seen with the most powerful microscopes.

Mr. Osborn—I would say for the benefit of some, that I believe from my experiments, that it comes when it will, and goes when it pleases; that no remedies have been found, and that it cannot be controlled.

I have used the knife a good deal, but to no avail, and my opinion is, that it comes and it goes; it has passed us and is going to some of the rest of you. You need not look for a remedy, because I believe it is out of the reach of man.

Professor Crandall—We considered the question pretty well settled several years ago, when Professor Barker worked out exactly what caused it. Last year the department of agriculture detailed an agent, and he worked all last season on blight diseases in apples, and he is going to continue just the same as Professor Smith has been doing on the diseases of peaches (he has been working since 1887); and this man has taken up the question of blight to see if he can find out any thing about it. Most of us do not think he can.

Mr. Brothers—I do not think we should give up, and say we cannot find a remedy for blight. I have made a very poor hand of it myself, but I do not want any one to follow in my footsteps. I believe if I had been wise enough to have known how the blight would have acted, I could have saved two-thirds of my trees; but they got so sick before I knew what to do, that I did not find any salvation. My trees have been going down for the last four years, and I wondered what was the matter with them for about three years; and if I had had sense enough to have looked at the roots of the trees before I did, I would have found that the roots were killed in a great many cases as much as the tops. I could take you to my orchard to-day, and if I dug up fifty trees, you could hardly find one that has any life in the roots. But I believe we will strike on it some of these days, and I hope we won't stop talking about these evils of blight until some one finds a remedy.

I do not believe that there is an evil or trouble in the world, but that there is a cause and remedy for it, and I believe that every tree that the Almighty has ever sent, was sent for a use.

Mr. Knowles—I want to say a word about our experience, because it might be like that of a good many

others. Our trees grew very fast. The man, I think, foolishly put manure in the ditch that he used for irrigating his trees, and made them grow too fast; and, as I say, the soil was a clay loam; now there were two particular trees that I have knifed and knifed every day, and I believe I have saved them; but only two trees.

The Ben Davis seemed to me to stand it better than any others.

One gentleman here thinks it is rather in favor of the blight to use too much water. We watered them a good deal and encouraged them to grow. We did not know any better; but I think it is all wrong.

I wish we could find out just what varieties are most susceptible to the blight. I know that there are none that stand it better than the Ben Davis. I think we should go in with Paris green, London purple, etc., and save the trees we have.

Mr. Brothers—We have a young man at Boulder who has "a sure thing" for the blight. I told him if it was "a sure thing," he had his fortune.

Mr. Osborn—While we are on this subject, I would like to know what it is that is destroying our blackberries. This interests me as much as the blight, just now.

Professor Gillette—I will say that I had some blackberry leaves sent me from Wheat Ridge, and these leaves certainly had the red spider present on them in great numbers. I hate to have any one ask me about the red spider, as the remedies for them do not seem to be very satisfactory. The best out-of-door remedy is a kerosene emulsion. They do not, however, seem to be very easily disturbed by kerosene emulsions; but it is stated by some entomologists that if two or three applications are made, it may destroy the spiders, but not the eggs. The eggs will hatch in three or four days, and unless you follow the applications three or four days apart, you will not get rid of them.

In the green-houses they keep the red spider down by using a great deal of water. You cannot do it out of doors, as our climate is the very best one for them to multiply in.

Mr. Brothers—What makes the red rust?

Prof. Crandall—That is a fungus.

Mr. Knowles—How would you apply the kerosene emulsion?

Prof. Gillette—By a force pump.

Mr. Smith—Do we understand that this red spider has come to stay, and must be exterminated?

Prof. Gillette—Yes, sir. (Laughter.)

SOME FUNGUS DISEASES OF PLANTS.

Remarks by Professor C. S. Crandall.

Professor Crandall: Mr. President, Ladies and Gentlemen—I thought I would first say a word about the nature of fungi, for the reason that I have found that there was a good deal of misapprehension as to what fungi are; and I have often heard the question: What are fungi? They are a low order of plants; and we can best understand what they are if we consider for a moment the character of some of the higher plants.

The higher plants have roots, stems and leaves, and produce flowers and fruits. The higher plants also produce a substance called chlorophyl—leaf green. Now, this chlorophyl is a wonderful substance, endowed with a very wonderful office. Everything that lives is dependent upon this one substance, which spans the gulf between inorganic and organic —between dead matter and living matter. This chlorophyl is the one substance that has the power of taking inorganic matter and converting it into organic matter.

The higher plants take up water by their roots, and with that water comes the various mineral substances dissolved from the soil; and all these mineral substances, by the influence of this chlorophyl, are converted into plant food, and then the plant uses this plant food to build up its tissue. Now, so much for chlorophyl.

Chlorophyl itself is dependent; it is formed only under the influence of light—sun-light; and, in fact, we may ascribe to the sun the power which makes possible the life with which the earth abounds.

Fungi are quite different; they produce no chlorophyl; they have no power of converting inorganic matter into organic matter; their action is a tearing down action; they tear down what the higher plants have built up; they have no green color showing the presence of chorophyl. I do not want to say, however, that these plants never have chlorophyl. Chlorophyl is sometimes found in them, but they do not manufacture it themselves any more than the cellulose tissue of which their bodies are constructed.

Fungi have no proper roots, no stems, no leaves, no flowers. They are propagated by very minute bodies called spores. The classification of fungi depends entirely upon structure, and mainly upon the structure of the spores, and the stalks upon which they are borne. The portion of a fungus answering the purpose of stem consists of delicate threads, called mycelial threads; they are very minute, and nearly alike in all fungi. The classification must be based upon the only organs that show any distinction or difference in different species; and these are the spores and spore cases.

From a physiological standpoint we may divide fungi into two classes—the saprophytic fungi, which live on dead organic matter, and the parasitic fungi, or those that live on living plants. The saprophytic fungi, or those which live on dead matter, are familiar to all of you. Leave a piece of bread in a damp place, and you will find it covered with a blue mould

—this is one saprophytic fungus. Fungi of this class are constantly springing up everywhere. They derive their sustenance from organic matter. This organic matter was formed by chlorophyl-bearing plants, and the action of the fungi is to tear down the complex structure, rendering the chemical composition less complex, and finally reducing it to the dust from which it was taken. The parasitic fungi live on living plants or animals, stealing their nourishment from their hosts. The effects produced by these parasitic fungi are very different on different plants. Sometimes they cause a destructive composition to set in, which very soon reduces the plant to a rotten mass. In other cases the fungus may live a long time on the plant or animal and cause no material damage, because it only takes just enough for its own sustenance.

Parasites are not entirely confined to fungi. We have several flowering plants that are parasites, living on other plants. The monotropa, or Indian pipe —an eastern plant—is parasitic. In this country we have the aphylton, or cancer root, parasitic on the sage. Under the sage you will very frequently find this plant. It is of a reddish color, and gets all its growth from the sage. These parasitic plants may, therefore, be compared with the fungi.

The fungus diseases that we meet with are commonly spoken of under four heads: Rusts, smuts, mildews and moulds These are very familiar terms, and not always used with botanical accuracy. The rusts belong to the family uredineae, and it can be said that there are certain other fungi that produce a rusty appearance on plants. But they are not true rusts. When we come to mildew, we have something different. The moulds are saprophytic fungi, living entirely on dead matter. The mildews are mostly parasitic fungi, living entirely on live matter. It would hardly do, however, to make this the general rule. One of the exceptions is the dry rot of timber, that in a short time will reduce a solid piece of timber to a crumbling mass of dust.

There are a few fungus diseases that I want to mention in particular. So far as my knowledge goes, we have but two fungus diseases in the state that are at present injurious to our cultivated plants. There are two others in the foot-hills that, it seems to me, may at any time attack our cultivated plants, and three or four others in the state; you will frequently find them on fruit in the market, and I should not at any time be surprised to hear of their depredations in the orchard.

The first of the fungi attacking our cultivated plants is the apple scab. The department of agriculture has had an agent working on this. I recently met him in Chicago, and he told me that Colorado was the only state that had not reported that disease. In the fall of 1892 I was west of the range and visited a great many orchards there. I have also looked into the orchards on this side of the range, but have not seen the disease. That it is a destructive disease, is shown by the reports from other states. Illinois reports the loss at 20,000 bushels to the county. At this rate, the annual loss to the state would be $400,000. In Missouri, they estimate the loss at one-half the crop. In Kansas, one-fourth of the crop. Secretary Ragan estimates the loss in Indiana at one-sixth of the crop. The disease does not work alike on all varieties. The snow apple and the pearmain are each attacked. The Baldwin is also much attacked. The Ben Davis is reasonably exempt, and the Rhode Island Greening and the Duchess are mentioned as varieties not much affected.

It first appears as olive-green spots on the surface of the fruit. These spots enlarge and become circular, with a grayish outline; several spots may run together, or they may involve one side of the apple. Wherever this fungus takes hold, you will find a one-sided apple; and where this disease is bad, it renders the fruit unfit for the market.

This fungus is very peculiar in its working; the mycelial threads work in the tissue, just under the

cuticle. It does not work down very deep, and in paring the apple you can take most of it off. These mycelial threads grow, and finally accumulate in one spot beneath the cuticle. From these threads are thrown up stems; the pressure will rupture the cuticle, and then we have the fungus in its fruiting state. The spores sometimes have one cell, and sometimes two cells. These are carried by the wind, and will spread the disease over an orchard. This is the way it is propagated.

This kind of spore is produced all through the summer. Late in the summer there is another spore formation taking place. These are produced in little sacks, each sack producing about eight spores, and these remain in the tissue of the apple during the winter, and diseased fruit which is allowed to remain on the ground will keep these spores alive, and in the spring, when they are set free, they will again start the disease.

As to the remedy for this disease, it is thought that any of the copper compounds are very satisfactory in preventing it, and checking its spread. Professor Goff, of Wisconsin, says that there is quite an advantage in spraying. If I remember his figures, trees not sprayed showed 23 per cent first-class fruit, a large percentage of second-class fruit, and quite a large percentage of third-class. Of the trees sprayed (he used six or seven solutions; but the copper carbonates gave him the best results), 72 per cent showed first-class, 26 per cent second-class, and less than 2 per cent third-class.

I will speak briefly of the diseases of the raspberry, and the raspberry rusts that are in the state. I had a sample sent me. It is the red or orange rust of the raspberry, and is a disease very difficult to fight. The spores of this fungus get access to the plant through the young shoots, just as soon as they start out in the spring. The mycelial threads may work up or work down. We do not see any sign of this fungus until along in the summer, when we may

detect a yellow leaf and a general debility of the plant, and finally, when it reaches the spore stage, it will show on the under side of the leaves. These cups are very thick on the under side of the leaves, and when the cases open, a number of spores are freed, and these are carried by the winds. They will germinate readily under favorable conditions, and the favorable conditions are a good degree of moisture and warmth early in the winter.

For a plant that is affected, there is no remedy, except to get the plant out and burn it. The vegetating portion of the fungus is in the plant. We can, however, prevent the spread of the disease by the use of copper compound. If the trees are treated with this, the spores will be prevented from germinating when they alight on the leaves.

Another raspberry disease is what is known as the anthraenose. This is very bad on the black-caps; also on the purple canes, like the Shaeffer. The disease begins within three or four inches from the ground, in purplish spots; they enlarge somewhat, and finally break open, and appear as irregular black spots. This is one of the fruiting stages. It is also a very difficult disease to fight, the vegetating operation being entirely inside.

Another disease of the apple is what is known as ripe rot, or bitter rot. A few years ago it was found that one of the rots on the grape was identical with the apple rot—it is called bitter rot, because it has an exceedingly bitter taste—spores from the grape rot working on the apple, and spores from the bitter rot working on the grape; but in the latter case it has not the bitter taste, so ripe rot is the better name to apply to this disease. The disease does not affect the fruits until they are just about to ripen. It first appears as brown spots; these spots enlarge, and they may involve the whole apple. You frequently see it from one-half to three-quarter inches in diameter. Unlike the apple scab, this sends its mycelial threads all through the tissue, and a little later, when these spots

may be three-quarters of an inch in diameter, they break up the tissue on the inside of the apple, and the surface will settle down. Shortly after this, you will see over the brown spots of the affected portion very minute black spots; they can be seen by looking very close with the naked eye, but can be seen much plainer with the lens. These are the spore cases, which are formed on the mycelial threads lying just below the surface. They are globular in shape, something like those in the leaf blight of the pear. These pretty soon open up, and the spores which are produced are carried about and spread the disease. Each one of these branches (illustrating) bears a single spore, and they stand just as thick as they can in these little spots.

This disease will spread in apples that are packed in barrels. A few apples infested with the disease will, in time, affect every apple in the barrel. The copper compounds are applied for this disease, sprayed on the trees just before the fruit begins to ripen.

This (illustrating) is intended to show the pear leaf blight. It does not affect the branches, but causes the defoliation of the trees. It works mostly on nursery stock, and sometimes in new orchards. It does a great deal of damage. It is a fungus similar to the one that attacks the apple. It first appears on the leaves as reddish brown spots. These spots are first round, and by a coalescence of a number of spots, they run together; they will soon involve the whole leaf, and by the 1st of July the tree will be entirely devoid of foliage; and if a man has a lot of 50,000 or 100,000 pear seedlings to be budded in July, if they lose their leaves, they cannot be budded, and probably the trees will be lost. This (illustrating) shows the fungus on the leaf. It germinates, and penetrates the cuticle; it is supposed to do this by some corrosive action. It gets through this layer of tissue, through the epidermis, and from that are very short threads from which are produced the spores. The spores are

very characteristic; there are no other fungi having spores like them. They are like this (illustrating), and the cells may be two or four in number, and they produce these little spines. That is the summer spore. Later in the season, on certain leaves, will be produced the perithecia, in which will be produced spores that live over winter.

Here is a chart showing the ripe rot on the apple—a single thread from which will be thrown off the spores. There is a peculiar thing about this. It will grow several different threads, from which will spring other threads, and each one will send out its spore.

Now, take the question of potato rot: That is a disease that works inside the tissue, and no amount of application will assist the plants that are affected; but by using the spray, we can prevent its spreading, only. This (illustrating) represents the potato rot, and the mycelial threads are working through that (illustrating) all the time.

I will speak of another disease, and that is the black rot of the tomato. It has been given out that the black rot of the tomato was formed by this fungus, called macrosporium solani, on account of the large spores. I do not believe that we have positive proof that this is the case. There is not very much to the fungus. It has mycelial threads, the same as the other. It works under the cuticle, and when it reaches the fruiting state, threads are thrown, out, and on the ends of each are produced the spores, which are like this (illustrating.)

We have had various remedies recommeded for this disease. One man will tell you that if you trim your vines so as to expose your fruit to the sun, it would not rot. Another will tell you that if you trellis your vines up, they will not rot. I do not think that trimming vines influences the amount of rot, or trellising vines influences the amount of rot. It is a very erratic disease, that seems to do much as it wants.

Mr. Smith—What causes the blight on the tomato?

Professor Crandall—That is caused by an organism. I do not believe it is a fungus. I have spent many hours in its study, and I cannot find anything in the nature of a mycelial thread, or spore production, and I am quite willing to believe that it is a bacterial disease.

On motion, adjournment for recess.

AFTERNOON SESSION.

Meeting convened at 2:30.

QUESTION BOX.

Question—Are the wind breaks or forests contiguous to orchards harborers for orchard insects?

Mr. Holt—I have a wind break, and my trees are more prosperous with the wind break than without.

Mr. Osborn—I cannot answer that, only in this way: I am satisfied that windbreaks are very beneficial, and I have everywhere recommended; and when I come to a young orchard and see them plant, as I did at Grand Junction, on the mesa, 200 acres of orchard, and not a thing to break the wind, I think to myself, that the day will come when those trees will be full of apples, and a wind storm will come and take the majority of them off.

I know of an orchard near Loveland, where a great many of the trees are bending at an angle of 45 degrees. After the ground was irrigated, there came a wind storm and bent them over to this extent.

The windbreaks may harbor insects, but if they are a pretty good harbor for insects, they may not come out and destroy our fruit.

Mr. White—Is a shelter of that kind a good thing for trees, or is it not better to allow the air to circulate

through them? Is too much of a protection a benefit to fruit trees?

Mr. Osborn—I do not intend to make an effort to answer any of these questions; but we had an orchard near Loveland that had a splendid crop last year, except they were infected with the codling moth grub; but the apples were there. Growing alongside the irrigating ditches are willows as tall as this ceiling, and so dense that there may be a very storng wind and you could not feel it.

Mr. Brothers—I have had windbreaks around my orchards ever since I could have them, and I would not plant an orchard anywhere in Colorado to-day without one. I plant them the same year I do my trees.

As for the insects, I do not see that the windbreaks harbor insects. Of course, if you have ten or twelve feet of rubbish, they may; but even then I do not think they hurt the trees. I do not think that the insects that feed on cottonwood, etc., feed on orchard plants.

Mr. White—Do you recommend the cottonwood?

Mr. Brothers—I would use it if I could not get anything else.

Mr. Grimes—Several years ago I asked a gentleman if he would plant a windbreak around his orchard, on what side he would plant it, and he said: "I would plant it on the north side; I would plant it on the east side; I would plant it on the south side, and I would plant it on the west side." I asked what kind of trees he would plant, and he said, Ben Davis.

I have given a good deal of study to windbreaks, and I find that a close windbreak on the north side is the most destructive thing that you can plant. It is the cold wind that ripens the wood of our trees and helps the growth. You place a windbreak on the north side; it is the coldest place you can find. If you will look around, you will find the heaviest growth on the northern exposure. We want the cold wind to

ripen up our trees and check the growth in the fall, and to prevent an immature growth in the spring.

There is no question but that these windbreaks do harbor insects—it is their home and shelter; though, as my friend here remarked a moment ago, I think our orchards should receive the utmost care. It should be our study to keep our orchards clean, and then we need not fear the insects.

Question—Has any one present tried the Prince Albert currant? Is it a success? Is Fay's Prolific a profitable currant?

Mr. Grimes—I do not know the first currant mentioned; but I was unfortunate in trying Fay's Prolific. They cost me fifty cents apiece; I kept them five or six years, and I have not gotten off of them as many currants as I have off the Red Dutch, under good cultivation. The berries are large, but very few in number, and I do not think they are profitable to this country.

Mr. Brothers—That has been my experience.

Mr. Osborn—I might add the same experience. I consider them overestimated.

Mr. White—Has any one ever tried the Prince Albert?

Mr. Grimes—As long as we have the Red Dutch, we do not want to try any more.

Question—Has any one been successful in spraying for codling moth?

Mr. Brothers—How successful?

Mr. Osborn—Successful enough to save their crop. I wrote that question myself, and I say it is the most important question that has been asked, or will be asked this meeting. I take it for granted that is what this orchard bill is for.

I do not blame any, if you have not succeeded. If, because we have not succeeded, is that any reason why we cannot succeed? If we cannot kill these insects, or cannot get rid of them, is it not the fault of the horticulturist?

Mr. Carlsen—I have tried burning sulphur under my trees, and I consider that it benefited them a great deal. I have not many worms on them.

Mr. Brothers—How much do you burn under the trees?

Mr. Carlsen—I take a pail, put some sulphur in it, and then put some live coals on the sulphur; but this should be done on a damp day.

Mr. Brothers—What time do you apply it?

Mr. Carlsen—I burned it twice—once in July, and once when the apples were visible. Of course, the more you burn the better it is.

Mr. Brothers—You did not tell me how much you burned.

Mr. Carlsen—Only a few pounds.

Mr. Brothers—How many trees have you?

Mr. Carlsen—About 250. If you could get some dry stuff, and put a fire to it, and then put on the brimstone, it would be better than the way I said.

Mr. Brothers—I want to say that I think that experiment is worth trying.

Mr. Osborn—Did you have any codling moths before you used sulphur?

Mr. Carlsen—Yes, sir. I used to have to use the spray.

Mr. Brothers—I am interested in what this young man says. I believe the codling moth is the most destructive insect we have to contend with. I have never tried burning sulphur. I believe in spraying, and I am going to keep on spraying; but with all that, I had a good many codling moths. There were very few apples raised around where I am, and I believe the folks get careless. I believe I have nearly all my neighbors' codling moths as well as my own.

I believe in the old principle of putting gunny-sack bands around the trees. I begin putting bands around my trees in June, and I do not let up on it until I have gathered my apples. I examine the bands

and kill the worms once a week. I never take a sack off but that I find from one and twenty-five. If you do not want to attend to these sacks carefully, you had better not put them on, as they otherwise will be a hiding place for the insects and worms.

As far as my experience goes, in eight or ten days they will hatch out.

Mr. Easley—I have not much faith in the sulphur. I have never tried it. Even Mr. Brothers and his remedy seem to have failed to secure a good crop of apples this last year.

My experience has been this: I have never sprayed but twice a year, since starting, for the codling moth. Of course that is not sufficient to destroy the whole crop of them; but I think that successive sprayings during the summer, is the best thing to do. When these intervals should be, I do not know, but the first should be about when the apple forms, and the second about one week later. You will notice that when the egg is deposited, it is between two apples, or under a leaf; that would show that there must be a second crop of codling moths. It therefore takes more skill to get at the second crop of codling moths than the first. If we knew how to apply it, we could get at the remedy.

I had a No. 1 crop this year; I sold them here during the summer, and they made a fine appearance. There were no worms, and I had hoped that I would get through my winter apples the same; but after the summer apples had disappeared, the worms began to appear, and I believe it was because I did not apply the remedy later.

I would like to know what remedy should be used to get rid of the codling moth?

Prof. Gillette—The use of arsenic for the destruction of the codling moth, has passed the experimental stage. It has been demonstrated time and again that the arsenic applied at the proper time, will do a great deal toward keeping the codling moth in

check. In fact, in experiments where actual count has been made, shows that of ten trees selected to be sprayed, and ten trees decided not to be sprayed, counting the wormy apples on the two lots of trees (these experiments have been tried over and over again in the United States and always with the same results—75 per cent. of the codling moths have been destroyed by two applications of London purple or Paris green.

Of course, in some cases you might not have a good quality of poison, or there may be bad weather; but where good poison is used and applied at the proper time, it is the best method known.

The next best method is that of Mr. Brothers' in bandaging the trees, and taking it off every six days and killing the moths. There are two broods of codling moths. The first brood begins its work very soon after the apple has started. The moths produced from this brood, begin depositing their eggs by the first of July, and by the middle of July there are a hundred times as many moths in your orchard as you had in the spring, as each one will deposit from 80 to 100 eggs. If you destroy the first brood, you will have no second brood. Therefore, that is the reason why the winter apples are more infected than the summer ones.

Now about the sulphur; it does not do a particle of good. It may drive them over to your neighbor's orchard, but I do not think it possible that you can burn them out. I do not believe that you can destroy the larvae or the moths.

In regard to the number of applications and when they should be applied: The first application of the London purple or Paris green, should be made as soon as the blossoms fall; go right in and make the application; for all that time the moth is depositing its eggs. Make the second spraying a week or ten days later, then if you do not have heavy rains following this, it will hardly pay to make a third application. If, however, the rains should follow,

and thus wash the poison off, it will pay to make a third application.

As regards the third application: About July every apple has a little cavity at the top, and if you spray the apples then, there is the utmost danger of poisoning those who eat them. It is better to make two applications early in the season, than later. It has been proven by experiments that two applications are all that it is necessary to make.

As to the proportions: Make it not stronger than one pound to 150 gallons. It will be very safe in these proportions. It is also a good idea to add lime to it, one pound to every barrel. The lime causes a precipitation of any solids.

Mr. Brothers—About this sack business: I start in about the middle of June; but it is about the latter part of June before I catch any. I never take these sacks off entirely between this time and until I have gathered my apples; but even after I have been catching them the whole summer long, there seems to be no let up to the "little cusses." After the apples had been gathered, I found some under some sacks. The boys may have missed them in picking them off, but it seems to me they kept increasing all the time.

Prof. Gillette—I can explain why you think so. The codling moth does not appear all at one time; the moths that hibernate during the winter come out early; those that you take into your cellar along with your fruit, will come out later, but the first brood will appear about the time your apples are in bloom; for two or three weeks then, you will find larvae all the way from a worm just hatched to the full grown insect. The later ones are the second brood.

Question—What is the best paper in the United States on fruit growing?

Mr. Cornforth—While I was in California, I was a subscriber to the California Fruit Grower, and it is looked upon by the people of the western slope

as the paper adapted to their section. I notice the Field and Farm is going to devote one page to horticultural interests, and I believe as the industry grows, they will devote more. I notice also that the Colorado Farmer is doing the same.

It seems to me that the editorial staff of our papers should take clippings from the different papers of the class of information that will be most important to the people. But to-day the paper that is devoted most nearly to the fruit growing interests, is the one in California.

Mr. De Vinney—I would like to make one suggestion; that hereafter, we do not care so much about the new varieties of fruit as to know how to take care of the old ones that we already have. Let the editors take more care—instructing in the manner of cultivation—the diffierent remedies for disease, etc. That is one great recommendation of the California journals. They are the best journals I know of on the subject, because the whole paper is taken up, not in telling about new varieties, but how to take care of the old ones. We do not care to know anything about these fruit peddlers.

While I am up, I will say that I am a victim to these new kinds of fruits. The Duchess of Oldenburg was recommended to me as the best, and that they would compare favorably with any of the old varieties. As I said in this horticultural society, it takes from 60 to 100 years to develop a fruit, and anyone who buys a fruit that has come out in the last 20 or 30 years takes a risk.

There is another apple that is recommended; it is a seedling of the Duchess, the Wealthy. I can tell the Wealthy and Duchess wherever I see them. People come on this floor and advocate them, and say nothing about the Ben Davis. The Ben Davis is the best apple we get, and I can bear testimony to the fact, that it is the least subject to blight of any that we have.

Mr. Osborn—Mr. De Vinney is just right; he has hit the point that we want to get at.

Mr. Brothers—I do not believe in that doctrine. I want to say here, that we are a progressive people, and if we do not try new varieties, how are we to know what is good and what is bad?

I believe what Mr. DeVinney says about sticking pretty close to the old varieties; but my practice has been to try most every thing new that comes up; but to try them light. If you happen to strike it, you are all right.

In regard to the Wealthy apples, I would not have exchanged it for anything I had, until this blight struck it; but that hurt it a good deal.

Mr. Lee has a nice orchard that the blight never touched; but if I was going to plant again, I would plant Duchess. I thought we had gotten through with the blight for a while. We planted apples for 25 years here, and did not know what blight was until lately, and I believe now the blight is gone, at least I hope so. It was not nearly so bad in my orchard last year as the year before.

I believe the Wealthy is one of the most profitable apples that there is.

Mr. Cornforth—As a dealer in fruit, and a student in the keeping qualities of apples, I would like to say—for the benefit of every person here who is going to invest money—from my experience, the Ben Davis apple for all time to come is the very best. I know an orchard in Missouri from 25 to 30 years old, and that orchard is producing yet, and since the new methods of preserving apples has been known, it has been found that the Ben Davis comes out of the ice house in better condition than any other.

The Baldwin apples will scald. I have seen them scald black on the outside; that is something you seldom see in the Ben Davis, after it comes out of the ice house.

During the last five years in Chicago, at any period of time between April 1 and June 30, the Ben Davis apples would bring from 50 cents to $1.00 per barrel more in the market than any other.

Another thing I have noticed about the Ben Davis apples in Colorado, is the spice; it has much more spice. Now, the day will come when our people will not pay the price for apples they are doing now; but other districts will. The value of our apples, particularly the Ben Davis, is, that it is adapted to shipment to all parts of our country; it will even carry from here to Australia, from here to France, or even to South Africa; it will carry for six or eight months.

The eye, like the stomach, can also become schooled. As an illustration, take the question of syrup—twenty or thirty years ago, when we used to get St. Louis drips and New Orleans molasses, and people got accustomed to the taste. Let one of these people not taste it again until the present time, when 30 per cent or 40 per cent of glucose has changed the flavor, he would not recognize it as the same thing. The true flavor of the sugar cane syrup does not now exist. We demand that the eye shall be satisfied. One beauty of the Ben Davis apple is, that it polishes up, and consequently brings a higher price for this quality, all things being equal. And it satisfies everybody. The housewife likes it; she knows that not one will decay while she is using them up, while she knows that all other apples are dangerous for any one to buy.

Every house in the city to-day contains a large heating stove or furnace; that furnace in the cellar is heating from five to twenty-five rooms in the house; the cellar is kept too warm for the successful keeping of apples. The Ben Davis apple answers this purpose exactly. It will keep in a temperature of from 75 to 80 degrees; we know by experience that they will do it, and I beg of you not to plant anything but Ben Davis apples, and money will be your reward.

Mr. White—I hope that none of these remarks from these gentlemen with so much experience will defer us, who are beginners, from trying any new varieties. I would like to know when the Ben Davis originated? There must have been a time when the Ben Davis was a new variety; and if it had never been tried, we would not have had any Ben Davis to-day; and while it would seem to me to be injudicious for us to invest largely in new varieties untried in Colorado, still I would like to know which are the best of the new varieties.

Mr. Brothers—I do not want to run the Ben Davis down; but my favorite apples to-day would be the Ben Davis for winter, Wealthy for fall, and Red Astrachan and Duchess for summer.

Mr. Steele—I want to give a short and safe rule for all parties intending to start an orchard for commercial purposes. It is a rule that they should bear in mind, because if they do, it will save many from great loss. It is this: Go into the market and see the varieties of fruit that are selling best, and plant accordingly. If you will bear this rule in mind, you will not be caught in planting. You may find the Red Cherry currant selling best, and the next the White Grape currant. Following this rule, you will plant more Red Cherry than White Grape; and so with the apples. Mr. Cornforth will tell you that nine out of ten barrels that he sells are Ben Davis—consequently, I would plant Ben Davis first and the others in proportion. I consider the Jonathan a very good fall apple.

Mrs. ————————I would like to speak once, from a housewife's side. If the housewives were all like me, you would not have any market for your Ben Davis apples. If, as the gentleman says, you go into the market, you have to buy the Ben Davis, as there are no others there. If they would give the same amount of care to other trees, it seems to me that we would have a better apple than the Ben Davis. For

myself, I would go without apples before I would touch one.

Mr. Brothers—If you did not know what the Ben Davis was, you would think it was a great deal better apple. I have had a great many people come out to my place and buy Ben Davis apples. They came right to this market and sold them; but they never mentioned the name of Ben Davis. I can gather Ben Davis apples in two different ways, and you would never know but that one was not a Ben Davis.

If I lived on the other side of the range I would plant quite differently from what I do on this side for apples. I think these fellows are mean. They are stealing our Ben Davis rights over there when they can raise other kinds.

Mr. Stone—Just a word: At our house, the Ben Davis is under a ban. I was sent around town to look up some good apples. I know a good apple, I think, when I see it, and I always look for a Belle Flower. Of course it was not difficult to find a Belle Flower, and plenty of them; but the Belle Flowers were all devoid of the good taste that we were accustomed to. Then I examined the Greenings, and they were not up to the high-water mark. Then the apple question was discussed; then I went to one of our grocers, a man who has been in the business a number of years. I said to him: "Have you a good cooking apple in the store?" and he answered, "I have not." I asked what kind he had, and he showed me his best. I think, the next day when I went home, they told me that they had found the apple—it cooked all right, and tasted all right. They brought up one to show me, and what do you think it was? A Ben Davis! (Laughter). I got a knife and went into it, and it was the best in taste and color that I had ever seen. I am interested in this discussion; I am just now interested in fruit growing.

The question that was raised, from which we have digressed, is: "What is the best fruit growers'

journal?" and I would like to have that answered a little more fully, if possible. Mr. Cornforth has given it as his experience that the California Fruit Grower is the best. There is a good deal of fruit talk in it, and, so far as my experience is concerned, it is a really first-class paper, containing good, practical instructions for growing fruit in California.

I see a number of quotations from Green. Who is Green?

Prof. Gillette—I do not think there is any one better known than Green, of New York, and most of his sayings are the very best; and while he prints a very superior paper, and one very instructive to fruit growers; though for irrigated lands, if I were going to take a paper for instruction, I would rather take the California Journal, for the reason that their conditions are more nearly like ours.

CHANGE OF SUBJECT.

Mr. Coburn—I wanted to know, yesterday, the names of the six best varieties of apples.

Mr. Osborn—Some one has said the Ben Davis and Walbridge.

Mr. Brothers—I think our friends on the western slope should give their best six, and we to give ours. I know that they can raise a good many more different kinds of apples than we can here.

Mr. Steele—I think we should defer this until after the evening session.

THE LADY-BIRD.

Paper by Mrs. Lute Wilcox.

Happening to look in at a well-known florist's one day last summer, I surprised the proprietor in the act of corralling a lot of little red and black bugs upon his counter with the aid of a collar box. I

asked "Where did you catch all those coccinella borealis?" "Out on my pumpkin vines in the yard," answered the florist, as he skillfully scraped the last recalcitrant bug into the box and invited the visitor to a seat amid budding orchids, bristling cacti, creeping clematis and one thousand other marvels of the floral kingdom.

"Coccinella Borealis" may be the book name for that sort of a bug, but any school girl or boy would have called it a "lady-bird." What banker or lawyer, preacher or school-ma'am does not remember crawling around on hands and knees among the plantain and burdock to root from the cool resting place on the under side of some leaf, the little red, beetle-like bug, with ink blotches on its back, whose harmlessness and demeanor of modesty and bashfulness won for it the title of "Lady-bird." Is there a woman so old that she does not recall some bright day in childhood when she took a lady-bird on the palm of her hand and sang: "Lady-bird, lady-bird, fly away home; your house is on fire and your children will burn." And didn't lady-bird fly away every time? Of course she did; and a mighty important part in the scheme of nature this little creature had to play too, beside saving her house. This little turtle-shaped creature is a hard worker for the horticulturists' profit and pleasure. How innocent and docile she looks as she tries her red wings as she promptly flies away upon notification of the conflagration that threatens her home.

And yet in her sphere she is a mountain lion, a ravenous coyote, an insatiable glutton, all in one. For her size she is stronger than the largest lioness, for she has jaws which in proportion could engulf an ox; no telegraph pole could withstand a blow from her hind leg; and the motion of her wings could brush a passenger train from the track. But she is small. She eats no oxen, and is always glad to quit the hand of the little child and "fly away home." The home of lady-bird is upon almost any tree or

shrub where plant-lice are to be found. She hunts the tiny insects that spoil peach and pear trees and rose bushes. She eats these mites and her internal arrangement is such that she can digest them as fast as she can eat them. This is her mission, and the florist who transplanted her from his pumpkin vines to his choicest shrubs knew what he was about. Now there are millions upon millions of plant lice. Undisturbed, they would consume all verdure. Lady-bird's life is very short, not more than five weeks' duration. Just see what Nature has done to equip her for keeping down the obstreperous insects. Lady-bird has to destroy a great many mites to perform her part successfully and so Nature gave her a stomach like an Indian's—always empty or nearly so. Thrips can jump, but lady-bird can fly. Lice can cling to and conceal themselves upon the tinniest twig or petal, but lady-bird has delicate, invisible hairs upon her legs by which she, too, can cling and follow. But after her brief life, lady-bird leaves to the work of saving our beautiful flowers and plants, her children, which she is supposed to have saved from the fire. These children are small worms called larvae by scientific men, who spend the first part of their lives in studying up Latin names with which to befog the understanding of every day people later on. These worms or grubs are furnished with enormous jaws. If the whale had such jaws in proportion to its size, it would be able to swallow one of Uncle Sam's iron clads without a wink. In fact, what there is of lady-bird's children that is not stomach, is jaw; and both stomach and jaw work day and night on those plant lice.

Watch a rosebush sometime in the month of July. On the underside of a leaf will be found a whole flock of little green plant lice. They are nibbling away peacefully at the leaf. Keep a good lookout. Here comes lady-bird's oldest son up the limb that bears the leaf. He is half an inch long with from four to six yellow spots on his wormy body. He

climbs up stealthily like a cat after a sparrow. He gets near enough and leaps among the unsuspecting lice which scatter like a flock of sheep when the only real house dog in the neighborhood descends upon them for some fresh mutton. The grub works those jaws like all possessed and one can almost hear the ribs crack in the unfortunate lice. This little tradgedy of the entomological kingdom is re-enacted by the grub repeatedly for two weeks, when Mr. Grub becomes smitten with "that tired feeling." He then fastens himself upon a leaf and by hard work rolls part of the same about himself. Then, usually, the owner of the roseleaf or whatever sort of leaf it happens to be, comes along and swears at him and abuses him for being a destructive villain and altogether a nuisance; whereas he is altogether a useful fellow undergoing a change that will turn him out a shining, painted lady-bird in two weeks' time. Man has been acquainted with some of lady-bird's good qualities for some time. The ancient Egyptians thought she was a scavenger and held her in high esteem. In Germany, in olden times she was called "Lady beetle of the Virgin Mary," and the French called her "Cow of the Lord," though why she should be called a cow, or what the Lord would do with a cow if in possession of one is not made clear. It is even within the memory of people still living, that two mashed lady-birds put into the hollow of a tooth would cure the tooth ache. This was, however, probably superstitious, or a last resort of the people who would take beetles or nearly anything else to esape the dentists, a merciless set in those days. The lady-bird for the last few years has found a great friend in the United States Government. In 1887, when the fluted scale parasites became so numerous in California that it threatened the destruction of all the citrus and deciduous trees on the Pacific coast, Uncle Sam sent two trained entomologists to Australia and these men returned with a sufficient supply of the imported Australian lady-bird. These insects

were released in the orchards of southern California and the success of the experiment was so marked that the California legislature has since appropriated $10,000 annually with which to carry on the experiments and assist the lady-bird in her good work of protecting the orchards. The species is perpetuated by building glass houses over living orange trees and here the breeding operations are conducted from season to season in order that the race may not die out.

In Colorado, the lady-bird has a native habitat and we are told that the species in this state numbers nearly three hundred. At least that is the conclusion arrived at by an eminent English entomologist named Cockrell, who spent several summers in Colorado, investigating the habits of the lady-bird and other native insects. One wealthy old gentleman of Philadelphia, who has a weakness for bugs of the right stripe and complexion, comes every summer to Colorado to familiarize himself with our insects, and he is particularly partial to the lady-bird. She has somewhat multiplied here since civilization came in and we find her always at home in the cultivated portions of the state, especially in the orchards and gardens. She thrives without irrigation and seems content to live quietly, carrying out the good work for which she was designed. She is worthy of our kindest consideration, and every fruit grower in the land should court her acquaintance and favor.

DISCUSSION.

Mr. Daniels—Speaking about horticultural papers, we have one here in our midst that I think we should patronize; I refer to the Field and Farm. I understand from now on, it will have at least one page devoted to horticultural interests.

Mr. Osborn—We will not cut off discussion on the paper just read.

Mr. Brothers—I used to think a good deal about the lady-bird when I was a boy, only the little piece of poetry was different from the way Mrs. Wilcox read it. We used to have it:

"Lady bird, lady bird, fly away home,
Your house is on fire and your children all gone."

I have had the little things in my hands many times, and I want to acknowledge here that I have never hurt one that I knew of. I will take more care of the lady beetles in future.

Mr. Thompson—This paper is particularly valuable because there is so much included in it, and yet it is so concise and to the point.

THE GRASSHOPPER.

C. W. Steele of Grand Junction.

Mr. Steele had no paper prepared, but made the following remarks:

Mr. President, Ladies and Gentlemen—I have to say that, owing to a fever followed by severe neuralgic pains, I have been unable to prepare a paper on the grasshopper.

I had expected to embrace in my paper information from papers that I received last summer; but I have not even looked into these works since I received them; consequently, I know very little about the grasshopper; but what I do know amounts to a great deal, because I have learned that grasshoppers can be destroyed.

One year ago last spring, the outlook of the horticulturists in the Grand valley was very gloomy, and that summer the grasshoppers entirely destroyed several young and promising orchards. The largest pear and peach orchard in the state had one-third the

trees killed by the grasshoppers. A few neighbors and industrious individuals undertook to destroy them on their own premises, and their success was in a measure, satisfactory; but their neighbors did not kill what their premises had produced, and in consequence, the hoppers came in myriads and destroyed the crops of the men who were trying to rid their premises of the pests, and there was no way of compelling their neighbors to take care of their own pests.

I heard that Prof. Bruner, in the employ of the United States entomological department, had had great success in destroying the hoppers in some Minnesota counties, and it was suggested that he might tell us how to get rid of our grasshoppers. He came down and, after giving us a discourse slightly scientific, but very practical, he told us how we could destroy them by pulling off our coats and going to work. He told the success that had been made, and read us statements, showing hundreds of thousands of dollars saved in Minnesota counties by the destruction of these pests.

We also had great encouragement by the act of the legislature, creating the State Board of Horticulture, and we found by that law that the offender could be made to take care of his pests. Notices would be sent to everybody to take care of the grasshoppers as well as the other pests. The railroad company brought us a car of oil, free of freight, and this crude oil was sold to the farmer at the rate of twenty cents a gallon. We found that the places where they bred most rapidly was in the alfalfa fields, and the injury done to these fields was enormous.

Each farmer was supposed to take care of the grasshoppers on his place, but as soon as the alfalfa was cut, they would come on the apples by myriads. It is a very easy matter to catch these hoppers by simply dragging the hopper pans over the fields, and you will kill three times as many as you catch;

because, should the coal oil touch any part of him, he is bound to die.

Another method was used in some orchards where there was a dense undergrowth of blackberries, raspberries, etc., where it was impossible to use the hopper pans—a dough made of bran and arsenic was tried. One or two of our neighbors made a mistake by putting the dough on the branches of their trees. It was found that so much arsenic was poisonous to the trees.

Another method used by some of us was one recommended by Mr. Brothers: the dropping of coal oil in the irrigating ditch. The time to destroy them is now, in the egg state.

As I told you, I know nothing about the grasshopper and I feel that we are done with them in Grand Junction. You do not hear of them any more there.

Mr. Brothers—I would ask these gentlemen once more that, if they have any insects in their orchard the coming year, if they will send them to Professor Gillette of the Agricultural college, he will tell them all about them. We want to keep posted on these things. As far as I am personally concerned, I cannot name all the insects, and we want to know what our enemies are, and what our friends are.

Professor Brown told me, when I told him that I was going to put lamps in my orchard over night and keep them going all night, he told me that I would catch a tremendous pile of insects, but that I would kill as many of my friends almost as I would my enemies. We want to know now which are our friends and which are our enemies.

Mr. White—I would like to learn regarding the bulletin issued from Fort Collins. I find one occasionally in my mail and am always grateful for it, and I am sure all the agriculturists would like to

know where they are published, and how they can secure them.

Prof. Gillette—We are very glad indeed to have everyone in the state who desires these bulletins, get them, and all you have to do is to ask that these bulletins be sent you regularly.

Mr. Osborn—I will say to Professor Gillette that we ask the co-operation of the horticultural department of the Agricultural College, and that they will be with us, and work with us as far as possible. We can help one another. We are on the track of these insects, and we propose to keep on it, and that is the reason that I put that question in the box. I was most interested in that, not only for my own especial use, but for the benefit of the state. The reason, as I said before, was that we wanted to get some light on this subject of destroying these codling moths; and if anyone in the state had been successful, that is what we wanted to know.

I merely state this, as the professor was not here, and we will no doubt send you insects and twigs from various trees and vines. We have been very kindly treated so far and we hope to work in harmony with you.

Mr. White—I do not know, but it seems to me that I feel like moving vote of thanks to these gentlemen. I feel that I am under personal obligations to them, and I move, a vote of thanks be extended to Professors Gillette and Crandall for attending our meeting and giving us the valuable information they have.

Seconded by Mr. Brothers.

Carried unanimously.

Professor Crandall—If the efforts of the men at the college are appreciated, we feel very grateful for that appreciation. We are there to do what we can for the farmers and fruit growers of the state, and what we are very anxious for is closer co-operation. I think that feeling of willingness to co-operate

is growing, judging from my own department. The correspondence has been very much larger, and many more plants and fruits affected with disease have come under my observation than ever before.

I would be very glad to have you keep an eye out for fungi, noxious weeds and anything of that kind, and send specimens of them to the college at Fort Collins.

CHANGE OF SUBJECT.

Mr. Easley—I have discovered a noxious weed on my place for the last two years. We call it the wild lettuce; it is hard to eradicate, and I do not know how we will get rid of it.

Prof. Crandall—I have not had a specimen sent to me, but I think I know what you mean. It is growing in abundance in our locality, and there are three species of it here.

I have spent a good deal of time studying our weeds, and there are 228 on the list that I have made. In the United States there are 626 species of plants, regarded as noxious weeds.

In 1891 I found four different kind of grasses indigenous to England. They were introduced in the United States on the eastern coast, and were brought out here, no doubt, by the railroads in transporting other freight; and it may be of advantage to know what these plants are that you come across, and whether they are credited with noxious qualities.

WHAT I THINK ABOUT THE FRUIT GROWER.

Paper by J. T. Cornforth.

Mr. President, Ladies and Gentlemen:

The people of this great country are passing through a terrible crisis. Unwise and dishonest legislation against silver has thrown out of employ-

ment 3,000,00 American citizens. Nearly every article produced, or owned by man is depreciating in value; but how with the fruit grower of Colorado? His prosperity amongst the very few, maintains its own, thus showing the value of the orchard and virgin fruit lands of the state. No such profitable field can be found than in the fruit belts.

"We may live without poetry, music and art,
We may live without conscience, and live without heart,
We may live without friends, we may live without books,
But civilized man cannot live without fruits!"

It is said we may over-produce. There can be no over-production, but there may be wrong distribution. The proper marketing of your increase is essential, so that regulation and wide distribution must go hand in hand. Organization will make wide distribution, and regulation self-sustaining and self-protecting. Expedited time by railroads means much It gives the key for the accomplishment of successful distribution and full value.

Let us look back into the consumption of fruits, that are considered luxuries, and not entered upon the family's list of necessities. The importation of bananas last year (1893) was 13,000,000 bunches; at a low valuation, worth $7,500,000; over 1,000,000 boxes of oranges from Italy; 300,000 barrels of grapes. The Florida orange crop amounts to 4,000,000 boxes; California orange crop, 3,000,000 boxes; 10,000,000 pine apples, at a low valuation, worth $1,000,000. One barrel of apples to-day will buy from two to five boxes of oranges; from three to six bunches of bananas; from three to five boxes of raisins; from 100 to 130 pounds of sugar.

The fear that Colorado will produce more fruit than can be disposed of at remunerative prices is simply absurd. There can be no such thing as over-production, for the acreage is limited.

Railroads stretch out to every part of the United States, and are anxious for tonnage; freights will be regulated according to the volume of business. The day is not far distant when we must hope to not only supply our own state, but ship hundreds of cars of fruits to more distant markets.

The grape growers of New York shipped over fifty cars of Concord grapes to England this season. It is believed that an unlimited market will be opened for American grapes.

The shipments of California raisins to January 1 amounted to 29,000,000 pounds. The United States and Canada shipped to Great Britain in 1892, 1,250,000 barrels of apples. Eighteen hundred and ninety-two was an off year in the east, causing a shortage for home supply. Sacramento, Cala., shipped east 4,500 cars of assorted fruits. Think of it! Nearly 110,000,000 pounds. Again, on August 30, 310 loaded cars of peaches (from all sections) was received at New York city; in tonnage, 7,500,000 pounds.

Statistics are dry, so I will close, thinking I have enumerated enough to show the greatness of the industry. The fruits we grow are necessities in the family list and it will be a wonder if the growers keep pace in planting with the growth of population in the Great West. Then again, take our climate, which is the best in the world for drying fruits; clear, bright sunshine, no fogs or heavy dews fall, thus insuring bright, clean dried fruits, that at all times command the highest values in the market.

I predict that the dried apricot will hold its value for all time. The day is not far distant when Europe will call for America's dried apricot. Everything looks bright for the fruit grower of Colorado. Truly his lot is an envious one. He has seen the silver mines shrink in value from millions of dollars to paltry sums; the wheat lands nearly unsalable, ditto city lots, ditto the products of the eastern factory.

While with him, every year adds to the value of his orchard. You have bent your energies in the right direction. Your achievements have worked miracles for good. You have taken dry, waste and barren plains and made them beautiful.

Yes, it is with exultant pleasure every Coloradoan refers to you. Keep on in your good work. Your homes will then abound in comforts. Your children are amongst the most intelligent. All are under obligations to you for showing the grand results of fruit growing in our beloved state—Colorado.

Mr. Cornforth—That is all I have had time to write, but I should like to add that I do really and sincerely appreciate the State Board of Horticulture of Colorado, and the efforts it has made; but, at the same time, I feel that legislation is far from perfect, and new legislation is necessary for the successful protection of our fruit growers. Agriculture, horticulture, and entomology should be separate, and our horticultural society should be divided into boards of this description.

I believe to-day, as I have stated now for ten years, that a state chemist should be employed, with a view to compounding poisons for the destruction of our insect pests. I suggested the idea in California, and I am glad to say that after a number of years a state chemist has been employed in that state.

We should also have—I don't know what to call him but a bacteriologist. This man should discover the disease, and the other man make the poison.

Several gentlemen have been speaking to me in the last year, asking if I would advise an extensive acreage of fruit under one individual control. I would say, if the law will give me the same protection as it does the resident on Capitol Hill to preserve his property, yes; as safe as the United States mint.

Mr. Hatch, a personal friend of mine, takes charge of 800 acres of fruit. He has a total acreage

of 2,580 acres of fruit lands. This is an enormous amount to have control of, but it is only true to state that that man only controls that much property; for rest assured if the state does not give especial talent, and money sufficient to protect this interest in the state, it will be precarious for you that have invested your money.

I do not want to discourage you, but I have been working on this measure for eight or ten years; I worked with you last year, am working still, and expect to work on it for another eight or ten years; and if these measures would go through, the value of your land will advance from $300 to $1,000 per acre, for every acre you have. You can figure this out, and you will see that your interests will be the greatest in the state. Our mining industry will be a mere bagatelle, our silver will be a mere bagatelle, and our cattle industry will be as nothing compared to it.

Let us see to it that what we plant is done right. I am not a fruit grower; but any thing that I say comes from my heart. I know there are thousands of people who are desirious of having something on their tables just a little out of the common when visitors come; and it does seem to me that strawberries should not be forgotten. I have spoken of this for many years, and I think there are districts in our mountains where there is a small acreage adapted for very late strawberries; and I believe it is one of the most valuable pieces of property that a man can own, because late strawberries at altitudes from 6,000 to 8,000 feet come in when all the low values go out of existence; and that is just when the people have had their appetites sharpened to pay the highest price to get the last box of strawberries. And I am safe in the assurance that thousands of acres of strawberries could be planted at high altitudes and marketed in Chicago at from $6 to $15 per crate.

I was in New York once, and saw strawberries selling at $5 a box. I saw a letter from our ambassador in London, and in it he said: "I have visited peo-

ple here high in authority, and I have not at any time seen more than six peaches at once on their tables. Peaches in England are worth 25 cents each, and it would be impossible for any one market to supply the demand. The day is not far distant," continues this gentleman, "when American peaches can be carried from the United States to the London market."

Now, in defense of that, I have scientifically applied myself to the shipment of fruit only (I know nothing about its growing); but I will take the liberty of speaking of an invention of our own in carrying fruit a long distance.

In California, in one season, I sold 60,000 of my fillers, and every one of these cases realized to the shipper from 10 cents to 40 cents per box more than the same identical fruit ranked without it. What I say is selfish, and to my own interest; but it is as Mr. Boyd says—that the coming package and the coming mode of shipping fruit will enable fruit of this character to be carried across the Atlantic; and I am confident that the time will come when peaches and other delicate fruit can be marketed in London.

Take Concord grapes: Fifty cars of Concord grapes were shipped to the English market this year; twenty years ago they could hardly be carried from New York to Chicago. Now it is nothing for them to go from California to Denver; and it is nothing for them to cross the ocean.

Now, relative to apples: Your Ben Davis are the best-keeping in the world; your Ben Davis apple will compare in flavor with any apple of like quality grown on earth. It used to be, only a few years ago, if we wanted a good apple we had to fall back on—what was it? A Russet. The Russet is not worth a continental. We want to feed the eye.

You may talk about your Rhode Island Greenings—they won't grow in this country. Take your land that is now worth from $25 to $150 per acre, plant it with Ben Davis at from $5 to $6 per acre, and

make your land worth from $300 to $500 per acre, as it should be. Don't experiment with fruit at all, except so far as it satisfies your own fancy; but keep on planting what you think the most successful, as adapted to your soil, and I will guarantee that you will have such a fortune that the bankers will be jealous of your prosperity. (Applause).

Mr. Smith—I move a vote of thanks to Mr. Cornforth.

Carried.

Mr. Smith—Several years ago Mr. Cornforth said to me: "Your are planting too much," and I felt discouraged. If one of my neighbors had said it, I would not have cared; but I went home and concluded to accept an offer I had of $8,000 for 108 acres—six acres in strawberries, and a little in alfalfa; but later I changed my mind. If I have made any money I owe it to Mr. Cornforth's speech. He told me that he could ship my Ben Davis apples as far as railroads reached north, and as far as they reached south. I favor the Ben Davis apple. It is least subject to the blight; and that is the reason I asked last night for an expression of opinion as to the three best apples grown.

HOW TO ADVERTISE THE AGRICULTURAL ADVANTAGES OF COLORADO.

Paper by Mrs. Olive Wright.

Mr. President, Ladies and Gentlemen:

With 4,00,000 acres of land in the state under ditch, and only one-half that number of acres cultivated, as reported by the state engineer, how to secure the early cultivation of the other half, seems a very important question.

First—Because uncultivated, irrigable lands involve an immense outlay of capital with no return to the investor, till said lands are cultivated.

Second—With only two articles of agricultural produce, viz: Wheat and potatoes, raised in sufficient quantities to supply home consumption, there is the greatest possible inducement offered farmers from distant localities to settle upon these lands.

Third—Cultivating land by irrigation, or artificial watering, has advantages over natural rainfall at every point of comparison.

A spirit of philanthropy should be shown by those familiar with the advantages of irrigation, in spreading far and wide the good news.

Practical irrigation is the blue blood aristocracy of husbandry, and as such should be advertised among the farming fraternity, who wish to change from a region dependent for its moisture upon the clouds' down-pour, or blow over.

There is a particular pleasure in controlling the moisture required for growing crops, especially when one portion of the field needs more water, and that another portion needs less water, in order to produce the most profitable results. Many Colorado ranchmen own large tracts of land under cultivation, a portion of which they wish to divide up and sell to newcomers, for fruit and vegetable growing.

Land under ditch for sale, wherever located, involves neighborly acquaintance and social relations, that become important factors in the opinion of intelligent people of good principles, who regard the moral influences surrounding their homes as of more importance than financial benefit to result from the sale of a portion of their lands.

The kind of people to be permanently located as near neighbors is a matter to be carefully considered by our intelligent, educated and refined Colorado ranchmen who have, very many of them, engaged in tilling the soil because ill health requires a life in the open air. On ranches throughout the Rocky Mountain region, college educated men are to be found who have been driven from pulpit, platform, office or

schoolroom, by some form of chest affection, nervous prostration, or malaria, for which our pure, dry air, and almost perpetual sunshine has proved a specific in cases without number.

Colonies collected from the lowest level of foreign countries, and shipped like cattle or sheep, are not a desirable class of immigrants to locate near and mingle with the intelligence that has experimented with the barren-looking soil of the Great American Desert, till it has made it really, as well as theoretically, to "blossom as the rose."

Ten years ago I became deeply interested in the future development of agriculture in this state. I studied every phase of the industry carefully and prayerfully, with the most intense desire to aid in attracting attention to its great and peculiar advantages from the best classes of people.

In course of time I made up my mind that New England farmers were the most desirable immigrants whose intelligence, frugal, industrious habits, and good principles were calculated to develop the hidden wealth of our soil faster and in a more satisfactory manner than any other. I also entertained an idea that those who could arouse an interest in this region among New England farmers who intend to change their residence to a milder climate, would prove themselves public benefactors.

When I first entertained thoughts of personally aiding the systematic advertising of Colorado agricultural lands in New England, they seemed as vague, visionary and impractical as contemplating a voyage to the moon; but in the course of time a singular train of circumstances conspired to place me where I could test the belief I had cherished for years. I found myself in Boston on two occasions, with an interval of five years, the most singular, or I might say providential, experience being an extensive acquaintance among the agricultural people of the far East.

I became convinced that a field of immigration to Colorado was white for the harvest; yet alone and single-handed I could not even thrust in a sickle. I therefore appeal to the Colorado Horticultural Society for its co-operation in sending throughout the Atlantic seaboard region facts and figures concerning the amount of irrigated lands ready for the plow. Then, too, advertise the large ranches ready to divide into ten, twenty and thirty-acre lots, which are now working their owners to death, as well as their wives and daughters. There are many interesting particulars connected with this subject, but I will only take time to mention one or two.

The great number of deaths from consumption at the East, for which our climate has proven a cure in numberless cases, has an important bearing upon the immigration from New England.

Members of families who have lived for generations in a low altitude, within reach of the salt sea breezes during long winters of severe cold, which have developed chest affections of every kind, are scattered about throughout the East, in great numbers.

We who have a personal knowledge or experience of the almost miraculous effects produced upon this class of diseases by the pure, dry air and high altitude of the Rocky Mountain region, would be guilty of cruelty and sin, did we withhold this knowledge from such sufferers as we are able to reach with the glad tidings with which we are all familiar. The great number of first-class, well-to-do people who are quietly studying the relative natural advantages and attractions offered by Colorado and California, is a matter of vital importance to the future welfare of our state.

As a result of careful study and unusual opportunities for forming opinions, I suggest the following course as a means of securing the palace car immigration, which I believe awaits a business-like way of

reaching out for this most desirable class of agriculturists.

First—Open an office in the city of Boston for the purpose of advertising the irrigable lands of this state.

Second—Supply this office with a small but representative exhibit of Colorado products.

Third—Supply the office with printed matter for distribution.

Fourth—And most important of all, establish in that office one or more persons of good principles and habits, who can be trusted at all times to "tell the truth, the whole truth, and nothing but the truth," about Colorado.

The enterprise outlined above can be established with little expense, if the few persons interested in rapidly settling up Colorado's irrigable, unoccupied lands will form a co-partnership and set to work immediately with a determination to prevent all so-called "Western tricks and land schemes."

DISCUSSION.

Mr. Easley—Have any of the poor class of people that you met a spark of hope of getting away from that country?

Mrs. Wright—I am very glad of that question, and thank you for it. I have not been brought in contact with that class of people. Every year they have a mechanics' fair; I was present at the second fair; it is kept open from 7 to 10 p. m. It is a good thing, and judicious advertising there would be of advantage.

(Mrs. Wright continued for some 35 minutes a rambling talk, the burdren of which was, that it would be advantageous to the state at large to install her in an office in Boston as its agent.

Mr. Cornforth—With all due deference to Mrs. Wright and to any gentlemen here who have any

fruit lands to sell, I would say that Colorado is not in competition with California.

In regard to the altitude, I would say that the best fruits grown in California are grown at an altitude of from 5,000 to 9,000 feet above the sea level. The Grass valley in California is practically in the mountain district.

Colorado need not run down any state to build up itself. It stands pre-eminently as the Centennial state.

This board takes the stand that one acre of apples in Colorado is worth one acre of oranges in California. It is absurd for us to go east and expect to run down California; people east are as well informed as anyone, and I tell you again that you can buy three boxes of oranges with one barrel of apples.

It is absurd for men to leave Colorado and go to California to raise oranges. Stay at home and take care of your apples. I will guarantee you today, that any man can get two acres of navel oranges for one acre of Colorado apples.

Mr. Grimes—Whilst I was east, I remember reading a little paragraph in one of the papers, it was this: "Mrs. Wright, please hush, it is all we can do to stay in this country now." All we want in this country are intelligent people, and whether they are from California or from the New England states, a man with a little capital and brains can dig out a fortune for himself in a few years.

I am going to a meeting of the American Pomological society there, and I have been getting facts from a certain man on Wazee street, and I will tell these people that they need not stay away if they have intelligence enough to get here.

Mr. Logan—I thoroughly agree with what Mr. Cornforth has said in relation to the fruits and the difference between Colorado and California; but on the other hand, Mrs. Wright is doing all she can

to advertise Colorado, and California is carrying these ideas out; they have never ceased to advertise; they are advertising in their agricultural papers, and in every way possible; they even send carloads of fruits east for exhibition, and I believe if Colorado people will do the same thing, we can develop our interests in the same way.

Mr. Osborn—What I want to say is that the Colorado Farmer and The Field and Farm are just such papers as the farmers and horticulturists of Colorado have a mind to make them. It is pretty hard for an editor to gather up and glean from all sources just what is interesting for the farmer and horticulturist. Where does he want to glean these from? He does not want to depend entirely upon clippings, and I would urge on every horticulturist and agriculturist here the importance of helping sustain these papers; I will give some of them papers, and I hope others here will do the same thing by occasionally writing something interesting for the horticultural department. If anything interests you, it will interest some one else, and that is how we learn.

Mr. Smith—Last year California had a great deal of advertisement at the World's Fair, and they had a man who stayed there all the time and would talk for hours on it, and the idea struck me that if we had a good man there to speak of our advantages, it would have been of untold advantage to us.

Mr. Logan—In speaking of the agricultural papers of the state, if they depended for clippings from the country papers they would get left.

I have asked since last March that if anyone would send me articles touching on agriculture or horticulture, they would not only advertise themselves and their community, but their whole state as well. In my opinion, this is one of the grandest states in the whole Union.

Mr. Rogers—I think we need immigrants in this state; the same class of immigrants that have peopled

up California in the past few years. Two ways have been suggested here to obtain these desirable people to come here and help enjoy our climate and help realize the profits of fruit culture.

Mrs. Wright has suggested what seems to me to be a very good plan, but she has probably underestimated the cost of such an enterprise.

Another way has been suggested by which we can advertise, and that is by sending our local horticultural and agricultural papers in the east, to friends of ours, and to all who we can obtain the address of.

I have been watching this flow of immigration to California for six or seven years; I have watched the bringing of their arid lands under irrigation; I am continually in receipt of their local papers and other information, and I am firmly convinced that these people in southern California are away ahead of us in Colorado.

We have much to learn from them. If we devote the same amount of intelligence, the same amount of energy, in bringing before the people of the far east our resources here in Colorado that they have; if we exert ourselves to the certain extent that they have done in fostering the horticultural interests, then we will reap a reward far in excess of what we can expect to obtain now in our present state of lethargy.

Mr. Spears—Mr. Rogers has covered nearly all the ground that I wish to speak of. When I was back east last summer, I visited my old home, and there are very few of the scholars that went to school with me, left there; those that thought perhaps they had better stay with the old folks, they are there. But in the cities and towns of Massachusetts, there are many that are affected with throat and lung diseases; we should certainly get these, and if we did, we would get a good class of them at that.

In my vicinity a farmer went to California and returned and described it in the most glowing terms; he then went out with his family, and after a year returned and said: "Don't say anything to me about California; New York is good enough for me." Yet I did not find the first one who had returned from Colorado.

QUESTION BOX.

Question—Is the Erie blackberry a good bearer?

Mr. Osborn—I wrote to Mr. Phoenix, of Wisconsin, to send me the best blackberry grown in America, and he sent me the Erie. It has proved to be very good; but I cannot say that it is the best.

Mr. Brothers—The Wilson and the Ancient Briton are the best I have known of in Colorado in years gone by, but they are a failure now, and have been with me, for the past three years. Since 1874 I never made a failure with them, but for the last three years, they have been very unprofitable with me. I am going to plant a couple of acres this spring, but I have not yet made up my mind what variety I am going to plant. I would rather have the Wilson than anything I know of.

Mr. White—I feel extremely modest about this, but I want to suggest to Mr. Brothers that he try Wilson Junior. It grows alongside of the Wilson Early and it seems it is not subject to blight or double blossom as much as the Early Wilson. It is just a little longer berry than the Early Wilson, and the flower is a little different. I do not think there is any better berry brought into this market.

I am also trying the Erie.

Mr. Brothers—I will say for Mr. White's information that Mr. Tobias sent and got some Wilson Juniors. I got some from him and set them side by side with mine, and I could not see a particle of difference. I do not believe that there is any dif-

ference except in the name; I could not see any difference in the berry.

I also got that Fay's Prolific currant that would lay everything out, and I want to say that I would not give one bush of the old Dutch Red for a hundred of them.

I am going to see if Brother Wilmeth has any new varieties that will lay the Erie out. We want to get a berry here that we can lay down. There are two or three, if we could lay down, I would have; but there are none that I know of that we can lay down as easily as the Wilson.

Mr. White—I would like to say to Mr. Brothers if he will go to Arvada and visit Mr. Ensenbach's orchard, he will see about one acre of Early Wilsons and about one acre more of Wilson Juniors, and I am sure he will see considerable difference in the two varieties.

Question—Why were the peaches supplied from the North Fork so small?

Mr. Coburn—I think I can tell you the reason for that. The trees were overloaded and not taken care of. The majority of people who raised peaches there, tried to get all they could off the trees. They did not understand that they could get as many if they clipped some of the limbs off, or destroyed them in some other way.

Still, perhaps, there is another answer to that question: There are three grades of peaches: A, B and C. We have a greater demand for the first and second grades than the third. We can sell all of our first grade peaches that we raise to the trade around about the mining camps, and in fact most of the second also. When orders come in our best peaches go to the mountain districts, and we realize for them just as good prices as we could in Denver, and besides the purchasers pay the freight, and our surplus fruit we send to the commission men in Denver; consequently, they got the smaller ones.

Question—Please tell us of the profits and growth of the apricot and nectarine in Colorado.

Mr. Coburn—The apricot and nectarine, as well as the peach, do remarkably well on the western slope, in Delta and Mesa counties; but so far as my experience in shipping them goes, they are not a very profitable fruit. They seem to strike the markets of our state about the same time as the California peaches, and our people not being so well acquainted with the apricot, and knowing the peach, they will buy the peaches and leave the apricots alone.

I have had very fair success in shipping apricots out of our orchards, and the nectarines are much the same—that is, it fares the same fate. It is a very delicious fruit; a hybrid between the peach and the plum. It does remarkably well with us, but we have so far failed to find any great demand for them. I had seventy-five boxes on five trees. I shipped them to different portions of our state—some to Denver, some to Pueblo, and some to Gunnison; but I never had a second call for them, and that convinced me that while the fruit was delicious, there was no particular demand for it.

Mr. Cornforth—The apricot, for large acreage, is of extreme value, and it can be planted to great advantage. I have my mind now on a mesa district of California, fifteen miles long and one-half mile wide. It is one of the most valuable fruit districts in California. They have a more uniform call for their fruit from the canning factories near by than has any other section of the state. There are two delicacies that will remain with us—canned apricots and canned Bartlet pears; and as Mr. Coburn believes that it is successful in its growth here, I would advise a large crop of apricots. Germany is calling for more apricots to-day; London, Liverpool, and French markets are calling for them, and I do not believe that the demand will be less in proportion to the supply than it is at present.

Mr. Coburn—However, we cannot find any market for them.

Mr. Cornforth—As a fresh fruit, it is not desirable to ship; but from that little district I was speaking of they clear from $1,000 to $1,500 per car for them in their canned state.

Mr. Smith—In regard to the apricot: I have six trees as high as this room. Three years ago they were covered with apricots—so much so that you could not see a leaf; however, I have never sold an apricot, as I have six boys, and they will not allow one to ripen. I think it is the healthiest tree that we have.

Mr. Steele—My experience with the apricot is, that it is easier grown than the peach; it is hardier than the peach in the bud, and I think it could be successfully shipped. While it is not as profitable a fruit to ship in its fresh condition as the peach, still I am thinking, seriously thinking, of putting in ten acres of apricots, because of the demand for it in its dried state.

The nectarine is nothing more or less than a smooth-skinned peach. The portion of our country where the nectarine can be grown to advantage is more limited in extent than that in which the peach will thrive. In Western Kansas and Missouri they do not grow the nectarine; people from that locality visiting my orchard wanted to know the name of them. If you will notice the market quotations, you will find that they are quoted 50 per cent higher than the peach. It costs no more to raise them; having a smooth skin like the plum it is equally subject to the ravages of the curculio. However, for the purpose of drying, and perhaps canning, it would be more profitable to grow nectarines than peaches. The most profitable variety I grow for drying is the new White nectarine. It is worthless to ship, as the skin is so thin the slightest pressure will bruise them, and they will arrive in the market in poor condition. Another variety that I have, and that I like for flavor, is the

Early Violet. In fact, it has returned me better prices than anything I have shipped. Two years ago nectarines were selling for thirty-five cents per pound, while peaches were selling for ten cents.

Mr. Smith, Denver—I have nectarines growing on my place.

Mr. Brothers—How long have your apricots been bearing, Mr. Smith?

Mr. Smith—They are now six years old; they have been bearing for four years.

Mr. Tobias—What varieties have you?

Mr. Smith—I have four varieties. There is one I wanted to dig up; it is useless and small. The other three are very fair Russian varieties.

Mr. Brothers—I have four Russian varieties and, as Mr. Smith says, they grow faster than cottonwoods; but I have not gotten any fruit, and I have no boys, either.

The man who put that question in there asked for Colorado. Now, I do not honestly believe they can be made a success here in Northern Colorado. I do not want to mislead our friends here with big orchards; but I have not had a ripe apricot off my trees, and I do think we should make a distinction of the different parts of Colorado, for the reason that Colorado is five or six hundred miles long.

Mr. Coburn—For the benefit of the people on this side of the range, in planting apricots, I will say this: It was generally supposed here a few years ago that no apricot would come to maturity and bear fruit in Colorado unless it was of iron-clad hardiness; and for that reason the tree peddlers recommended nothing but the Russian and other hardy varieties in our part of the country. When we first began to plant, we planted varieties introduced by Professor Budd. After that we planted the peach and pear; after that we found out some other varieties, until now I have thirteen varieties in my orchard.

However, the only three that I would recommend would be the Royal, the Peach, and the Mophar. These are all fine apricots, and the Early Golden is also of particularly fine quality. I am satisfied that you cannot raise these varieties on this side of the range; possibly you might raise the Early Golden.

Question:—What variety of the strawberry is most profitable?

Mr. Smith—Captain Jack, with me.

Mr. Grimes—I had a good deal of chance for observation in strawberries last summer. We shipped to the World's Fair from this county, and all strawberries I sent in I kept a record of, and I found, like the Ben Davis apple, nine times out of ten, they were the Jucunda; then came the Jewel, Jersey Queen, Captain Jack, and the other varieties; but I found that nearly everybody raised Jucundas.

I found it was the same way with apples—all I could get was "B" and "J."

Mr. Snow—Would it be wise to plant Captain Jacks alone?

Mr. Osborn—It is a self-fertilizer.

Mr. Brothers—The Jucunda will do better to fertilize every time. I would like to hear from Mr. Barnes.

Mr. Barnes—The general opinion is that the Jucunda and the Captain Jack are the best varieties. Some may think the Captain Jack the best for the market, as they can grow more to the acre; but the Jucunda is generally established to be the best shipper. All points considered, perhaps the Jucunda is the best.

Question—What is the best variety of raspberry?

Mr. Smith—My best is the Turner.

Mr. Osborn—Up at Loveland they recommend very highly the Marlboro. It is the best berry in that part of the country.

Mr. Barnes—It is a good berry in this county.

Mr. Osborn—I have had good years for the Marlboro, and then, again, I have had years for nothing but the Marlboro. The Turner and the Cuthbert are also good.

Mr. Easley—Which sell the best in the Denver market—the black, or the red?

Mr. Coburn—In reference to the red raspberry: I have some ten varieties of the red raspberry that I have had for over eight years, and I find that the Cuthbert is the best berry for Colorado that I have had of any kind. But when it comes to profit and hardiness I think the new Marlboro the best of any of them.

Mr. Spears—The Marlboro and the Cuthbert seem about equal; but the Hansel knocks them all out. For a black, the Shaeffer is getting in its work, and the Golden Queen is also a good one.

Mr. Smith—I think I got $6 for red raspberries, and only $2.40 for the same quantity of black.

On motion, adjourned till 8:30 p. m.

NIGHT SESSION—JANUARY 12.

"TREE PEDDLERS."

Paper by Elwood Easley.

I promised the society a short paper on this subject. It is not expressed in the heading whether it shall be pro or con. So I "pays my money and takes my choice." It is conceded by every one that nearly all questions have two sides. In this little paper it is not my province to bestow any very fine epithets upon modern tree peddlers. It is not in the natural trend of events; it is rather preposterous to think that such a subject as this must be permitted to come before a

horticultural society for discussion. I infer there must be good ground for it, or it would not be done.

I, with many others, have become disgusted with their unprincipled methods of doing business in recent years, and they should be called to give an account of themselves, or their misdeeds, or call a halt. I have made up my mind to have nothing more to do with tree agents. I am sure I can get along without them and their deceptive ways, by buying goods direct from the grower, generally getting better stock at much less cost, and that will render better satisfaction every way. Life is too short to fool with them.

There are several reasons why it will not do for men of my age, if they ever expect to realize any benefit for time and labor expended, to be duped and put back by such unscrupulous agents as I have been dealing with for the last three or four years. There is a way out of this dilemma. I am almost ashamed to own that I have been so badly beaten by these same agents, when I knew just as well as I do now what to expect. I knew a better course to pursue, but took no heed. But this is only a warning to others to improve by my mistakes in this respect. These kid-gloved agents are too eager to make money to be strictly honest with their patrons; too many tricks that are vile, and too many ways to fool the unwary in this business. Let them severely alone, would be my advice. I don't presume to say there are no exceptions in this class of business, for there are some honest men, I believe, in all professions; but how are we to arrive at this knowledge? Only by bitter experience.

What I would like most to impress upon your minds, if it were possible, is to make these men responsible for their misdeeds. It is true, it is catching before hanging. You seldom see a tree agent but once, and that is when he is duping you for your first order for trees; and if he has made a big catch, you may be pretty sure you will never see him again, but

his second will appear upon the scene at the appointed time, to deliver the goods and take your money; but should you discover anything wrong, you cannot hold him responsible for the acts of the other fellow. Be that as it may, you are in a quandary to know just what to do; to what extent you have been duped. It may take you several years to find it all out. It is very easy to get along with some men in selling trees to them, as they are not particular as to kinds; they want trees to fill up their grounds. To say they have an orchard set out, fills the bill with a great many farmers. Peddlers get along fine with these fellows; but when a man is choice in his selections, and knows the exact merits of everything he orders, and wants that, and nothing substituted, then he has a different man to deal with altogether. While it is comparatively smooth sailing to get along with the first class of customers, in the meantime these same peddlers get to be wily, expert confidence sharks, to get away with the latter class.

Now, fruit growers of Colorado, what are you going to do about it? Are you still going to let them carry on their nefarious business indefinitely, and not raise a voice against them, or let them go the full length of their rope, and let others learn, as we have learned, that they are not just the class of men we wish to turn loose upon the public? It might be well had I not brought this subject before this society, unless I could have spoken in glowing terms of their great and noble deeds. With all our aspirations and fine wishes in their behalf, it goes without saying that it will not bring honesty of purpose nor just dealing with all of whom they have come in contact.

The horticulturist has very many things to contend with to make a success of his business at all. First, the elements; then a suitable location must be found for carrying out the successful production of the orchard and garden; the choice of good trees and plants, and how to obtain them; contending with all the insect pests and right methods of destroying

them, and a score of other things I might mention. But not the least of all, is the leech, or tree vender, who too often gets in his work most effectually. Then is it not time to retrench and reform, and cut off all superfluous as well as unnecessary expenditures as much as possible? A man is a misnomer to-day, who will stand up and contend for justice and the betterment of humanity. I am in favor of all who work and toil and try to gain a competence by upright living. No honest man will take offense at what I have said, nor the charges I have made in this paper. I hope some good will come out of it, at least.

DISCUSSION.

Mr. Steele—I want to say, Mr. President, that I have never found a class of people more honest than nurserymen; more careful, more painstaking to have the variety sent out true to order.

I have had but little experience with tree peddlers but I do not know that I want any more. I have bought only one bill of trees from a peddler since being in Grand Valley. I had just sent in an order, but the nurseryman did not have them. A peddler came along and I ordered some Iona grapes and Fay's currants. These were selling at 30 cents a plant. When they came my Iona grapes were black, and my Fay's currants, white; but I do not lay it up against the class.

When I was a boy in Indiana, the tree peddlers came as regularly as the leaves in spring, and they did lots of good because they induced many men to plant trees, who for ten years would not have sent in an order to a nurseryman; that is the good that they are doing, and so I say, all who have become adept enough, let them buy from the nurseryman, and these other fellows, let them buy from the peddlers, and I would have no kick coming.

Mr. Easley—I could not tell you all the stories that tree peddlers have told me; that would be too

big a job; but I would like to hear from others, the experience they have had, and how they have been duped.

Mr. Brothers—That is what we want to hear.

Mr. Smith—I have had an acquaintance with tree peddlers for fifteen years. My first experience was in Illinois; an old gentleman kept us company when I was traveling, and showed us certain orchards that he had sold trees for; how he had persuaded that man to plant trees; how he had sold trees to this one seven or eight years ago, and so on. So that when I came out here, I fell very easily into the hands of the tree peddlers. I have been ordering fruit for the last ten years, and am ashamed to say that I am taken in every year, even to the very last, by men representing responsible and respectable firms in this country; they are not even the trees that they are labeled.

You all know the Crandall tree currant. I purchased one from a peddler, and have the original label. The stock does not by any means show that it is this variety; it dies down and grows up from the roots, and I will defy anyone to make anything more or less out of it, than our common yellow currant.

Talk about being taken in: I have 80 cherry trees that I am going to dig up bodily and throw away, and so it goes time after time. It does seem as if I do not know where to turn to get fruit. I have sent to hundreds of different nurseries; I have paid from 70 cents to $3.00 for Fay's Prolific currant, and I have nothing that beats the Red Dutch. My wife and sister, two or three years ago, picked from one of my bushes of Red Dutch currants, two bushels of currants. Now then, the Fay has never done anything like that for me; I have currants they call the Fay, but I have nothing as good as the Red Dutch.

I have also all kinds of gooseberries. I have the Industry, a little red berry, a little larger than a pin head, and I am so disgusted that I do not know where to turn.

Last year I bought what they called the Big Ute and paid $1.00 per plant, and this year they produced nothing but a little common plum.

Mr. Osborn—The Big Ute is only a native Colorado plum.

Mr. Spears—They are not claimed to be anything else.

Mr. Brothers—They got the dollar all right, did they?

Mr. Smith—You bet they did!

Mr. Brothers—These fellows have gotten track of you. If Mr. Smith has been bitten year after year by tree peddlers, I should think he would know enough to quit after two or three years.

Mr. Coburn—Relative to these Crandall currants that Mr. Smith and Mr. Easley speak of, I would like to say here that the Crandall currant is nothing more or less than the common Rocky Mountain currant, and it is so advertised throughout the East. It is a great acquisition to the Eastern nurserymen and they are making big money out of it. It is all the rage, simply because it comes from the Rocky Mountains.

Another berry that you see advertised is the June berry; and then again they advertise very extensively the Buffalo berry in the East; we have them right at our very doors. We never think of cultivating them; but they take them there, and think them a very great acquisition. If we will hunt up the article and see where it comes from, we can then tell at once if it is anything we have here.

The plum that grows wild up and down Grey creek—I am just like you, in that I have paid $1 and $1.50 apiece for them; but I got them to propagate from. They did not fool me when I got them.

There is another fruit that grows wild up in our mountains, and is very prolific—it is a kind of cherry. I see it advertised here as the Dwarf cherry. I cannot speak intelligently about that, as I am not positive on the subject, although what I have seen on the Western slope is nothing more or less than the common Choke cherry.

Mr. Osborn—They are not the Choke cherry. The bush does not grow quite that high. They are very prolific; that part is correct. I have some of them, and they will bear just as thick on the branch as you could put them there with your fingers. The bush has a leaf very similar to the willow. It is the same as Mr. Phoenix has made thousands of dollars out of.

Mr. Coburn—Are they good?

Mr. Osborn—I rather question the quality; but people will buy anything.

Mr. Coburn—That reminds me of a great many inquiries I have for the Crandall currant. "No," I say. "I have not got them; but if you want them, I can get them for you, or you can go to the mountains and dig them for yourself." They think them the most wonderful thing they have ever seen. I ask them frequently what they are going to do with the currant. They are not fit to eat. No one will buy them, and I cannot see the profit of planting anything that we cannot sell. Now, this cherry may be a wonderfully good thing; but will people buy them? It is the same thing with this currant as with the June berry and the Buffalo berry. I do not know where there is any sale for them. If we had 10,000 crates, I do not know where you could sell one.

Mrs. Wright—It makes a very fine jelly; the finest cultivated cherries cannot make any better.

Mr. Spear—The Rocky Mountain Dwarf cherry has been growing at Greeley for seventeen years, and I have never seen one that would exceed three feet in height.

Mr. Osborn—I would say that we started out on the tree peddlers. Now, I want to say this: I have found one honest peddler. I sent to F. K. Phoenix, Wisconsin, for some fruit several years ago. I sent the money for the fruit, and he sent it back to me. He said, "I cannot fill your order." That is the first time that I ever sent away, but that I got my orders filled. I may not have gotten what I ordered, but something was sent to me.

Mr. Steele—Are you not conflicting nurserymen with tree peddlers?

Mr. Osborn—I do not know but that I am.

FRUIT GROWING IN OTERO COUNTY.

Remarks by Hon. J. H. Crowley.

Mr. Crowley, on being introduced, spoke as follows:

Mr. President, Ladies and Gentlemen—I owe an apology to this association. I promised a paper on fruit growing in Otero county, but have been sick for two weeks before coming to Denver. I got out of bed last Saturday. I do not look sick, and I do not want you to think that I am sick now; but it hindered me from preparing my paper, and this special, or extraordinary, session of the legislature, as it is called, has hindered me from giving any attention to this meeting at all. I am here, therefore, without the paper, and I do not feel that I should inflict myself on you without any preparation.

I will say, however, in regard to fruit growing in Otero county, that about twelve years ago the first trees were planted by Senator Swink. These trees were brought from Illinois in a trunk. They were very small, and for the first three years they were allowed to die down to the ground. In fact, when I came to Otero county, seven years ago, that was the

great complaint—that trees did not winter. The senator experimented until, in fact, one winter he went out to dig up the trees and get rid of them; but he found that the ground was so dry that he could not get the trees out, so he quit. He discovered that it was the dryness as well as the cold that killed them. He immediately turned on the water, and from wetting the ground, the trees grew without any dying. Of course, without being a member of the Ninth General Assembly, I would not dare make that assertion. If any of you have any trees, try that yourself.

When the weather is perfectly dry, and there comes a hard freeze, you will find the bark shriveled.

That was the first start in fruit growing there. I, however, started a nursery at Rocky Ford, six years ago last spring. I set the first fruit grafts on sod, and I grew 90 per cent of them. At the same time I was told before I started in that they would not grow by irrigation; there was something in the alkali water that would spoil their growing; but, as I say, I grew 90 per cent of them.

Since then there has been set out in that county something like 1,600 acres of trees. I have grown sixty varieties of apples, thirty-five of grapes, and all the smaller fruits, and I have protected nothing except the California varieties of grapes. I have had no grapes to ever winter-kill; I have never had a peach tree to winter-kill, and I have never had any kind of fruit to winter-kill except red raspberries; and that was more on account of dryness, owing to the fact that it was impossible to get them moist enough, on account of being short of water.

Our trouble in Otero county is, that the winters are too mild. When I left the legislature last spring, my trees were all in bloom; then it suddenly turned cold and we had a month of most unusual weather for that time of the year; however, the grape crop was full; apples suffered considerably; the plums were all right, especially the Weaver and the De Soto. But,

as a general thing, it was an off year for fruit in Otero county.

In the early part of the season, notwithstanding the cold, we had an unusually promising crop of fruit —in fact, apples, plums, and all kinds—when we had a hail storm strike there last summer. It covered a strip four miles wide, and destroyed all the fruit in that section—that was on the 7th of July—consequently we did not have any fruit exhibited at the fair. We have now in the county about sixty acres of grapes planted. As I say, we protect nothing. The Concord is the grape mostly planted, although there are ten acres of Delawares.

Mr. Bushnell, in his Grape Manual, says there are but two places in the United States where the Concord becomes a sweet grape—one section in Virginia, and the other in Tennessee; but in Rocky Ford they are a sweet grape. I sent him a basket two years ago, and he wrote me a very flattering report of these grapes. He said they were the richest he had ever tasted; in fact, if they could be grown up to the standard of the ones I sent, they would make a substantial good wine; but these grapes are not recommended.

He sent me quite a sample of his wine grapes. These I am testing now; and I have had good success with the Lady Washington, Niagara and several varieties.

Now, I am sorry, very sorry, that I was not here to hear your day papers. I would certainly like to have heard the different successes and failures they have been having throughout the state; but as I am not prepared, and as there are others here who can give you better reports, I will close by thanking you, and saying that I will try in the future to do better. (Applause.)

Mr. Wilcox—I would like to ask Mr. Crowley if any of the varieties of the California grapes he speaks of have ever fruited?

Mr. Crowley—Yes, sir; several.

Mr. Daniels—What is the character of the soil?

Mr. Crowley—It is a clay, mixed with some gravel. It is a very warm soil; in fact, it is two weeks earlier than the sandy soil, which is perhaps eighty feet lower down. My land is upland, and the grapes are all lower down. Where the grapes are, gravel comes to the surface; but most of the soil is clay. In fact, when you plow in the sub-soil fifteen inches deep, it is very difficult to get a plow that will scour; there is not enough sand to scour the plow.

FRUIT GROWING IN COLORADO.

Paper read by A. M. Daniels.

Horticulture is a fascinating pursuit; one that always should exert a refining and elevating influence on mankind. By it we are brought in direct contact with nature in her best and most lovely form. We have before us object lessons which excite wonder and admiration, and bring us nearer to our Maker. It contributes largely to health, pleasure and comforts of mankind, and affords opportunities for experiments, and opens a field for improvements so vast that we are at a loss to know where the end will be. In Colorado it is comparatively a new industry, and yet it is the oldest science of which we have record; and I may say the one that is abused the most. There is more room for a full life of activity in fruit growing than in any other profession I know of. I would rather raise fruit than anything that comes from mother earth, especially at this time, when one barrel of apples will pay for 500 pounds of flour, and one acre of orchard gives more profit than 100 acres of wheat. Within the last few months more than $1,000 profit an acre has been realized from some of our Colorado orchards. This demonstrates the possibilities of fruit growing

on irrigated lands. I am looking for this industry to increase rapidly from this time on. More so, perhaps, than any other. While we cannot expect to receive present prices for all time, a good article of deciduous fruit always has and will bring a paying price. The great and increasing south lies near us, that never can grow a good apple, and there is no locality that can supply that market better than Colorado. The flavor and fine keeping qualities of our apples are such that they will always be in good demand. We should plant more trees, more orchards, and larger ones in Colorado, and should grow our own fruit, at least, and keep our men and money at home. Three million dollars' worth of fruit was shipped into Colorado in 1892. This, and nearly one million dollars' worth more, that was home-grown, was consumed within our borders; and yet not one in ten of our people have the fruit they need for their health and happiness. More fruit means better health and more comfort to mankind. I think there is no better place in this wide world than on our irrigated lands for intelligent and profitable farming and fruit growing. Our land is the best. We have plenty of sunshine, and can control the moisture so as to almost reach perfection in the growth and ripening qualities of our fruit. No crop is grown that is so remunerative as the production of a fruitful orchard, and none so easily obtainable. The places in which good fruit can be profitably grown covers but a small part of these United States and of the world. Its territory is not increasing as fast as the demand for fruit increases. Orchards no farther east than Illinois are failing, and all the more so as one goes east; and seldom do you see a new orchard put out in these localities, to take the places of those that are fast going to decay. From this on, our possibilities have no bounds in fruit growing. Fruit growing in the early days of Colorado, I may say, was incidental. Those that dared

to put out the most hardy varieties did so with many doubts and fears. For years, fruit growing was experimental. But at this time no one needs to work on uncertainties. They can work from the experience of others before them. On the western slope, where at first it was feared that nothing but the most hardy fruits could be grown, now we see the most delicate peaches, apricots, nectarines, figs, and the tender varieties of grapes growing. No state covers a wider range, except California, of adaptability for growing all kinds of fruit than Colorado. It has the soil, and by its different altitudes we have the humidity most favorable to produce the apple at all elevations from 4,000 to 7,000 feet, and, on the western slope, the most delicate varieties of all deciduous fruits. There the trees and fruit grow unmolested, as nature would have them. We find that fruit, like people, change their nature, and sometimes their names, as they come to the west. The Spy and King apple are among the best keepers in the east, while here they ripen in autumn and early winter. The New York Pippin, ashamed of its former habits and nature, changes its name to Ben Davis, and improves in size and quality and becomes a respectable member of the apple family; and we see it quoted, even in New York, with the standard varieties at equal prices. The apple stands at the head of all fruits for food, and is king. The grape stands next, and is queen—all other fruits are members of the royal family. The apple was the first fruit made for man; the serpent guarded it; Eve first ate of it. No fruit has so many legends associated with it, or as much history connected with it, as the apple. People will have it, no difference what it costs. It has become the staple article of food, rather than a luxury. Oranges, or any other fruit will not fill its place. One and a half million barrels were shipped to Great Britain in 1892. It is the only all-year-round fruit, and one that all mankind

enjoys alike. No fruit can be used in so many ways for the good of mankind as the apple. We are seeing stormy days in our business world—distrust in ordinary business enterprises. The closing down of factories and mines, failure of banks—these things are teaching men that it is best to produce for themselves; which causes impetus to the settlement of our agricultural lands. The east is drifting toward the west—especially to our irrigated lands. By the statistics, the number of farms are decreasing in the east, while here they are increasing. The official statistics given in the eleventh census, taken in June, 1890, make the number of farms in the United States to be something over five and one half million. Within the last ten years the large farms in the south, and New England states have absorbed the smaller ones, to the number of over fifty thousand. Illinois decreased in number of farms over fifteen thousand between 1880 and 1890. On the other hand, we find that Colorado has increased her number 11,883, or 264 per cent. in the ten years, being the greatest per cent. of increase of any of the states. I have no figures to show the increase since 1890, but the last three years has added largely to our number as well as to the value. The decrease has been the most in the south—the middle states next. Colorado's irrigated lands rank second, to the extent of its reclaimed area, among all of the arid states. Irrigation has added very materially to the value of these lands. It is estimated that the average value in Colorado is eighty-five dollars an acre. The lands increase in commercial value as the profits from them increase. Unimproved mesa land, good for fruit growing, with perpetual water right for the same, can be bought for thirty dollars an acre. This put out to fruit, will the third year nearly pay all expenses up to that time. Nothing in Colorado will grow into value with so much certainty as an orchard. No class of men can be better situated to re-

sist the evils of hard times than the fruit grower on our irrigated lands. They seldom fail of giving a good crop in our mountain valleys. I am a believer in small farms—growing fruits, vegetables, poultry and bees, so as to have something to eat and something to sell; and, as the saying is, "not put all your eggs in one basket, lest you may lose them."

DISCUSSION.

Mr. Spears—I can bear Mr. Daniels out in what he says relative to the farms in the East, from my own experience in districts near my own home. In one, where there were thirteen families when I was a boy, to-day there are but five. In that school district there used to be sixty-five scholars; this summer they had but seven. Another school district in the East sent forty scholars—to-day they are sending twelve, and six of these are from one family.

What the proportion of the farms that are being abandoned is, I cannot say; but I know it is considerable.

Mr. Crowley—I think we cannot too strongly call the attention of the horticulturists and farmers of this country to the fact that the people are drifting from the country to the cities. I do not know exactly what the percentage is—the census of 1890 shows it—but I do know that it is enormous. I have talked to the people of our own country, to farmers' clubs, and to people of other counties about this.

The prohibitionists have introduced into our schools studies on physiology, showing the effect of drink on the system. I think—and I have advocated—that we should plant in our school yards all the varieties of fruits, and all the varieties of flowers that grow in this section.

Last year, on Arbor day, I took an armful of branches from different trees, as many as I could carry, and went through the uses of each. I offered our school district a tree for every child in the school

district. I said: "I want you to plant these trees in the school yard. I will give each child a tree, and let him be responsible for the care and cultivation of that tree." In this way it will be a pleasant memory to the child; they will take a pleasure in it, and they will be proud that they are the children of fruit growers.

I think this is the best thing that can be put into our schools. While you are teaching them botany you have the illustrations right at hand. I remember once meeting a teacher, who told me: "I have been teaching botany for twenty-five years, and until I got on a farm, I could not designate one tree from another." He had taught botany, but he had only the theory. I certainly endorse all of that paper.

Mr. Spears—I think Mr. Crowley's remarks are very appropriate, and this is a principle that should be followed in every school.

Three years ago this coming spring I gave to each school child in Greeley a tree, either fruit, shade or ornamental, with the provision that each one should register his name in a book. I had 465 scholars come after trees, and of this lot of trees distributed, I do not think exceeding 4 per cent of them died. For the last two years I have given to each grade in every school in the state a tree, if they would ask for it, and pay express charges; and if every school will plant for the credit of the class a few trees, roses or shrubs, it would do a good deal more toward instruction in botany than the teachers.

CHANGE OF SUBJECT.

Mr. Daniels—If not too late, I would like to ask two questions for information. They may perhaps be of interest to others as well as myself. One is this: Has any one here ever had any experience in setting the plum on the peach, and whether they would recommend it? We are in a locality to which the peach is better adapted.

The next question is: Whether there are any here who have had any trees that were set back in cold storage until late in the season? If so, I would like to know with what success.

Mr. Spears—For my part, I would prefer plums set on the peach, in preference to the main stock, and planting them deep, so they could be on their own roots.

Relative to cold storage: I bought some trees two years ago; they had been in cold storage all winter. I got them about the last of April. I raised 75 per cent. of them. All that started grew, and are now in good shape.

Mr. Smith—My best plums are on peach stock.

Mr. Daniels—I had a large quantity held back in St. Louis. We were unfortunate, and did not get water in Peach valley at the time the trees were set out. I bought quite a quantity of them; they did not reach me until about the second week in June—perhaps the 12th—and about the 15th or 16th day of June I set out a row of pears on my land. They were dormant, and some of them died, while perhaps two-thirds of them lived. At the same time I set out about 700 of the Bartlets. These were also held back, but the buds kept green. I cut them off about eighteen inches high. They remained dormant a long time, but about the last of June they burst through the bark. The leaves would commence no larger than a pin when first sprouting, and in two days would be a good leaf. The vitality of the bud seemed to be entirely gone, and where a tree sprouted, it had to make its own way through the bark.

If any one else has had any experience of that kind, I would like to hear it.

Mr. Osborn—If you had taken these trees and cut them off within three inches of the ground, they would then have sprouted a bud or a little twig; but the trouble with your trees was, that they could not support the bud—they had not sufficient fibrous root.

It does not hurt a tree as much as a good many think to cut it back. You say they were dormant; they will get a little too dormant, because there is not enough sap flowing up through the trunk to support it. I have had trees the same way, and I trimmed them down to three inches.

Mr. Daniels—My plums and peaches it did not affect so badly.

Mr. Osborn—There was a hail storm passing over a section of our country four or five years ago; it seemed to center around in a few parts, and it battered the trees so badly that it seemed they would die; and in fact they did die to within two or three inches of the ground, and from that point they sent out nice shoots; and to-day I would rather have them than to trust my luck to the trees. It is a healthy growth; but of course you must watch this. The only trouble with Mr. Daniels' trees was, that they could not support their bodies. Did they go into winter quarters that way?

Mr. Daniels—Yes, sir.

Mr. Osborn—Then you have no other remedy.

Mr. Stone—What would you expect as a result?

Mr. Osborn—They will begin to die from the top, and die gradually.

Mr. Stone—I asked that question because I have a few Sweets that have gone into winter quarters, and instead of the tops dying, only the limbs were affected. It is something I do not know what to do with. I expected to put in new trees this spring; but perhaps these trees could be made as good as new ones.

Mr. Osborn—Yes, sir. I would rather have them. You have the root there, and it will stand a large, healthier tree. I have the Pond Seedling plum. I had bought several and sent them down to the farm, all except one; and I had a place I wanted for just one. I took all the care possible of that one, but it was just like Mr. Daniels'; I saw it was not

going to do anything, so I cut it off and it sprouted. There was nourishment enough in it to support what I left. I had a little Idaho pear in the same way; it is a nice tree now. I have every confidence that if you cut them off, you will have a nice twig. It is the only thing in the world that you can do to save it; and if that won't do, nothing else will.

Mr. Crowley—I hope the secretary will make a note of this question, and I would like very much to have a report of it. I do not think it is a case of fibrous roots; but the trees were too dormant, and I think they will be a great deal more so next spring.

The president has stated that they have but a small hold on the ground, and do not supply sufficient nourishment for their bodies; it is a very small hold, and if these trees have not sturdy leaves, they have not sturdy roots; and if they grow, I am very much mistaken. I hope, for the benefit of the association, that a full and particular report will be made of this case.

Mr. Brothers—I was going to ask Mr. Stone why his trees were in that shape.

Mr. Stone—The only answer I can give to that is, that I was late in getting my ground ready, and my order was not made until late. The trees came—I do not know the exact date—I think about the 10th of May; but they came before I expected, and my ground was not quite ready. I heeled them in thoroughly, according to directions, and they were not disturbed until I was ready to set them out. They were then set out as rapidly as possible; but no leaves came on these trees that I speak of. I have sixty, and there are several of these that have never given out a leaf. Of course, I took care of them; watered them and cultivated them the same as my other trees. They were green the latter part of December; but I have condemned them and expect to replace them next spring.

Mr. Brothers—There must have been a cause. Had they good roots?

Mr. Stone—Oh, yes.

Mr. Brothers—Were they as good as the others?

Mr. Stone—They were beautiful trees. I reported them to the nurseryman as such.

Mr. Brothers—Did you cut any limbs off?

Mr. Stone—A few.

Mr. Brothers—Were the limbs nice and green then?

Mr. Stone—As far as I could see they appeared to be.

Mr. Brothers—I think these trees will be in a worse fix next spring than they are now.

Mr. Stone—I shall try the experiment again. If in the spring there is a single tree that has a good green bud near the ground, I will cut it off for experiment sake.

Mr. Brothers—I believe if they have root enough they will grow.

Mr. Stone—They never have grown.

Mr. Steele—In this connection, I am going to give a leaf of my own experience. In the fall of 1885 I put out a number of trees, all of which started to grow next spring except one. It never showed any sign of growth so far as I could see. It remained where planted until the spring of 1887. Eighteen months after I had planted it, I dug it up and planted another tree in its place. A day or two afterward I noticed the roots of the tree and found them green and healthy. I thought for an experiment I would put it out. I planted it between two trees in a row. It promptly started to grow, and to-day it is one of the finest I have. Now that pear tree I know was dormant.

A further illustration of trees dying during the winter for want of moisture: I have had some experience along the line of fall planting. I got some trees during the fall of 1888; they arrived the middle

of November. I did not expect to plant them that fall, but when they came, it was very good weather for planting trees, and on the 17th of November I planted out these trees. At that time I had plenty of water, and I irrigated every tree that I planted, except one full row and half of another, and then the water was turned off; but the ground was in such good condition, that I expected the trees to grow. I took three times as much time in planting those that I could not irrigate, as I did the others, and took the same precautions in planting them as we did back east. As I say, I took every precaution with them, but every one of these trees that failed to get water from the ditch was dead down to the ground but their roots were in good condition. I cut them off, and to-day they are as good as any that I have.

It however taught me this lesson: That winter irrigation is just as necessary as it is in the summer.

I will say, further, that in our country you need not be afraid to plant trees in the fall; the results will be very satisfactory, but you want to be sure that you have plenty of water.

Mr. Osborn—I want to say that that is the only remedy there is: to cut them off; they may not grow then, but you could not do anything else. That is the only remedy that there is, and if it does not bring them, nothing will. That is my idea, and it has been corroborated by Mr. Steele.

CHANGE OF SUBJECT.

Mr. West—May I be permitted to ask a question? It is the question relating to pear culture. From the horticulture reports of your society, I noticed that it seemed to be the unanimous opinion of the members that in the cultivation of the pear tree, the ground should not be cultivated. I would like an explanation of that. Whether after the pear is planted, all cultivation ceases? Do you leave it to the growth of weeds? or how do you do it? It is a

question in which I am very much interested, having a considerable orchard in pears. These have done fairly well in bearing and are large enough now to bear heavily. Last year they did very well, but shall I cease all cultivation, seed the ground down, or shall I continue cultivation? In reading some of your former minutes, I noticed that you had abandoned cultivation.

Mr. Osborn—I believe it is conceded that the pear will stand more careless cultivation and neglect than most any of the other fruit trees, but my experience in traveling over the state for the last two or three years, clean cultivation has been noticeable, especially upon apples and other fruit trees. There are others here who have had more experience with the pear than I have; still, I cannot see any objection to clean cultivation. I had a few pears that did as well as any pears could until the blight came and took them away.

I do not agree with a good many on the blight. I said they could never find anything that would cure the blight, and I stand to it. I believe it is like lightning—it comes and strikes the trees. You do not see the effect of it then, but you will afterwards. It appears and goes; from whence it comes you do not know. I had my pear trees cleanly cultivated; but that was not the reason they were killed by the blight, because I know of some that were growing in the grass, and they were also struck by the blight; and I do not know of a single pear tree, except those two or three years old in the northern part of the state, but that were killed by blight. I do not believe that there was one left.

I know my friend Mr. Brothers had clean cultivation, and his pear trees did well. They could not do better. What more do you want, when a pear tree cannot do any better? That is good enough.

Have you reference to the fact that whether with careless cultivation a tree will produce the same?

Mr. West—I have reference entirely to the cultivation of fruit for commercial purposes. I thought I had read somewhere in the reports of this society that cultivation was not desirable in the pear. That is, that the tree would not bear successfully. I believe in the reports of the meeting previous to this, in a discussion of this kind, a question arose as to the non-production of fruit, and the reason given was, that the trees were cultivated when they should not have been cultivated.

Many of the men whose names are familiar to me went on record as saying that after a pear tree had reached an age sufficient to produce fruit, and did not produce fruit, there was some cause for it. The question arose as to why, and the answer to that seemed to be very nearly unanimous—that the trees were cultivated too much; that cultivation after a certain period should cease if you want to produce fruit.

Mr. Brothers—I have had experience both ways, and what Mr. West says is correct. We have had a discussion of this nature in this society. I believe we decided as he says, and he has been governed by it; but we learn every time as a society, just like everybody else.

In regard to my old place: I had some pear trees standing in front of my house. I planted them in 1876, and they grew beautifully until four years ago—until this disease came upon them that we call blight. People said: "If you had these pear trees of yours on sod, they would not have died." That was the advice I got. They asked me how they were cultivated, and told them, clean cultivation. The year that the blight struck them they were just loaded with beautiful fruit as big as walnuts, and in two weeks the pears were all shriveled up, and in less than a month the trees were dead. That was on my place where I am now. They said: "Those pears on the other place will not die, as they are on sod. I

went down there to see, and found that they were in as bad shape as the others.

In talking to Mr. Lee about it, he said: "I won't cut the tops off my pear trees; you cut the tops off yours, and we will see the results." There is now no difference between the trees. Mr. Lee's are dead; so are mine.

Mr. Osborn—I will say this: The nicest orchards we saw in the state were where clean cultivation prevailed.

In visiting an orchard we saw on one side of the road an orchard in clean cultivation, and on the other side one planted in the sod. The one with clean cultivation was planted two years later than the one in the sod; and yet in the cultivated one, planted two years later than the other, there was a two years' larger growth.

Most of the orchards on the Western slope that we visited last year, with a very few exceptions, were clean cultivated.

It has been said that there was a wrong impression given out here. We are all learning, as my friend Brothers said. There are many things to learn; what I have learned will make a very small book, and what I have not learned will make a very large one. There is a great deal to be learned yet; and we have not gotten any further than the multiplication table. Have a mind of your own, and reason with yourself, and see whether you cannot believe that careless cultivation, and careless tree planting does not pay. We find a great many things by experimenting. We sometimes suffer from it financially. We have gotten to A, B, C, and we are trying to get further.

In traveling over the state, visiting from orchard to orchard, we would try and get everything we could and note it down. We saw an orchard in the state that had no irrigation, and there was not an orchard in the state that excelled it. Clean cultivation did

the work. If there are any weeds in the orchard, they take just that much nutrition from the ground; though, if you have clover or alfalfa in an orchard, that is better than if you have weeds; still they all sap the vitality from the trees.

Mr. Wilcox—I would like to add a word to this question of clean cultivation. In the first place, I have never heard of clean cultivation hurting any orchard. I have made observations in the pear orchards of California, and found fruit there that excelled all others; and in these orchards you could not find a weed.

The California man has one religion, and that is "Cultivation." The cultivator they use is a one-horse affair, and they run it constantly. I think they run it every two weeks.

One more objection to weeds in the orchard is the harboring of insects. Another advantage of the clean orchard is the action of the soil in retaining the moisture.

Mr. West—Would you advocate cultivating vegetables between the fruit trees?

Mr. Wilcox—It can be done in certain crops where they were not gross feeders. I do not think it would hurt very much, especially if they did not crowd the trees. Potatoes, for instance, may be planted.

Mr. Osborn—I will say one thing more. We visited nurseries in this state, and we found all the model nurseries clean.

I tell you it is wonderful to see what a difference it makes in orchards or nurseries with clean cultivation.

Mr. Smith—There is one thing I would like to know: Mr. Brothers, in your experience, what are the best two winter, two fall, and two summer apples?

Mr. Brothers—If I were on the Western slope, I would plant very differently from what I do here; but

I would not change my opinion of the Ben Davis. Mr. Ackerman used to have it that his best apple was the Walbridge. He says the Walbridge is a better apple, as early, and is just as good as the Ben Davis. As far as blight is concerned, the Walbridge resists the blight as well as the Ben Davis, and I think the apple is somewhat better, but I do not think they will bring as many dollars to the tree as the Ben Davis. I should take the Ben Davis for winter, the Jonathon and Wealthy for fall, and Red Astrachan and Duchess for summer.

Mr. Crowley—I think we are almost too young to decide what is best. With us, I think the Missouri Pippin comes first, the next the Ben Davis, and the next the Jeneton. My trees are all young; still I have had on some seven-year-old Missouri Pippins 170 pounds per tree, and on four-year-olds I got forty pounds.

The Red Astrachan is also very sure with us; so is the Tetofsky, an early and transparent fruit. They disputed with me that I have not the Tetofsky, and the president himself says I have not got it. I bought it for that, and I am selling it for that. It is a very fine apple, and beats the Red Astrachan with us. Altogether, the Duchess yields well with us.

In regard to fall apples, I hardly know what to say. The Wealthy is a good one, the Jonathan in all right. In fact, we have the best specimens of Jonathans in the state. Our trees are mostly young; the oldest I have is seven years. Mr. Swink has had good luck with winter apples—Jonathans, Ben Davis and several others.

Mr. Coburn—I am going to give you what is called for—the commercial varieties for profit. The first would be the Missouri Pippin and Ben Davis for winter; for fall, the Wealthy and Jonathan; and for summer, the Red June and Sops of Wine.

If I was going to choose apples for quality, I would choose Rawles' Jenet, Grimes Golden, Wealthy, Jonathan, Red June and Early Harvest.

Mr. Steele—Next year I might select different varieties. The Missouri Pippin, the first ten years after planting, will pay a bigger dividend than any apple in the catalogue. It is an early bearer; but I do not think that the tree, after obtaining ten years of age, will produce as much good fruit as the Willow Twig and Jenet. I would change in quality, and instead of the Wealthy, I would have the fall Wine Sap. It is a better apple than the summer Wine Sap.

Mr. Coburn—Now about the Missouri Pippin. If you quit fertilizing the trees, they will soon bear themselves out.

Mr. Osborn—How about the Wagner?

Mr. Coburn—The best apple for profit is the one that bears the bushels. You come to the Wagner, and there seems to be a great many apples on them; but when you come to gather them, there are not so many. The Ben Davis, however, is different.

We have a new apple—it is called the Orange Winter. It is a very large orange apple; the tree is very hardy, a very thrifty grower, and even better than the Ben Davis. I had, last year, trees planted four years ago, from which I have picked as high as seven bushels per tree. Wherever I have sent these apples they have written back immediately, and wanted to know if I had these kind of trees. I told you yesterday of that apple. If you will send to any of the Wisconsin nurseries, you can get it; but you must inquire for the apple called the Newall; that is the new name. When this apple first originated it was taken to the State Horticultural Society for a name. They examined it carefully, and thinking it worthy of a name, they called it the Orange Winter. But in the locality where it grew, it seems they were not satisfied with this name of Orange Winter, and later on, some two years ago, they had a county horticultural society meeting; they took this apple to the meeting, and they renamed it, and called it the New-

all. That is the man's name that raised the apple, and it has been a question with horticulturists in Wisconsin, which name it should go by.

I got my grafts of Phoenix & Morrison, of Farmington.

Mr. Smith—Will these gentlemen tell us the best plum?

On motion, the following resolution was read, and carried unanimously:

Whereas, Since the last meeting of this society, it has come to our knowledge that Death has claimed one of our oldest and most active members, Mr. Avery Gallup, therefore,

Be it resolved, That the most sincere sympathy be and is hereby extended to the family of the deceased; and be it further

Resolved, That this society deeply regrets the loss of said worthy member of the State Horticultural Society and worthy citizen.

(Signed.)

LUTE WILCOX,
W. S. COBURN,
JOHN TOBIAS.

On motion of Mr. Coburn, it was resolved that the above resolutions should be incorporated in the minutes.

Mrs. Wright—May I beg the indulgence of the society for about five minutes?

Mr. Osborn—Yes, but please make it as brief as you can, Mrs. Wright.

Upon which permission, Mrs. Wright spoke for about fifteen minutes, lauding the advantages of some apparatus for distilling water, in which she was interested.

Mr. Osborn—We have never had a meeting that we could hold to this hour. It is remarkable; we have held them here until now it is 11 o'clock, and yet there is an interest displayed that I have never

seen equaled since I have been a member of the society.

We have not spent any money foolishly; but I want to say to you, that we contemplate holding a horticultural fair next fall, in Denver, and if we do, we shall do everything possible to make it a success. We have had horticultural fairs a success, and we can do it again.

Of course, I only mention this in order that horticulturists may make some extra exertions, and plan for it in raising nice fruit. How can we raise nice fruit? The horticulturists know how to do it; by picking off some of the superfluous fruit, like Hon. Silas Wilson told me.

Now, the state board is very thankful to you who are not members of it. We shall always do for you what is in our power as a board, and we feel that you have been of great help to us. We feel that we are here to do good, and are placed before you to carry out the provisions of this orchard bill, and we are going to do the very best we can. If we fail anywhere, it will be through ignorance on our part; what we do not know, we will try and get from others who do know.

We are not traveling around over the state for the mere pleasure of it; most of us have business that would pay us better to stay at home; but as we said before, we are going to continue; and where we have made mistakes in the past year (and I can see a number of them), we can profit by the mistakes made. We can arrange our laws different; we can do more work in the same length of time, and we can do it better.

It is the same as you and I planting trees—we are not going to plant the same varieties as we did a few years ago. Why? Because we have learned better; and we learned from past experience that which will enable us to do better in the future. We shall be able, I hope, in the coming year to get such knowledge and information in regard to these insects and pests that we will be able to impart to you at

our annual meeting another year such information as will be of great benefit to you.

We see that the horticulturalists are becoming more interested. The reason of this is, that they are planting more; they have more fruit trees in the ground, and they want to take care of them. They want to look forward to varieties that will be the most profitable. I do not wonder that they are seeking knowledge; and I believe that many of you would stay until midnight.

I could say much more; but we can only thank you—both our horticultural friends, and the ladies who have been so attentive here. We feel that it is a great work, and that this organization has done wonders; still there are a great many things to do. We thought we could visit all the orchards in the state. We have not seen a tenth of them; we could not do it. But we are going to do all in our power, and we are going to ask you to co-operate with us; and we ask you who live in other counties to see to it that these organizations in their counties assist us in carrying out the provisions of this orchard bill.

If there is anything you want to say to this board, write to our secretary. His address is 908 Equitable Building. The matter will be laid before the board, and any information that it is possible for us to get in any way, shape or manner, we are bound to get it.

We will do everything that is possible for the horticulturists of the state. We are horticulturists ourselves—the whole board—and we feel that we need help.

I thank you for your kind attention and your co-operation with us, in making this meeting one of the most successful that I have ever attended.

Mr. Stone—I think I express the sentiment of this meeting when I thank our president for the very interesting manner in which he has conducted this meeting, and the assistance he has been to the horticulturists.

Mr. Osborn—Thank you, gentlemen and ladies, for the expressions you have given me. It gives me encouragement, and I shall go on and do the very best I can. We try to do all we can in the shortest time possible, as we do not intend to make any more expense to the state than is absolutely necessary.

On motion, adjourned.

REPORT FROM BOULDER FRUIT GROWERS' ASSOCIATION.

In the beginning of the year the Boulder Horticultural Society was merged into the Boulder Fruit Growers' Association, as it was found an unnecessary burden to keep up both societies. The officers are as follows:

W. L. Scott—President.

S. B. Southerland—Vice President.

G. M. Anderson—Secretary and Treasurer.

The general condition of fruit crops good. Some injury from recent heavy wind-storm.

G. M. ANDERSON,
Secretary.

SKETCH OF THE OTERO COUNTY HORTICULTURAL SOCIETY FROM THE BEGINNING TO DECEMBER 30, 1893.

The Otero County Horticultural Society was incorporated on February 9, 1891, with F. L. Watrous, A. Nichols, J. H. Crowley, J. P. Stevenson and G. A. Jones as incorporators. At that time slight progress had been made in horticulture, owing to the newness of the country, and but two meetings were held.

The society was reorganized on December 2, 1893, with a membership of twenty-nine members. The second meeting to perfect organization was held December 16. A membership fee of $1 was charged for men; ladies admitted free. The following officers were elected:

R. O. McLain, President.

J. C. Kain, Vice President.

E. E. Blake, Treasurer.

W. C. Steele, Secretary, Rocky Ford.

The following papers were read at subsequent meetings:

ORCHARD INSECT PESTS.

The Otero County Horticultural Society met at the old school house Saturday afternoon, R. O. McLain, president, in the chair, W. C. Steele, secretary.

Hon. G. W. Swink addressed the meeting, saying that as he had the oldest bearing orchard in this vicinity, he had an opportunity for knowing most of the insect pests, which were the subject for discussion at this meeting. Three years ago his orchard had a very few codling moths. Two years ago an increase was noted, and one year later the pest was quite plentiful. The remedy for them was gunny-

sack bandages around the trees. He put on two bandages—one higher up the trunk than the other. The first will catch most of the worms, but those which escape that will be caught in the second. The bandages should be put on in May, taken off weekly, and the worms killed. This can be done by pouring on boiling water; or, what is better yet, where one has a large orchard, running the bandages through a clothes wringer, or the bandages may be thrown into the chicken-yard, where the worms will be quickly disposed of to the mutual advantage of the chickens and the trees. Mr. Swink accounts for the presence of the codling moth in his orchard from the fact of his having taken home from his store barrels and boxes in which apples had been shipped from the East; also, from having thrown out the refuse portions of imported apples.

There is no more important work for Otero county horticulturists than the thorough renovation of their orchards. Now, while the orchards are new and the insects but very few, is the time to make the work count largely for the future. Now is the time to prepare for a vigorous spring campaign.

Mr. Swink was sanguine of the best results for fruit growing, it promising to be one of the foremost industries of the valley; but to insure this certainly attainable success, the horticulturist's work must be done energetically and intelligently. To aid in this he favored the formation of a county horticultural board, and the appointment of a county inspector, which can be done by the commissioners upon the application of fifteen fruit growers. It will be the duty of this inspector to look after the importation of insect-infected nursery stock, and to enforce such lawful regulations as shall be for the best interests of the horticulturists of the county. This inspector will be paid by the county, at the rate of $3 per day, for each day's actual service, the salary for any one year not to exceed $200. The county board will act in conjunction with the state board.

W. C. Steele said the first thing to do in the suppression of insect pests was spraying the trees. The codling moth laid its eggs in the blossom, and the egg hatches out as soon as the blossom drops. The spraying should be done from the 10th of May to June 1st, using Paris green. The first spraying should be followed by a second, one week later. The leaf-roller and the canker worm are pests that afflict orchards in other sections, but which have not reached Otero county. Both of these may be prevented by spraying. He would recommend the purchase of the Paris green of the house that you buy your sprayer, as the chances of getting a pure article are thereby increased; and use it according to manufacturer's directions. When the apples begin to come to maturity, and to drop, turn in hogs and sheep, because the fallen apples must be destroyed, unless you would have a large increase of insect pests. Keep all rubbish out of the orchard, as it is a good shelter for insects.

The bandages spoken of by Senator Swink should be six inches wide, and kept on the trees from June 1st until the apples are all off. It is well to keep the trees free from old bark. If second-hand barrels are used for packing fruit, see that they are thoroughly scalded, as they may be infected with insects. The cellar in which the fruit is stored should have close-fitting doors or screens, that the millers may be prevented from escaping in the spring and doing their damaging work in the orchard.

To prevent rabbits from destroying trees, Mr. Steele suggested the following mixture, which is approved by J. R. Cotton, in Field and Farm: Take a two and one-half gallon wooden bucket and put in a lump of lime about the size of a man's double fist, and pour in hot water enough to slake it, and while this is slaking, put in one-half pint of gas tar and a pound of concentrated lye; keep stirring the mixture so as to get the gas tar well mixed with the other ingredients, and add more hot water until the bucket

is nearly full; then put in earth and keep stirring until it is as thick as whitewash. The bucket by this time should be full; take a whitewash brush and rub the trees with this late in the fall, or as late as February. A rabbit will never touch a tree rubbed with this mixture and it is claimed that if there are any borers in the trees it will kill them. When the spring rains come, the mixture will wash off, and the trees will look green and glossy, and it will make a fine growth. Try this, both summer and fall, and you will never quit using it. It is cheap, and harmless to the tree.

The woolly aphis, a juice-sucking louse, and the pear blight, were annoyances of which we knew nothing. The following recipe was highly recommended for use in sprayers: Dissolve three pounds of salsoda and four pounds of resin in three pints of water above fire; when properly dissolved add water slowly, while boiling, to make thirty-six pints of compound. To make the kerosene emulsion, add to the above compound an equal amount of kerosene. To use this emulsion in the sprayer, add five parts of water. This will be found useful on small fruits and vegetables, where Paris green could not be used on account of its poisonous nature.

J. C. Kain had used London purple to good advantage on his plum trees, which bore so heavily that the limbs had to be supported to prevent breakage.

W. E. Anderson moved the appointment of an assistant secretary, whose duty it should be to correspond with manufacturers of sprayers, leading horticulturists, the state board, etc., in order to ascertain the very best sprayers to get, and learn the most effective compounds to use against insects. It should be a leading aim of the association to secure and disseminate among the members the most reliable information relative to destroying and preventing injurious insects. To do this we should get the advantage of the experience of those who had "gone through the mill."

W. H. Kollock, of La Junta, said that a live horticultural society should be maintained at Rocky Ford, the center of the fruit-growing interests of the Arkansas valley. He had some acquaintance with Eastern methods of managing orchards, but that knowledge would not apply where irrigation was used.

Senator Swink said that all farmers in Otero county would be welcomed to the meetings of the society, as all must work together to secure the best results.

Frank Crowley suggested that a wide range of subjects be taken up, that all interested in horticulture might be instructed.

R. O. McLain said that the best varieties, and how to plant, would be timely information for those who are planning to set out orchards this coming spring.

On motion of W. E. Anderson, D. W. Barkley was elected a member of the association.

On motion of Senator Swink, the chair appointed a committee of three on programme, as follows: J. C. Kain, G. A. Jones, and Frank Crowley, which committee selected the following topics for discussion at the next meeting: Grape Pruning, by E. E. Blake; Apple Pruning, by Frank Crowley.

The meeting adjourned to Saturday, January 13, 1894, at the old school house, Rocky Ford, at 1 o'clock p. m.

ARKANSAS VALLEY HORTICULTURE.

The regular meeting of the Otero County Horticultural Society was held at Rocky Ford, Saturday, January 13, R. O. McLain, president, in the chair, and W. C. Steele, secretary.

The increased attendance from distant portions of the county indicated a growing interest in the objects of the society. The promise is that the organi-

zation will soon grow to a size and importance commensurate with the extent and value of the farming interest which it seeks to promote.

E. E. Blake, of Fowler, then read the following paper on grape pruning, illustrated by the natural vines and blackboard drawings, to show the manner of training on the trellis:

PRUNING OF GRAPES.

In speaking of this subject, I shall commence with the first year, or the year of setting the vine.

I would prune the young vine back to one stem, leaving only one eye or bud upon that, and force the whole strength of the vine in that. During the season all the side shoots, or lateral vines, should be pinched back, if you intend them as stump or stalk vines. If for trellis, you should leave one branch about twelve or fifteen inches from the ground, so you can take one each way on the trellis. I will only speak of the trellis vines, as most all are trellised in this country. The second year the old growth should be cut back to within one eye or bud of the forks of the vine, and all growths beneath the forks should be removed, and would force all the growth into the main branches again. During the growing season, all side branches of lateral growth should be pinched back again as before. By no means allow a great mass of growth to start and cut it all back all at once. That would injure the vine and stop its growth, and will take some weeks for it to recover. If you should neglect them and such a growth starts, which surely will if you care for your vines properly, cut them back a few at a time until you get the vine under control again. At the end of the second year you should have two good, long and stout branches from which to grow a crop of grapes the third year. At the beginning of the third year, the same as the second year, you will have but little pruning to do and no rubbish in your vineyard to

clean out or work over. All you will have to do in the way of spring work is spreading a good coat of well rotted manure and stir it into the soil, and cut back your vines to about three or four eyes or buds on each branch of the second year's growth. All of these eyes will start new branches and each branch will give bloom buds, about two or three in number. These should be carefully tied up as soon as the fruit forms. As you are tying up your fruit vines, you should commence the pinching back process again and force all the growth and strength into the fruit and main stalks. The result will be, you will have a good vine that will bear for years, and two or three dozen bunches of as fine grapes as you ever saw, large and the best of flavor. A four-year-old vine I would cut back just as before and not leave more than two buds on each cane or lateral you started and fruited from last year, and possibly one new bud on the old or main cane, making in all eighteen at the outside limit. I would advise cutting back one of the fruit stems and leave but three laterals on each branch of two buds each, making twelve instead of eighteen buds to bear the fruit. It is best not to burden the vines by leaving too many fruit buds, more than the vines are able to produce, and thus injure your vines by shortening their lives and cutting upon the grape crop in weight. It is true, you will have more bunches, but you will have gained nothing in pounds, and will have lost materially in the size of the bunches, the size of the grapes and the flavor. All undergrowth should be constantly kept off and the vines should never be allowed to interlap each other. You will have too much vine, too much shade and be annoyed in the cultivation and pruning.

In after years would proceed, as I have here shown, and be very careful not to leave too many fruit buds. If, after the fourth or fifth year, you want to renew the vines, start from the ground again, bring

up your vine and branch it as before and run it out each way, leaving but the three first laterals upon each branch to produce the next year's crop of grapes. It makes no difference how old a vineyard is, it is only the last year's growth and the new wood that produces the grapes. If you will care for your vines as I have described, you will have a nice vineyard and one to be proud of. If you have not kept it so, commence this spring and cut back as I have described, according to the age, being careful not to leave too much new or old wood.

Questions were then asked and a general discussion followed, participated in by almost all present, during which the following points were brought out: Grapes cannot be successfully grown here on the stump, California style. Wire trellis was objected to by some, but H. H. Norton said they were O. K. if posts were close enough. Mr. Steele was trying cedar posts, allowing the grapes to droop over them and he proposed also to nail lath at the top. Mr. McClain suggested a trellis on which the wires ran horizontally. Mr. Blake said tie up the grapes with leather strings. Frank Crowley said the Concord grapes would not grow on stumps here. Mr. Kollock asked as to cutting off roots when transplanting. Mr. Crowley said not, but keep all the roots and dig a wide but not deep hole—the more roots the better. Mulching killed the vines, B. U. Dye's experiment being mentioned. Mr. Steele said his experience had been the same. If the ground is rich no manure is needed and very little water is required. The sweeter grapes grow on the poorer ground.

PRUNING THE APPLE.

By Frank Crowley.

The first thing to do is to arm yourself with a good, sharp pruning knife. If pruning is done at the

proper time and in the proper manner no other tools will be necessary, but if neglected, or too many main branches are allowed to grow, the saw will have to be used. In cutting off a branch the knife should follow the shoulder, which we notice at the junction of the branch to another, or to the main stem, and the surface of the cut should be no larger than the base of the branch removed. To make a cut of this kind, the knife must be drawn inward a little, care being taken not to cut the bark on the main stem. We often see a limb cut off with an outward stroke of the knife, leaving a sharp stub at the upper side of the cut which will require a year or two for the bark to grow over, or from which a new shoot may start. On the other hand, we frequently see the cut made too close to the main stem, causing a very large wound or peeling the bark from the top of the cut, or up the tree some distance. Either of these should be avoided. In removing a portion of a branch the proper way is to take the branch to be operated on in the left hand, below the place where the cut is to be made; place the edge of the knife on it directly opposite the base of the bud to be cut to, and then make a firm, quick, smooth draw-cut, sloping upwards so that the knife will come out on a level with the point of the bud. If we cut too close to the bud, so as to remove some of the wood with which it is connected, the bud will die, or else make a very feeble growth, and the bud below it will take the lead. While if we cut too high the wood will die down to the bud and will make an unsightly stub if not cut off in after-pruning.

Where the saw is used in cutting a heavy limb, first saw a little at the lowest part so that when you saw through from the top the weight of the branch will not peel or split off some of the bark from the main stem as it falls. Saw cuts should be trimmed smooth with the knife to make them heal more quick-

ly. It is also a good plan to paint large cuts to pervent the wood from drying and cracking into the tree too much.

In growing an orchard by irrigation we do not have to prune in summer to produce fruit, nor to prune in winter to encourage growth of wood, as they do in the east. This we can see by the orchards already in bearing, that trees grow more rapidly, and that the same varieties will commence bearing in from one-half to two-thirds the time required in eastern localities. This, I think, is mostly due to the fact that if the soil is kept uniformly moist the roots do not need to go so far nor so deep to obtain the food required and are settled down to business in less time. I think the best time to prune is just after the sap starts in the spring, in May or the fore part of June, as the wound will heal sooner and better at this time than at any other. If it is impossible to get at it at this time I believe I would prefer February or March.

To give a tree the proper shape, pruning must be practiced from the time it is set in the nursery row through all the processes of culture until it has passed beyond all usefulness. But until it leaves the nursery and is given a place in the permanent plantation about all the pruning necessary is to keep all the suckers and limbs rubbed or cut off that come out below the place where the main head should start. Before being set in the ground any roots that have been bruised in the digging should be trimmed. After setting, the ground should be allowed to settle around the tree so that the knife can be used without loosening roots or having to hold it in the ground with one hand while you prune with the other. When you attack the tree cut off all the limbs on the main stem, if any remain, up to where you want to head the tree. I believe the majority of fruit growers in the west recommend a low-headed tree, say from twenty inches to three feet, and I think there are few

who would choose a tree headed five or six feet from the ground. The only advantage of high-headed trees is that they are more easy to get around with a plow or other implements. A high-headed tree exposes more of the trunk to the hot rays of the sun, and will get too top-heavy to cope with the heavy winds which sometimes prevail. It also requires more time to get a tree up to that height and form a good, substantial head than with lower-headed trees.

From what experience I have had in growing young trees in the nursery and in pruning them when set in the orchard, I consider that the exact height of the head should be governed by the particular tree in hand, and the branches chosen that are good and thrifty, and well set and well balanced. Be very particular to avoid leaving any forks in forming the foundation for the head of the tree, as these will split if too heavily loaded with fruit. But if it is impossible to balance the tree without leaving a forked branch, it can be made strong by taking two cross-limbs, one from each side of the fork, and twisting them together where they will grow fast and form a good brace; two or three pairs of these could be fixed along up the branch and make it quite secure. If three limbs come out so as to balance well, they will be better than four for the first main branches. The leader, which should always be strong and in advance of the others, should be clear of limbs for at least a foot above the first set of branches, when there should be another set, balancing like the first, and so on up as the tree grows, always bearing in mind that a limb never gets any farther from the ground at the base than it was when started, and that when the main branches get to measure several inches in diameter, they will crowd, if left only two inches apart along the stem, so that some will have to be removed, or the tree will be spoiled. Next, do not cut back the limbs, as is practiced in the east, and has

been done a good deal in this country. In the east it is done to make the tree branch more; but they branch entirely too much here, so if this system is practiced all the buds along the limb that would have made fruit spurs, or remained dormant, are forced out and make a dense lot of cross-limbs that have to be cut out the next season; so we lose not only all that growth, but that which we cut off in the first place besides spoiling the shape of our tree by making a crook wherever we cut a limb back.

A mistake which I have noticed several making, is to cut off the little bushy-looking spurs which grow along the main branches near the trunk, with a view of preventing cross limbs in the center of the tree. In doing this you deprive the body and larger limbs of much protection from the sun, and at the same time destroy a great number of fruit spurs which will bear a year younger than most of those higher up on the limbs. Of course some of these would become water suckers if left; but it is plenty of time to cut them off when they have developed into such.

VARIETIES OF APPLES.

By R. O. McLain.

The Otero County Horticultural Society met at the old school house Saturday afternoon. In the absence of President McClain, J. C. Kain, vice president, filled the chair. W. C. Steele read the following paper, prepared by R. O. McClain:

I have been called upon to write a paper on the varieties of apples best adapted to the Arkansas valley. There seems to be a prevailing opinion that we have to plant iron-clad varieties—that the common varieties are not sufficiently hardy to withstand our mild winters, and have to look to Russia, Iowa, Minnesota and Canada for something that will stand se-

vere cold. The conditions of climate here and there are entirely different. In the north they have steady cold, with few or no thaws until spring, and then summer begins. All they have to look for is something that matures its wood well before winter begins and they are all right. They pay no attention to the budding of the trees, whether that is early or late. Here our climate is the opposite. We have warm and cold spells alternately the entire winter. If we go too far north to secure varieties, we will in all probability change the season of fruiting, and in many cases they prove to be worthless apples, that are long keepers in Russia, but have, on being brought here, been changed to summer; or, at best, fall apples. It is not the cold that we have to contend against—it is the hot days in the winter and early spring that causes the buds to swell and become tender. I have seen over fifty varieties of apples tried here, and have not seen one that will grow and make a tree. The main thing to look for is the varieties of trees that bloom late—that stay dormant till late in the spring, and thereby escape the late frosts, which is the worst thing we have to contend with.

Fruit growers in all countries have at first to experiment and find the varieties that are adapted to that locality. What will succeed in one place may fail in another. It is not desirable to choose large apples that look well on paper without you know it is adapted to the country. There are a large number of trees that are recommended for the far north that are not desirable to plant here. Some of them are as follows: The Transcendent, Haas or Fall Queen, Grimes' Golden, Early Harvest, Clayton, and many others that bloom too early. We want trees that will bear good crops the off years; and they will be the trees that are the most profitable. I will take the Ben Davis as a standard in regard to the time of blooming. Most of the trees I recommend bloom later

than the Ben Davis: For summer—Cooper's Early White, Yellow Transparent, Duchess of Oldenberg, Fourth of July, Red Beitingheimer. Fall—Wealthy, Autumn Strawberry, Jonathan, Rambo, Maiden-blush. Winter—Ben Davis, Jeneton, Walbridge, Pewakee, York Imperial, Willow Twig, Mammoth Black Twig. Those are the varieties that bloom late, and will succeed here. Have seen nearly all of them fruiting. As to pears, the Howell, Flemish Beauty, Seckle, Clapps' Favorite, Buerre D'Anjou, L. B. De Jersey, Duchess De Angoleme are all reliable, and will, with good care, bear good crops. The Bartlett I consider too early a bloomer to be profitable. There are a number of new varieties that are worthy of trial, but I have not had any experience with any of them. It has been my purpose to recommend only those I have seen tried here.

J. C. Kain read the following paper:

Fruits are the generous overflow of nature's bounty—gems from the skies dropped down to beautify the earth, charm the sight, gratify the taste, and minister to the enjoyment of life. The more we realize this, the more we shall realize the Divine goodness to us, and our duty of providing them for others. If it was not for the bright prospects for fruits in this valley, our home would not be planted here.

The cherry requires ground fairly good, in proper shape for irrigation. Sandy land is very good, giving the water a chance to sink quickly, as the cherry does not need much water. Make the furrows for the rows twelve to fifteen feet apart, owing to the kind of tree you want to plant. Early Richmond is a straight, upright grower, and twelve feet is enough for it. Wragg, Morillo and Ostheimer spread out more and of course will need more room. Buy young, thrifty stock, for when they are dug from the nursery, nearly or quite all the roots are left on the tree. It is a mistake to buy old, large trees to get fruit sooner, as

when they are taken from the nursery many of the roots are cut off, leaving too much body for the amount of roots for the tree to start quick and grow rapidly. Hence, the young, thrifty tree will overtake and soon pass older ones, bear as soon, and be a much nicer tree. My choice would be a whip, then not to branch it below three feet. This gives you a chance to branch them in the orchard, so that you can leace the heavy limbs on the northwest to balance it against the wind from that direction.

Keep the ground in nice tilth by cultivating in beans, cantaloupes, or any low growth that will not retard the growth of the trees by shading. As a rule the sour are the best marketable variety to cultivate. Prune well, and in four years you will have trees ten feet high, six to eight feet across, bearing four to eight gallons each. Early Richmond is a fine cherry; ripens early. Ostheimer and Wragg bear young and late. Add the Morello, and you can have cherries nearly all summer.

Russian apricots are classed in size with the plum. My reason for planting the Russian sorts was that they stood the cold at 38 degrees below zero in northern Iowa without being affected, and seem insect proof. We started with four kinds: Alexander, Alexis, Gibbs, and J. L. Budd. The three first named are mostly yellow, with a slight rose cheek, very delicious, slightly sub-acid. J. L. Budd in looks resembles the Clingstone peach, but far superior in quality. They are all freestone, most excellent, and very thrifty growers. We have some, six years from transplanting, measuring two feet in circumference and sixteen feet in height. Some planted in a cluster for shade for bees (which were mailed to us about ten inches in length), with six years' growth, now measure twenty-two inches in circumference at base, and fifteen feet high. Were we to begin again, we would make our wind-break of this kind. A switch planted

that is three feet high, ten feet apart in rows, the limbs will lap in five years' growth. Besides, their value for a wind-break, every year that there is a peach crop, they will have plenty of fruit. Plums, we think, will soon become the most profitable fruit we can propagate in this valley. They are easy to grow and bear very young; so that if we are not very young, we need not hesitate to plant for fear we will not live to pluck fruit from our planting. We have a few that bore the next year after planting. We would recommend beginning with Weaver, Forest Garden, Wolf, Golden Beauty. Select a piece of ground rather level, in order to hold water, as they need abundance of it, and plant in rows about twelve and one-half feet apart each way. Plant no two of a kind together. To illustrate: In beginning a row, plant first a Weaver, then a Wolf, a Forest Garden, then a Golden Beauty. In beginning the next row, start with another kind. This is done that the different kinds being close together will cause them to fertilize much better. Prune up to two and one-half or three feet high, always pruning heaviest on the south and east. The Weaver is by all odds the very best plum to grow. From those planted six years ago, I have gathered five crops.

F. L. Watrous, assistant professor of agriculture in the state agricultural college, Fort Collins, wrote J. C. Kain as follows, in answer to a letter of inquiry:

"I would recommend the following varieties of plums: DeSoto, Forest Garden, Winner, Weaver, Wolf, Forest Rose and Red Egg. If your plum orchard is also your chicken yard, you can teach your fowls to 'take in' the curculio as you go around in the morning and jar them from the trees, or you may catch the insects by having sheets on the ground. Use Paris green, 1 pound to 200 gallons of water, spraying as soon as blossoms fall; then three or four times at intervals of a week. Add a little lime to Paris green or London purple mixtures, always, to

prevent damage to leaves. Jarring is apt to fetch the gouger, also, in early morning. Can recommend for cherries, Morello and Dwarf Rocky Mountain. The latter is hardy, a fairly good fruit, and so far as I know, not susceptible to injury from insects. The apple leaf-roller works on cherry trees as well as on most other fruits, including currants, gooseberries, apple, pear, plum, etc. You may find his eggs on bark of trees now—a grayish, round blotch, a quarter of an inch in diameter. The eggs may be killed now by spraying with kerosene emulsion, or they may be killed by poisoning with Paris green, spraying as soon as leaves start. This is the apple leaf-roller. I know little or nothing about Russian apricots, but from what I have seen and heard I think they are only valuable as a novelty."

J. C. Kain is experimenting with many varieties of fruit and his labors will be of great benefit to the valley.

In answer to a question of Mr. Gauger's, twenty-five feet was named as the distance apple trees should be apart. Mr. G. said if the trees grew as large here as in southern Illinois, that would be too close, as had been proven by experience there, and that thirty-five and forty feet was now being used.

The bulk of opinion was not favorable to planting peach or other trees in apple orchards, as the different kinds of fruit required different irrigation.

W. C. Steele favored peach trees among the apples; also said that the tendency was to give all trees too much water.

J. E. Gauger says it will pay to raise peaches if the crops are not consecutive. G. A. Jones says that if only three peach crops are gathered during the life of the tree, it will pay to plant peach trees. The experience of the valley is that peaches are good for three crops in six years.

TRANSPLANTING AND ORCHARD GRASSES.

The session of the society on March 10, 1894, was more largely attended than any previous meeting. This shows that the wide-awake fruit growers of the county are taking an increasing interest in their business and giving deserved attention to an association calculated to be of great benefit to them.

The opening paper was by Hon. J. H. Crowley, the veteran Arkansas valley nurseryman, on the proper method of transplanting. He said that the distance which apple trees should be planted depended on the varieties, as some have a much more spreading growth than others. Close planting had proved profitable in some orchards, say sixteen to twenty feet.

It is advantageous to have the ground shaded as soon as possible. Judge Felton, of Canon City, planted much of his orchard fifteen feet apart, but has now cut out every other tree, making them 15x30 feet. Would recommend planting them twenty-five feet apart, and would not plant all of one variety together, but alternate the upright and spreading growers. For other fruits the following distances are about right: Cherry, 15 to 18 feet; peach, 15 to 16; apricot, 16 to 18; plum, 7 to 15; gooseberries, black raspberries and blackberries, 5x7; red raspberries, 3x7; currants, 6x7; grapes—Concord, 8x8; Delaware, 6x8; strawberries, 3 1-2x1 for field culture.

In setting trees I would first stake out the rows the direction I intend to run water to irrigate. Then with a good heavy team and a 12-inch plow (set to run beam deep), plow down and back, throwing the dirt outward. Go two rounds in each row and continue on until all are plowed out. Then reset the stakes in ditch and be sure to measure correctly. In planting have the water ready to start. Set the first tree at upper end of row, making a mound around it so

the water will run on each side of it. Turn in a small head and go on setting. Let the water run until the soil around each tree is well soaked. Commence at upper end of each row and continue as for first row. In two or three days when the soil is well settled and begins to get dry, take a 6-inch plow and one horse (use a short single-tree), and plow down one side and up the other, turning the soil toward the tree and filling the ditch made to set the trees in. This will leave a small furrow on each side to be used for future irrigation.

In answer to questions Mr. Crowley said: It is not such a loss to cut out alternate trees, as one good crop will pay the cost of the tree. Have had apple trees four years old which bore forty to sixty pounds of fruit. The earliest bearer is the Missouri Pippin. Has been known to bear at two years from the root graft. It is no trouble to get trees to grow here. Of the 910 planted for J. E. Godding, every one was alive at the end of the year. Don't tamp soil—it will naturally pack. But the earth should be pressed firmly with the foot. The soil should be close to the roots to furnish them the necessary moisture. Has not heretofore advocated planting peaches, but since having seen the orchards of Grand Junction, think we should try them; will plant one acre this spring, and if only one good crop is obtained, the orchard will pay.

Senator Swink read the following paper on the best grass to grow in an orchard:

The ground of all orchards should be kept in a high state of cultivation until the trees grow to proper size, and after that, work for the protection of the trees and maturity of the fruit.

In order to do this, we must study the conditions and adopt methods to assist instead of obstruct nature. In my twenty-five years' experience in working in forest timber, I observed that the healthiest and best timber was found where there was no sod,

but a heavy mulching of leaves. And I have noticed where tracts of timber in pasture of a soddy nature and the leaves blew off of the ground, the timber would soon begin to decay; and the same conditions are noticeable in orchards.

In Illinois, where the ground in an orchard was allowed to get to a tough sod, the fruit would be small and tasteless, and the trees would soon commence to die. The same conditions would have similar results here.

Our object should be to sow grasses that would form the least sod, and take the least moisture to grow, and a grass that would conduct the most fertilizing properties into the ground to feed the trees. For that purpose I would recommend the red clover. It is a grass that forms but little or no sod, and is fed largely by induction from the air. It is the best of fertilizing grasses, reclaiming abandoned and impoverished lands. The life of red clover is only three years, and the roots in rotting tend to enrich and make the ground mellow. In this county red clover makes a very heavy undergrowth, which serves as mulching, and tends to hold the moisture in the ground, and also keep the leaves of the trees from blowing away. Another advantage red clover has in an orchard is, that it makes good pasture for hogs, which, if allowed to run in the orchard, will eat the fallen apples, and help very much in the destruction of the codling moth, which threatens to do much damage. As a crop, red clover will not compare with alfalfa in quantity of hay, but will in quality. The average seed crop will be as much as alfalfa, and the seed brings a better average price—i. e., about $5 per bushel. Another good feature is, that it is not hard to plow up, like some other grasses. I am confident the red clover will meet the approval of all horticulturists who use it in their orchards. Crops other than grasses should be of small growth, and such as require little moisture. Melons or turnips are good,

but corn is not. Where clover was grown, would use first crop for hay, and leave the second on the ground for mulching.

FREE FOR ALL.

Mr. McCaskill—Know peach trees in the valley twenty-five years old.

Mr. Crowley—You can't mulch a tree to delay blooming, but can shade it.

The best way to prevent damage by frost is to let the water run in the laterals all night.

Mr. Kain—In Nebraska clover was sown to prevent blight.

Mr. Huntley—Red clover did not prevent it in Iowa.

Mr. Steele—California horticulturists have no crops whatever growing in orchards, but cultivate the ground all the time.

Mr. Crowley—David Brothers' experience was that the blight came, irrespective of whether the orchards were in grasses, or kept clean by cultivation.

Mr. Swink—Blue grass is the worst for an orchard.

Mr. Kain—Sugar beets are an excellent crop to grow in the orchard.

Mr. Crowley—First year would irrigate three or four times. Not apt to injure trees by too much water. Don't irrigate after August until the wood ripens, but soak the ground thoroughly before winter.

Mr. Crowley furnished the following recipe for grafting wax: Resin, 4 parts; beeswax, 2 parts; tallow, 1 part (all by weight). Melt together and turn into a pail of water. Then pull and work until it gets a good grain. This is good for all orchard work. Grease your hands with tallow before using wax.

THE SOCIETY DISCUSSES THE STRAWBERRY.

The disagreeable weather of last Saturday prevented a large attendance at the horticultural meeting. J. C. Kain not being able to be present, the question of insecticides was not taken up, but all the time was devoted to hearing F. A. Huntley, superintendent of the Arkansas valley experiment station, on strawberry culture.

Mr. Huntley said that strawberries should have a very rich soil—one which had been fertilized for two or three seasons. The best fertilizers were well-rotted stable manure and wood ashes, which should be applied in the fall and turned under. Bone meal was also an excellent fertilizer, and very little of it was required. The ground should be spaded or plowed to the depth of twelve to fourteen inches. Good, vigorous plants should be selected; such as have a mass of roots about three inches long, and a good show of foliage is desirable, but not necessary. The rows should be twenty-four inches apart, and the plants from fourteen to sixteen inches apart in the rows. The plants should be set on slightly raised ridges to facilitate irrigation. The roots should be spread and the soil pressed firmly around them. Set so that the crown of the plant shall be even with the level of the ground. The first year's cultivation should be such as will keep the ground loose and mellow, and irrigate so as to never let the ground get dry, nor yet apply so much water as to make the ground heavy. Mr. Huntley exhibited two large drawings to show the difference between the staminate and pistillate varieties. The following list of varieties was recommended for Colorado culture: Imperfect Flowering—Pistillate—Bubach, medium in blooming; Haverland, early medium; Jersey Queen, late medium; Crescent, early medium.

Perfect Flowering—Staminate—Charles Downing, Gandy, Wilson; early, Cumberland; early, Jessie; late, Parker Earle; medium, Manchester; late, Jucunda; late, Old Ironclad.

In planting the varieties requiring fertilization by another variety, set two rows of the imperfect bloomers to one row of the perfect. This will insure full fruitage. The above combinations are recommended.

Strawberries should be planted in the spring. Irrigate on both sides of the ridge until the ground is well soaked. Every farmer should have a strawberry bed. If very generally raised a market would be found for the surplus.

After fruiting the ground should be cultivated, so as to keep it well stirred, and no weeds allowed to grow. The runners should be trained to run in the direction of the rows. Straw is the best for winter covering, say about three inches deep, with clods of earth on it between the rows, but not on the plants. But little earth is necessary to keep the straw in place, and the plants are not pressed by weight of the clods.

At the close of Mr Huntley's talk, questions were in order. In answer to George Peck, of Las Animas, Mr. Huntley said that the plants should be covered with straw as soon as done growing, first irrigating the ground well.

Frank Crowley—I grow a row of oats beside each bed, and late in the fall break the oats down for a covering for the plants.

Mr. Huntley—All right—if you supply the ground with proper fertilizers, to take the place of the strength drawn out by the oats.

G. A. Jones—Can you plant in newly manured ground?

Mr. Huntley—Not unless well-rotted; but would recommend bone dust.

In answer to G. W. Swink—Plant early in April. If the rows run north and south, plant on the side of the furrow facing west. If rows run east and west, plant on side facing north.

The secretary was instructed to prepare a petition to the board of commissioners, requesting the appointment of a county board of horticulture, and have the same ready for the special meeting next Saturday, when three representative horticulturists will be selected to recommend to the commissioners for appointment.

A special meeting of the society will be held Saturday next at 2 o'clock. A report will then be received from the committee on sprayers, who will have present one of the sprayers recommended, that the members may see just what it is and what it can do. A question box will be provided through the medium of which members are requested to propound any queries on which they want light.

A CHOWDER PROGRAMME.

The committee on programme had asked D. W. Barkley to tell all he knew of horticulture in five minutes, and the following was the response:

FIVE MINUTES ENOUGH.

Bill Nye has written a history of the United States. In announcing the publication of this book, he says: "If any facts have crept into this history, they have done so without my knowledge or consent." Patterning after the popular humorist, I will say that if any valuable horticultural information is discovered in this paper, I will tender an apology at the close of the meeting and refund the gate money.

My first studies in horticulture began in the year 1850, when at the tender age of eight years. A favor-

ite play-ground was an old orchard. Long suckers were abundant around the base of many trees. It was one of my youthful recreations to cut off these suckers with a Barlow knife and sharpen the small end so that it would readily penetrate an apple. With an apple sprout six feet long, flexible and elastic, you have a sling which has a throwing capacity equal to that with which the Jewish shepherd boy killed the Philistine. Such a weapon has a force and range which must be tried to be believed. Adjacent to the orchard was an old horse-mill, largely given up to the chickens as a roosting place. About sundown a few large apples bounced on the roof of the mill-shed would bring the chickens out in plain view, where they were good targets for my horticultural missiles. The only moral of this story is, that orchardists who allow suckers six feet long to grow on their apple trees will raise only such apples as are fit for a boy to throw at chickens.

I once spent the night in an obscure country district in the east. Each of the three corners of the room contained a bed, and each bed was the ostensiple resting-place of two people, a total of six—to say nothing of the unnumbered multitude who held homestead rights on the territory we temporarily occupied. The fourth corner of the room was devoted to a lounge, on which slept the boy of the household, and under the lounge slept the big yellow dog, and under the dog was the family stock of dried apples. The horticultural suggestion in this incident is, sell your apples without drying them; but if they must be evaporated, don't dump them on the floor with that carlessness that the old-time country merchant did with his codfish; and also see to it that the watch dog has his station outside the house, where he can be of some service in police duty.

I have never eaten fruit from a cultivated mulberry tree, but have pleasant memories of the wild varieties. The fruit of the mulberry, which grows

among the walnut, oak and hickory trees of the Mississippi valley, is neither large, nor has it a specially fine flavor. Besides, the berries are difficult to obtain in quantities sufficient to satisfy the appetite of a half-grown boy. But the mulberry has two other uses, which are paramount to its value as a fruit-bearing tree. The mulberry leaves, when assimulated by the digestive apparatus of the silk worm, become the raw material for the elegant dresses which so delight the feminine heart, and without which the world would be a dreary waste to fashionable society. The other use of the mulberry tree is not so important commercially, but has a glamor and attractiveness in the eyes of a sportsman which eclipses the lustre of the finest silk ever made up by Worth for millionaire's daughter. That mission is this: In its season of fruiting it draws into its spreading branches all the squirrels from a wide scope of territory, and from thence they can be picked off by the rifle or shotgun of the jubilant hunter. The man or boy who has ever found a mulberry fairly effervescent with grey-squirrels will afterward refer to this noble tree in words of joyful enthusiasm.

To allow insects to increase in your orchards will be worse than to permit clusters of suckers to conceal the trunks of the trees. No man who wilfully harbors injurious insects, without using all available means to destroy them, has any moral right to have apples to eat. To decrease the ravages of insects you should encourage the presence of all the birds you possibly can; use the most approved insecticides and the very best sprayers which are obtainable.

Any intelligent man can plant an orchard, but it takes a very faithful man to bring one to a bearing age. The first planting of an orchard is a May-day picnic compared to the constant, watchful, long continued toil and painstaking necessary to bring it to fruitage. The proper care of an orchard, and com-

bating the various insect enemies which threaten it, is like taking a family of thirteen children through the measles, whooping-cough, scarlet fever and other afflictions incident to childhood. How to reduce this worry and labor to a minimum, and how best to prevent unnecessary expenditure of time and labor by the adoption of precautionary measures, is one of the most important duties of this association.

An extensive traveler once said that if he was asked to say what single aspect of our American economic condition most strikingly and favorably distinguished the people of the northern states from those of all other countries he had visited, he would point to the fruit trees which so generally diversify every farm, and are so generally found around the modest homes of mechanics and workmen in every village, and in the suburbs of every city. This picture of the wide diffusion of wholesome and palatable fruits included only in the northern states. Those sections of the United States where irrigation is practiced have a capacity for a much higher grade of cultivation, both in the lines of agriculture and horticulture, than where rainfall is depended on. This well-known fact makes reasonable the prediction that but a few years will be necessary to so dot the Arkansas valley with fine orchards as to make it the garden spot of the west. And this consummation, "most devoutly to be wished," can be largely promoted by the work of the Otero County Horticultural Society.

This was followed by a question box. The first question taken up was: "What is the best variety of cherry to raise for profit?" The answer was assigned to Mr. Crowley, who said that he had not the experience to allow him to answer the question as he would like. The best bearer was the Wragg; then came the Early Richmond, Morello, Montmorency, etc. He could not be certain which was the most profitable as a seller. The Wragg was a splendid variety but were somewhat difficult to pick for mar-

ket, as the stem adhered firmly to the tree. The State Horticultural Society recommends the Morello.

A general discussion followed on the proposed county board of horticulture.

Mr. Crowley—I plant Russian Mulberry for a wind break, and grow the fruit to attract the birds away from the cherries, etc.

R. O. McClain—By planting seedling peaches very liberally, a new late-blooming variety may be discovered which will be just the thing for the valley.

Senator Swink—Prune your trees often and not much at a time. Pruning can be done in a small way at any time of the year. He favored some pruning every month, keeping a constant eye on the shape and condition of the trees.

The question was asked, what was best to do with trees which have been injured by the hail? The answer seemed to be unanimously: Do not cut off the injured parts now, but let the new sprouts start out where they will and await developments.

The sprayer which Mr. Steele had ordered from Ohio for exhibition and trial at this meeting failed to arrive, after being almost two weeks on the road.

A special meeting will be held next Saturday to consider the sprayer question, and every fruit grower in the county should be present.

The trial of the sprayer at the horticultural society meeting, Saturday, April 12, 1894, proved it to be a splendid apparatus. Yesterday afternoon, Senator Swink used the machine in his orchard and it worked admirably.

W. C. Steele, secretary, may be addressed for particulars.

This was the last recorded meeting.

REPORT OF MESA COUNTY HORTICULTURAL SOCIETY.

Grand Junction, Colo., May 15, 1894.

Mr. John Tobias, Secretary State Board of Horticulture:

Dear Sir—The Mesa County Horticultural Society have held irregular monthly meetings. When well attended, the meetings have been both interesting and profitable.

The members for 1894 are: C. Waters, P. A. Rice, C. W. Steele, A. A. Miller, A. V. Sharpe, R. A. Orr, F. C. Seely, A. B. Hoyt, W. H. Coffman, Theo. Lemon, A. D. Guild, J. L. Pratt, G. W. Smith, J. H. Smith, B. Coyler, H. Sonner, Dr. F. R. Smith, F. G. Chapman, B. G. Smith, H. R. Ottman, Wm. Bomgardner, H. C. Long, F. H. Rich, J. H. Johnson, J. F. Spencer, A. V. Sharpe, president.

C. W. STEELE,
Secretary.

THE CODLING MOTH.

Extract from an address delivered by H. C. Long before the Mesa County Horticultural Society.

This, the greatest insect pest with which apple and pear growers have to contend, is strictly nocturnal in habit in both moth and larval forms, concealing itself during the day and for this reason hard to find and difficult to combat in orchards.

Described, the moth measures three-fourths of an inch from tip to tip of its wings, the latter of a gray color, with numerous dark transverse lines and a curved black line edged with a coppery tint before

the ocellated patch on the inner angle; its larval form we have all seen in other states.

It is the worm in wormy apples.

In habit, in its larval state it lives through the winter, spinning a white, strong cocoon between the cracks of barrels, boxes or bins where apples are stored, in weeds or under the rough bark of trees. The warm spring weather causes the pupa state to pass so that the full fledged moth emerges at the time apple trees blossom. Then its nightly flights commence; passing from blossom to blossom, it lays one egg in each, each moth a total of about two hundred eggs. The eggs hatch in a few days and the minute insect burrows to the core of the fruit to eat the seeds, its food. Three weeks time are required for the larvae to grow to full size, when either the apple falls to the ground or the larva lowers itself at night to the ground by a small thread which it spins; descended it forms its cocoon as before, and in two weeks emerges a full fledged moth, this time laying its eggs, as a rule, on the blossom end of the apple or pear.

In our warm climate, each summer three and four broods are produced and an estimate of the unhindered damage of one moth emerging in the spring is the destruction—making wormy—of eight million apples.

Its only natural enemies are the woodpecker and ichneumon fly; sheep and hogs will eat windfalls and destroy the insects contained, chickens pick up many larvae.

The means to combat them are spraying with Paris green before the apple droops on its stem, putting bands of hay, straw, sacking or other material about the trunks of trees in which the cocoons may be formed, and destroying the cocoons by burning or scalding these bands every two weeks, keeping the grounds free from weeds and rubbish by cultiva-

tion, removing the rough bark from trees and whitewashing them, and other similar easily devised methods.

The codling moth must be fought and fought diligently. A wormy apple has no market value. A wormy pear is worthless.

PRACTICAL FRUIT GROWING AND FARMING.

An itemized statement of the fruits and vegetables grown on my fifteen-acre tract of mixed fruits for the year 1893:

300 bushels of apples, 15,000 lbs. at 4 c	$ 600 00
100 boxes of pears, 2,500 lbs. at 6 c	150 00
2,000 boxes of peaches at 80c per box	1600 00
150 boxes of plums at 80c per box	120 00
1,500 lbs of cherries at 13c	195 00
200 lbs. of apricots at 8c	16 00
75 boxes of prunes, 1,600 lbs at 10c	160 00
50 boxes of grapes, 1,000 lbs at 5c	50 00
200 lbs of crab apples at 5c	10 00
700 quarts of gooseberries at 7c	49 00
1,200 quarts of strawberries at 15c	180 00
100 cases of raspberries of 24 pints each	240 00
150 cases of currants at $2.75 per case	412 50
5 cases of blackberries	18 00
Total	$3,800 50

The small fruits were all grown on the same land with the trees, and in addition, I raised 2,000 pounds of peas, 4,000 pounds of rhubarb, lettuce, onions and radishes. Currants were marketed in Denver at $2.50 to $3.00 per case. Cherries brought in the same market, 12 to 15 cents per pound. Peaches were sold all over the state and averaged 80 cents per box; a great many selected and choice boxes were sold in Grand Junction for sample shipments

at $1.50 per box. The apples netted me four cents per pound, and strawberries 15 cents per quart. The other fruits sold proportionately as well.

This estimate does not include what was sold canned and dried at the orchard, which in peaches alone amounted to 400 boxes at least.

This represents lots of hard work and care, and the employment of six or seven hands, berry pickers and other help, during the summer season.

R. A. ORR.

WHAT TO PLANT.

Read before the Mesa County Horticultural Society by C. W. Steele.

Mr. President—The subject allotted me is so varied in scope and extended in the field of operation, I scarcely know where to begin. The adaptability of the soil and climate of Mesa county for the production of all the hardy and half-hardy varieties of fruit is such, we hardly know where to stop in making selections. In some countries some varieties of small fruits are rejected because of liability to mildew. In our arid climate it is unknown. Varieties of apples that fail in some places succeed well here.

Then if we were to plant for home use, we would plant other varieties than those which have proven most profitable for market.

The apple is now second only to the peach in importance, and liable to become first in the estimation of our fruit growers. There is but one profitable variety—the Ben Davis. I have tried to retain predjudice against this popular variety, but as long as one-fourth my orchard is all Ben Davis trees and one-half the apples Ben Davis apples, I must recommend Ben Davis for profit. My next most profitable, and for the first five years after planting, out-yielding the

Ben Davis, is the Missouri Pippin. Then comes that beautiful, showy apple, the Lawver or Delaware Red Winter. The Jeneton and Winesap are also profitable and of good quality. To describe the merits of the varieties I shall recommend, will take too long, so I shall give a brief list of such as have proven themselves most profitable in my experience, naming in order of merit:

Summer apples—Early Strawberry, Chenango, Caroline Red June, Sops of Wine.

Autumn apples—Jonathan, Oldenburg, Fall Winesap, Rambo, Wealthy.

Winter apples—Ben Davis, Missouri Pippin, Lawver, Jeneton, Winesap, Grimes Golden, Minkler, Willow Twig.

Pears, summer—Bartlett, Clapp's Favorite, Congress.

Autumn—Keiffer, Anjou, Angouleme, Flemish Beauty, Sheldon.

Winter—Lawrence, Winter Nellis.

Peaches, early—Arkansas Traveler, Alexander.

Medium Early—Hale's Early, Mountain Rose, Foster.

Medium—O. M. Free, Yellow St. John, Hill's Chili, Wagner, Wheatland.

Medium Late—Elberta, Globe, Stump the World, O. M. Cling.

Late—Wonderful, Lemon Cling, Smock Free, Susquehanna.

European grapes—Black Hamburg, Tokay, Blue Malvoise, Cornichan.

Raspberries—Cuthbert, Gregg.

Currants—Cherry, White Grape, Red Dutch.

Gooseberries—Houghton, Industry.

Strawberries—Sharpless, Jucunda, Capt. Jack, Wilson.

My aim in furnishing this paper is to furnish a safe guide for the amateur. The lists and varieties are large and many. The planter may experiment at will, for were my orchard confined to varieties herein named, it would be more profitable than it is. My experience is in fruit growing in sandy loam, too low for sweet cherries to be profitably grown and too warm for blackberries to withstand the winter sun. The California varieties of grapes require protection in winter, my ground being too flat and wet to check growth in time for wood to mature. If you have Grand valley land, plant trees, all you can care for. The orchardists of the Mississippi valley are becoming more and more discouraged. The forests are being rapidly destroyed, climatic changes follow, and failure of the fruit crops follow in rapid succession. The hills and cliffs protecting the valley of the Grand are here to remain; they cannot be destroyed, and the conditions that make Grand valley so favorable a spot for fruit growing are fixed and immutable.

IMPORTANT TO FRUIT GROWERS.

Circular No. 8, second series, Unites States department of agriculture, treats of the San Jose scale, described scientifically as Aspidiotus Perniciosus. This is the most pernicious scale insect in the country and infests all the deciduous fruit grown in California, except the apricot and Black Tartarian cherry. It is known as the worst insect pest of deciduous fruit trees on the Pacific coast, and has caused great pecuniary loss. Many crops of fruit have been ruined, and thousands of trees have been killed. It has been found for ten years in the vicinity of Las Cruces, N. M., upon apple, pear, plum, peach, quince and rose, brought into New Mexico upon young trees from California; also said to occur in Florida, having been imported from California. It has also been found in Charles county, Md., and New Jersey. The circular states that it, without doubt, exists in other parts of the east, and measures have been taken to ascertain all the points at which it occurs.

The importance of such knowledge can hardly be exaggerated. The insect spreads rapidly, for a scale insect, and is the most dangerous scale known.

It is inconspicuous, and will hardly be noticed by the average fruit grower until it has become very abundant, so much so, in fact, as to practically incrust the bark.

Remaining unnoticed in any one locality, it is a constant and immediate menace to the fruit growing interests for many miles around. The constant portage of nursery stock all through the fruit-growing states of the east in all directions, affords the most favorable opportunities for the spread of the insect, and this without restriction.

The San Jose scale belongs to the same group of scale insects to which the oyster-shell barklouse of

the apple belong. It differs in that the scale is perfectly round, or, at most, slightly enlongated or irregular.

It is flat, pressed close to the bark, resembles the bark of the twigs in color, and when fully grown is about one-eighth of an inch in diameter. At or near the middle of each scale is a small, round, slightly enlongated black point, or this point may sometimes appear yellowish. When occurring in large numbers the scales lie close to each other, frequently overlapping, and are at such times difficult to distinguish without a magnifying glass. The general appearance is of a grayish, slightly roughened, scurfy deposit. Limbs, when thickly infested, have every appearance of being coated with lime or ashes. When the scales are crushed by scraping, a yellowish oily liquid will appear, resulting from the crushing of the soft yellow insects beneath the scales, which will indicate to one who is not familiar with their appearance, the existence of healthy living scales on the trees. After scraping off the scales with the finger nails, the outlines of the removed scales will be noticed upon the bark. Where the scales do not occur so thickly, they are more perceptible, and upon young, reddish twigs the contrast is quite noticeable, as the scales there appear light gray. The younger and smaller scales are darker in color than the older and larger ones and sometimes appear quite black, while the still younger ones are yellowish.

The insect affects not only the young twigs and limbs and, with young trees, the entire plant, but is also found upon the leaves and upon the fruit. When abundant, the fruit is destroyed. One of the most characteristic points in the appearance of the insect upon the fruit is the purple discoloration around the edge of each scale.

HOW THE INSECT SPREADS.

Aside from the transportation with nursery stock, it may be carried upon fruit sent to market. These are its principal modes of travel from one part of the country to another. In orchards and neighborhoods its spread is in the newly hatched condition only. The female is wingless, and once fixed cannot move. The young lice crawl rapidly and persistently, even descending from one tree and crawling to another. But the principal method of spread is by means of other insects which are winged and by birds.

When the trees are found to have become badly infested, the safest and, in the long run, the most economical course, will be to cut them down and burn them, trunk and branch. Where the infestation is less marked, insecticide washes and sprays may be used.

Before the young lice have begun to secrete scale (as at this time they can only be discovered with the help of a magnifying glass), they may be destroyed by spraying with kerosene soap emulsion. In making the emulsion use rain water, or soften by adding a little lye or bi-carbonate of soda. Dilute one part of emulsion with nine parts of cold water.

The circular further says: The time will come in the immediate future, when some kind of quarantine regulations will have to be established by states or by large fruit growing districts. Should this species already have obtained the firm foothold in the east which we suspect, New York, Michigan and other states, in which the pomological interests are great, should immediately, by act of legislature, establish quarantine regulations similar to those in force at the present time in the state of California.

In the meantime no orchardist should admit a single young fruit tree, or a single cutting, or a sin-

gle bud from a distance into his orchard, without first carefully examining it and satisfying himself absolutely that it does not carry a single specimen of the San Jose scale.

If this plan is adopted by everyone interested and without exception, the rate of spread of the species can be limited to the natural spread by crawling, by winds and by the aid of other insects and birds.

We wish to particularly impress upon the minds of fruit growers that as soon as this insect is found to occur in an orchard, the most strenuous measures must be taken to stamp it out. No half-way measures will suffice. The individual must remember that not only his own interests are vitally at stake, but those of the entire community in which he resides. Trees badly infested should be instantly burned. The individual may think he cannot bear the loss, but the loss in consequence of the slightest neglect will be much greater. The fact, too, that there is a community of interests among fruit growers in this matthe must not be lost sight of. Fruit growers must be mutually helpful in an emergency like this.

To the fruit growers of Grand valley this is of more than ordinary interest. Trees are shipped here in large quantities from all directions. No planter should plant a tree until the same is carefully inspected, root and branch. If he has any doubt of his competency to make a thorough examination and inspection, he should call on Mr. H. C. Long, county inspector. Only by mutual effort can the present high standard of fruit growing in western Colorado be maintained.

C. W. STEELE.

FREMONT COUNTY REPORT.

Fremont County Horticultural Society—annual meeting for election of officers, reports, etc., first Saturday in May. Last election May 5, 1894, resulted in the election of John Granestock, president; W. H. Trout, C. W. Burrage and G. O. Baldwin, vice-presidents; Eugene Weston, secretary; W. A. Helm, treasurer. Regular meetings, first Saturday every month at 3 o'clock p. m.

The business of fruit growing is receiving each year in this county, more attention. A marked increase of acreage is noted this season in the planting of standard and small fruits, especially those which are remarkably sure croppers in this county.

The county commissioners have appointed a county board of horticulture and also a fruit inspector, with instructions to see laws relative to sale of nursery stock and the growing of fruit strictly enforced.

Prof. Brown's patented formulas for insecticides were bought in spring of 1893. Their value has not been as yet fully demonstrated, considerable difference of opinion existing among leading fruit growers. Mr. John Granestock says it kills everything, but the hard shelled insects. Will kill woolly aphis if trees are first sprayed with water; that followed by the Brown formula which must, however, hit the body to be effective.

The red spider is becoming a pest to be vigorously fought. The root louse, from whence comes the woolly aphis (?), is doing serious damage to a few orchards—believed in some cases to have been introduced in the nursery stock. A scale pest was lately detected in one orchard by the inspector, which was supposed to be the San Jose scale, but proved not to

be, although nearly as destructive. The fruit growers are generally waking to the necessity of vigilance and prompt action against our insect foes when found.

The apple crop of 1893 was phenomenally large, one grower selling more than 450 barrels of apples grown on one acre at $4.00 per barrel on the tree—believed to be the champion record in America. The apple crop of this year will be markedly short, but not a failure. Other fruits will bring up the general average.

ORCHARD INSPECTOR'S REPORT.

To the Honorable State Board of Horticulture, Denver, Colo.

Gentlemen—Herewith I hand you my report as orchard inspector for Montrose county for the season of 1893.

Total number of orchards inspected, 56.

Estimate acreage of fruit orchards, 6,500.

Estimate planting of trees for 1893, 125,000.

Estimate acreage of orchards in bearing, 1,500. Estimate value of fruit crop, $40,000.

Out of the 56 orchards inspected, four were found to be badly infested with the codling moth. These orchards were thoroughly sprayed by their owners and the result has been so satisfactory to them that I feel confident they will never neglect this duty they owe to themselves and their neighbors.

Insects found to exist in the orchards of the county are as follows: Codling moth, tent caterpillar, plum louse, flat and round head borer, leaf roller and tobacco worm.

The majority of the orchards were found to be sadly in need of cultivation and, in a few cases, orchards were found whose owners do not believe in pruning or cultivation; but as these people are surrounded by orchards wherein both these necessary adjuncts are practiced, I feel sure their conversion to correct principles is near at hand.

The grasshoppers did little or no damage this year. They appear to be rapidly dying out. Nothing in the nature of blight was discovered to exist in any of the orchards.

In Mr. Nye's orchard the blight appeared to exist in his Baldwin and King of Tomkins county apple

trees. These trees are eight years old but after carefully examining trees, the following was discovered to be the cause: His orchard is located in the river bottom where the soil is from two to four feet deep; on digging down by the tree, we found that the roots had passed through the soil to the gravel strata and were standing in water; the death of the trees was caused by sub-Irrigation. The sap-sucker or woodpecker bird is causing the orchardists situated in the river bottoms, some little trouble and loss, having killed in Mr. Nye's orchard no less than six eight-year-old apple trees. The bird operates on the tree in the following manner: He bores a hole in the body of the tree close to where the branches leave the trunk, in which he allows the sap to accumulate, and as each well made ceases to flow, he opens a new one, about a quarter of an inch apart; thus he continues in a circle around the body of the tree until he has entirely girdled the trunk. His habit is to bore a hole in the afternoon, returning the following morning to gather the sap. The only method yet known to exterminate this bird is to watch for him in the morning or afternoon and shoot him. He confines his operations principally to apple trees. I would respectfully call your attention to the fact that California orchards are importing insects into our state in large quantities in the following manner: In June of 1893, a shipment of peaches from New Castle, Cal., arrived at Montrose consigned to the express agent, with instructions to distribute among the fruit dealers and to realize whatever he could get out of them. The consignment consisted of about 35 boxes. One of the dealers called my attention to the wormy condition of the peaches and on examination I found that the entire lot were wormy. I called on the agent and learned that a similar shipment was landed in each town along the road, and I further learned from a Salt Lake commission man that the orchards of California take this method of working off their in-

ferior or cull fruit crop. If this importation is allowed to go on it will infest all our orchards with California peach moth. Fearing the bad results from this consignment, I had the same gathered up and destroyed.

Respectfully submitted, and trusting that the effort will meet with your approval, I remain

Yours truly,

A. F. REVES,

Inspector.

CONDENSED REPORT FROM C. W. STEELE.

March 20 visited orchards east of Grand Junction. Mr. Blair's orchard on sandy loam shows good care and cultivation. Peach trees were not properly shortened in and have grown too tall, as have a number of the trees of Mr. Steele's 40-acre orchard. On Fruit Ridge are old orchards of exceeding promise, belonging to Robert Orr, W. A. Kennedy, Wm. Bomgardner, Dr. Smith, Mrs. Chapman and others. The codling moth was quite bad in this locality last year, but all are convinced of the necessity of spraying; low-headed trees, and shortening in was here generally adopted. Alex. Struthers has one of the oldest orchards in the valley; has been much neglected; is being put in better shape; the same with Mr. Kelly's orchard adjoining. On Orchard Mesa the oldest trees commenced bearing last year. The Orchard Mesa Company have now planted 300 acres; Smith Bros., 100 acres; Johnson Bros., 45 acres; Mr. Fifer, 40 acres. West of town, Henry Wurtz has nine acres in assorted fruits; has alfalfa in orchard, but does not recommend it. W. H. Bergen has five acres cultivated vegetables among trees; prunes but little; finds much injury done by excessive pruning. One Ben Davis apple tree, four years from planting, produced 175 pounds apples; another 229 pounds—trees two years old when planted. Has never been troubled with insect pests; keeps many chickens which roam at will—thinks that the reason. Peach trees averaged 300 pounds per tree, five years from planting.

Dan Mullen, 12 acres in young orchard; showed neglect. The same with 10 acres of Walker tract. Mrs. Wright has 10 acres. Other places looking well

were Mr. Allison's, Mobley estate, and W. T. Carpenter's.

In the 70-acre orchard of P. A. Rice, the woolly aphis had been found and destroyed with a strong emulsion of soap and Prof. Brown's insecticide. The orchard was also infested with peach borers.

A. A. Miller has one of the oldest peach orchards near here, also an extensive vineyard of California grapes, which he covers in winter.

Mr. Guild has a fine large vineyard on rolling land; southern slope; uses little water; thinks too much injurious; has seen no evidence of phylloxera.

On March 31, examined with Prof. Long, a lot of trees from Huntsville, Ala.; condemned several affected with root knot. Messrs. Ramey Bros. have 10 acres of pears looking well; are using the yucca palm tree protecter, which they find valuable as a defense against rabbits, borers and sun-scald.

REPORT OF DELTA COUNTY FRUIT INSPECTOR.

The result of my inspection of fruit trees and orchards in and around Delta, during my term of office, does not include any of the orchards in the eastern part of the county, on the north fork of the Gunnison.

The period of my inspection began June 12, 1893, and ended July 17, 1893, during which time I visited the following orchards, which were in comparatively good condition with the exception of some small ones that a freer use of the knife and a little more cultivation would have been beneficial. The orchards are free from blight or any perceptible disease, and only a very few codling moths in a few places, and no other insect pests. Following is the approximate number of trees planted in orchards, usually twenty-five feet apart:

Geo. B. McGranahan, 4,000.
Geo. Childs, 2,000.
Robert Londreth, 500.
Geo. Horshman, 1,000.
A. W. Worrington, 1,500.
Patrick Curtis, 300.
Bigelow Bros., 6,000.
W. H. Cratsen, 400.
T. H. McGranahan & Butler, 2,000.
Jos. Patterson, 100.
A. C. Jenson, 850.
A. C. Huntley, 600.

A. Saram, 100.
John P. Bosler, 100.
Honks Bros., 150.
Geo. Conklin, 3,000.
A. E. Armsbury, 3,800.
A. D. Johnson, 3,000.
Herman Beor, 400.
P. W. Dunall, 200.
J. R. Porter, 1,000.
N. Visner, 100.
Geo. E. Corner, 200.
J. W. Gant, 350.
A. J. Harris, 1,000.
W. O. Stevens, 2,000.
H. Waters, 300.
Geo. Burts, 800.
W. M. Hastings, 1,000
A. W. Carr, 1,200.
J. M. True, 500.
J. W. Smith, 100.
Susan E. Sparr, 1,000.
John Broner, 300.
W. M. Kinnicott, 1,500.
J. C. Hort, 300.
R. E. Griffith, 500.
Geo. O. States, 400.
J. W. Sell, 600.
E. C. Rist, 350.
Chas. Estes, 300.
Calvin Lewis, 350.
Geo. H. Gorrison, 800.
H. H. Ingersol, 600.

Frank P. Beslim, 500.
R. D. Blair, 500.
Thomas B. Hannum, 2,000.
Total inspected, 48,700.

THOMAS B. HANNUM,
Inspector.

SEMI-ANNUAL REPORT

OF THE

Colorado State Board of Horticulture

FROM JUNE 1 TO NOVEMBER 30, 1894,

INCLUSIVE.

VOLUME VII.

JOHN TOBIAS, Secretary.

LETTER OF TRANSMITTAL.

Denver, Colo., November 30, 1894.

HON. NELSON O. McCLEES,
Secretary of State.

Sir—In compliance with the law, I have the honor of submitting herewith the second semi-annual report of the Colorado State Board of Horticulture, with supplemental papers for the year 1894.

JOHN TOBIAS,
Secretary.

STATE OF COLORADO,
Secretary's Office.

Filed November 30, A. D. 1894, at 12 o'clock.

NELSON O. McCLEES,
Secretary of State.

By Lyman B. Henderson,
Deputy.

REPORT.

Denver, Colo., June 8, 1894.

The board met at the office of secretary as per previous notice.

Present—W. B. Osborn, president; David Brothers, W. S. Coburn, John Tobias.

A verbal report was given by members present as to condition of orchards and fruit prospects. The advisability of holding a fruit show this fall was discussed, with the result that it was decided to have an exhibit in Denver.

Mr. E. Milleson, representing the Beekeepers, desired to have a show of the bee industry in connection with the fruit show.

On motion of Mr. Coburn the beekeepers and florists were to be given opportunity to exhibit with us.

The premium list of fall show of 1892 was discussed.

A new scale insect was reported to be infesting shade trees in West Denver. Members in a body visited the locality, inspecting the surroundings, but failed to find any fruit trees infected. The insect proved to be the Cottony maple tree scale.

On motion, adjourned to next day.

June 9, 1894.

Board met as per adjournment at office of secretary.

The premium list was taken up and revised.

Adjourned to June 11.

June 11, 1894.

Board met as per adjournment.

All members present except Ben Reed.

Revision of premium list continued.

Motion carried that premiums on flowers be limited to $75.00.

Mr. E. Milleson was appointed to solicit special premiums.

Motion carried that premiums on Aparian products be limited to $40.

Ordered that members solicit, gather and prepare fruits, pantry stores, flowers and honey for show and be allowed per diem only, total amount not to exceed $50 each.

Date of show left with secretary; preferred dates about September 25.

Bills for services and mileage of members since January meeting were allowed and vouchers drawn for same.

On motion, adjourned to first day of show.

JOHN TOBIAS,
Secretary.

The preliminary arrangements for the fruit show being left with the secretary to carry out, the premium list, as revised, was put into print and early in July distributed over the state. Early fruits as they ripened were received and placed in cold stor-

age to await the time of the show. The Gettysburg building, the largest room in the city was fitted up with tables aggregating 2,200 square feet, all of which was thickly covered by over 3,000 plates of fruit, consisting of eighty-one varieties of apples; seventeen of pears; thirty-four of peaches; grapes, both native and foreign; plums of many varieties, also a few nectarines, with small fruits in solution.

The state beekeepers also made a good showing of their wares, adding to the attractiveness of the display.

The State Board appointed the following committees:

On Nomenclature—Thos. W. Page, W. S. Coburn.

Awarding Committee on Fruits—D. S. Grimes, Peter Youngers, Jr., Geneva, Neb.; Thos. W. Page.

LIST OF AWARDS.

County making best display of deciduous stone fruits, grapes and small fruits—Mesa, first; Fremont, second; Delta, third.

Display of fruits grown by one person—W. S. Coburn, of Delta county, first; C. W. Steele, second; R. A. Orr, third.

Display of apples grown by one person—W. S. Coburn, first; Jesse Frazer, second; W. C. Catlin, third.

Display of pears grown by one person—W. S. Coburn, first; W. B. Felton, second; R. A. Orr, third.

Display of American grapes grown by one person—W. H. Trout, first; John Gravestock, second; John Deiter, third.

Display of foreign grapes grown by one person—W. L. Allison, first; William Bomgardner, second; A. D. Guild, third.

Display of peaches grown by one person—W. S. Coburn, first; R. A. Orr, second; C. W. Steele, third.

Display of nectarines grown by one person—W. S. Coburn, first.

Display of quinces grown by one person—C. W. Steele, first; W. S. Coburn, second.

Display of native plums grown by one person—Thomas Prescott, first; Ben Tyler, second.

Display of foreign plums grown by one person—W. S. Coburn, first; C. W. Steele, second; William Bomgardner, third.

Best plate five apples grown by one person—R. A. Orr, first; William Bomgardner, second.

Best plate five pears grown by one person—C. W. Steele, first; W. S. Coburn, second.

Best plate seven peaches grown by one person—Dunfee Bros., first; R. A. Orr, second.

Best plate ten native plums grown by one person—Thomas Prescott, first; W. S. Coburn, second.

Best plate ten foreign plums grown by one person—W. S. Coburn, first; C. W. Steele, second.

Best and largest specimen apple—Robert Herrick, first; Benton Canon, second.

Best and largest specimen pear—Dunfee Bros., first; W. S. Coburn, second.

Best single plate American red grapes—John Gravestock, first; John Deiter, second.

Best single plate American black grapes—W. H. Trout, first; John Deiter, second.

Best single plate American white grapes—John Gravestock, first; John Deiter, second.

Best single plate foreign red grapes—M. L. Allison, first; William Bomgardner, second.

Best single plate foreign black grapes—A. D. Guild, first; M. L. Allison, second.

Best single plate foreign white grapes— A. D. Guild, first; John Gravestock, second.

Best plate seedling peaches—Mr. Rand, first; John Deiter, second.

Best plate ten plums any one variety—W. S. Coburn—Ogon, Purple Botan, Yellow Botan, Satsuma, Blood, Genii, Bradshaw, Yellow Egg, Washington, Green Gage, Shropshire Damson, Blue Damson, Rollingstone, Shipper's Pride, Fallumburg, Pond's Seedling, Wild Goose, Golden Beauty.

J. S. Ibbison—Lombard.

H. C. King—Forest Rose, Big Ute, De Agen Prune.

William Bomgardner—German Prune.

C. W. Steele—Chabot.

R. A. Orr—Italian Prune.

Best plate seven peaches, any one variety—W. S. Coburn—Early Crawford, Early York, Coolridge's Favorite, Foster, Early Beauty, Bergen's Yellow, Elberta, Captain Eads, Prize, Climan, Reeve's Favorite, Moore's Favorite, Stephens' Rare, Ripe, Prince's Rare Ripe, King George I., O. M. Free, Kennedy Iron Clad, Choin's Choice, St. John, Chinese Cling, Wheatland, President, Mount Rose.

W. H. Bergen—Late Crawford.

C. W. Steele—Camelia Flowering, Heath Cling, Indian Blood.

R. A. Orr—Globe, Wonderful, Ford's Late White, Salway, Crosby, Ward's White, Family Favorite.

Best plate five apples, each variety, awarded as follows:

B. F. Rockafellow—Ben Davis, Wine Sap, Fall Queen.

W. S. Coburn—Wagener, Walbridge, Dominie, Arkansas Black, Maiden's Blush, Rawl's Gennett, Rome Beauty, Sutton Beauty, Orange Winter, Utter's Red, Red Bettinghimer, Plumb's Cider, Northern Spy, Fink, St. Lawrence, Fitna, Golden Sweet, Seek-No-Further, Scott's Winter, American Summer Pearmain.

H. C. King—Wealthy, Whitney No. 20, Duchess, Yellow Transparent, Hagloe, Golden Beauty Crab, Red Astrachan, Sops of Wine, Mammoth Black Twig, Charlamof, Hibernal.

J. W. Bowles—Wolf River.

C. W. Steele—Missouri Pippin, Lawver, Fall Wine Sap, Fall Pippin, N. W. Greening, R. I. Greening, Rambo, Twenty-ounce Pippin, Minkler, Little Red Romanite, Roxbury Russett, English Golden Russett, Bethel.

Albert Wolff—McMahan's White, Willow Twig, Prior's Red, Sheriff.

P. A. Rice—Pewaukee.

T. E. Jewitt—York Imperial, Baldwin.

William Bomgardner—Jonathan.

W. H. Reynolds—Huntsman's Favorite.

G. W. Smith—Bellflower.

J. S. Ibbison—Hyslop Crab.

R. A. Orr—Haas, W. W. Pearmain, Fallowater, Milam, Autumn Swaar, Smith's Cider, Roman Stem, Loy, Gano, Indian, Violet.

M. M. Marble—Gideon, Fall Rambo.

John Tobias—Martha Crab, Longfield.

A. R. Bruce—Fulton.

Best plate five pears, any one variety—W. S. Coburn—Clapp's Favorite, Lawrence, Seckel, President Doud, Rutter, Longworthy No. 1, Beurre De Easer, Beurre Clairgeau.

R. A. Orr—Flemish Beauty, Bartlett, Buffum, Kieffer, Winter Nelis, Le Conte.

C. W. Steele—Congress.

PRESERVED FRUITS.

Best jar sweet cherries—W. S. Coburn, first.

Best jar sour cherries—W. S. Coburn, first.

Best jar red currants—J. S. Ibbison, first; W. S. Coburn, second.

Best jar English gooseberries—W. W. Wilmore, first; M. M. Marble, second.

Best jar American gooseberries—W. S. Coburn, first.

Best jar red raspberries—W. S. Coburn, first.

Best jar blackberries—J. S. Ibbison, first.

Best collection small fruits—W. S. Coburn, first.

THE COMMITTEE'S REMARKS.

The committee on awards added the following comments to its official report:

"State Board of Horticulture:

"Gentlemen—Your committee on fruit awards beg leave to submit the following report:

"The extensive and varied display of fruit now on exhibition in the Gettysburg building demonstrates the rapid advance of fruit culture in Colorado.

"The prophetic assertion made by the pioneer horticulturists a few years ago, then classed as visionary dreams by the doubting Thomases, has exceeded the most sanguine expectations of the men who placed confidence in our future development and the adaptation of our soil and climate to extensive fruit culture.

"In making awards we find quality so near equally balanced in exhibits, that it is exceedingly difficult to draw the line of excellence between them. They are all worthy of the highest premium. But, unfortunately for us, however excellent the display may be, your committee must draw the line.

"And whether any exhibit receives the highest premium or not, we most earnestly endorse the entire fruit exhibit as the most perfect and creditable one that has ever been placed before the citizens of Colorado.

"D. S. GRIMES,
"THOS. W. PAGE,
"PETER YOUNGERS, Jr."

The prizes awarded for apiarian products were as follows:

First prize of $5 for the best and largest exhibit of apiarian products by one person, awarded to H. Knight; second premium, $2, to W. L. Porter.

First prize, $2, for the best and largest exhibit comb honey by one person, awarded to W. L. Porter; second premium, $1, to J. E. Lyon.

First prize, $2, for the best and largest exhibit extracted honey by one person, awarded to W. L. Porter; second prize, $1, to H. Knight.

First prize, $1.50, for the best and largest exhibit beeswax by one person, awarded to L. A. Smith & Co.; second premium, $1, to W. L. Porter.

First prize, $1, for the best ten pounds comb honey in one-pound sections, awarded to L. A. Smith; second premium, 50 cents, to M. S. Patterson.

First premium, $1.50, for the best crate twenty-four pounds honey in one pound sections, awarded to L. A. Smith; second premium, $1, M. S. Patterson.

First Prize, $1, best one quart extracted honey in glass jars, awarded to Edith Knight; second premium, 50 cents, to W. L. Porter.

First prize, $1.50, for best ten quarts extracted honey in glass jars, awarded to Edith Knight; second premium, $1, to W. L. Porter.

A prize of $5 to J. E. Lyons, for the best exhibit of one colony bees in observatory hive.

The following special prizes were awarded by the Denver Bee Keepers' Association:

One silver dollar to Edith Knight for the best display of extracted honey by a girl under 16 years of age.

One silver dollar to Lester Smith, also under 16 years of age, for a similar display.

One silver dollar to L. A. Smith & Co. for the best display of beeswax.

One silver dollar to J. E. Lyon for the best display of extracted honey.

One silver dollar to W. L. Porter for the best display of comb honey.

The State Beekeepers' Association offered a reward of $5 for the best display of apiarian products and supplies. It was awarded to L. A. Smith & Co.

Bartels & Co. offered a prize of five dove-tail bee hives for the best ten pounds comb honey in one-pound sections.

L. A. Smith & Co. also received for the same exhibit a subscription from the Denver Republican for one year and a subscription for the Colorado Farmer for one year as awards from the two publications.

In the exhibit of flowers no one competed with W. W. Wilmore, and he was the recipient of the $3 prize for the best five varieties of dahlias. The blossoms were beautiful, and could scarcely have been surpassed. Mr. Wilmore offered several prizes to the amateur dahlia propagators for the best exhibits containing the greatest number of specimens in the best conditions. They were awarded as follows:

The first premium, $3, to Robert James, of Denver; the second, $2, to S. H. Wood, of Denver.

Charles F. Webb received a prize of $2 for the finest display of pansies, and a $2 reward for the best exhibit of annual cut flowers. These prizes were also given by Mr. Wilmore.

The following comments of the press are worthy of preservation, also, showing the standing of Colorado fruits:

"One of the finest fruit displays ever seen on this continent is now on exhibition in the Gettysburg Building, and every citizen of Denver should endeavor to see it for himself to-day. Neither California nor any other state can compare with Colorado in the variety, high quality and rare beauty of its fruits, and we predict that the time is not far distant when horticulture in this state will become a

more important and valuable industry than gold or silver mining. Visit the Gettysburg Building today and see if you do not indorse this prediction."

"The Horticultural Fair closed yesterday, after a three days' exhibit, which has been most gratifying to all who were interested in it. Those who had it in charge have every reason to be proud of their success, as a more complete and perfect display of one of Colorado's great resources had never before been made anywhere. That it was appreciated by the Denver people was proven by their patronage, which, though not as generous as it might have been, was yet very good. At the latest hour yesterday it had not been determined whether or not enough had been realized to defray the expenses, but the deficiency, if any, is at least small.

"Much of the fruit exhibited at the fair will be sent to several of the horticultural fairs to be held in the Missouri valley. This will be an invaluable advertisement for Colorado."

The following is an extract from a letter of one of the committee on awards, to his old home in Missouri:

"Our State Fair has closed; the people could hardly realize that the fruit was really grown in Colorado. You know my experience in fruit growing in Missouri—that I have seen fine fruit, lots of it, but never before such fruit as we had here. It would have done you good to be with us. Beautiful fruit, in all its glory!"

FINANCIAL SUMMARY.

State appropriation for 1894 ..... $2500 00

VOUCHERS DRAWN.

1893.			
Dec. 30.	No. 24.	John Tobias, salary for December	$ 62 50
1894.			
Jan. 13.	No. 25.	David Brothers, per diem and expenses	19 35
Jan. 13.	No. 26.	W. B. Osborn, per diem and expenses	32 00
Jan. 13.	No. 27.	W. S. Coburn, per diem and expenses	59 05
Jan. 13.	No. 28.	C. W. Steele, per diem and expenses	39 70
Feb. 1.	No. 29.	John Tobias, salary for January, rent of hall annual meeting and office exp.	94 15
Feb. 6.	No. 30.	John A. MacDonald, stenographer annual meeting	73 95
Mar. 1.	No. 31.	John Tobias, salary for February, printing and office expenses	84 60
Mar. 31.	No. 32.	John Tobias, salary for March and office expenses	67 85
May 2.	No. 33.	John Tobias, salary for April, printing and office expenses	103 00
May 31.	No. 34.	John Tobias, salary for May and office expenses	64 80
June 9.	No. 35,	W. B. Osborn, per diem and expenses	201 60
June 9.	No. 36.	W. S. Coburn, per diem and expenses	199 35
June 9.	No. 37.	C. W. Steele, per diem and expenses	191 70
June 9.	No. 38.	David Brothers, per diem and expenses	155 60
June 30.	No. 39.	John Tobias, salary for June, printing and office expenses	78 75
July 31.	No. 40.	John Tobias, salary for July, printing and office expenses	83 10
Aug. 31.	No. 41.	John Tobias, salary for August and office expenses	72 40
Sep. 29.	No. 42.	John Tobias, salary for September and office expenses	78 20
Sep. 29.	No. 43.	David Brothers, per diem and expenses	70 40
Sep. 29.	No. 44.	W. B. Osborn, per diem and expenses	93 70
Sep. 29.	No. 45.	C. W. Steele, per diem and expenses	107 25
Sep. 29.	No. 46.	W. S. Coburn, per diem and expenses	119 20
Sep. 29.	No. 47.	John Tobias, to pay balance due on expenses of fruit show September 25 to 29, 1894	238 00
Oct. 4.	No. 48.	H. D. Mann & Co., printing	24 00

Oct. 31.	No. 49.	John Tobias, salary for October and office expenses	71 00
Nov. 30.	No. 50.	John Tobias, salary for November and office expenses	65 70
		Total	$2,550 90

NOTE.—With the exception of No. 48, Nos. 42 to 50 inclusive remain unpaid.

Fruit Reports for 1894.

COMPILED FROM ANSWERS TO FOLLOWING CIRCULAR.

STATE BOARD OF HORTICULTURE,
SECRETARY'S OFFICE,

Denver, Colorado, October 30, 1894.

Dear Sir—You are kindly requested to give your attention to the following questions, from practice or observation, relating to horticultural interests, that the same may be published in our forthcoming report, and may be of mutual benefit to present and intending fruit growers:

1. Orchards; condition in 1894.

2. Treatment affording best results.

3. What insects are doing damage? How are you combating them?

4. What varieties are least injured by blight? Which the most?

5. Name six best apples for profit; same of other fruits.

Respectfully yours,

JOHN TOBIAS.

WESTERN DISTRICT.

Delta, November 9.

1. Orchards in good condition where well taken care of.

2. Cultivation and properly irrigated.

3. Young apple trees are often injured the first year after planting by the apple borer. The apple trees can be protected by wrapping them the first year after planting with cloth or heavy paper, say about two feet from the ground up.

The codlin moth has made its appearance in some orchards. The plum and peach aphis are getting troublesome. Spraying with kerosene emulsion will destroy them if properly applied.

4. No blight has appeared that I know of.

5. Best Apples—Yellow Transparent, Wealthy, Jonathan, Ben Davis, Missouri Pippin, Shackelford.

Plums—Lombard, Moore's Arctic, Bradshaw, Price's Imp. Gage, Shipper's Pride. Damson. Peaches and apricots both do well, especially on the mesa and foot hills. Strawberries do fine, and most all other small fruits.

FRANK TALBERT.

Delta, November 12.

1. Orchards—Very good; crop good; all peach and some varieties of apple, plum and pear were thinned.

2. Judicious pruning, thinning and thorough cultivation, uniform grading and honest packing, with a guarantee of weight, grade and quality.

3. This is the first season the codlin moth has appeared in my orchard. Six pears and four apples were infested.

No curculio has yet to my knowledge been found in this country. The blister mite is working on some varieties of pear. The yellow mite has also appeared on pear and also on some apple and plum trees, for which we must vigorously spray. Strawberry or Box Elder bug did no damage to fruit this year.

4. Insect blight I have not seen yet. Frozen sap blight has appeared in some young orchards, as it always will through carelessness or ignorance of growers.

5. Apples—Yellow Transparent, Am. S. Pearmain, Rambo, Mammoth Black Twig, Jonathan, Missouri Pippin.

Pears—Early Wilder, Bartlett, Flemish Beauty, Seckel, Keiffer, Easter Buerre.

Peach—Waterloo, Yellow St. John, Mountain Rose, Foster, Old Mixon Free, Elberta.

Plums—Ogon, Bradshaw, Abundance, Burbank, Yellow Japan, Winter Damson.

GEORGE B. McGRANAHAN.

Hotchkiss, Delta county, Nov. 10.

1. Orchards. No one.

2. Clean cultivation.

3. We have no insects, but are ready to spray if codlin moth should appear.

4. We have no blight or any indications of any.

5. Apples—Ben Davis, Jonathan, Wine Sap, Rawle's Janet, Missouri Pippin, Walbridge.

Peaches—Alexander, Hale's Early, Foster, Late Crawford, Elberta and Globe, ripening in order as named.

Plums—Native, Wild Goose, Wolf, De Soto; foreign, Lombard, Bradshaw, Yellow Egg, Fallemburg prune, Ogon, Botan.

Cherries—Early Richmond, English Morello, Wragg, Large Montmorency, Ostheim, Nectarines, New White, Hardwick, Stonewick, Apricots, Moorpark, Peach, Royal.

Pears—Bartlett, Mory, Flemish Beauty, Clapp's Favorite, Seckel; dwarf pears, Clapp's Favorite, Anjou, Duchesse De Angouleme, Sheldon, Louise Bonne of Jersey, Vicar of Wakefield.

W. S. COBURN.

Montrose, November 13.

1. Orchards—Good.

2. Shallow cultivation and light irrigating, moderate pruning.

3. Plant Louse—Kept in check by spraying.

4. No blight here.

5. Apples—Wagner, Winesap, Ben Davis, Jonathan, Alexander.

Peach—Early Crawford, Elberta.

Pears—Keiffer, Bartlett.

Plums—Blue Damson, Lombard.

Grapes—Concord, Oregon Red.

A. L. ANDERSON.

Antlers, Garfield county, Nov. 8.

1. Orchards in our part of the valley are open for great improvement. They have suffered from a scarcity of water and the care that is necessary to the making of an orchard. Taking them as a whole they are in a fair condition.

2. Good cultivation and close attention to irrigation when required.

3 and 4. Have not appeared in our midst. Orchards, which ought to be giving a small return, have been those to suffer from non-attention. The best of our orchards are too young for bearing, hence cannot name best varieties.

CHARLES D. EDDIE.

SOUTHERN DISTRICT.

Canon City, November 7.

1. In this neighborhood most of the orchards are in a very thrifty condition. Several have this season yielded a full crop of apples, pears, plums and peaches, also a full crop of small fruits. There are a few orchards that were caught by an extra late freeze after fruit was set last spring, which did considerable damage to fruit, but did not hurt the trees; the same trees have made a fine growth this season. Most of our orchards are going into winter in first-rate condition.

2. Clean culture for young orchards—Small fruits are sometimes planted between the rows with good results, as the culture necessary for these keeps the soil in fine fix for the trees and will cause them to make a thrifty growth. The returns from the small fruits will more than pay all expenses until the orchard trees come into bearing. Corn and vegetables are often planted, also with good results. The head of young trees are kept well open and not let grow too thick.

3. As to insects that are doing damage, we have lots of them. The red spider, woolly aphis, leaf slug, grape leaf hopper and the codlin moth, all doing considerable damage unless they are continually

combatted. We are fighting them with kerosene emulsion, one-fifteenth kerosene. Whale oil soap is more effective than the common soap in making the emulsion. Are also using the Brown formula for some insects with good results. For the codlin moth we use Paris green, or London purple, one pound to 150 gallons of water. We also use the Climax poison for the same insect.

4. Apple trees have very little blight so far, but pear trees have blighted very bad this season. Clapp's Favorite and Bartlett the most, and all other varietie more or less.

5. Apples—Ben Davis, Winesap, Missouri Pippin, Jonathan, Red Winter Pearmain, Willow Twig.

Pears—Bartlett, Flemish Beauty, L. B. of Jersey, Vicar, B. D. Anjou, B. D. Easter.

JOHN GRAVESTOCK.

Florence, November 3.

1. The condition of my orchard this year is better than that of any preceding season.

2. Each spring I always scrape away all scales of bark and wash the trees with concentrated lye, and always keep the tree as smooth as possible.

3. The only insect I find doing any damage in my orchard is the codlin moth. This usually climbs the tree to find a protected place in which to web up. I place a doubled bandage around the tree, in which they web up; then they can be killed in a short time by carefully removing the bandage and killing each one. In this manner I have reduced my wormy apples one-third in the past four years. These bandages must be removed and the worms destroyed at least every ten days. I find spraying out of the question on trees of the size of mine, and so close together.

4. There has been little blight in my orchard, and it was confined wholly to the Jonathan.

5. Apples—Ben Davis, Wine Sap, Jefferis, Striped Gilliflower, Missouri Pippin and Rawle's Janet are the most profitable I have.

JESSE FRAZER.

Rocky Ford, November 4.

1. Orchards generally in fine condition, and had a good crop of fruit for the age of the trees; quality was also good.

2. Best results from good cultivation. Low-growing crops, such as vines and tomatoes, and well watered, are a success. We find in this vicinity trees need plenty of water while fruiting.

3. Very few orchards troubled with insects. The codlin moth and red spider have been bad in my oldest orchard. I sprayed once with London purple and lime before blossoming, and once after the bloom had all fallen off. I think the spraying did much good; but they should have been sprayed once more.

4. No blight in this part of the county.

5. Apples—Ben Davis, Jonathan, Missouri Pippin, Rambo, Rawle's Janet, Wine Sap, Iowa Blush.

G. W. SWINK.

Catlin, November 5.

1. Orchards—Condition fair.
2. Good cultivation; judicious pruning.
3. Codlin moth—remedy, spraying.
4. We have no blight here.

5. Cooper's Early White, Jonathan, Wealthy, Rambo, Willow Twig, Ben Davis, York Imperial.

Pears, plums and prunes all do well; also gooseberries and cherries.

R. O. McCLAIN.

Rocky Ford, November 3.

1. Orchards very good.

3. The codlin moth is doing most of the damage. Spraying with London purple or Paris green, the remedy. One orchard that was entirely ruined last year, one spraying saved 25 per cent. this year. In the future expect to save 100 per cent.

4. Glad to say there is no blight in the county.

5. Ben Davis, Jonathan, Willow Twig, Wine Sap, Missouri Pippin, York Imperial, Huntsman's Favorite.

J. C. KAIN.

CENTRAL DISTRICT.

Elizabeth, Elbert County, November 1.

Fruit culture in our county has had but little attention. There has been considerable money paid out for trees, but the most of them were set in a hole about a foot square, and then left to rustle for themselves. Hardy varieties, where properly cultivated, had some fruit on in 1893; but last spring the buds were all killed as they were coming open. There are no orchards around here to speak of. Some of us have a few trees in our gardens. I have some Ben Davis and a few crabs, and others I don't know the name of, that stand the winters all right. Small fruit does well.

Leaf-roller is the worst pest here. We have done nothing in the way of spraying.

J. A. MAUDLIN.

Littleton, November 15.

1. Orchards thrifty; made large growth.

2. Plow once; cultivate often; water two to four times.

3. Leaf-roller did most damage.

4. Least Blight, Ben Davis, Wine Sap, Wealthy. All pears old enough to fruit blighted.

5. Apples—My trees are all too young to answer.

Plums—Lombard, Damson.

JOHN G. LILLY.

Villa Park, Jefferson County, November 8.

1. Orchards—Fair to good; but blight and cancer worm still present.

Varieties least affected by blight—Ben Davis, Walbridge, Red June, Red Astrachan, American Summer Pearmain, Porter.

For profit, same list.

V. DEVINNY.

Lakewood, Jefferson county, Nov. 11.

1. Orchards—Condition good.

3. Codlin moth—Spraying with London purple.

4. Blighted least—Ben Davis, Early Harvest, Red Astrachan, Winesap.

Blighted most—Wealthy, Fameuse.

5. Apples—Ben Davis, Winesap, Duchess, Wealthy, Fameuse and Early Harvest.

The poorest apple in my orchard is the Walbridge. I hope to find a good apple that will be in season between September 15 and December 15.

R. V. PICKETT.

Golden, November 3.

1. Orchards—Conditions of old orchards generally bad, owing to neglect of the owners to properly care for them. Young orchards much better.

2. Treatment affording best results for young orchards would be to cultivate in hoed crops for about ten years after planting, fertilizing the ground well so as to produce a good annual growth of new wood, fighting all insect enemies as they appear, using good judgment in the use of water and the results will be satisfactory. After trees are too large to be treated with plow and cultivator, would recommend to sow to white clover. This will give the orchard a neat appearance, will keep down weeds and save labor, serving as a mulch in summer and winter. The slight sod formed will not injure the trees, and no mowing is required. Irrigating should now be done by flooding.

3. The codlin moth does more to destroy the commercial value of the apple crop than all other insects combined at the present time in Colorado.

4. Apples least injured by blight—Red Astrachan, Winesap, Walbridge, Bellflower, Jonathan, Rawle's Janet. Those most in order named: Alexander, Pewaukee, Missouri Pippin, Fameuse, English Golden Russett, Duchess, Wealthy and Ben Davis to some extent.

5. Apples for profit—Duchess, Wealthy, Red Astrachan, Ben Davis, Jonathan, Winesap.

Cherries—English Morello has been very profitable with me.

ELWOOD EASLEY.

NORTHERN DISTRICT.

Eaton, November 1.

Think the condition of my fruit trees is better than a year ago, as have had less blight, but more insects to contend with than ever before. Treated them with a solution of London purple and Paris green, but found Paris green much the best. Leaf roller did the most damage. Think Paris green the best remedy.

Least injured by blight—Martha Crab, Ben Davis, the only two varieties that were profitable this year. The Excelsior is an excellent apple, has fruited for five years, but blights some. Yellow Transparent, fairly well but blights. The Duchess the same. Think trees will eventually die.

Find plums the most profitable fruit in this section. They all do well and bear fully. Have De Soto, Forest Garden, Wolf and Miner. They all bear about all the trees can hold up. Have only about two and a half acres in fruit.

A. J. EATON.

Boulder, November 3.

1. Orchards—Condition good. Trees set out four years.

2. Sprayed in full bloom, again after bloom had fallen. One pound of London purple to sixty gallons water.

3. None, except grasshoppers.

4. One variety blighted, name unknown.

5. Trees too young to name best varieties. Have 700 trees. My plan is continual cultivation, limited irrigation.

N. GLAZE.

Boulder, November 8.

1. The condition of the orchards is good.

2. Could not answer.

3. Codlin moth and woolly aphis. Spraying with London purple and kerosene emulsion

4. Least injured—Ben Davis, Walbridge, Red June, Salome, Red Astrachan, Winesap, Yellow Transparent.

Most injured—Pewaukee (worthless), Tetofsky, Talman's Sweet, Northern Spy.

5. Apples—Yellow Transparent, Wealthy, Red June, Ben Davis, Walbridge, Winesap.

Strawberries—Manchester, Jucunda, Captain Jack, Edward's Favorite.

Raspberries—Marlboro, Cuthbert, Gregg, Tyler.

Blackberries—Erie, Wilson, jr., Ancient Briton.

Dewberries—Lucretia, very hardy and free from disease. The Kittatinny blackberry is worthless on account of rust. Ancient Briton made a poor growth this year; supposed to be on account of a grub working at the root.

Grapes—Concord, Worden.

G. M. ANDERSON.

Loveland, November 12.

Apples for commercial use: Summer—Duchess, Yellow Transparent, Sops of Wine, Dyer. Fall—Utter's Red, Grimes' Golden, Hagloe, Plumb's Cider. Winter—Ben Davis, Sheriff, Walbridge, Gano.

I know these are all reliable and the man that plants these varieties makes no mistake.

W. B. OSBORN.

Loveland, November 20.

1. Orchard in fair condition.

2. Best treatment—Very little pruning for three or four years after setting, with clean cultivation, allowing tree to branch close to ground and as orchard becomes older cut off lower limbs. Irrigate so as to keep the ground quite moist the year round.

3. Codlin moth, leaf-roller, woolly aphis—For the two first, spraying with one-quarter pound Paris green to forty-four gallons water.

4. Least blight on Walbridge, Wine Sap, Grimes' Golden, Red Romanite, Red Astrachan.

Twig blight—Duchesse, Rawle's Janet, Ben Davis, Wealthy.

Trunk blight (sure death)—Pewaukee, Alexander, Dominie, Willow Twig, Fameuse, Transcendent Crab, Hyslop.

5. Apples—Walbridge, Ben Davis, Grimes' Golden, Wine Sap, Rawle's Janet, Duchess.

Raspberry—Gregg.

Blackberry—Snyder.

Currants—Fay's.

Gooseberries—Smith's Improved.

Hops—English Cluster.

ALFRED WILD.

Barr, Arapahoe County, November 10.

Orchard—Condition good. Trees all young. No insects or blight. Have planted Ben Davis and Wealthy.

JOHN MURRAY.

Yuma, November 5.

My orchard is bad for the lack of rain. There has been only 7.18 of rain the past ten months. I cultivated good and mulched with manure and have not lost any, but they have made no growth.

The plum curculio commenced in my cherries and plums. I sprayed with London purple as soon as the bloom began to fall and again in about ten days, which put a stop to all insects and as dry as it was, I had several plums and cherries, and the trees were only three years old. I never saw trees more full of fruit, but the dry weather made them fall off. I saw no sign of blight.

Have had no apples, but the best varieties of cherries are Early Richmond, English Morello, May Duke, Montmorency.

The Miner plum I consider the best. The Pottawattamie and De Soto all dried up and fell off, while the wild plum trees were loaded with ripe fruit.

Grapes and gooseberries nearly all died.

My orchard is on black sandy loam and I think if there was some way of getting water to irrigate with, this would be as fine a fruit section as there is in the eastern part of the state.

AMOS BINFORD.

Reports of County Inspectors.

LARIMER COUNTY.

O. D. SHIELDS, Inspector.

Loveland, Colo., November 11, 1894.

Number of orchards inspected	249	
Apple trees, bearing age	20,578	
Apple trees, not bearing age	14,657	
Total		35,235
Plum trees in bearing	3,000	
Plum trees not in bearing	4,000	
Total		7,000
Cherries in bearing	400	
Cherries not in bearing	687	
Total		1,087
Pear trees in bearing	50	
Pear trees not in bearing	187	
Total		237

Approximate yield of apples in 1894, 40,000 bushels.

Approximate yield of plums in 1894, 1,000 bushels.

First choice for prolific bearing was Ben Davis. Mr. Plummer claims the Sheriff or Ox Eye to be equally productive and much finer flavor; readily brings two cents per pound more in market than Ben Davis. Mr. Perry Besworth, who has the same variety, corroborates Mr. Plummer's statement. It is somewhat similar to the Sheep Nose of Ohio and Pennsylvania, and is an oblong, red winter apple, keeping till March. Mr. Plummer, who has had a large experience as an orchardist, would plant, were he putting out an orchard of 100 trees, the following:

Fifty Sheriff, thirty Ben Davis, ten Red June, ten Duchess.

It was my aim to find out as near as possible, those varieties which were productive annual bearers, that the planter of to-day may profit by the experience of the past. Fully half of the trees that are now of bearing age are not sufficiently productive to justify us in giving them ground room, but these can readily be changed by top-grafting, and in three years made to bear choice sorts.

Orchardists were asked the following questions:

What are the best trees for planting for profit?

The vote standing as follows:

Summer—Duchess, Yellow Transparent, Red June, Early Harvest.

Fall—Utter's Red, Haas, Fameuse, Plumb's Cider.

Winter—Ben Davis, Walbridge, Perry Russett, Rawle's Janet, Jonathan, Wine Sap.

Others that have done well were Red Astrachan, Sops of Wine, Rambo, Pewaukee and others which have not been generally tried. A few valuable seedling apples were also found which will be spoken of at some future time.

The following table, furnished by Mr. James Ackerman, gives the ripening season of some of the leading varieties of apples:

Tetofsky, July 20; Red Astrachan, July 28; Duchess, August 1; Sops of Wine, August 7; Fall Stripe, August 15; Plumb's Cider, September 25; Utter's Red, October 1; Walbridge, October 10; Ben Davis, October 18.

I would place the following six apples at the head of the list for general planting:

Winter—Ben Davis, Walbridge, Sheriff.

Fall—Utter's Red, Plumb's Cider.

Summer—Duchess.

There are many others, such as Early Harvest, Yellow Transparent, etc., that are very desirable. In crab apples would use Martha, Shields and Minnesota. The Transcendent and Whitney should never be planted, owing to their tendency to blight.

Apple trees most free from blight—Ben Davis, Sheriff, Red Astrachan, Utter's Red, Walbridge, Plumb's Cider, Haas.

Most subject to blight—Alexander, Fameuse, Pewaukee, Tetofsky, Transcendent and Whitney crabs.

One of the most essential things to the success of an orchard is a good wind break on the north and west. I noticed in the absence of them the trees on the first two or three rows had little or no fruit, while with protection all were fruiting alike. Plant low-branched trees; the nearer the ground the better. If your trees have long trunks, protect them with boards, paper or something, as many trees which are called blighted are really only sun-scalded. Some of the tree-washes are excellent for preventing sun-scald. Those containing lime and grease are good.

The American type of plums all seem to be adapted to Northern Colorado, and the best are the Wolf, Weaver, Hawkeye, De Soto and Forest Garden. The European plums have not done so well; they are much slower coming into bearing. The Pond Seedling, Spaulding and Moore's Arctic are a

few exceptions; wherever found, these were highly spoken of as heavy bearers of fine, large fruit.

Very few pears are now alive, as the blight played sad havoc among them. For the past two years, however, they have done well, and some choice pears were raised the past season. Keiffer and Flemish Beauty seem to do nicely, and I found many dwarf pears fruiting very well.

The Morello type of cherries do very well here, the preference being for Early Richmond and English Morello, with Wragg, Ostheim and the common Morello doing fine.

Mr. David Lykins and a few others have been raising peaches in the foot hills. I have found the Elberta, Crosby, Bokara, Early Rivers and a few other varieties which seem to stand the winter without killing.

Condition of Orchards—About one-third were in a badly neglected condition, with more or less blight, as many people became very much discouraged, and had concluded to let them go. I succeeded in persuading most of them to clean up and spray, and those that failed to do so have had ample opportunity to see their mistake, as orchards thoroughly sprayed are almost entirely free from worms; those not, in most cases, are badly affected. The best remedy for blight is to keep all diseased branches cut off and burned. In a few orchards I found the woolly aphis. The best remedy I have found is kerosene emulsion, or a strong solution of tobacco.

Codlin Moth—Where spraying was effectually done, very few wormy apples were found. The best remedy was Paris green—1 pound to 200 gallons of water; better than London purple, as it is not so hard on the foliage.

Leaf-Roller—Spray as for codlin moth, and while still wet sprinkle air-slaked lime over the trees. I found this very effective.

Phytopsis—I found in a few plum orchards an exceedingly small insect which was doing much damage. Specimens taken to Professor Gillett of the State Agricultural College were pronounced phytopsis. The insect, or rather mite, makes little red protuberances or galls on the upper side of the leaves, which are hollow, with a small opening on the underside of the leaf, within each gall are hundreds of the mites. The only known remedy is to burn all affected branches.

In many places ants have become very troublesome. You can get rid of them by making a hole twelve to eighteen inches deep in their nests and pouring in a teaspoonful of bisulphide of carbon, filling up the hole at once.

Currant Stem Borer—Before spring take out all dead and unhealthy wood and burn it.

Tree Borers—Wash the trunks of the trees with strong soap suds in which you use half a pint of carbolic acid to ten gallons of wash.

Orchardists are very much encouraged with the outlook, as in no country can they raise finer apples nor heavier crops than here, and I predict that when the financial cloud, which has hovered over the country for the past two years, shall have rolled away, we will plant heavily and become one of the leading apple sections of the United States. Our apples will, on account of their long keeping qualities, find a ready sale across the briny deep.

BOULDER COUNTY.

W. L. SCOTT, Inspector.

Boulder, November 14.

In April and May last I went through this county and examined 332 orchards. In some localities I find the trees much injured by blight, and some orchards about ruined for want of care. I gave

each one a copy of the Regulations and urged them to follow directions. Generally they have done so and there is a great improvement in the health of the trees. There is but little new blight; some little twig blight on some varieties. The condition of orchards at present is generally good. By spraying for the codlin moth the apples are very free from worms. I must say I don't think we spray often enough. If I live until next year I will spray five to seven times, according to the season of the fruit.

I have taken no account of pears and other fruits. The pear trees that are of bearing age are about all dead, many of the young trees are blighted and are no good; looks like they are a failure. Cherries bear well, some of them dying every year. A great many plums are grown and fruit heavily; not many can tell the variety they have.

I have classed the apple tree in three classes about as I find them in the orchards.

Trees of all ages and conditions	54,932
Trees in bearing	21,273
Trees not in bearing	33,659
Classed as good	14,749
Classed as fair	22,975
Classed as bad	17,228

JEFFERSON COUNTY.

ELWOOD EASLEY, Inspector.

Golden, November 12.

In making my report at this time it must be brief, as I have spent but four days as inspector, being appointed late in the season. The press of other business prevented devoting more time to it. The orchards that came under my observation in 1894, old orchards especially, were generally in bad condition, mainly from neglect of the owners to properly care for them. Many of these might be re-

claimed, by thorough pruning, manuring and cultivating, thereby doing good service again to their owners. Young orchards were in better condition, but nearly all were affected more or less with blight, I found more or less of the codlin moth, leaf roller, woolly aphis, tree cricket and apple scab.

I did not attempt to arrive at the number of acres of fruit trees or the number in bearing, but presume I will make a fuller report in detail hereafter.

I would recommend to every fruit grower in the state the importance of keeping everything about their orchards scrupulously clean so there will be no hiding place for insects. The fall and winter is the time to attend to that and have them in prime condition for the following year.

The codlin moth does more to destroy the commercial value of the apple crop than all others combined at the present time in Colorado, therefore we should make it a special object to combat him at every point. Many persons, especially new beginners, do not know the nature and habits of this little pest. The principle object of this paper is to treat on his life covering the period of one year. In the spring the moth comes forth from its hiding place and deposits eggs in the blossom end of the apples when in bloom. The eggs require from six to ten days to hatch. This is about the time the bloom is off. Then our first work begins by spraying with Paris green or London purple, twice or three times, a week between sprayings. This is our first attempt to destroy the codlin moth, but there is nearly sure to be some left which begin to leave the apple from the 10th to 15th of June, and become moths early in July, and ready to deposit eggs for the second brood of worms. These are the most difficult to contend with. I am not sure that spraying at this time would be of much benefit, though many apples are rendered worthless by this second brood. The worm exists in the larva state about four

weeks and in the pupa state twelve to eighteen days in the early part of the season. But the second brood of worms, the progeny of the moths which hatch out after the 10th of July, invariably pass the winter in the worm or larva state, within the apple after it is picked, or within the cocoon which it spins. If the orchard is kept neat and clean, leaving no hiding places except the trap you set yourself they are easily caught with simple contrivances. They are not cunning like a rat or fox, but will take to the most simple retreat in which to hide and spin their cocoon, and there remain for the winter. The simplest remedy is to take burlaps, cut them into strips, roll them up into three or four thicknesses, two or three inches wide and pass them around the tree between the ground and lower limbs, fasten the end with a large tack enough to hold it. This is the trap and all you want. Put these on by the 1st of May and keep on all summer. After the 15th of June take off once a week, kill all worms and replace bands again. This is the best plan of getting away with the moth if well attended to.

Fall and winter is the best time to thoroughly put the orchard in good condition for another season. There are thousands of worms now under the old rough bark of nearly every old orchard that should be attended to at once and it will pay an hundred fold on next year's crop. The moth does no injury to the tree, but will wholly destroy the fruit if let alone.

ARAPAHOE COUNTY.

ELISHA MILLESON, Inspector.

Denver, November 12.

I commenced work the last days of March, as per instructions from the state and county boards. I found the orchards and small fruit gardens in and near Denver in a very bad condition. Many currant

and gooseberry patches entirely worthless from the ravages of the currant borer and gooseberry worm. The apple trees in many places almost entirely worthless from twig blight. Plums much damaged by plum gouger. Pear trees nearly all destroyed by blight. Cherries in a little better condition, but in the latter part of the season were attacked by a slug, damaging the foliage very much, but did not seem to affect the fruit. Peach trees seem to promise something in the future in a few localities. Apricots and nectarines—A few trees look well, but more are worthless. The fruit tree leaf-roller has been bad, and the woolly aphis to some extent. Of apples, I find the Pewaukee is damaged by blight more than any other variety.

While spraying has not been an entire success, yet great good has resulted in reducing the ravages of the many fruit pests where the remedies were applied two or three times, early in the season. The quality of the fruit was far above that in orchards of the same age where no remedy was used.

I find it impossible to give any correct estimate as to number of fruit trees, as few orchardists have any correct account.

I inspected about one hundred and fifty large and small orchards, numbering about as follows:

Apples	50,000
Plums, native and foreign	7,000
Pears	2,000
Peaches	600
Cherries	2,000

Strawberries, where properly cared for, were a good crop.

A few orchards south of Denver yielded fine crops of apples, plums and cherries. Many orchards that bloomed well had fruit killed by late frosts, both on high and low land. Some, however, had heavy crops.

The plum crop was unusually heavy, and of fine quality; the same of cherries. Grapes were a light crop.

I spent a reasonable amount of time among the fruit dealers in Denver, but found nothing of consequence that needed attention. Distributed among growers over 500 copies of Regulations of the State Board.

FREMONT COUNTY.

W. A. HELM, Inspector.

Canon City, November 12.

Condition of orchards past year very good.

Insects doing most damage are codlin moth, woolly aphis, apple tree root aphis, red spider, clover mite.

Kerosene emulsion I think the best remedy, except for codlin moth, for which we use Paris green, made as strong as the leaves will bear. Bandages on the trees for catching the worms I think one of the best remedies if properly attended to. Examine and kill every eight or ten days. Should be put on about June 1.

I find those that have hogs, chickens and turkeys in their orchards are the freest of worms.

For apple tree root aphis, hot water, kerosene, lye and lime are all good. Also good for apple tree borer, which we have. The wire probe and knife should also be used for the borer. I find we are bothered some with the leaf-roller and caterpillers; use kerosene emulsion. (Whale oil soap should be used freely with kerosene emulsion.) For all fungous or sporadic diseases, the Bordeaux mixture is best. For blight, cut out and burn.

I find the pear blight making its appearance in some orchards, but in no particular localities or soils.

It is yet only confined to pears. I noticed it first last year. The most injured as yet are Clapp's Favorite (which is no good and should be all cut out), Souvenir De Congress, Bartlett, Osband's Summer (also no good); all others very little if any, so far. Can tell better another year. Am afraid of it.

Best apples for profit—Jonathan, Wine Sap, Ben Davis, Rambo, Missouri Pippin, Wealthy, Yellow Transparent. Several others also good.

Pears—Bartlett, Sheldon, Beurre De Anjou, Mt. Vernon, Tyson, Flemish Beauty.

As near as I can estimate, the

Acreage in fruit trees, bearing.....1,000

Acreage in fruit trees not bearing....1,000

I am doing all I can as inspector for the money there is in it. I can't attend to it as it should be, and they should pay more money.

OTERO COUNTY.

J. C. KAIN, Inspector.

Rocky Ford, November 5.

It is no more an experiment now whether we can raise fruit in Otero county and the Arkansas valley. The pounds, boxes and bushels that have been gathered speak volumes for the success of horticulture. But the question is: Can we and will we protect the trees from the ravages of the destructive insects? As yet there are but few to contend with, but as the orchards grow older (if we take the experience of older states) they will show us that they multiply, and that, very rapidly. Hence, we will have to be on guard, watch every box and empty case that is brought in at our shipping points, as these have been the mediums that have already introduced what we have. And now that old adage comes in very truthfully "a stitch in time saves nine."

To be a little careless in this would be to lose the best paying interest in our county. A good, thrifty apple tree, at the age of nine or ten wears, will bear two barrels of apples. Those of good quality will sell for $4.50 per barrel, making $9 per tree and ninety-two trees per acre would make a gross of $828, and much easier cared for than a crop of wheat, an everage crop of which does not exceed twenty-five bushels per acre which at 45 cents per bushel will make $11.25 or but little over the product of one tree. On the other hand, if we let the worms and insects destroy the fruit, we might as well sow wheat and let other places reap the reward of our negligence.

We will first speak of the codlin moth, the one that is most felt in our midst at present. It is not a native of America, being imported from Europe about one hundred years ago. As a large number of worms of the fall brood do not leave the apples until they are stored in cellar or barrels, this insect is unavoidably introduced wherever apples are shipped. The mature insect is, as the popular name implies, a moth, or, as such insects are often called, a miller.

Its description is: About two-thirds of the basal portion of the antena wing above is ashen gray crossed by numerous broken lines of brown. Near the outer margin of the wing there is a large brown area occupying nearly one-third of the wing surface, within which are numerous gold or bronze colored scales and also a few scales that are entirely black. The posterior wing is of a dingy brown color, being lighter near the body. The larva or worm is too well known to need a description. All who have eaten apples have seen the apple worm.

The exact time at which the moth begins to lay its eggs varies greatly owing to the late or early spring, but it is safe to say that egg laying does not take place to any considerable extent until the flowers have fallen from the late variety of apple trees. The eggs are deposited in the blossom or calyx end of the apple, and it has been estimated that each

moth deposits at least fifty eggs. Within a few days after the deposition of the eggs, the time dependent upon the temperature, the larva hatches. It feeds for a while within the calyx and then begins to burrow towards the core of the fruit, within and about which it feeds until fully grown, when it gnaws an opening, usually at the side of the apple, when it escapes and goes in search of a suitable place to spin its cocoon and transfer to the pupa or chrysalis state. About two weeks later (about the first of July here) the moth of the second brood begin to appear, which soon begin to lay eggs for the second brood of the worms. This brood does much more harm than the first, unless the first has been mostly destroyed, in which case there are comparatively few moths to lay eggs for the second brood.

Now for remedies to destroy them: There are some natural enemies of the larva such as insectiverous birds and a few species of insect parasites. But let us not wait and depend upon them to do our work. Now is a good time to begin or as soon as the leaves are off. Wash the body and large limbs of the trees with one box of concentrated lye to three gallons of water. That will destroy all that are secreted in crevices and under scales of bark, so we will have that many less to contend with next spring. Then as soon as the apples are formed begin to spray, using one pound of London purple or Paris green to 150 gallons of water. Then from the 15th to the 25th of June, spray with 200 gallons of water to one pound of London purple, which will give you at least 75 per cent. of nice clean apples instead of having 75 per cent wormy. There are some here now in that shape detrimental to all of us. If we once clean up the orchards it will then be a small matter to keep them clean and our reputation will be as good for fruit as it is for melons.

In our inspection we have only found four orchards that are infested with the codlin moth, and we will be glad never to have to write of them again,

as this is far the worst enemy we have to deal with now. There are a few borers and they have only begun in sun-scalded and burned up trees. Two washings of lime and sulphur will do them up in one season. My inspection was too late to find the effects of the curculio, but we know there are some as they affected our trees some, but the trees being so heavily laden, those that were stung and fell off were not missed. We sprayed once but that was just half enough. We will try and do better next spring.

Red spiders have done a little damage but we think they can be easily destroyed by using a coarse spray nozzle and throwing water with great force against them. There are many other insects that have not come to our midst and we hope never will.

MESA COUNTY.

H. C. LONG, Inspector.

Grand Junction, Colo., Nov. 14, 1894.

Very little has developed during 1894 that is unusual except a small orchard at Fruita was very badly infested with San Jose scale. About 100 trees were covered with them and red spider and brown mite were abundant on the same trees. They were very easily handled and were entirely destroyed with one application of the soda-potash-sulphur mixture. The scale is not to be feared so much as many much more common insects.

The codlin moth will cause more damage in one season than scale can do in three. The moth is quite common in Mesa county, but most orchardists are using sprayers and will keep them down to some extent. It is brought in from Utah in fall and winter apples in boxes, etc., which are filled with groceries and hauled home by the farmers regardless of the numerous cocoons they contain.

Borers do but little damage except in stock that is shipped in from Eastern nurseries in states which have no inspection laws. Our planters use a sulphur-lard-carbolic acid wash that keeps away all borers after planting. Plant lice did some little damage in the spring because people failed to spray before the leaves curled over the lice.

We are cramped very much because only $200 is allowed the inspector. This is nonsense and should be left open to the county commissioners.

We handle successfully whatever has appeared on our 5,000 acres of orchard now planted. We will plant 3,000 acres in 1895.

DELTA COUNTY.

W. J. SAWYER, Inspector.

Hotchkiss, November 12.

I hereby hand you a brief report from Delta county, Colorado.

The number of acres in fruits, about 3,500.

The number of acres in bearing, about 400.

The crop has increased rapidly, no failures having been experienced since the first trees were set in the county.

During the past two years the interest in fruit culture has increased greatly. Old orchards, such as are owned by S. Wade, W. S. Coburn, D. Stephens of Paonia, and G. B. McGranahan, of Delta, have proven exceedingly profitable.

Nearly all of the orchards which I visited are in good shape, and some are as well kept as any I ever saw, that of Wesley Ault, on the North Fork, being a model of neatness and thorough culture.

Very few injurious insects have been found—the codlin moth appeared in two orchards in the Uncompahgre valley, and two other places in the county,

but in small numbers. A few apple trees were found infested by woolly aphis. Prompt measures were taken against both these pests.

During the planting season of 1894 I examined over 100,000 trees imported from a dozen different states. Many apple trees were badly infested with woolly aphis; one shipment of peach trees showed many black aphis, the most dangerous enemy of the peach tree grower, except the yellows.

One thing much to be dreaded is the root knot, and angualula. While I saw comparatively few trees affected by either of these diseases, the peculiar nature of these diseases, or of the latter, renders all stock which shows any signs of it, suspicious, as it has been demonstrated that the poison is in the sap, and buds taken from an infected tree and inserted in free stock, will convey the disease to the latter. I have seen tens of thousands of trees dug from nurseries in Texas and destroyed, as they were worthless through the effects of these diseases.

I found no stock grown in Western Colorado or Utah affected by disease or insect, hence I advise all planters to secure home grown stock, as a means of keeping out pests and diseases.

The horticultural interests of Delta county and some other counties are so great that the sum appropriated for inspection is wholly inadequate to enable the work to be done thoroughly. I think it would be economy to expend $1,000 per year to have inspection so thorough that diseases may be stamped out and pests destroyed as soon as they appear. It seems also advisable that the law be so modified as to give the inspector greater powers. Having resigned the position of inspector of Delta county, my interests are with the fruit growers for the most thorough inspection that the state will permit us.

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