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**MASSACHUSETTS
AGRICULTURAL
COLLEGE**

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MASSACHUSETTS

Fruit Preserving Company.

ACT OF INCORPORATION GRANTED, 1866.

BOSTON:

HENRY W. DUTTON & SON, PRINTERS,

90 AND 92 WASHINGTON STREET.

1866.

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Massachusetts Fruit Preserving Company.

OFFICERS OF THE COMPANY.

GEORGE B. LORING, - - - - - *President.*
CHARLES M. HOVEY, - - - - - *Vice President.*
DANIEL NEEDHAM, - - - - - *Clerk.*
JESSE A. LOCKE, - - - - - *Treasurer.*

Directors :

GEORGE B. LORING, GEORGE L. STEARNS,
C. M. HOVEY, EMMONS RAYMOND,
DANIEL NEEDHAM, E. S. CONVERSE,
EDMUND BURKE, GEORGE B. WILBUR,
 J. WARREN MERRILL.

Building Committee :

GEORGE L. STEARNS, CHARLES M. HOVEY,
 EMMONS RAYMOND.

Finance Committee :

J. WARREN MERRILL, GEORGE L. STEARNS,
 E. S. CONVERSE.

Commonwealth of Massachusetts.

IN THE YEAR ONE THOUSAND EIGHT HUNDRED AND SIXTY-SIX.

An Act to incorporate the Massachusetts Fruit Preserving Company.

Be it enacted by the Senate and House of Representatives, in General Court assembled, and by the authority of the same, as follows:

SECTION 1. Charles M. Hovey, Daniel Needham, Christopher W. Bellows, their associates and successors, are hereby made a corporation by the name of the Massachusetts Fruit Preserving Company, for the purpose of carrying on the business of preserving fruits, foreign and domestic, in the city of Boston; with all the powers and privileges, and subject to all the duties, liabilities and restrictions, set forth in all general laws which now are or hereafter may be in force relative to such corporations.

SECTION 2. The capital stock of said corporation shall not exceed two hundred thousand dollars, which shall be divided into shares of one hundred dollars each; and said corporation may hold, for the purposes aforesaid, real estate to an amount not exceeding fifty thousand dollars, and shall not commence business until one hundred thousand dollars of its capital stock shall have been paid in.

SECTION 3. This act shall take effect upon its passage.

HOUSE OF REPRESENTATIVES, April 19, 1866.

Passed to be enacted.

JAMES M. STONE, *Speaker.*

IN SENATE, April 21, 1866.

Passed to be enacted.

JOSEPH A. POND, *President.*

April 23d, 1866.

Approved.

ALEX. H. BULLOCK.

SECRETARY'S DEPARTMENT, BOSTON, May 23d, 1866.

A true copy.

OLIVER WARNER, *Secretary of the Commonwealth.*

BY - L A W S .

ARTICLE 1. The annual meeting of the MASSACHUSETTS FRUIT PRESERVING COMPANY shall be held on the first Monday in May, in the city of Boston, at such hour and place as the Directors shall determine; notice of which shall be given by a written or printed notice, sent by mail to each stockholder, at least seven days prior to said meeting. Special meetings may be called by the President, and notice shall be given as provided for the annual meeting. At every such special meeting at least one fifth of the stock of said Company shall be represented. Each share of stock shall be entitled to one vote, subject to Chapter 60, Section 7, of the General Statutes.

ARTICLE 2. The officers of this Company shall be a President, Vice President, Treasurer, Clerk, and nine Directors.

ARTICLE 3. The President shall preside at all meetings of the Company, and in his absence the Vice President, and in the absence of both, the Director whose name appears first on the list of Directors as they were elected at the annual meeting.

ARTICLE 4. The Treasurer shall have custody of all moneys, notes and accounts, and shall pay out moneys only on the approval of an Auditing Committee, chosen by the Directors; and shall give bonds with securities satisfactory to a majority of the Board of Directors; and shall also record all transfers in a book kept for that purpose.

ARTICLE 5. The Clerk shall keep a record of all meetings, shall be sworn to the faithful discharge of his duties, and shall issue notice of all meetings to the stockholders.

ARTICLE 6. The Directors shall have the whole management of the affairs of the Company, and shall hold meetings at such time and place as they shall agree; all such meetings shall be called by the

Clerk, at least two days previous thereto, by notice sent by mail, or delivered otherwise, to each member of the Board. The Directors may appoint Agents, and fix compensation of officers. A majority of Directors shall constitute a quorum at any meeting of the Board.

ARTICLE 7. The seal of the corporation shall be a cluster of grapes, with the words encircling the same—Massachusetts Fruit Preserving Company.

ARTICLE 8. Each stockholder shall be entitled to a certificate of stock, certifying the number of shares held by him or her, and said certificate shall be as follows :

MASSACHUSETTS FRUIT PRESERVING COMPANY.

ORGANIZED UNDER A SPECIAL CHARTER FROM THE LEGISLATURE OF MASSACHUSETTS.

No. _____ Capital _____ Shares.

THIS CERTIFIES, That of is the holder of shares in the Capital Stock of the Massachusetts Fruit Preserving Company, numbered , subject to the By-Laws of the Company, and transferable by assignment and record on the books of the Company, on surrender of this certificate.

IN WITNESS WHEREOF, the President and Treasurer have affixed their signatures hereto, this day of 18

. PRESIDENT.
[Seal.]
. TREASURER.

Upon the back of which shall be the following assignment :—

FOR VALUE RECEIVED . . . hereby sell and transfer to of Shares of the Capital Stock of the Massachusetts Fruit Preserving Company.

DATED the day of A. D. 18

ARTICLE 9. These by-laws may be amended at any meeting called for that purpose.

Massachusetts Fruit Preserving Company.

THE FRUIT HOUSE.

WHAT IT WILL DO.

It will preserve autumn grapes and pears until mid-winter and spring and into the following summer; thus giving an opportunity to buy fruit at a low price in their season, when they are plenty in the market, and keep them in a perfectly fresh and unimpaired condition until the season has passed by, when they can be offered in the market and realize a profit of two hundred per centum.

The autumn domestic fruits, such as grapes, pears, and other valuable fruits can be stored in September and October, and in December and the following months they can be thrown upon the market in such quantities as the demand will justify.

Bartlett pears can be preserved in the most perfect condition until mid-winter and later; their color being improved and their flavor not in the least injured.

In the early spring, as the domestic fruits are removed from the fruit-house, the rooms can be filled with the foreign fruits, such as lemons and oranges, which, during the last of February and the month of March, can be bought at low prices. These fruits can be preserved without perceptible shrinkage or loss until mid-summer, when they can be sold to realize two or three times their original cost.

Eggs, also, can be kept nine and twelve months in a perfectly fresh condition. Purchased in May and June, when they are cheap, they can be kept until December, when they will yield a profit of at least one hundred per centum.

WHAT THE FRUIT-HOUSES HAVE DONE IN THE WEST.

At Cleveland, Ohio, where a house has been in full operation some years, this last winter large quantities of grapes, amounting to several tons, have been perfectly preserved, and hundreds of pounds yet remain unsold. The policy of the owners of the house being to put them upon the market in a manner to realize the largest profit. These grapes were purchased at two hundred dollars per ton, and now sell readily for from six to seven hundred dollars per ton.

Dr. Geo. B. Loring and Hon. Edmund Burke, who were on a committee to visit this house at Cleveland, and whose report is published herein, brought back to Boston with them ten or twelve pounds of these grapes, which, on their arrival here and for two weeks after taking from the fruit-house, were in the most perfect condition. These grapes were exhibited to dealers and fruit raisers in Boston and vicinity, who pronounced them perfect in condition and flavor.

CONSTRUCTION OF THE HOUSE.

These houses are divided into several rooms, or compartments, and being air tight and impervious to heat or cold, the moisture of the atmosphere is absorbed by chemical process. The oxygen, which is the decomposing element of the atmosphere, is destroyed, and the fruit surrounded by carbonic acid, kept at the even temperature of thirty-four degrees.

We call especial attention to the reports of the Committees who visited Buffalo, Cleveland, Covington and Newport, Kentucky, and Pittsburg, Pennsylvania, for the purpose of examining the fruit houses established in these cities.

EXTRACTS FROM REPORT OF COL. DANIEL NEEDHAM, SECRETARY OF THE NEW ENGLAND AGRICULTURAL SOCIETY.

“The Messrs. Caldwell Brothers of Newport, Kentucky, own three houses, one at Newport, and another at Covington, Kentucky, and one at Detroit, Michigan. The house at Newport has been in operation two years. It is now filled with apples. This house was built at a cost of about eleven thousand dollars, and last year yielded a profit of seventeen thousand dollars on its apples alone. The apples in the West are as difficult to preserve as any other fruit, and the house which will keep apples well will keep any variety of fruit. The cost of the ice for cooling the temperature of the rooms, and the chemicals for absorbing

the moisture and destroying the oxygen, are not expensive items—the amount being stated at about six hundred dollars per year for a house of ten thousand bushels capacity. It requires very little skill to manage the house. The thermometer hanging in a window of each room, and seen from the hall without opening the door to the room, indicates the temperature, whilst a hydrometer similarly placed assures you that the desired dryness is secured. A single room has a capacity of six or eight hundred bushels. The house at Pittsburg is divided into twelve rooms, and two or three weeks may be occupied in removing the fruit without especial detriment to the fruit itself.

Mr. Caldwell informed me that a lady at Detroit requested the privilege of placing a half bushel of Bartlett pears in the fruit-house, to be kept until Christmas. The liberty was granted, and at Christmas they were taken out perfectly sound and fresh, improved in color, and the flavor as rich as though just ripened from the trees. The temperature in all the rooms I visited was at 34°, and all persons interested in the houses, or who had visited them and taken an interest in the fruit preserving process, with whom I conversed, had perfect confidence in its success. Among these people not especially interested in the houses, were Hon. Wm. Stoms and Hon. Geo. Graham, President and Ex-President of the Horticultural Society of Ohio, both of whom shew me great attention and aided me materially in my investigations.”

EXTRACT FROM REPORT OF DR. GEO. B. LORING, PRESIDENT OF
THE NEW ENGLAND AGRICULTURAL SOCIETY, AND HON. EDMUND
BURKE, FORMERLY COMMISSIONER OF PATENTS.

“From the Buffalo house we proceeded to Cleveland and examined the fruit-house and its contents in that city. There we found a variety of fruits in an excellent state of preservation, such as grapes, apples and lemons. The grapes were apparently as fresh as when taken from the vines, retaining all their juiciness and bloom. And in our judgment the flavor was improved by the process of preserving them.

We brought with us, to this city, specimens of the grapes and apples which we found in the house at Cleveland. They are in a fresh and perfect condition, and abundantly demonstrate the efficiency of the process by which they have been preserved.

It is proper to remark that the Cleveland house is one of the first constructed according to the principles of Prof. Nyce’s patents, and is not as perfect and thorough as the houses of more recent construction.”

Hon. Edmund Burke, at the request of several gentlemen, examined the Letters Patent of Prof. Nyce, and gave a written opinion, which was to the effect that they covered the entire ground claimed by Prof. Nyce, and that they perfectly secured the process of preserving fruits under the patents, to the parties to whom the same might be conveyed.

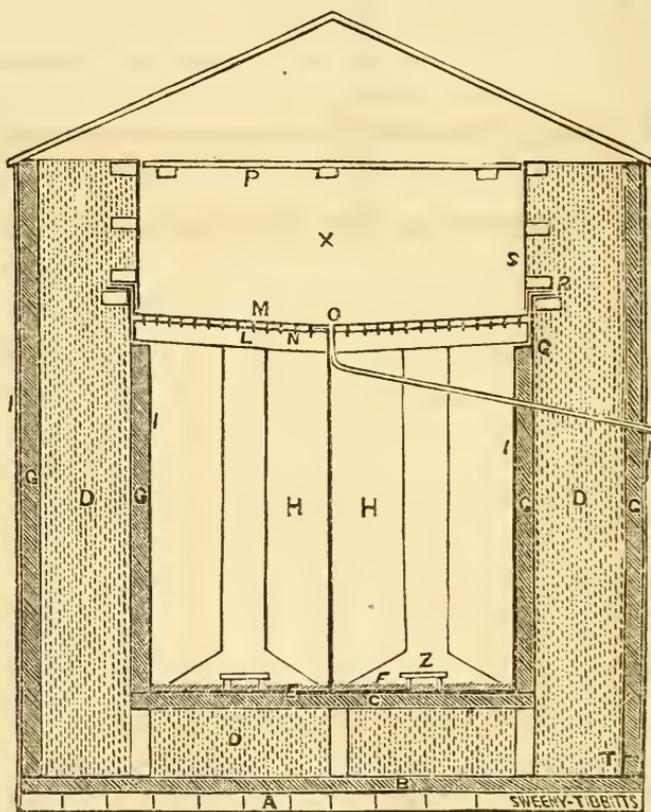
CONCLUDING SENTENCE OF HON. EDMUND BURKE'S REPORT UPON
THE LETTERS PATENT OF PROF. B. M. NYCE.

“The prominent reason, which convinces me more than all others of the novelty and originality of Prof. Nyce's invention, is to be found in the fact, that it accomplishes that which has never before been attained, viz.: The preservation of fruit for a series of months, if not years, in a sound and perfect state. The logical deduction is, that it embodies a new and original principle never before made practical by any process or mechanical contrivance hitherto discovered or invented.”

We subjoin statements and letters from eminent gentlemen in other cities.

FRUIT PRESERVING HOUSE.

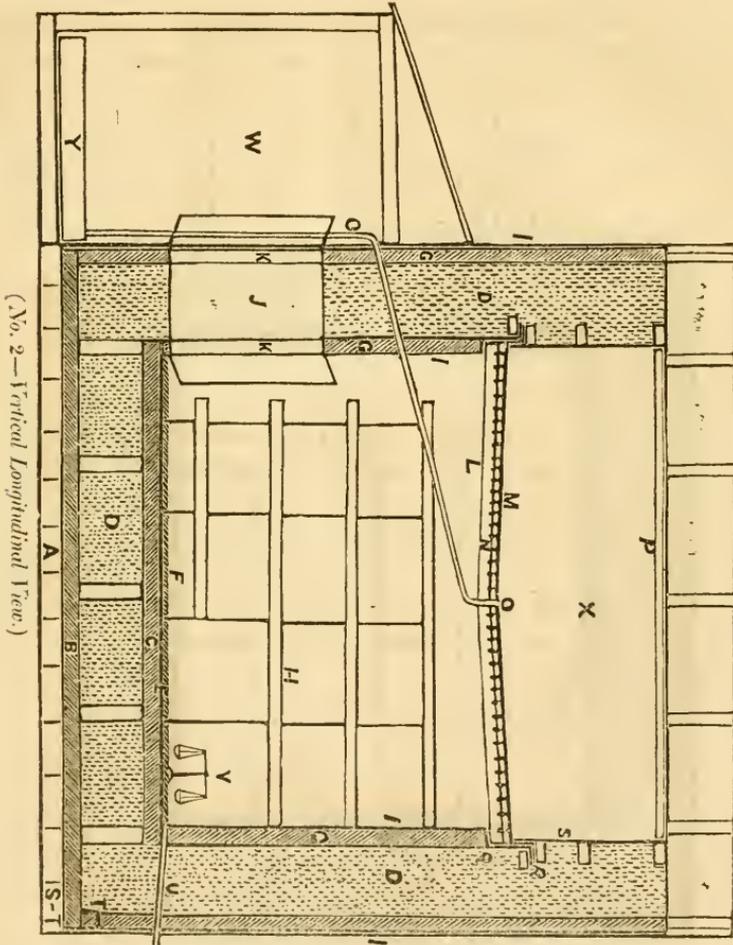
This house has for its object, the preservation of fruits and other *organic substances*, beyond their usual period of keeping. The following drawings and explanations will give a clear idea of its construction.



(No. 1—Vertical Transverse View.)

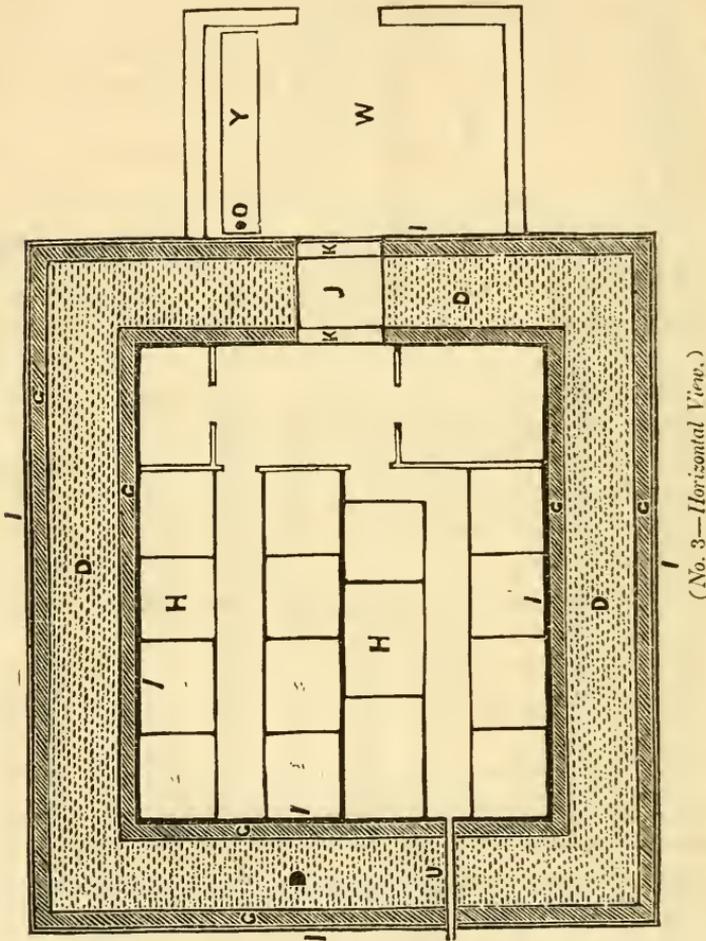
(A.) Foundation walls. The ground floor is levelled off, and made solid, and even with the foundation walls. (B.) A covering of *tar and pitch*, one half inch thick, put over the ground and foundation walls, to prevent the entrance of moisture. The tar and pitch should be mixed

so as to be only moderately hardened by the temperature of the ground. (D.) The filling between the walls is composed of short dry shavings, chaff, or other poor conductors, $3\frac{1}{2}$ feet thick, on the bottom and sides. (C.) Joist for plank floor, $3\frac{1}{2}$ feet above the ground. The floor is made level throughout. (F.) Chloride of calcium, or *dried waste-bittern*, from salt works, spread on every part of the floor of the pre-



serving room, to absorb moisture. (I. I.) Air-tight casings, made of common sheet-iron No. 26; the edges thickly painted, and nailed to upright studding. The outer casing in some houses is made of brick. The inside of the brick wall is covered with roofing cement, or pitch, or some other air-tight coating. (K. K.) Doors 6 or 8 inches thick,

filled with chaff or shavings, and fitted tightly to the door frames, by listing or cloth nailed over thin layers of cotton. (X.) The ice chamber. (L.) Joists to support the ice floor, resting two inches on the posts at Q. (N.) Iron bars, $1\frac{1}{4}$ inches wide, and $\frac{1}{4}$ inch thick, gained $\frac{1}{2}$ inch into the joists, and placed crosswise to them. A bar must always be put directly under the seams and rivets. Three bars



are enough to be under a sheet 30 inches wide. (M.) The galvanized iron ice floor, No. 18 or 20; the edges joined with rivets not more than 1 inch apart, and very carefully soldered. The ice floor is put on the edges of the iron bars so as to expose every part of its surface, on which ice directly rests, to the air of the room below. (S.) Sides of

ice room made of upright planks. Better have it lined with zinc or galvanized iron, inside of the plank. Scantling, 2 by 6 inches, are placed on the ice 4 feet apart, made even with the ice. Wide plank (P) are placed loose across the scantling, the edges as close as may be together, to prevent the filling falling on the ice.

Sawdust, 6 inches thick, is placed on the plank (P). Shavings are not compact enough on the top to keep the air from the ice. (O.) A discharge pipe to conduct the water from the ice. (W.) An ante-room with an ice-water trough, (Y) in which canned fruit is kept, in large stone crocks, for retailing by small measure. The drawings are adapted to small houses, for private use.

The room (W) with trough (Y) forms an excellent dairy. Trough (Y) may be put in the cellar of a dwelling house.

THE COST OF A HOUSE.

A house, with room 15 ft. square, 8 ft. high, 22 ft. square on outside — with capacity for holding 500 bushels — would be about as follows:

Common iron, at 7½ cts. per lb., cost in the house,	\$210 00
Galvanized iron, No. 26, at 20 cts. per lb., . . .	105 00
Galvanized iron, No. 20, at 18 cts. do., . . .	80 00
Whole cost, probably,	800 00

The frame and roof being simple, their cost need not exceed what similar structures would cost.

A house 17 feet square outside, 10 feet square inside, holding 250 bushels, and 18 feet high, would cost, for

Common iron, No. 26,	\$151 00
Galvanized iron, No. 26,	50 00
do do No. 20,	44 00
Whole (estimated) cost,	475 00

Large houses are made with an entry through the middle with 5 or 6 rooms on each side; their cost, generally, about at the rate of \$1 for every bushel they hold.

PRINCIPLES OF THE HOUSE.

Coldness, dryness, purity, absence of light, sameness of temperature, exclusion of oxygen, the great agent of decomposition, — and the immersion of the fruit in an atmosphere entirely harmless to it, make up, when combined in suitable degrees and proportions, all known needed

conditions to keep fruit. Brine, alcohol, oil and sugar preserve organic substances, but change their nature in so doing. This house, on the contrary, holds the fruit as it finds it, keeps it in a state of complete quiet, leaving it undisturbed by any agency beyond itself. Three thermometers, in different parts of the house at Cleveland, were not seen to vary from being a little below 34° , from April till August of 1865. This remarkable evenness of temperature is, in a great part, the result of very perfect walls, doors, and floors, and great care in the construction of every part. In this way all decay arising from expansion and contraction of the skins, cells and tissues of the fruit is completely arrested.

The absorbent, or waste bittern, is spread out on the entire surface of the floor, and, if needed, on additional surfaces above it. One square foot of well exposed bittern, either in the dry state, or state of inspissated brine, will be enough to take up the moisture arising from two to six bushels of fruit, varying according to its condition of greenness or ripeness. The floors of the preserving room should be level, so that the thick brine running from the dry chloride may not collect in basins, but spread over the largest surface. The moisture from the fruit, taken up by the absorbent, varies from about three to ten gallons, for every one thousand bushels of fruit, weekly. Fruit plucked early evaporates much less than when fully ripe. In a room or any confined vessel when filled with fruit in the gradual process of ripening, carbonic acid and water are constantly generated. Six pounds of carbon, and one of hydrogen, will take up all the oxygen contained in one hundred and twenty pounds of air. The oxygen, especially if the fruit be ripe, and the air warm, will usually be consumed in about forty-eight hours. The atmosphere is then made up of the nitrogen of the air and carbonic acid. The former is destitute of all active properties, good or bad. The latter is not found to have any action on fruit immersed in it. Hydrogen and carbon then cease to be evolved from the fruit, as there is now no agent to unite with them, in the same way that they cease to be evolved from a burning candle when the air is removed. Decomposition ceases in both cases from the same reason.

The principle is thus stated by Liebig: "Decay is much retarded in the absence of moisture, and by the substance being surrounded with an atmosphere of carbonic acid, which prevents the air from coming in contact with decaying matter." All fruit should be in the house when tree ripe; that is, as soon as it has received all the virtue the tree or the vine can impart to it. Liebig says: "Rub an unripe or green

apple, or pear, on a grater, to a pulp, wash this with cold water on a fine sieve—the turbid liquid which passes through deposits a fine flour of starch, of which not even a trace can be detected in the ripe fruit. This after-ripening, as it is called, is purely a chemical process. It is the starch being transformed into sugar: the more starch unripe fruit contains, the sweeter does it become when ripe.”

Starch proper does not decay. It must first be turned into sugar; but the change is made with extreme slowness at 34° . After the saccharine change, though putrefaction is greatly retarded at 34° , yet comparatively, its progress is easy and rapid. In this house the most tender fruits, if put in immediately when made, keep better than the most hardy sorts, if not put in till full-ripe. And with the same fruits, decay is not one-tenth as rapid in the former case as in the latter. It was formerly believed, both in this country and in Europe, that delicate fruits, such as tender apples, pears and grapes, would not keep well in an atmosphere lower than 40° F. The appended report on pears, kept from August till March, proves the erroneousness of this opinion. These pears were never above 36° , (the house then was imperfect,) and a good part of the time as low as 34° . Sour fruits will not bear as much cold as sweet ones. The Catawba grape will suffer no harm at 26° ; while 32° will be as cold as is safe for a lemon. But all provisions for different degrees of coldness, by means of ice alone, in regard to fruits, is useless—as all of them should be in a temperature as cold or colder than ice alone can make them. Some advantage would be secured to the grape, and Sweet apple, by a greater degree of cold than 34° . Refrigerating mixtures might secure this, but the cold produced in this way is instantaneous, and temporary in its action. They would need constant renewal, day and night, to keep up an equal temperature—and we do not think that the comparatively slight advantage gained could ever justify the labor and money expended. The decay below 40° , was caused, hitherto, not by a cold atmosphere, but by the impossibility of making a cold one dry.

There are but two known modes in practical use for drying air. One mode consists in throwing it upon ice, or an ice-cold surface; the other in exposing it to absorbents. Nearly all the conservatories, and experiments, hitherto, have concerned the former method, which must ever be imperfect and unsatisfactory; for by it the air gives up only so much vapor as is in excess of its capacity at 32° . It is still as wet as it can be at this ice-cold temperature, and does not become dry till it rises to 40° , or above it.

NYCE'S FRUIT-HOUSE, without absorbents, presents one of the best arrangements to dry air by the first method, as it presents the largest ice-cold surface, on its upper part—the place to which vapor from the fruits, always somewhat heated, by constant chemical action that produced it, immediately ascends. But experience has shown in this house, that present results could not be reached by this method alone. The absorbents used, on the contrary, condense vapor freely, from the dryest air, even when chilled down to zero, or below it. And when spread out on sufficiently extended surfaces, produce in this room any desired degree of dryness. It is claimed that this is the only plan, known to science, that can secure a dryness, uniform and complete, together with a sufficient and equable degree of coldness, for preserving fruits and other organic substances.

A window with one pane of glass is placed between the entry, or entry room, and each of the other rooms. On the inner side of this is a small shelf, so as to be seen from the entry; on this is put a small pair of scales, as seen in the drawing. One ounce of dried clean waste bittern, diluted with two ounces of pure rain water, is put on a wide thin plate on one side, balanced and put on the shelf. This kept balanced, indicates the usual proper state of dryness, if the plate sinks, moisture is increasing, and the dried absorbent should be renewed. An instrument, known as the Oriental Hygro-Barometer, is also happily adapted to this purpose.

SUCCESS IN KEEPING FRUIT.

This depends entirely upon the condition in which it is, when put into the house, and the manner in which it is treated. The house at Newport, opposite Cincinnati, last year showed a loss, in the months of May and June, of only 2 or 3 per cent., and yielded a net profit of \$10,000 on about 6,000 bushels of apples;—the house in question costing about \$10,000.

The loss on grapes, in the house at Cleveland, by the evaporation and drying of bruised and imperfect berries, was about 8 per cent.; and there was not it was thought, in May, a loss by rotting of a single berry in *four tons* of fruit. With lemons and oranges, everything depends upon the sound and fresh condition in which they are, when put in the house. Soft skinned lemons, with the skin indented, will not keep as well as hard skinned; but sound skinned ones, with green stems on, have been kept in the Cleveland house from March through July

without any loss. Taken out of the house in moist weather, the papers, on lemons especially, become very wet, and should have the papers dried or renewed. If warmed in an air-tight room before shipment, this evil may be in a great measure prevented.

Butter and eggs imbibe rapidly foreign impurities, and must not be left exposed in the midst of fruits and vegetables. Butter, in confined firkins, is not injured where fruit is, and both butter and eggs keep well in a chamber by themselves.

COST OF RUNNING THE HOUSE.

One and a half barrels of waste bittern, costing from \$3 to \$5 per barrel, are sufficient for one thousand bushels of fruit per year. In a house holding 7,000 bushels of fruit, the cost per year would be as follows, present prices of labor and materials being understood :

Eleven barrels of absorbent,	\$50 00
Cost of drying it every two months—36 days in all,	72 00
Five cords of wood,	25 00
Sheet iron pans,	8 00
Total cost,	<u>\$155 00</u>

SOURCES OF PROFIT.

The sources of profit are pears and grapes, kept during the fall and winter months; apples until the months of May, June and July; lemons, oranges, pineapples, through the summer season. Oysters, butter and eggs are also sources of profit.

FLAVOR.

Apples, as well as other fruits, from the house, are in the spring and summer unusually heavy, juicy, and rich in flavor. The reason is, that evaporation goes on very slowly at 34°, and gives time for the more complete separation of the atoms of water from those of the sugar contained in the fruit. A larger proportion of water and less proportion of the aroma of the fruit escapes than when the temperature is higher and the evaporation more rapid.

KEEPING OF FRUIT OUT OF THE HOUSE.

Fruit, such as apples, taken from the house in July, compares well in keeping qualities with the early summer crop. The period of keeping

will vary according to its degrees of soundness, and the temperature of the weather, from two or three days to two or three weeks. But no fruit can keep long at 80° or 90°. Those wishing the benefit of this house should have it in operation in their own neighborhood; they can then be supplied with every kind when in its best condition.

CONCLUDING STATEMENTS.

This House not only combines together all the known conditions of Fruit keeping, but it is thought that it secures them in the cheapest and simplest possible manner.

1. In a chamber with walls, floors and doors proof against atmospheric changes, if the air be exposed to an ice-cold plain surface,—(this is the cheapest as well as the most effective surface possible,)—on the entire upper part, the greatest cold possible by ice alone will be secured. The reason we do not gain a temperature below $33\frac{1}{2}$ or 34°, is not owing to the want of a sufficiently extended cold surface exposed,—(for the ice may be melted away from the part of the surface above, without sensibly affecting the thermometer below,)—but to the necessary imperfection in walls and doors; and especially to the action of the absorbent, by emitting the latent heat of vapor, in turning it into liquid. Though there be 1,000 tons of ice upon the upper surface, it does its work from one winter to another, without one hour's additional labor, until the last pound is melted.

2. Absorbents, as we have shown, are the only known successful means of producing the dryness required, at 33 or 34°. Two men can dry in a single week, enough of fluid waste bittern, being at some salt works 1-6 of the entire brine, heretofore running away as useless, to supply a large house a whole year; and a few hours' work will spread out enough of this absorbent upon the floor to last for months to come.

3. There is no expense in exhausting oxygen from, and forcing carbonic acid into, the rooms. The chamber is simply closed and the fruit, in 48 hours, at a very trifling advance, (as the time of doing it in a very cold chamber proves,) in the ripening process, consumes entirely the agent of its own destruction.

4. Freedom from foreign impurities, and absence of light, are at once necessary results. The equality or sameness of temperature is complete.

The following letters and testimonials, from distinguished parties, confirm the above view.

LETTERS AND TESTIMONIALS.

LETTER FROM PROF. B. SILLIMAN TO THE PATENTEE.

NEW HAVEN, July 11, 1865.

SIR:—I have long intended to acknowledge your attention in sending me, in May last, samples of fruit preserved by your Patent Fruit House. The Catawba grapes, and apples, reached me in perfect condition. The stems of the grapes were green and fresh, as in October, and the bloom on the berries perfect. Several friends happening to be with me on a festive occasion—and among them excellent judges of pomological matters—your fruit came before a critical jury. The unanimous verdict was one of surprise and satisfaction at the perfect condition in which it was found after more than half a year of time had passed. The flavor of both grapes and apples was as perfectly preserved as their beauty—revealing all the freshness and aroma of autumn. At the time these observations were made, the fruit in question had been two weeks out of your fruit-house, and had made a journey of about 500 miles by railroad.

I cannot see what remains to desire, in the perfectness of your plan. You have demonstrated that by the joint effect of cold and dryness, the decay and ripening of fruit may be retarded to any desired degree, for the smooth-skinned and firm-fleshed fruits, apples, pears, grapes, &c., particularly those fruits which it is most desirable to preserve, and the natural season of which, such as the grape and pear, is far too short for their full enjoyment.

Every considerable city should have such a fruit-house in its neighborhood, as a means of health and enjoyment to thousands who would thus be provided with delicious and healthful fruit, throughout the entire winter. In this view, I regard your invention as a great public benefit, for the perfecting of which, you cannot fail of an ample reward.

I am yours respectfully,

B. SILLIMAN.

BENJ. M. NYCE, A. M., Cleveland, O.

FROM R. T. BROWN, PROFESSOR OF THE NATURAL SCIENCES IN THE NORTH-WESTERN CHRISTIAN UNIVERSITY AT INDIANAPOLIS, AND STATE GEOLOGIST OF INDIANA.

INDIANAPOLIS, Dec. 5, 1865.

PROF. B. M. NYCE:

DEAR SIR:—I have watched, with constantly increasing interest, the progress of your experiments in maintaining unimpaired the organic structure and peculiar qualities of fruits and vegetables. The primary ideas involved in the arrangements of your fruit-house embrace all the natural agencies to this end known, at present, to science.

The ordinary decay of fruits containing sugar is a true fermentation. This is entirely arrested at temperatures below 40° F. But even at this low temperature, if moisture be present, fungi may be developed, and thus the organic structure broken down; or chemical changes may take place in the vegetable acids of the fruit, thus destroying its flavor. Even in the decom-

position of metals, and other inorganic bodies, moisture is the most prominent of the exciting causes. A chamber, gas proof, will be an important auxiliary in securing an atmosphere of carbonic acid, and thus excluding uncombined oxygen, the great destroyer. Darkness is a condition not to be overlooked in this inquiry. All these conditions you have secured in your improvement, when your plans are carried out. I see nothing more to recommend.

Yours truly,

R. T. BROWN.

WHAT DISTINGUISHED POMOLOGISTS SAY.

The Fruit Preserving House of Prof. Nyce, in our opinion, not only embraces all the known needful conditions for preserving from decay, fruit, and other organic perishable substances, but combines them in the simplest and cheapest manner. And we unite with Prof. Silliman in saying: "That we can see nothing more to desire in the perfectness of this plan."

JOHN A. WARDER, Cincinnati, O.

GEORGE GRAHAM, " "

Cincinnati, Dec. 8, 1865.

M. B. BATEHAM, Painesville, "

REPORT OF THE CINCINNATI HORTICULTURAL SOCIETY, ON CERTAIN EARLY AND SUMMER PEARS, KEPT IN THE CONSERVATORY OF BENJ. M. NYCE, FROM AUGUST TILL DECEMBER 15, 1861.

No. 1.—Roussellet Stuttgart—Juicy, and of a rich saccharine taste; reminds one of the Belle Seckel.

No. 2.—Bartlett.—Has been kept a little too long; is still juicy; somewhat more saccharine than usual, and quite good.

No. 3.—Belle Lucrative, or something else. Has the extraordinary fine flavor, and melting, buttery lusciousness which have given the Belles their reputation.

No. 4.—Unknown.—In good condition; is of a somewhat insipid, sweetish flavor, evidently natural, sound, and without blemish.

No. 5.—Belle Lucrative.—Is in perfect condition; plump, juicy, and well flavored; fully up to its summer reputation; very juicy and very buttery.

No. 6.—Also the well known Beurré Bosc.—It retains in every respect all its well known characteristic excellences.

In conclusion, we may say, that all the above named fruit attained its natural color at maturity, and seemed to be free from all foreign flavor and taste, which usually adheres to fruit that has been preserved by other means, beyond its natural season.

Cincinnati, Dec. 15, 1861.

ROBERT REILLY, Chairman.

EXTRACTS FROM THE SIXTEENTH ANNUAL REPORT OF THE OHIO BOARD OF AGRICULTURE.

CINCINNATI HORTICULTURAL ROOMS, March 2, 1862.

Report on Pears preserved by B. M. Nyce, McCoy's Station, Decatur County, Indiana, in his Patented Preserving House, some of which were picked August 12, 1861.

Beurré Bosc—The original flavor and quality very well preserved.

Belle Lucrative—Remarkably well preserved.

Urbaniste—Delicacies, a fine pear, admirably preserved.

Autumn Colmar—Well preserved.

Jamiette—A Winter Pear; sweet, and as good as usual.

Grapes, Catawba—From Kelley's Island; reported to be as good as when first picked.

Your Committee take great pleasure in noticing these fruits, which are the result of the applications of science to the every day operations of the farm and garden. The horticulturist may grow the finest fruits in their season, and enjoy them with his friends in their day; but it requires the patient efforts of the man who will studiously apply the aids of science to the wants of his fellow man, to preserve these choice results for an almost indefinite period. Here we have some delicious fruits, preserved for nearly seven months, and presented to us in their natural condition.

Approved.

WM. STOMS,
R. M. REILLY,
WM. RESOR,
THOMAS SHERLOCK,
JOHN A. WARDER.

JULY 20, 1861.

From Benj. M. Nyce, of McCoy's Station, Decatur County, Indiana :

Apples—Growth of 1860, preserved in his Patent Preserving Fruit Room: Pennock, Romanite or Gilman, White Winter Pearmain, White Bellflower, Rhode Island Greening, Pryor's Red, Northern Spy, Raul's Janet, Rambo, Campfield.

Strawberries—Gathered seven weeks since:—Sound and fresh.

Potatoes—Growth of 1860:—Perfectly sound, showing no disposition to sprout, or grow, or wilt.

These products furnish further evidence, if any such were needed by this Society, that the ingenious application of scientific truths has enabled our enterprising friend Nyce to arrest the natural process of decay in our perishable fruits, most of which appear before us in a perfectly sound condition after months of isolation from the parent trees upon which they acquired their growth and perfect maturation.

JOHN A. WARDER, Chairman.

REPORT OF COMMITTEE OF OHIO STATE POMOLOGICAL SOCIETY ON THE FRUIT
EXHIBITED BY PROF. NYCE, DEC. 8, 1865.

Your Committee, to whom was assigned the duty of examining the fruits shown by Prof. Nyce, and which have been preserved in the most perfect condition by the system invented and introduced by Prof. N., consisted of the following kinds and varieties:

Pears—Duchess d'Angouleme, Belle Lucrative, Louise Bonne de Jersey, Onondaga, Bartlett, Seckel, and Beurré d'Anjou.

Foreign Grapes—Aug. 30—Black Hamburg, White Sweetwater, Muscat of Alexandria, and Royal Muscadine.

Native Grapes—Diana, Delaware, and Catawba.

The specimens of pears and grapes shown were as sound and perfect as when put away in August and September last, and those tasted by your Committee retained nearly their natural flavor and quality, and your Committee believe fully justify the inventor in what he claims as one of the excellences of his patent right, viz.: The preserving of fruits in a state unchanged in respect to flavor and quality. This point has been one of the most desirable to secure, and your Committee congratulate the inventor on the success he has attained. The unchanged condition secured by this system is shown by some of the bunches of grapes examined by the Committee in the fresh

greenness and fulness of the pedicels, and fruit stems; on the Catawbas were some berries partially decayed, by insects, disease, or bruising, the rest show the same appearance as when growing on or taken from the vine. The duty assigned your Committee is associated with the pleasant retrospection, that we, as members of the Cincinnati Horticultural Society, were among the earliest if not the first members of a public body, to report upon and strongly commend the valuable invention of Prof. Nyce, and their visit to the first structure he erected to demonstrate its practical value is still remembered as among the most pleasant recollections, and it is a source of pleasure to further know that the public are beginning to appreciate its value, and the genius of the inventor to receive its substantial reward. A proof of which our Society had another instance of in our visit to the substantial establishment recently erected in Covington, by Caldwell Brothers & Smalley; and in this connection your Committee return their thanks to Messrs. R. H. and R. F. Caldwell, for their kindly courtesy and generous attentions on the occasion of our visit to their establishment.

Respectfully submitted,

GEO. GRAHAM, }
WM. HEAVER, } Committee.

EXTRACT FROM THE ANNUAL ADDRESS OF THE PRESIDENT OF THE STATE POMOLOGICAL SOCIETY OF OHIO, DEC. 6, 1865.

"It is always a matter of great importance to preserve our fruits in a sound condition until their proper period of ripening, and it is often desirable to defer that period as long as possible. Various methods have been proposed to effect this object, mostly depending upon the maintenance of a low degree of temperature. Of all the plans laid before the public, that of Mr. Nyce, which has already been explained to this Society, appears to be not only the most philosophical, but the most successful. We have had our summer fruits kept until late in the autumn, with scarcely any change or ripening; indeed, they were preserved for two months, as firm, and apparently as immature, as when they were first gathered from the tree.

"The perfect isolation of the chambers from the atmospheric and terrestrial heat, by means of non-conducting walls and floors, enabling the inventor to reduce the temperature of the air to nearly the freezing point, by means of ice resting upon a metallic floor, which forms the ceiling of the chamber. In addition to this, the atmosphere is kept dry by the use of chloride of calcium, which rapidly absorbs all the moisture that exhales from the fruit after it is introduced.

"The establishment at Cleveland was described in the last Report, and your attention is now called to the subject, because there is an establishment near us which has been very successfully conducted by Messrs. Smith & Caldwell, of Newport, Kentucky, just across the river, which some of you may wish to visit and examine. For its preserving power, you are referred to the specimens of fruits upon the tables. These enterprising parties have been so successful in their first experiments, that they have this year put away 14,000 barrels of apples, which they can preserve perfectly until the market is exhausted of the present supply, when they can command the highest prices for their fruit."

OPINION OF CITIZENS OF CLEVELAND.

CLEVELAND, July 3d, 1865.

We, the undersigned, citizens of Cleveland, have this day examined the House of the Cleveland Fruit Company, built and conducted according to

Prof. Nyce's patent for preserving fruit. We found the rooms completely free from moisture, even the ceiling on which the ice rests being perfectly dry, and the temperature not exceeding 34° F. In the rooms, we saw and ate of fine full clusters of Catawba grapes, from their original packages, which we understand, have not been disturbed for the last nine months. These possessed all of their original flavor and plumpness, the bloom being still on them, and exhibiting no signs of decay, and will apparently keep for months to come.

A variety of apples, such as Baldwins, Greenings, Russets, Northern Spy, Nonsuch, and even the Rambos and Belmonts, presented the appearance of having been kept with little loss, being remarkably fresh, crisp, and having lost none of their original flavor. There were also in the house, lemons, in fine condition, which had kept since the 1st of April.

Pineapples that had been in five weeks, were without any change.

A House holding 8,000 bushels, will cost about 85 cents to the bushel. If larger, less in proportion, or smaller, more in proportion.

We can unhesitatingly recommend the wonderful preserving process of Prof. Nyce, as being a complete success, for the preservation of almost all kinds of fruit.

From the fact that three or four successive crops of fruit, from tropical as well as temperate climates, can be kept for almost an indefinite period, we have no doubt that if a House of this kind is well managed, it cannot fail to yield to its owners an extraordinary large per cent. of profits.

W. BINGHAM, Hardware Merchant.
 FRENCH & KEITH, Dry Goods Merchants.
 BABCOCK & HURD, Wholesale Grocers.
 W. A. FISHER, of Garretson & Co.
 EDWARDS, TOWNSEND & Co., Wholesale Grocers.
 G. W. WOODWORTH, Banker.
 L. M. PITKIN, President of Board of Education.
 DAN P. EELLS, Cashier of First National Bank.
 W. W. GOODWIN, in George Worthington & Co.'s.
 E. A. PERKINS, Assistant Cashier of National Bank.
 GEORGE W. JOHNSON, Associate Editor of Plain Dealer.
 T. B. BROCKWAY, Proprietor of American House.
 PARISH & KNIGHT, Stove Dealers.
 J. W. CHASE, Wholesale Merchant.
 TENNIS, DANGLER & CO., Hardware Merchants.
 J. M. RICHARDS & CO., Confectioners.
 F. FORD, Engineer of C. C. & C. R. R.
 H. C. BLOSSOM, Hardware Merchant.
 W. H. BURRIDGE, Patent Attorney.

LETTER FROM PROF. J. C. BOOTH, UNITED STATES MINT.

PHILADELPHIA, April 9th, 1866.

TO PROF. B. M. NYCE:

DEAR SIR:—After carefully investigating your Plan of Preserving Fruits, &c., in its theoretical bearings, I examined its execution on a large scale at Trenton, N. J., and herewith offer my opinions in relation to it, premising that I had previously given my attention to the general subject of preservation of organic matters, both theoretically and practically:

1. The object you propose is the preservation of food, chiefly in its natural condition, with more especial reference to Fruits, whose taste and flavor are

usually evanescent, and fading with the short season of their production; in other words, you propose to regenerate the table of Summer and Fall, at any period of the Winter and Spring, with the same facility that the moderate temperatures of Summer are re-produced by fire throughout the more inclement seasons.

2. The difficulties of preserving food lie in various kinds of natural fermentations, acetous, vinous, putrefactive and mouldy, to which it is subject. These difficulties are, in some instances, very great, and are perhaps greatest of all when the delicate taste and flavor of fruits are to be retained. These results you propose to attain by a suitable degree of cold and dryness, and the practical exclusion of light and air. I can conceive of no other principle required, except perhaps that of economy, in attaining these ends. I propose to remark on the mode which you adopt and the results you attain.

3. I observed that the preserving house was practically air-tight and dark, from its construction of sheet-iron, with its double walls, about $3\frac{1}{2}$ feet apart, the space between them being filled in with shavings, &c., and the floor similarly made, and laid on a bed of cement, to prevent the possible entrance of moisture from below. The top is constructed of a water-tight metal floor, on which is a stratum of some 6 feet of ice, with its usual non-conducting covering of saw-dust, etc., and a simple roof covers the whole.

The entrance door, below, is doubled, both of which, and those opening into each compartment of the interior, are rendered practically air-tight by good workmanship, and a very simple and ingenious contrivance. The building is practically air-tight; and, in further proof, I may mention that while I breathed freely, and a candle burned brightly in the hall, between the ranges of compartments, one of the latter being opened, and in which were stored some 500 boxes of lemons, a candle thrust in was instantly extinguished by an atmosphere of carbonic acid, deadly to fire and animal life, but preservative of vegetable life. When it becomes necessary to enter such a room there is no difficulty in removing the carbonic acid, which is again supplied by the fruit after closing.

The necessary cold is of course maintained by the complete covering of ice above, which being charged in one winter, lasts until the next, with a surplus to spare. I observed that some half a dozen thermometers in the entry and rooms indicated 34° Fahr., only one being a shade above. I may observe in passing, that this degree, just above the freezing point, and uniformly maintained, is an important element in your mode of preservation.

The dryness of the compartments, secured by the use of chlorides of calcium and magnesium, obtained at a trifling cost from the waste bitter of salt works, seems to be as perfect as desirable, and its degree is ingeniously measured by a balance weight of the same salts, visible through glass from the hall, in each compartment.

The mode of construction, and the simple materials used, appear to me to attain all the objects required, as far as we know them, in the most perfect manner. The question of economy is easily settled by the moderate cost of construction, and the extreme cheapness of ice and the chlorides.

4. It would seem to me unnecessary, with the experience and observation I have had, to state that where such a degree of cold and dryness as I have witnessed in your house, so perfect an exclusion of light and air have been attained, that as perfect preservation is effected as seems practicable, — certainly much more than by any other plan I have ever heard of; but for the sake of those not acquainted with the principles involved, I may state that the results prove the soundness of the conclusions and the perfection of your arrangements, by the perfect retention of taste and flavor by the fruits contained in your houses, after long months of repose. The harvest apple of July, 1865, is at this moment as perfect as the day it was put in. An unripe apple, of the Fall of 1865, is now in exactly the same condition of unripeness as when

pulled, and requires, as then, to be kept to ripen. The Grapes in appearance, taste and flavor, are in as perfect condition as when put into the house. It is interesting to witness 2000 boxes of lemons in a perfect condition, when we recall the quantity of such ruined fruit heaped in the street near fruit stores in the city.

After what I have stated, you observe that I regard your whole process of inestimable value to the community, as tending to render the riches of the summer perennial.

J. C. BOOTH.

REPORT OF FRUIT COMMITTEE.

HORTICULTURAL HALL, Philadelphia, March 20, 1866.

The following apples were shown by Prof. B. M. Nyce, of Cleveland, Ohio, having been kept in his Fruit-Preserving House in that place since last Fall:

BALDWIN—Stem green, flesh crisp and not yet perfectly ripe.

NORTHERN SPY—In perfect order, flesh juicy and perfectly ripe.

R. I. GREENING—Flesh juicy and perfectly ripe.

BELMONT OR GATE—A beautiful apple, and of best quality; *a desirable sort for propagation.*

A SUMMER APPLE—Supposed to be the Summer June; a sweet and porous flesh, without much flavor, but perfectly kept.

CATAWBA GRAPES—Bloom perfect, and flavor unimpaired in keeping. These fruits, the grapes especially, satisfy your committee that fruits can be kept by this process without injury to the flavor for several months after their usual period of maturity.

Respectfully submitted,

J. E. MITCHELL.

W. L. SCHAFFER.

FROM THE PRINCIPAL OWNER OF THE PERU HOUSE.

PERU, IND., March 19th.

PROF. B. M. NYCE, Cleveland, Ohio:

DEAR SIR:—Your letter of 6th inst., is received. I don't know much about the eggs we kept in our house. We had, perhaps, 200 dozen, put in boxes, of about 40 dozen in each, in cut straw. They were put up in April, 1865, and opened and sold out in January, 1866. They cost us 10 cents a dozen, and we sold them at home for 25 cents per dozen. Had we shipped them to New York or Cincinnati, we could have realized three times the original cost. I think they were not turned over more than two or three times in nine months. We regard it so much a success, that we want to invest \$5000 in them (eggs) this Spring. I used a good many of the eggs at my house, and never have heard of any complaints about them tasting of lemons, oranges, or apples, or anything else. We expect, however, in putting up this season, to put our eggs in ordinary apple barrels, packed in oats, and turning the barrels every two or three weeks.

We bought, last May and June, some twenty thousand pounds of butter—worked it over carefully, so as to get out all the milk and streaks—packed it in tight kegs of about 100 pounds—headed them up tight—shipped them to New York, in February, and sold for 39 cents. Had we not sold until March, we could have sold for 45 cents. It cost us 16 cents. We regard the house as valuable for butter and eggs as for fruit, and shall fill our house this summer with eggs and butter.

I am, very truly, your friend,

HARVEY SHIRK.

LEGAL OPINIONS

IN REGARD TO

NYCE'S PATENT FOR PRESERVING FRUIT.

The following opinions of the most eminent Patent Lawyers in this country, are here given, to assure all interested of the preëminent value and durability of Prof. Nyce's claims and discoveries :

13 MOFFAT'S BUILDING, 335 BROADWAY, NEW YORK,
November 3, 1865.

Dear Sir : I have carefully examined your Re-issued Letters Patent for *Improvements in Preserving Fruits, &c.*, dated July 25, 1865, and am of the opinion that they are sufficient to properly protect and cover the intentions described therein. I see no reason to doubt their being sustained, in Law and Equity, in the Courts of the United States.

Your Obedient Servant, S. J. GORDON.
B. M. NYCE, Cleveland, Ohio.

NEW YORK CITY, Nov. 6, 1865.

I have examined the Re-issued Letters Patent, granted to B. M. NYCE, July 25, 1865, for *Improvements in Preserving Fruits, &c.*, and, in my opinion, the said Patents are valid, and can be sustained against all infringers.

CHARLES M. KELLAR.

335 BROADWAY, NEW YORK CITY,
November 3, 1865,

I have examined the three Re-issued Letters Patent of BENJAMIN M. NYCE, for *Improvements in Preserving Fruits*, dated July 25, 1865, and am of the opinion that they are valid, and can be sustained in our Courts.

GEORGE GIFFORD.

PROFITS OF A FRUIT-HOUSE.

Bartlett pears may be bought when abundant in the market at \$5.50 per bushel, and in one month's time they will double in price with a quick sale. One room containing two thousand bushels devoted to Bartlett pears would yield in one month a net profit of eleven thousand dollars. Grapes by being preserved from three to four months would yield profits as follows :

Twenty-five tons of grapes could be put into the fruit-house in the autumn, at two hundred dollars per ton—making the cost five thousand dollars. In January, February and March they could be sold at from thirty to forty cents per pound. At thirty cents per pound (six hundred dollars per ton) they would yield a clear profit of ten thousand dollars.

From the best evidence, after consultation with all the dealers in foreign fruit, C. M. Hovey, Esq., the President of the Massachusetts Horticultural Society, came to the following conclusion, with reference to the profits on foreign fruit preserved in the fruit-house :

Ten thousand boxes of lemons bought in February and March, after grapes, pears and other domestic fruits were removed, would cost three dollars and one half per box. Say—10,000 boxes lemons at \$3.50 per box, \$35,000. The same could be sold in July and August for seven dollars per box, as it has been well established by many years experience that foreign fruits double in price from March to July. Ten thousand boxes at \$7.00 per box, \$70,000, *YIELDING A NET profit of \$35,000, without risk from loss by decay or waste.* Oranges, Pineapples and other foreign fruits would yield an equally large profit.

On strawberries, the season of which could be prolonged from four to six weeks, by packing in the fruit-house, a profit of several hundred per cent. could be made in six weeks of time.

Nothing has ever been presented to the public which promises greater returns from invested capital. And with judicious management large dividends can be made from year to year without risk or fear of loss to stockholders.

THE ADVANTAGES OF NYCE'S PATENTS FOR FAMILY
PURPOSES.

These are many and varied. In addition to the means furnished for preserving fruits and greatly prolonging their season, they provide a refrigerator upon a grand scale, into which ice can be packed once a year, and thus save the trouble and expense of weekly or semi-weekly packing. This family house can be divided into two, or four, or even six rooms, and one of these rooms can be kept for eggs and meat. Fresh meats and eggs in one of these rooms may be kept many months, and a family with this great luxury attached to their country home can, at all times, furnish their table, not only with the luxuries of the season, but luxuries which have passed their season; and also, the richest and rarest meats that the market may be able to furnish at any month of the year may be purchased and stored in this safe repository for future use.

The Company are now ready to sell private rights to parties desiring to build houses for private and family purposes. Terms may be made known on application to the Treasurer,

JESSE A. LOCKE,

No. 46 CONGRESS STREET, BOSTON.

OR TO THE GENERAL AGENT OF THE COMPANY.

