REPORT

OF THE

COLD STORAGE COMMISSION.

Ordered by the Legislative Assembly to be Printed, 8th December, 1892.

PERTH:
BY AUTHORITY: RICHARD PETHER, GOVERNMENT PRINTER.

1892.
8.—Preservation, &c., of Perishable Foods.—Mr. Harper, in accordance with notice, moved, That in the opinion of this House it is desirable that a Commission should be appointed during the recess to inquire into the whole subject of the preservation, carriage, and storage of perishable foods, with the object of ascertaining the possibility of establishing a comprehensive system of this nature in this Colony.

Debate ensued.

Question—put and passed.

THURSDAY, 9TH DECEMBER.

2.—Paper.—Sir John Forrest laid upon the Table of the House the following Paper:—

Report of the Commission appointed to inquire into and report upon the subject of the Preservation, Carriages, and Storage of Perishable Foods.

Ordered.—That the paper be printed, and lie upon the Table.

[Extract from Government Gazette of 24th March, 1892, p. 347.]

No. 409.—C.S.O.

W

COMMISION

By His Excellency ALEXANDER CAMPBELL ONslow, Administrator of the Government in and over the Colony of Western Australia and its Dependencies, &c., &c., &c.

To CHARLES HARPER, Esquire, Member of the Legislative Assembly, Justice of the Peace; WILLIAM THORLEY LOTON, Esquire, Member of the Legislative Assembly, Justice of the Peace; ALEXANDER ROBERT RICHARDSON, Esquire, Member of the Legislative Assembly; GEORGE RANKELL, Esquire, Traffic Manager.

WHEREAS it is expedient to inquire into the subject of the Preservation, Carriages, and Storage of Perishable Foods, with the object of ascertaining the possibility of establishing a comprehensive system of this nature in this Colony,

NOW THEREFORE I, ALEXANDER CAMPBELL ONSLOW, Administrator as aforesaid, with the advice of the Executive Council, have thought fit to appoint and do hereby appoint you the said Charles Harper, William Thorley Loton, Alexander Robert Richardson, George Rankell, and John Davies to be with the object of ascertaining the possibility of establishing a comprehensive system of this nature in this Colony, and to make such feasible suggestions as may appear likely to advance the object in view.

Such suggestions to be made with due regard to the interests of all classes of the community.

And I do hereby desire and request that you do, as soon as the same can conveniently be done (using all diligence), report to me, in writing, your proceedings in virtue of this Commission.

And I further will and direct, and by these presents ordain, that this Commission shall continue in force until you shall have finally reported upon the matters aforesaid, or otherwise until this Commission shall be revoked by me; and that you, the said Commissioners, shall have liberty to report to me, from time to time, as the same or any part thereof may respectively be completed and perfected.

And I do appoint the said Charles Harper to be Chairman of the said Commissioners.

Given at Perth, this twenty-fourth day of March, in the year of Our Lord One Thousand Eight Hundred and Ninety-two.

By Command of His Excellency the Administrator,

GEORGE SHENTON,
Colonial Secretary.
Report of Commission appointed to Inquire into and Report upon the subject of the Preservation, Carriage, and Storage of Perishable Foods.

To His Excellency Sir William Clarke Francis Robinson, G.C.M.G., Governor, &c., &c., &c.

May it please Your Excellency,

The Commission has, as will be seen from the accompanying letters and papers, collected a mass of information giving the cost of various sizes and classes of refrigerating plant and their effectiveness, as well as the experiences of some of those who are using them.

Looking at the rapid expansion of this system of dealing with perishable foods in Australia, and other parts of the world, the Commission is of opinion that the establishment of works of this description is destined to become of great importance to the pastoral and agricultural interests, and, of, perhaps, still greater importance to the consuming population of the Colony, as well as in adding largely to the railway traffic.

The Commission feels confident that a comprehensive system of cold storage of perishable foods could be successfully introduced, yielding great benefits to the centres of population by bringing into their markets a regular and sufficient supply of good wholesome meat, fish, dairy produce, and fruit at all seasons of the year, while, on the other hand, producers would be immensely encouraged by the certainty of a means of securing themselves against the heavy losses which a glutted market generally entails.

The Commission is, however, in some doubt as to whether this would be better undertaken by the State or whether it should be left to private enterprise. Perhaps, if a sufficiently strong company could be formed to undertake the establishment of works on such a scale as would ensure a continuous supply of the products mentioned, it would be a wise policy on the part of the Government to offer every legitimate encouragement to the project, in the direction of the abolishment of the present very heavy duty on the machinery required, the special provision for carrying the goods, and even, perhaps, offering a bonus on the first year’s output.

The Commission would call special attention to the letters marked A, B, and C respectively, attached hereto, as pointing to the importance, success, and magnitude of this system elsewhere.

CHARLES HARPER.
Chairman.

Perth, 2nd December, 1892.

A.

From Mr. W. Nelson, New Zealand.
Tomoa, Hawke’s Bay, N.Z., June 27th, 1892.

Dear Sir,

Yours of 29th ult. is somewhat difficult to answer, price of coal, wages, and building material entering so largely into the calculations, also the number of sheep, or rather the amount of meat, you require to keep frozen. Assuming coal to be 20c. per ton, the cost of keeping 10,000 sheep frozen should require to be very small, as the proportion of expenses increases. Half’s machine has been used, though the cost would be greater, as the proportion of expenses increases. We are putting one down here in two months time, and shall by the beginning of the year be able to give you our experiences.
We have just fitted up some large stores in London to hold 200,000 sheep, and have used the De Les Vergne Anatomia machine, which is giving very satisfactory results, and I should prefer it to the Lindb. Taylor's I am sorry I knew nothing of, never having seen one.

It will take about 2,700 cubic feet to store 1,000 fifty-lb. sheep.

We shall be glad to give you any further information at any time.

Charles Harper, Esq.,
Guilford, Western Australia.

I am, &c.,

W. NELSON.

From Messrs. J. Wildridge & Sinclair, Sydney, N.S.W.

Dear Sirs,

81 Pitt Street, Sydney, 29th July, 1892.

On the 30th May we sent you plans and particulars in connection with refrigeration on the Lindb system, but not having heard from you in reply, we are anxious to learn if they were received in due course, and if so would be pleased to learn what probability there is of such works being started in your Colony.

Since writing you, chilling establishments have taken a very sure footing in this Colony on the small plan—to chill 360 sheep per day and make sufficient ice for safe transportation of carriages, at a first cost of about £3,000, including digesters. This plan we can recommend to you owing to their low cost, thus allowing more of them to be distributed over the country.

We also notice that the City of Perth Council have not yet determined on a new Market, but are in treaty with the Perth Ice Company. Should they require an architect to lay out a Market we can recommend for them Mr. R. G. Gordon, the gentleman who has designed and carried out the Melbourne Markets, as a most capable man, and whose work has given that Corporation the greatest satisfaction.

Trusting to hear from you when convenient.

Chas. Harper, Esq., M.L.A.,
Perth, W.A.

Yours, &c.,

J. WILDRIDGE & SINCLAIR.

From the Ladies of the New South Wales Government Meat and Produce Markets.

Dear Sirs,

Ultimo, September 26th, 1892.

Your favor of 14th inst. to hand, and herein I beg to tender my views on the subject of Cool Storages.

SINGING OR WEIGHT.—We estimate that during the journey from Tenterfield, distance 483 miles, to Flemington (Homebush) sale yards, the loss in weight of a bullock, weighing originally 800 lbs, is at least 50 lbs, when trucked alive. This however, is not the only loss, for the beast, being starved, bruised, etc., must of necessity lose its sap—the meat, therefore, is more of a dry fibre than an article of nourishment—to say nothing of the fever which must ensue from want of water, and the general barrenness of a 2½ days’ journey in a railway truck. The chilling process probably reduces the weight of a beast by about 1 per cent.

COMPETITION WITH TOWN SLAUGHTERING.—From experience gained in our Metropolitan Meat Market, we are confident that-slaughtering in towns will eventually be completely abolished. Our system of combating the business is as follows:—The country chilling works are owned by a local company, the Chilling Works for pastoralists to send in their stock on certain dates, and notify the number they intend killing of the week, which includes the supply of ice for refrigerating cars, the manufacture of horns, hoofs, etc., and all other parts to the butcher. The company retains the tongs, tail, which is sold in Sydney Market. On arrival in Sydney, the refrigerating car is run into the siding at the Government Meat Markets (leased by us), where it is received and sold by us. Our markets are fitted with 21 chill rooms, 21ft. by 15ft. by 8ft.
high, and are cooled by a Fasor and De La Vergne machines, both ammonia compression machines, which give splendid results. In the event of the meat arriving when prices are bad, it is at once stored in our chill rooms awaiting an improved market.

We have also cool rooms for the retail butchers, who rent them at so much per week, according to size, the most of them being at 4½ per week; the latter rooms are 90 ft. 3 ft. 6 in. wide, and 7½ ft. high, is capable of carrying 500 dressed sheep of 500 lbs., or 35 bullocks of 750 lbs. The car is divided into two compartments, to enable dairy produce, fruit, etc., to be carried at the same time as meat. There are four ice-makers in each car—one at end of each compartment, each holding about 1000 lb. of ice, which is sufficient to keep temperature at 24° for three days during summer, with a full complement of meat.

I might mention that we have supplied the South Australian Railways with about 24 of the above ice-makers, which are put into an insulated chamber on wheels, thus constituting a refrigerator car. The last of these we sent away about a fortnight since, which goes to show that they are giving satisfaction; I believe that they are principally used for the carriage of fruit, butter, and milk.

You ask about risk of failure in a chilling business; we can only point to the Tenterfield works, which have been running since last February, and sending an average of 35 bullocks and 100 sheep to Sydney daily ever since, without a single failure.

Cost of Slaughtering and Chilling herein.—The Tenterfield Company charges the owners of sheeps sixpence per head, which includes every detail of the business; the charge per bullock is six shillings.

Cooling Machine.—For a small establishment I consider that a machine built on the same principle as the Fasor machine is the best; but for a large establishment I should say the De La Vergne.

This is all that occurs to me at the present time, but if at any time you require information, we shall be happy to give it. In conclusion I might say that we should be very glad to get some sort of an opening in your Colony in the line. Trusting you will have success in your undertaking.

I am, etc.,
ROBERT HUDSON.
p.s. P. R. H.

Charles Harper, Esq., M.P.
Guildford, W.A.

From Messrs. J. and E. Hall, London.

Dear Sirs,

We are duly in receipt of your letter of May 18th, and beg to answer your questions as follows:

1. Cost of a complete plant for treating with fish, flesh, fowl, and dairy produce for 20,000 people:

   The cost of the duplex machines, complete with steam boiler, wrought iron chimney, donkey feed pump, cooling pipes, and brine wells to be arranged within the cold chamber; also all connections between the various parts of the steam engine, boiler, and machine, would be £2,600.

   The cold storage building would be capable of containing 14 tons of meat and provisions, to be chilled each day from 80° to 32° Fahr., and would, in addition, have rooms for the storage of ten days supply; in all, a total capacity of 42,000 cubic feet.

   This should be conveniently arranged in two floors, 10 ft. high each, and 50 ft. long by 42 ft. wide, and the rooms might be partitioned off, and the space let out to butchers, bacon curers, butter merchants, &c., if desired.

   It is difficult for us to give the cost of the buildings, as these are affected entirely by the cost of the materials and labor, but at home the cost of the insulated building with galvanized iron roof, supported by cast-iron columns, including also the engine and boiler house, would be about £1,220.

In addition to the above a small ice tank would be required, with moulds for making ice at the rate of two tons per day, the cost of which would be £100.
2. Plant to chill 800 sheep per day, and make sufficient ice to convey same 300 miles:

The system of preserving meat by means of ice is objectionable on several accounts, as it maintains the air in a moist state, the temperature is not sufficiently low, and the cost in ice is very high. We would therefore propose to maintain the insulated trucks at 30° to 35°, with a perfectly dry atmosphere, by means of a storage of cold brine contained in a shallow tank, placed close under the insulated ceiling of the truck. This tank would be filled with filling and emptying pipes passing through the end of the track in such a manner that after being filled with chilled meat, for conveyance to a distance, the brine which had been put into the tank on the previous day would be drawn off and replaced by freshly cooled brine, at say 10° Fahr. By this means the temperature of the car would remain for 20 or 30 hours below 35°, and all the moisture contained in the air would be deposited upon the tank in the shape of snow, thus producing a dry air, which is so necessary for satisfactory cold storage.

In order to chill 800 sheep daily, and to provide the necessary brine for the conveyance of this quantity, in say 10 trucks, containing 80 sheep each, suspended at 15m. centers in one direction and 12m. centers in the other, we would recommend a pair of our No. 10 machines, arranged duplex. The system of working would be to run these machines for 12 hours for cooling brine for chilling the sheep, and the storage tank containing the brine for the supply of the trucks.

The cost of this plant would be as follows:

Two No. 10 machines, arranged duplex, with compound engine; set of brine walls and pipes for cooling 800 sheep per day, from 75° to 35°; boiler for driving steam-engine, with wrought iron chimney; donkey pump; all pipes and connections between the various parts of the plant; two tanks for containing the warm brine, which is drawn off the incoming trucks, and the cold brine with which it is to be replaced, with hair felt lagging covered with timber, £25,825.

The cost of fitting each railway truck to carry the necessary quantity of cold brine to obtain the results mentioned above would be £250.

The cost of a building consisting of two chilling rooms, each capable of containing 800 sheep, and having a capacity of 3,600 cubic feet, including roof and foundations, also engine and boiler house, with boiler setting, would be £220.

3. The cost of running each of the above plants per week would be as follows:

<table>
<thead>
<tr>
<th>Cost of Running per week.</th>
<th>No. 9 Machine.</th>
<th>No. 10 Machine.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coals, 801 b./p., at 42lbs. =120lbs. per hour</td>
<td>9 tons</td>
<td>10 tons</td>
</tr>
<tr>
<td>One engineer, day work</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>One stoker, day work</td>
<td>20s.</td>
<td>15s.</td>
</tr>
<tr>
<td>One greaser, night work (does own stoking)</td>
<td>20s.</td>
<td>25s.</td>
</tr>
<tr>
<td>Oil, stores, and chemicals</td>
<td>12s.</td>
<td>15s.</td>
</tr>
</tbody>
</table>

With regard to the type of machine for which we have quoted, although we have made over 200 cold air machines for freezing, storing, and importing frozen meat during the last three or four years, we have brought out this new type of machine, of which we have made upwards of 50 installations, including of Napier; and we have also fitted these machines on board ship for importing frozen meat in cargoes of themselves, and have now entirely superseded the older type of machines. We are at present fitting Australia, as you will see by the catalogue which we are sending you by this mail.

Messrs. James Nelson & Sons, of Liverpool, who have been large users of cold air machines, and have lately tried ammonia machines by the boat makers, have ordered no less than nine machines from us on this new system, and they inform us that they find the coal consumption to be 34th the amount required by the dry air refrigerator for storing purposes, and 4th for freezing purposes.

Under these circumstances we have not thought it advisable to quote you for cold air machines, as we presume you are anxious to have the most modern appliances which have at the same time given proof of their efficiency and certainty of action.

We enclose herewith a description of a freezing plant lately started in New Zealand, fitted with one of our new machines, and also some other printed matter referring to them, and we shall be happy to give you any further information that you may require and to prepare drawings on receipt of your reply.

Yours, &c.,

J. & E. HALL, Limited.
E. Hesketh, Managing Director.

Charles Harper, Esq.,
Chairman Cold Storage Commission, Guildford, Western Australia.
DEAR SIR,

In answer to your inquiry as to cost and efficiency of the Linde British Refrigerating Co.'s machines, we have now the honor to forward the information requested—1st. A description of the machinery and following answers to your several queries, accompanied by two complete plans of country plants for chilling works, such as we are now establishing in New South Wales, to be wrought in conjunction with the city markets and freezing establishments for export.

DESCRIPTION OF THE LINDE CO.'S SYSTEM OF REFRIGERATION.

This system is exceedingly simple, is based on the evaporation of liquid anhydrous ammonia at a low temperature, the heat necessary for this evaporation being abstracted from surrounding bodies, which are thus reduced in temperature or refrigerated. The ammonia vapour having served its purpose in the refrigerator is then, by means of compression and cooling in a surface condenser, again brought back into the liquid state, and flows into the refrigerator as required and repeats the cycle of operations.

The apparatus necessary for the Linde process consists first of three parts—either for the making of ice, cooling liquids, or refrigeration, and comprise:

1st. The Refrigerator or Evaporator, where the cooling process is performed.
2nd. Compression pump, which continually draws in from the refrigerator the vapour which has been generated, and compresses it, forcing it into the condenser coils.
3rd. Condenser, where the heat is abstracted from the ammonia through the medium of circulating water.

For ice making, the tank containing the moulds in which the ice is formed is generally made rectangular in shape, case with an insulating material. Continuous pipes run the whole length and breadth of this tank, through which the ammonia vapour circulates, carrying off the heat from the brine contained in the moulds, and thus the ice is formed. For pure crystal ice a special distiller is supplied, but for commercial ices the ordinary city water, filtered, is generally used.

Cooling liquids is accomplished by either the use of chilled brine or by flashing the ammonia vapour direct through coils inside of circular iron tanks. This can be carried on to any extent, and by the Linde Co.'s system of compound refrigerating coils, great economy has resulted; the system is now much used by brewers and for chilling milk.

APPARATUS FOR TRANSMITTING THE COLD PRODUCED IN REFRIGERATORS TO STORAGE OR CHILLING CHAMBERS.

This apparatus—which is termed the cooler—is a shallow open tank containing the refrigerator-coils and filled with brine, somewhat similar to the ice tank, on which is mounted a number of slowly revolving transverse shafts, and on each shaft is fixed a number of parallel discs partly immersed in the revolving transverse shafts, and on each shaft is fixed a number of parallel discs partly immersed in the circulating water. By this means the air, passing between the discs spaces on the revolving shafts, becomes cooled, and is circulated through ducts having the essential point required to a perfect cool the air, being purified, is returned perfectly dry, which is the essence of the system adopted and the preservation of consumable food. Wherever this system has been adopted it is admitted that the meat has been improved in quality.

EFFICIENCY.—It is claimed by the Linde Company that their machines give a higher ratio of efficiency than any other machine in existence on a smaller consumption of fuel and circulating water, and coupled with their several patents for promoting the high-class workmanship and material, and with the several other orders are anticipated. In Victoria the Queensland two machines are being erected, and several other orders are anticipated. In Victoria the Queensland two machines are being erected, and several other orders are anticipated. In Victoria the Queensland two machines are being erected, and several other orders are anticipated. In Victoria the Queensland two machines are being erected, and several other orders are anticipated. In Victoria the Queensland two machines are being erected, and several other orders are anticipated.
Following are the answers to your several queries, and trust the information will be sufficient to warrant your Government proceeding with works which, in our opinion, would be of immense value to your Colony.

Yours, etc.,

Charles Harper, Esq.,
Chairman Cold Storage Commission, Perth, Western Australia.

[Enclosure No. 1]

Description and estimate for an installation to supply the requirements of 20,000 people. Assuming, for calculation, an average consumption of 50lbs. of meat and fish per day, is equal to 27 tons, added to which we allow 1,500 gallons of milk, all to be cooled to about 35 degrees F., and the production of 9 tons of ice per day, would require a No. 6 Linde machine, with two No. 2 ammonia compressors.

The rooms to be chilled would have a capacity of about 20,000 cubic feet, allowing 12 feet height; this would leave ample space for passages and sub-divisions for produce dealers and butchers. The floor space required for this plant completely erected without duty, but with all other expenses, we estimate at £8,500, including well.

The complete plant would consist of the following parts: One Linde No. 6 compound condensing engine, driving two 3.5 Linde compressors—one compressor to be used making ice only, the other for refrigerating of rooms and milk.

Two patent disc coolers, one for meat rooms, the other for fish room, to prevent any possible contamination of this food with the other.

Two thousand gallons galvanised milk tanks, with all necessary cooling coils, draw-off taps and cleaning appliance.

One ice-tank, complete with agitating crane, tipping gear, thawing tank, and twice the quantity of moulds required for one day's output.

One distiller.

Two ammonia condensers.

One Worthington duplex steam circulating pump, with piping to draw from well and discharge into condensers, the engine, the other to be held in reserve. This we advise to allow of cleaning one boiler out at the time without stoppage of machinery.

One steam feed pump for boilers.

One feed water heater.

The foregoing estimate is for the complete plant erected ready at work, but without any insulation for ice tank coolers and ducts, or chimney, which would be included in architect's estimate. It is nearly possible for us to give a design for this plant without having from you some information as to the establishment proposed to be erected, but on receipt of same we would complete design by placing all machinery in position, or, if requested, we would supply you with a complete design and specification for markets to suit, say the city of Perth.

We may add that the chill rooms can be utilised as freezing rooms if required, longer time only being necessary for this work, which, in the case of mutton is three days, and beef, in quarters six days. The working expenses for the above plant would be as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Engineer, 14s. per day</td>
<td>£4.00</td>
</tr>
<tr>
<td>Three Foremen, 9s. per day</td>
<td>£14.00</td>
</tr>
<tr>
<td>Two Servants, 9s.</td>
<td>£1.70</td>
</tr>
<tr>
<td>Food, 2 tons of coal at 30s.</td>
<td>£2.16</td>
</tr>
<tr>
<td>Stores, oil, 6s., 10s.</td>
<td>£1.16</td>
</tr>
<tr>
<td>Fresh water</td>
<td>£1.10</td>
</tr>
</tbody>
</table>

Six days per week £229.14.0

[Enclosure No. 2]

Description and estimate of a complete installation and building capable of chilling 800 sheep per day and making sufficient ice for charging isolated cars to carry same from districts distant from 50 to 200 miles per rail.

The establishment would consist of three chilling rooms and ice room, cattle and sheep pens, slaughtering and hanging chambers, boilers, engine, and ice-tank rooms, degreaser, tallow and hide rooms, the whole to be a complete utility for production, in the manufacture of tallow, remainder for pig food.

Buildings to be constructed of timber and weatherboards, with galvanised corrugated iron roof, built on brick piers or foundations; slaughtering and dressing pens, hanging and chill rooms, occupy two-thirds of the space. Boiler, engine, and ice-tank rooms are arranged at one end, and occupy the remaining portion of the whole building, as per plan.

The complete arrangement is so that the cattle and sheep will be led from one side into the slaughtering pens, then killed, dressed, hung on rails and passed into the hanging chamber, which is fitted with rails so arranged as to on into either chill room as desired, the stalls being so arranged to contact with those on hanging chamber. From 10 to 20 hours is sufficient to draw out the viscous blood and chill the meat to a temperature of 38 degrees F., when it is ready for dispatch. Each room is capable of holding 200 sheep, two of which only are to be used in one day, the third...
being used more for a reserve or storing room. A sub-division of ice-room is made for market produce or fruit if required. A delivery platform, having verandah roof, would be constructed at railway siding for the protection of the meat when being passed into cars.

Machinery would consist of a No. 4 Linde Compound Engine and Compressor, one ammonia condenser, one patent disc air cooler, one ice tank complete with refrigerating coils and ice models and all necessary pipes, pipes, and ammonia conduits, one circulating water pump, one economic 20 horse-power tubular boiler, with feed pump, and all steam and water connections complete, capable of chilling 800 carcasses of sheep (40 lbs. weight each) to 30 degrees F., or equivalent weight in beef, and simultaneously making two tons of ice per day.

For the economic working of such an establishment we attach a method of treating the offal, which is caught in trucks running underneath the slaughtering pens, and thence conducted into two large wrought-iron boilers or digestors, where the whole is boiled down for the recovery of naph; the solid matter and soup remaining is then used for feeding pigs in an adjoining paddock.

Our estimate for the foregoing establishment complete, is as follows:

- Machinery and Boiler ........................................... $2,700
- Buildings complete, including meat rails .................. $4,300
- Digestors and Connections .................................... $2,900
- Total Estimate .................................................. $7,900

Working Expenses:

- One Engineer, 12s. per day.
- Two Firemen, 9s. each per day.
- One Ice man, 9s. per day.
- Fuel, 2 cords of wood, 41s. 10d. per day.
- Stores, 5s. per day.
- Six days as a week—£2 12s.

As machinery for making mutton is very expensive, unless large numbers of cattle and sheep are to be treated, we would not advise taking this into consideration.

We attach a smaller plan, marked No. 3, of an establishment similar to No. 2, but on a smaller scale, and suitable for country districts, but connected by rail to various centres of population for daily supplies of food, and suitable for country districts. This plan will be forwarded in the near future, and will be sent to any interested parties on application.

Working Expenses:

- One Engineer 12s. per day.
- One Fireman 10s. 6d. per day.
- One Attendant 9s. 6d. per day.
- One cord of wood 15s. per cord.
- Stores 2s. 6d. per week.

Both estimates are based on the assumption that water is available for condensing and boiler requirements.

Cold Storage for butchers in Sydney is charged for at the rate of 1d. (one farthing) per lb. per week.

Yours, etc.,

J. WILDEIDGE & SINCLAIR.


May 11th, 1892.
Colonies, and that the first cost and working expenses are considerably lower than those of any of the imported machines.

We would be glad to furnish you with any further information you may require.

We are, etc.,

HUMBLE & NICHOLSON.

per C. G. B.

To Clas. Harper, Esq.,
Chairman Cold Storage Commission, Guildford, W.A.

[Enclosure.]

Replies from Messrs. Humble & Nicholson to Questions by the Chairman of the Cold Storage Commission, Guildford, W.A.

Question No. 1.—The cost of a Refrigerating Machine, with chilling and ice-making apparatus, as per plan marked “A” (f.o.b. in Melbourne), and erecting same at Perth, guaranteed to cool 25,400 cubic feet of storage to 32° Fahr., and to make four tons ice daily, cooling water for the machine at 65° Fahr., would be three thousand eight hundred pounds

Steam boiler for ditto, two hundred and thirty pounds

£3,800 0 0

230 0 0

£4,030 0 0

The above price being subject to the following conditions:—“You to pay fitter’s expenses and wages while travelling from Melbourne to Geelong to the place of erection and back; and board while erecting the machine, also freight or carriage and all expenses on machinery, etc., from Melbourne to purchaser’s premises, and all carpenter’s work in connection with same; also find salt for brine and rock salt for tanks, also ammonium.” This plant consists of one Taylor’s patent Improved No. 4 Refrigerating Machine, with apparatus for cooling the storage chambers, and five ice-making tanks with ice moulds to hold five tons ice.

Question 2.—The cost of a Refrigerating Machine, with chilling and cold accumulator apparatus, as per plan marked B (f.o.b. in Melbourne), and erecting same in Western Australia, guaranteed to chill 800 sheep daily, and to supply sufficient cold power to truck same by rail for a 24 hours’ journey, cooling water for machine at 65° Fahr., for the sum of three thousand eight hundred pounds

Steam boiler for do., price

£3,800 0 0

230 0 0

£4,030 0 0

The above being subject to the following conditions:—“You to pay fitter’s expenses and wages while travelling from Geelong to the place of erection and back; and board while erecting the machine; also freight or carriage and all expenses on machinery, &c., from Melbourne to purchaser’s premises, and all carpenter’s work in connection with same; also find salt for brine and rock salt for tanks, also ammonium.”

This consists of one Taylor’s Patent Improved No. 4 Refrigerating Machine, with apparatus for chilling chambers; four accumulator tanks, to hold 10 tons of accumulators; and 416 accumulators, 16t. each, for railway refrigerating cars.

Question No. 3.—The weekly cost of actual working of a No. 4 machine in Melbourne, not including water, is as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>£</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Engineer</td>
<td>3</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>2 Firemen</td>
<td>5</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>7 Tons coal</td>
<td>7</td>
<td>0</td>
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£17 10 0

Question No. 4.—Butchers pay 30s. per week for each of the 22 compartments in chamber A on plan A.

Question No. 5.—We have not at present made up the cost and particulars of a slaughtering plant as described.

HUMBLE & NICHOLSON.
RESULTS OF COLD STORAGE IN AMERICA.

In discussing the difficulty of disposing of exhausted dairy cows, the American Dairyman has the following:—"Before the days of Chicago beef, when each town had its quota of butchers, who slaughtered for the local trade, there was no difficulty in disposing of them at fair rates, but that is all changed. In very many communities the slaughterhouse is a thing of the past. There are no longer any butchers—we have in their place vendors of meat, who simply buy and cut up carcases slaughtered in "the far West and sent East in refrigerating cars."

Secretary Government Railways of New South Wales to General Traffic Manager, Perth, Western Australia.

SIR,

Adverting to my letter of 15th March last, relative to louvered box wagon and insulated box wagon, and with reference to your telegram of 18th instant stating that photographs had not been received and asking cost of the wagons when in running order, I have the honor to inform you that the cost is as follows:

Louvered Box Wagon £196 17 0
Insulated ... £365 10 0

With regard to the photograph of an insulated box wagon promised in my letter quoted above, I regret to say that from various causes I have not been able to get one prepared, but hope to do so within the next few days, when a copy will be at once forwarded to you.

I have, &c.,

H. McLACHLAN, Secretary.

J. Davies, Esq.,
General Traffic Manager, Railway Department,
Perth, Western Australia.

MINUTES OF EVIDENCE.

Wednesday, 18th May, 1882.

Present:
George Readill, Esq., M.L.A.
A. R. Richardson, Esq., M.L.A.
W. T. Lenton, Esq., M.L.A.
John Davies, Esq.

Examination of B. G. Wood, Commission Agent, &c.

Question 1. By the Commissioner.—We are making some inquiries into the possibility of benefiting local trade and industries by some system of preserving perishable goods or produce by means of cold storage, and the Commission have asked you to come and give us some information. We understand you have had something to do with the importation and sale of butter, bacon and hams, and that stand you have had something to do with the varying of prices at different seasons of the year for all kinds of dairy produce. You are aware it is a fact that at certain seasons of the year they are.
2. What are the peculiar months, or those any regularity in the fluctuation?—Not a great deal of regularity, it depends on a deal, I think, as regards the butter trade, on the season they have in the other colony.

You think the season in the other colonies regulates the prices here more than the local seasons?—Most certainly I think so. I have not much to do with the local butter trade during the last three years, but I have found it as.

Does it apply to other things besides butter?—There is not a great difference in bacon and ham, I think; it is chiefly in butter.

And cheese?—A penny a pound would cover the difference all the year round. It is more in the under trade at this time of the year very high in Melbourne, but in New Zealand to July.

Butter is so much in your way?—You may say there is no regular market for poultry, especially in butter. Butter at this time of the year is very high in Melbourne, but in New Zealand to July.

Poultry is not much in your way?—You may say there is no regular market for poultry. There is no regular market for poultry at this time of the year. It is more in the under trade at this time of the year very high in Melbourne, but in New Zealand to July.

What about eggs? Do they fluctuate in the same way as dairy produce?—Almost entirely, just as the supplies for the local market come from the other colonies; I mean for biscuit people-

What season of the year is the greatest scarcity of eggs?—In cold weather they are scarce; they are generally plentiful in the summer months.

What is the range of price for eggs at our cheapest season up to the dearest?—I have seen them as low as 5d. a dozen, sometimes up to 1s. 8d. and sometimes up to 2s. 6d. and 3s. 6d.

In 1s. 6d. a dozen, the maximum?—I think you must say 3s. 6d. as the maximum, wholesale not procurable locally. I would tell me the other day he was at a standstill until a steamer came in from the other colonies.

Then we might say that the local supply at certain seasons of the year is—?—Yes, at

What is the greatest fluctuation in butter?—I have seen it at 3d. or even 2d. in Melbourne, and, without any cases at all, it goes up to 1s. 6d.

If you sell, you think the Melbourne prices rule our local prices?—Yes, I think so. If it were not for butter, what would be the rule?—It is not easy to tell from certain points in this market, and the local demand is also. The same as Mr. Bannister's. What is the price of butter?—I think it is 1s. 6d. a pound, the all-round price for butter at this time of the year.

Would you tell me at what season of the year there is a surplus of supplies of these articles?—I should say about the end of the season of the season; October, September, and up to November.

From your experience, at that time of the year is the supply we may buy any small or somewhat excessive?—I think it is at the end of the season.

More than would be consumed from week to week?—Oh, yes, certainly; more than could be readily consumed.

In your experience when in business had you rather decline to make local produce at that time of the year?—You, at certain seasons of the year I would prefer declining to take it.

And the determination, of course, you mean to sell us something about that, what the determination depends on much on the market. Will Smith's butter will keep a long time in a fair, well-cooled store, and will not go so well, unless the butter goes bad.

What has been your experience of butter when left to your various districts at that market?—Not in a good condition as much as usual. From what came?—The heat, I think, chiefly, during transport. Very often you see lots of butter being sent out to the various districts, especially to the Flinders jetty.

Butter of better quality would never again be sold?—It never recovers itself.

If it is the same with other dairy produce, bacon, hams, or pork?—Yes, with bacon and hams; but not so much with pork.

At certain seasons the local supply is plentiful;—Yes, very plentiful. Four or five months, say, you would get a lot of it in the market, 5d. or 6d. a mile, as some come only at the end of the pig season, and some from Melbourne, and the marks of such a lot, every pound of it went bad. Since I get yours about the market, it was perfectly good when it arrived in Melbourne, but it was sold under a penny a roll.

Do you think the existence of a Cold Storage Depôt would obviate these difficulties?—If it would, if the changes were not too high.
2. What is the particular month, or is there any regularity to this fluctuation? Is not a good deal of regularity in the prices of eggs as good a good deal as in the other commodities?

3. You think the season in the other columns regulate the price here more than the local market.

4. Does that apply to other things besides butter? Is there not a great difference in butter and eggs in the local market?

5. And cheese? A pound a pound would make the difference all the year round. It is queer, especially in butter. Local at this time of year is very high in Melbourne, but not in New Zealand. Other composites, to pay.

6. Fermentation but not in your place? You may say there is no regular market for putridity. Supplies do not come through the hands of people of the right class. Fergusson's take them rent whilst.

7. What about eggs? Is it fluctuating in the same way as dairy produce? Yes. There is no regular market for putridity. Supplies do not come through the hands of people of the right class. Fergusson's take them rent whilst.

8. What time of year is the season, the continual scarcity of eggs? In cold weather they are plentiful; they are generally plentiful in the season mixture.

9. What is the range of prices for eggs at the season changes up to the season? I have sales, as far as I know, up to 26s, and sometimes up to 26s 6d.

10. I am in, 26s, about the maximum? I think you might be 26s, but the maximum, as far as I know, is 26s 6d. You cannot get much of it with eggs fairly.

11. In 26s, about the maximum? I think you might be 26s, but the maximum, as far as I know, is 26s 6d. You cannot get much of it with eggs fairly.

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