prehended that the buyer who selects from a farm carrying anything between 10,000 and 100,000 must perforce remove many wethers utterly unfit for the meat market. The freezer has probably extensive paddocks, but he cannot fatten up the great quantity of store stock which arrives together with the fat wethers: they must alike go to the butcher's knife, and so the Argentine mutton which comes to the European consumer is of inferior quality and more uneven than that exported from New Zealand.

Nevertheless, the conversion of the freezer into a mere commission agent is not the most felicitous solution of the frozen mutton question. There must exist some intelligent observation of the market to determine when to remit supply and when to withhold it. The breeder is not in a position to do this, and the individual effect of his own produce would not materially influence the price list either way. The freezer should assuredly be an interested party. The best system, therefore, and one already in some use in the Argentine, is to establish a scale of prices proportionate to the dead weight return of the sheep sent in by the breeder. This would alike stimulate the sheep raiser to turn out wethers of an even weight and quality, and secure to the freezer remunerative prices in the home market. It rests with the breeder to study the matter more closely, and have a care that no wether shall leave his run which does not reach the necessary weight and is not in the condition to fit it for the butcher's knife. In a previous chapter I have pointed out how the breeder should commence an inspection of his flocks immediately after shearing, and from time to time select those wethers he finds in sufficiently good order to remit to the freezer. He can go further. He can have a special paddock for the fattening of his wethers, and draft them from thence to the market. And he will find that in every step he takes toward improving the present stupid method of selling he will be gladly met half way by the freezer.

The mutton freezing process is one of great interest, and a visit to any of the principal establishments cannot fail to impress the visitor with the skillful organization and care of detail to be noted in every department, from the killing yards to the shipment of carcasses for Europe. Messrs. Sansinena's great killing place on the outskirts of the city of Buenos Ayres, and conveniently situated on the banks of the Riacho, a navigable river connected with the port and harbor of the city, has provided one or two illustrations for this chapter.

The sheep are introduced from the sale and receiving yards to large pens under roof. Here are slaughtered those destined for the local market, the number daily disposed of in this manner amounting to about 400. Those selected for the frozen trade, which are generally superior to those for local consumption, are driven up to the far end of the yard, where the preparations for slaughtering are more elaborate. The floor is concrete, and water is constantly being played over it. The sheep, whose death is instantaneously occasioned by the skilled thrust of the butcher's knife, is laid on a trestle or board covered wheelbarrow. Here the skin is partially removed, viz., at the legs and around the head. The body is then suspended on hooks and the skin entirely removed by another man, who also disembowels the carcass, takes off the head and trotters, and ties the forearms up with twine to give the body that neat trussed-up appearance so necessary for the home markets. Up to 1,700 can be slaughtered for the freezing trade per diem, making with those destined for local consumption, a turn-over of 2,100 in all.

To follow the carcass first: It is conveyed to the scales and weighed, being sorted according to its weight. It is then hung up in a cooling room in order to be chilled, and left there until five o'clock in the afternoon. From thence it is hoisted by means of an ingenious elevator to the freezing chambers, where, robed in its clean linen cloth, it hangs for a period of not less than forty-eight hours in the dark, frost-covered vaults. Before it is placed in the freezing chamber it is weighed again; and still once more before shipment, making three different weighings in all.

The capacity of the freezing chambers amounts to 60,000 carcasses at one time.

The freezing is done by an eighty (nominal) horse power machine, the system being that of ammonia (De la Vergne). Another engine of the same capacity is at present being introduced.

The bowels and blood are run through drains, and by means of siphons the blood is run off and wasted. This is at present the only part of the animal which is not utilized by the company, but experiments are being made at the present time to find employment for this matter.

The intestines have all particles of grease removed from them, and are cleaned and sold to make sausage skins and guitar strings. The head, odd scraps of fat, paunch, and general offal are boiled down and refined, and the tallow is sold for exportation. The kidneys and tongues are sent home in a frozen state.

The kidney fat and fat robing of the entrails is put through an ingenious and remunerative process. While still hot, it is placed in large iron tanks, where a constant play of water soon renders it stiff. It is then broken up by machinery, rendered down and refined, until at last it comes out a fine yellow mass not unlike a puree of potatoes, and as pure and sweet as butter. It is removed to a warm room, placed in clean napkins, and subjected to hydraulic pressure. As grease becomes liquid at a temperature of 35° C., and tallow remains solid up to a temperature of 52° C., the temperature of the press room is kept at 40° C. The result of this is that the grease runs off the press in a liquid state, and the tallow remains still solid in the linen napkins. The grease, which has by this process been brought to an extreme of refinement, is put up in tins and sold for cooking purposes. It is termed "Oleo Palmatina," and the demand for it is greatly in excess of the supply. The tallow, which is of a superior quality to that obtained from the head and offal, is sold apart, generally for warm countries, where it is mixed with the commoner tallow to make candles. As this tallow will not melt at a lower temperature than say 45° C., it is in great demand in those countries where the climate is an extremely hot one. Its value is about 15 per cent. greater than that of ordinary refined tallow.

Thus every portion of the sheep is utilized with the exception of the blood. And it is probable that even

for this there will shortly be found a profitable employment.

In the smaller freezing stores the curious visitor will see all manner ofainties—partridges, asparagus, fish, sucking pig, and what not. These little branch industries are by no means unimportant; and such items are not only largely employed in the commissariat of passenger ships, but also have a ready exit in Europe, where they arrive at a period when they are out of season in the old world.

Messrs. Drabble Brothers, John Nelson & Co., O'Connor & Co., and others, have also large establishments for freezing mutton, more or less upon the same system as Messrs. Sansinena.

There has recently been established in the vicinity of the town of Quilmes, about twenty miles from the city of Buenos Ayres, an extensive industry for canning and tinning both beef and mutton. This enterprise, entitled the Highland Scot Tin Canning Co. (Hercules machine), is prepared to exploit the stock of the Argentine upon an extensive scale. In addition to the elaboration of 1,000 and upward head of cattle per diem, the factory can turn over 2,000 head of sheep daily, freezing those carcasses most convenient for exportation in a frozen state, and canning the mutton of undersized and inferior breeds of bleaters. This industry is of great moment to the stockmaster, for it provides him with a market at unseasonable times, when a threatened drought or flood makes it necessary for him to dispose of a great number of his stock in little space of time.

The breeder has therefore a most promising outlook for the disposal of his surplus increase, the present demand of the combined frozen, live stock for importation, and local consumption markets amounting to about 4,500,000 head of sheep per annum, or say 6 per cent. of the total stock of muttons at present existing in the republic. If the breeder has a care to continue the improvement of the quality and condition of his butcher stock, he has every right to look forward to a bettering of prices and a wider demand for his wethers.

[FROM ICE AND REFRIGERATION.]

FISH FREEZING.

By D. W. DAVIS.

LAKE fish—white fish and trout—have been supplied to the markets of the country after the close of the fishing season by the fishermen on the Great Lakes since the year 1868. Before that time, when navigation closed in the fall with the coming of ice in the straits and in the harbors, the supply of fish pretty generally ceased; but in 1868 a few tons of white fish were frozen artificially, and since then the business has steadily increased from year to year, the estimated quantity handled in 1893 being 3,000 tons.

In freezing fish the stock should be perfectly fresh and should be frozen quickly and at a low temperature, as freezing does not improve the quality of the stock, but simply prevents its decay. The time occupied in freezing in "The Davis Freezing Pans" is generally about six hours, when the pans are properly packed.

These freezing pans are made of No. 24 Junieta galvanized iron, twenty-eight inches long, fourteen inches wide and three inches deep, fitted with a cover two and a half inches deep. The corners of the cover and pan should be turned, riveted and soldered, so as to be water tight.

The fish are packed in the pans, backs up, so that when the cover is put on it will be in contact with the fish. This is very necessary, for the fish must be in contact with the iron and the freezing mixture in contact with the metal to produce rapid freezing.

After the fish are placed in the pans, these are packed in nonconducting boxes or bins between alternate layers of fine ice and salt, where they remain until the fish are frozen solid. About thirty pounds of Diamond salt to 100 pounds of ice is a good proportion. It should be well mixed, and should be put into the bins in layers about four inches thick between the two layers of pans. This produces a temperature almost as low as zero, F., on the outside surface of the pans, and the fish being in contact with the inside of the pan, it will be readily understood that the fish will freeze very quickly. After the fish are frozen they are removed from the pans to the storage room.

Naturally at this low temperature, the fish being moist, they freeze solidly together and also to the pan. To remove them, pour cold water on the pan, which will draw the frost sufficiently from the iron to allow them to be removed without breaking a scale.

After the fish are taken from the freezing pans, it is necessary to put them in the cold storage room as soon as possible, but before they are stored away they should be dipped in ice water for a moment, which will cover them with a thin film of ice, about a thirty-second of an inch in thickness. It makes no difference how low the temperature is, there is a certain amount of evaporation going on all the time, and by coating the fish in this way it prevents the evaporation of the juices of the fish just so long as the coating lasts. Fish frozen and treated in this manner and kept in a temperature of 12° below the freezing point of water, can be perfectly preserved for four to five months in a perfect condition. Fish not treated in this manner, in a very short time get discolored and lose their flavor.

The temperature of the storage room should be about 20°, or 12° below the freezing point. The cakes of fish should be put in boxes, in which case the chances for evaporation are very much reduced, and the fish keep better.

It is best to always freeze fish just as soon as it is possible to get them from the water, since the fresher they are, the finer the flavor, and this flavor does not deteriorate in freezing. It is impossible to put a coating of ice on the fish, after they are taken out of the freezing pans, of sufficient thickness to last for a length of time more than stated, owing to the great evaporation in the storage rooms.

Fish dry out about two and a half pounds to the hundred in freezing, but gain five pounds in a hundred by the coating process.

It is not necessary to dress fish before freezing. The less fish are handled the finer they will remain. Fish in the natural state handle and look better than dressed stock.

The above description is freezing by what is known as the dry process, and is used by all dealers in the United States and Canada, all patents having expired.

A process of freezing fish in ice, patented in 1880, by the author, may be deemed worthy of notice. By it the fish are handled and go through the same process of freezing as above described, except that they are packed in fine pulverized ice in the pans before being frozen, and when taken out of the pans the fish are so solidly embedded and frozen therein that they are part of the crystallized water; in fact, they are hermetically sealed and incased in a crystal jacket. Fish thus frozen and preserved have all the appearance of stock just taken from the water, as everything belonging to the fish is in the same natural condition that it was when alive in its native element, except that animation is suspended by the packing and refrigerating process; and so long as they are kept in this state there will be no change in their color, texture or taste, for they are hermetically sealed in ice; there is no chance for evaporation to take place, and the fish retain all their flavor and juices, and can be kept for ages in a fresh and perfect state.

"At the beginning of the present century a Siberian hunter discovered an entire mammoth frozen in a mass of ice and another has since been found, both of which were so perfectly preserved that microscopic examinations of sections of some of the tissues were able to be made. It was found in Siberia, and the bones were set up and are now in the museum at St Petersburg," says the Encyclopædia Britannica, Vol. VIII., page 125, ninth edition, under the heading of "Fossil Elephants."

"In 1800 a Russian naturalist, Gabriel Sarytschen, discovered the body of a mammoth wrapped up in a shroud of ice, and the body was in a complete state of preservation, for the permanent contact of the ice had kept out the air, and prevented decomposition; the waters had disengaged the mammoth, which had been imprisoned in ice for thousands of years," says "The World Before the Deluge," by Louis Figuier.

The inference from the quotations is obvious.

HOW RUBBER BULBS ARE MADE.

IT is commonly supposed by the uninitiated that the "bead," or raised line, that encircles a bulb shows the joining of the pieces of which it is made. The fact, however, is that the pieces or original parts of the bulb are invariably joined at right angles to the bead line. Long bulbs, such as syringes and atomizers, are made of two pieces; round bulbs, as pumps and balls, are made of three pieces. New and unique styles that call for variation from the established modes are daily encountered. A competent pattern maker, however, will find little difficulty, as a general thing, in so joining the parts as to secure the best results, both in vulcanizing, where the even swelling of the article must be considered, and in wear and tear, where the seams must run so as to be protected as much as possible by the general contour of the bulb.

After the pattern maker has decided by measurement and experiment upon the shape and size of the parts which go to form the bulb, zinc or galvanized iron patterns are made and given into the hands of the cutters. Mixed sheets of the required thickness being spread and afterward cut into convenient sides or squares, the bulb making begins. Each piece cut must have distinctly skived edges. Considerable care is necessary in this, as the strength of the seam depends upon the smooth fitting of the edges. The three parts for hollow balls may, however, be cut with a die. The pieces when cut are arranged in large books with leaves of smooth cloth. If the bulb has a neck, small pegs of iron are first prepared by being cemented and wound with strips of rubber as a nucleus for the neck. The two or three parts of the bulb are then brushed with cement the whole length of the skived edge, after which they are thoroughly heated.

When thoroughly warmed and softened, the bulb maker, taking a prepared peg, places the neck of one piece on one side of the rubber core, and another neck piece on the opposite side, then presses them firmly together, and rolling the whole tube-shaped piece between thumb and forefinger, has finished the neck of the bulb. The next process is that of knitting the edges which form the seam. Holding the finished neck toward him in his left hand, with the thumb and forefinger of the right he pinches the edges firmly together for nearly the whole distance round. The shape is now not unlike that of a "long clam." Into the side aperture, which is left open, is poured a little water or liquid ammonia. The opening is then made still smaller, and as a final touch the maker puts his lips to the orifice, and puffing out his cheeks till they look like miniature balloons, blows full and hard into the inside of the bulb. The softened rubber under this sudden pressure expands, the flattened shape is lost in a fuller and more rounded outline, while the operator, with a quick nip of the teeth, closes the opening, the imprisoned air and water holding the sides apart in symmetrical corpulency. There are those who can never learn the knack of blowing up a bulb with the mouth, but are obliged to use a bulb to inject the air.

After the makers have done with the now partly made bulb, it is passed to the trimmers, who, armed with scissors with curved blades, carefully circle the seams, cutting away all unevenness, till the whole exterior is smooth and ready for the mould. In front of the trimmers are a number of shallow pans partly filled with chalk. Into these the bulbs are laid. A small dumb waiter takes them down to the mould room and returns the empty pans. The bulbs on leaving the chalk pans are deposited in a small cylindrical box which, turning a few times, powders them so effectually that the rubber cannot adhere to the inside of the mould. An experienced mould worker now taking one-half of a mould in his left hand, with his right gently forces the bulb into it, capping it with the second half. If the pattern maker has done his part faithfully, each will just fit its mould. If not, they will come out of the vulcanizer wrinkled, showing that it was too large; or, if glazed and imperfect, that it was too small.

A flat iron ring or clamp holds the two sections of the mould together when in the vulcanizer. This is tightened by iron wedges which are driven between the mould ends and the clamp. The moulds after being