issues by the chimney *k,* while below a series of shutters allow access for the various manipulations.

The two drying floors *o, o* are each heated by three flues *q, q, q,*

continuations of those below the pan, within which circulate the heated gases on their way to the main chimney, and on this floor is spread the salt to be dried. The floor of a pan is generally at first slightly arched towards the centre, so that when new a pan

is rather deeper at the sides than in the middle, but they soon flatten out and warp in all directions on being fired. This warping is a great inconvenience, opening communications between the flues and interfering sadly

with the ar­rangements of

these latter

just described,

so much so that

some makers

prefer simple

iron or brick

supports placed

here and there,

without any definite arrange­

ment. On the

Continent the

pan is often

suspended by

iron rods from

the beams of

the roof. The

warping or buckling, the scaling, and the formation of “ cats,” as the workmen call the sort of stalactites of salt which form in the flues, arising from leaks in the pan, are perhaps among the worst annoyances of the saltmakers. The pans are of ordinary

boiler plates riveted together. The plates vary in size, but usually are 2 feet by 4 feet, and rather smaller over the fire. The grate, which should be such as to produce a moderate and diffused heat, is of the ordinary kind, and the firing is usually done from a pit below the end of the pan. In England they use “ slack” sometimes called “burgey”; abroad they use all kinds of fuel—wood, coal, lignite, and turf; and they also in many places are in the habit of protecting the pan from the more intense heat immediately over the fire c by a guard *t* at that particular part. As a means of pro­ducing a diffused and gentle heat without smoke, water gas will probably come to be used by and by. On the Continent the flues are often 2 or 2 1/4 feet high, and in Britain they are usually half that height. As, however, a slow and regular draught is to be aimed at, on the principle enunciated by Mr Fredk. Siemens, the Continental plan seems the more rational. Space does not here admit of a description of the so-called machine pans—the clay pans of the Cheshire Amalgamated Salt Company or Otto Pohl’s system. @@1

In Britain the brine is so pure that, keeping a small stream of it running into the pan to replace the losses by evaporation and the removal of the salt, it is only necessary occasionally (not often) to reject the mother-liquor when at last it becomes too impure with magnesium chloride ; but in some of the works on the Con­tinent, especially those of North Germany, the mother-liquor not only contains more of this impurity but becomes quite brown from organic matter on concentration, and totally unfit for further service after yielding but two or three crops of salt crystals. Some­times, to get rid of these impurities, the brine is treated in a large tub *(bessoir)* with lime; on settling it becomes clear and colourless, but the dissolved lime forms a skin on its surface in the pan, retards the evaporation, and impedes the crystallization. At times sodium sulphate is added to the brine, producing sodium chloride and magnesium sulphate by double decomposition with the magnesium chloride. A slight degree of acidity seems more favourable to the crystallization of salt than alkalinity ; thus it is a practice to add a certain amount of alum, 2 to 12 lb. per pan of brine, especially when, as in fishery salt, fine crystals are required. The salt is “drawn” from the pan and placed (in the case of boiled salts) in small conical baskets hung round the pan to drain, and thence moulded in square boxes, and afterwards stove-dried, or (in case of unboiled salts) " drawn ” in a heap on to the “hurdles,” on which it drains, and thence is carried to the store.

In most Continental countries a heavy tax is laid on salt; and the coarser as well as the finer crystals are therefore often dried so as not to pay duty on more water than can be helped.

The brine used in the salt manufacture in England is very nearly saturated, containing 25 or 26 per cent. of sodium chloride, the utmost water can take up being 27 per cent.; and it ranges from 38 to 42 ounces of salt per gallon. In some other countries, as has been explained, the brine has to be concentrated before use, and every ounce per gallon by which the brine is below saturation indicates a difference of cost in the production from it of salt of about 4 1/4d. to 4 1/2d. per ton. Subjoined are four analyses of brine taken from Messrs Richardson and Watts’s *Chemistry applied to the Arts and Manufactures:—*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Constituents in 100 Parts Brine. | Cheshire. | | worcestershire. | |
| Marston. | Wheelock. | Droitwich. | Stoke. |
| Chloride of sodium | 25·322 | 25·333 | 22·452 | 25·492 |
| Chloride of potassium |  |  |  |  |
| Bromide of sodium | ·011 | ·020 | trace | trace |
| Iodide of sodium |  | trace | trace | trace |
| Chloride of magnesium ... |  | ·171 |  |  |
| Sulphate of potash | trace | trace | trace | trace |
| Sulphate of soda | ·146 |  | ·390 | ·594 |
| Sulphate of magnesia |  |  |  |  |
| Sulphate of lime | ·391 | ·418 | •387 | ·261 |
| Carbonate of soda | ·036 |  | ·115 | ·016 |
| Carbonate of magnesia.... | ·107 | •107 | ·034 | ·034 |
| Carbonate of manganese.. | trace | trace |  |  |
| Carbonate of lime | trace | trace | trace | trace |
| Phosphate of lime | trace | trace | trace | trace |
| Phosphate of ferric oxide. | trace | trace | trace | trace |
| Alumina | trace | trace |  |  |
| Silica |  |  | trace | trace |
|  | 26·013 | 26·049 | 23·378 | 26·397 |

The price of salt at the works may be said to range from 4s. 6d. to 6s. per ton, the former being less than the cost price as given before the British parliamentary commission in 1881. It is there stated to be—brine, 6d.; labour, 10d.; fuel 3s.; rent, interest, &c., 1s.; total, 5s. 4d. Thus the margin for profit is but small, almost the only gain being said to accrue from the lightering, most of the salt manufacturers doing the carriage in their own “ flats.

@@@1 See Spoil’s *Encyclopedia of the Industrial Arts,* &c.