

respect and confidence of the entire fraternity, and holds it together for good, holds it together and makes it *one* as a fraternity. If not for it we would be as a mariner at sea with neither compass nor rudder, all aiming at we know not what, and striving to convince everyone that all are wrong but ourselves. We must have a Standard if we would remain a fraternity.

JAMES M. LAMBING.

Parker's Landing, Sept. 1st, 1880.

Artificial Incubation.

By WILLIAM HENRY THICK, 338 Gloucester St.,
Ottawa, Ont.

No III.

The first intimation we have in ancient writing of the practise of hatching chickens artificially, are to be found in those of Democritus, Aristotle, Diodorus and Pliny. The latter says, "The Roman empress, Livia, hatched an egg by carrying it about in her 'warre bosome,'" and this, doubtless, gave rise to the device, "to lay eggs in some warme place, and make a fire underneath, to give a moderate heat, but evermore the eggs must be turned by man or woman's hand, night and day, and so at set time they look for chickens and had them." (Hollands Plinie.)

On the revival of arts in Europe a method similar to the Egyptian spread successively to Malta, Sicily, Italy, thence to France and England. Alphonsas the second of Naples set up a hatching oven at his country residence; one of the Dukes of Florence also sent to Egypt for a person to superintend an oven for him. Charles the Eighth of France, in 1496, had one built at Amboise, and Francis First, another at Mont-richard. According to a curious entry extant of the expense of the oven at Amboise, we find the following, "Paid Messr. Nicholas Vicens, an Italian, for fourteen days by him taken and employed for working an oven at the said palace of Amboise, for hatching and rearing chickens without hens, which he has done for the King's pleasure during this time, at the rate of four sols two deniers per day, and has been paid, as appears by his receipt, the sum of fifty eight sols, four deniers." If this entry be correct, the Italian could only have partially succeeded in the process, unless he was employed for the last two weeks only, the time of incubation being the same as with the hen, three weeks; although occasionally I have hatched out in nineteen days.

In the "Theatre d'Agriculture," the father of French agriculture, Oliver de Serres, describes a little portable oven of iron or copper in which eggs were placed, surrounded with feathers and

covered with soft cushions, heat being communicated by means of four lamps, but he says it was more curious than useful. Naturally it would be if no attention was given to the proper gradation of heat and turning of the eggs. A like want of accuracy occurs in Aristotle, who says the Egyptians cover eggs with dung in order to hatch chickens, a circumstance quite impossible, although chickens may be hatched by the heat of dung as Reaumur has exemplified, if other conditions are fulfilled. A similar plan was tried by Bradley and Darby, in England, as stated in the Country Gentleman's Director, but here the same want of knowledge occurs. Bradley says he "made a hot bed of dung or tanner's bark, placed the eggs in a vessel like a garden pot, but not so deep, half filled with wool, on which the eggs were placed, and then covered with four inches more wool; this vessel when placed into the hot bed was covered with a glass frame such as is used for cucumbers," and no further attention appears to have been paid, and we are asked to believe that live chickens were hatched out.

M. de Reaumur, not satisfied with dung as a generator of heat, tried the fire heat of a baker's oven. A small carriage on wheels was constructed, in which were several drawers containing rows of eggs, and he was so satisfied with his experiments that he was of opinion it might be advantageous in point of economy to introduce this method extensively. A full description of his experiments and hatching boxes I purpose giving in due order.

M. Dubois' method is a copy of some later experiments of M. de Reaumur, the only difference being in the material for generating the heat,—he burnt balls of clay kneaded up with small coal, and two pounds of coal added every five or six hours was found sufficient to keep the proper temperature. Below a chamber ten feet by ten, with a low ceiling, and a door covered with tapestry, M. Dubois placed a metal stove, with a pipe rising into the chamber to heat it. The eggs were placed in baskets suspended by hooks from the ceiling, and marked with the date on which it was hung up. At the end of four or five days the eggs were examined and the infertile ones removed; from the twelfth to the fifteenth day the cords to which the baskets were suspended were lengthened, bringing them nearer the floor where the heat was not so great; the eggs were moved daily, (that is, turned,) and at the proper period the chicks hatched out. What proportion of chicks to the number of eggs in the basket we are not informed.

Monsieur Copineau, instead of the dry heat of the oven or stove, made use of hot water, carried in pipes along the floor of a chamber con-