Biston M (1828) Manuel Théorique et Pratique du Chaufournier. Paris, Roret. Practical and Theroretical Manual on Lime-burning.

Section I : the slaking of lime

Lime is slaked by three methods 1° From the fusion of the water, 2° By immersion, 3° spontaneously from the only action of the atmosphere.

P 196 Art. I Slaking by fusion

Slaking by fusion, also called ordinary slaking, has to be done in impermeable basins with only the necessary quantity of water to reduce the lime to a thick mush. We will be careful to give all the water it needs in the first instance, only coming back to it at the moment of the effervescence (to add more) or else, wait for it to cool and then add some more water. We will forbid in all cases, the method followed by some masons of drowning the lime in a large quantity of water, reducing it to a milky consistency before pouring it into permeable pits where it dries out and loses its qualities. When we need to keep the lime after it has been run, we will cover it with earth or sand.

Art. II Slaking by immersion

We will reduce the lime stones to the size of a walnut before putting them into an open-weave basket. We will immerse this basket into water until the surface starts to slighty bubble. Then we will then retrieve it; let it drain a bit and then pour the lime into boxes or barrels in which the concentrated heat, unable to escape, will be absorbed by the lime, which will turn into powder.

P197 To conserve this lime in this state, we are sure to cover the boxes or barrels with straw and keep it in a location away from humidity.

Art. III Spontaneous slaking

This is done by submitting the quicklime to the slow and continuous action of the atmosphere. It will then turn into a very fine powder with a slight emission of heat but with no visible steam. We should be sure not to practice this method in a humid atmosphere and we will only stop its operation when the reduction is complete. The spontaneous slaked lime should be preserved with the same care as the lime slaked by immersion.

Art. IV Slaking in general

Every experiment shows that the method of slaking has a great influence on the quality of the mortar, although less on the ordinary mortar than on the hydraulic one. However M. Vicat found out that we can still double the resistance of an ordinary mortar when it is properly selected.

Here are the results of the experiments of this engineer. They are not prescribed here as absolute principles but only as facts to support what we have just said on the influence that slaking methods can have on the quality of mortars.

P 199 ordinary slaking does not present any difficulty, it is essential only to give the strictly necessary amount of water.

P 200 With care, we will need to put the quicklime into a basin, to put a quantity such it will not spill out during slaking. We will then throw the water on the lime, wait a bit and when the bubbling begins to decrease, we will stir the gruel in such way as to be sure that all parts of the limes are dissolved. When the gruel is homogenous, it will be run through a grid opening into an earth pit to conserve the lime until it is used. It is essential to throw right into the basin all the water necessary for the slaking. It there is not enough, we will have to wait until the gruel has coolled down before adding any more water, otherwise, the lime will become lazy, will remain grainy and resistant to mixing.

P203-204 We should particularly distrust, for the choice of slaking methods, the ignorance and the routine of the masons, who often reject the best method of slaking only because it produces less expansion than the other.

P204 Sometimes, the workers reject, with the same reasoning, types of lime which would be preferable to the ones they are used to use. Thus, in the region of Calvados *(← YAY! Home!)*, **half of the limekilns produce hydraulic lime for the consumption of farmers to enrich their fields whereas this same lime is not at all used by the masons,** because it does not expand as much as the others and because it hardens quickly, therefore the workers would have to change how they work *(Or they just knew better than you, ah! Calvados masons rock!) (Biston pp203-204)*

During the works, the type of slaking will always have to be decided by the architect or the engineer. To this effect, we will determine by experience and for each type of mortar, the slaking method which will offer the best mortar and this method will be used exclusively during the entirety of a same works. Moreover, we observe it is best to slake the lime near where it is needed, *(on site, I assume)*, especially if the works are of some importance.

P206 The mode of slaking used in Lille and in other cities can be linked with the one we just mentioned from M. de Lafaye (immersion). Described in a note of Monsieur, the captain of engineering, JB Bergère on the coatings *(revêtement, very general term, like enduits)* on bricks. We throw quicklime with enough water to be turned into a very fine powder, after which we cover it with the necessary quantity of sand to make a mortar. This sand keeps the heat in the heap and accelerates the reduction of the lime into an impalpable powder. But this method (as de Lafaye's) requires close attention from the workers so that there will be no unslaked bits of lime left in the mix. M. J.-B Bergère thinks *(this*

method is) partially, the reason for the degradation occurring to the exterior walls of the fortifications on Lille square.

P207 (And here how he explains the cause of the accidents). When a wall is raised, the *(exterior part of the)* wall dries quicker than the centre. Later the excess of water will be rejected through the mortar […] and when it finds quicklime bits, with which they will combine and solidify and increases in volume, this lime then would produce a similar effect to the *gâché* (mixed with water) plaster resulting in puffiness on the walls and then cracking.