

III. *The Method of making the best Mortar at Madraſs in Eaſt India; deſcribed in a Letter from the Honourable Iſaac Pyke, Eſq; Governor of St. Helena, to Edmund Halley, L. L. D. Reg. Aſtr. Vice-President R. S. and by him communicated to the Royal Society.*

TAKE fifteen Buſhels of freſh Pit-Sand, well ſifted; add thereto fifteen Buſhels of Stone-Lime: Let it be moiſtened or ſlack'd with Water in the common manner, and ſo laid two or three Days together.

Then diſſolve 20 lb of *Faggery*, which is coarſe Sugar (or thick Molasses) in Water, and ſprinkling this Liquor over the Mortar, beat it up together till all be well mixed and incorporated, and then let it lie by in a Heap.

Then boil a Peck of *Gramm* (which is a Sort of Grain like a *Tare*, or between that and a *Pea*) to a Jelly, and ſtrain it off through a coarſe Canvas, and preſerve the Liquor that comes from it.

Take alſo a Peck of *Myrabolans*, and boil them likewiſe to a Jelly, preſerving that Water alſo as the other; and if you have a Veſſel large enough, you may put theſe three Waters together; that is, the *Faggery-Water*, the *Gram-Water*, and the *Mirabolan*. The *Indians* uſually put a ſmall Quantity of fine Lime therein, to keep their Labourers from drinking of it.

The Mortar beat up, and when too dry, ſprinkled with this Liquor, proves extraordinary good for laying Brick or Stone therewith; keeping ſome of the Li-
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quor always at Hand for the Workman to wet his Bricks therewith; and if this Liquor prove too thick, dilute it with fresh Water.

Observe also, that the Mortar here is not only to be well beaten and mixed together, but also laid very well, and every Brick, or Piece of Brick, flushed in with the Mortar, and every Cranny filled up, yet not in thick Joints, like the common *English* Mortar; and also over every Course of Bricks, some to be thrown on very thin: And where the Work hath stood, though but for a Breakfast or a Dining-time, before you begin again wet it well with this Liquor with a Ladle, and then lay on your fresh Mortar; for this Mortar, notwithstanding its being thus wetted, dries much sooner than one not used to it would conceive, but especially in hot Weather.

For some very strong Work, the same Mortar above is improved as follows:

Take course Tow and twist it loosely into Bands as thick as a Man's Finger (in *England* Ox-Hair is used instead of this Tow) then cut it into Pieces of about an Inch long, and untwist it so as to lie loose; then strew it lightly over the other Mortar, which is at the same time to be kept turning over, and so this Stuff to be beat into it, keeping Labourers continually beating in a Trough, and mixing it till it be well incorporated with all the Parts of the Mortar. And whereas it will be subject to dry very fast, it must be frequently softened with some of the aforesaid Liquor of *Faggery*, *Gram*, and *Myrabolans*, and some fresh Water; and when it is so moistened, and beat, it will mix well, and with this they build (though it be not usual to build common House-Walls thus) when the Work

is intended to be very strong; as for Instance, *Madrafs* Church Steeple, that was building when I was last there; and also for some Ornaments, as Columns, good arched Work, or Imagery set up in Gardens, it is thus made.

Though for common Buildings about *Madrafs*, where the Rainy Season holds not above three Months in the Year, and sometimes less, they usually lay all the common Brick-Work in a loamy Clay, and plaister it over on both Sides with this Mortar, which is yet farther to be improved. Thus far for Building-Mortar.

Having your Mortar thus prepared, as is before described, you must separate some of it, and to every half Bushel, you are to take the White of five or six Eggs, and four Ounces of *Ghee* (or ordinary unsalted Butter) and a Pint of Butter-Milk, beaten all well together: Mix a little of your Mortar with this, until all your *Ghee*, Whites of Eggs, and Butter-Milk be soaked up; then soften the rest well with plain fresh Water, and so mix all together, and let it be ground, a Trowel full at a time, on a Stone with a Stone-Roller, in the same manner that Chocolate is usually made, or ground in *England*; and let it stand by in a Trough for Use. And when you use it, in case it be too dry, moisten it with some Water, or the before mentioned Liquor. This is the second Coat of Plaistering.

Note, When your first Coat of Plaistering is laid on, let it be well rubbed on with a hardening Frowel, or with a smooth Brick, and strewed with a gritty Sand, moistened, as Occasion requires, with Water, or the before-mentioned Liquor, and then well hardened

on again ; which, when half dry, take the last mentioned Composition for your fine Plaistering; and when it is almost dry, lay on your Whitening Varnish; but if your Work should be quite dry, then your *Chinam* Liquor must be washed over the Work with a Brush.

The best Sort of Whitening Varnish is thus made. Take one Gallon of *Toddy*, a Pint of Butter-Milk, and so much fine *Chinam*, or Lime, as shall be proper to colour it; add thereunto some of the *Chinam* Liquor before mentioned, wash it gently over therewith; and when it is quite dried in, do the same again. And a Plaister thus made is more durable than some soft Stone, and holds the Weather better in *India*, than any of the Bricks they make there.

In some of the fine *Chinam* that is to endure the Weather, and where it is likely to be subject to much Rain, they put * *Gingerly Oil* instead of *Ghee*; and also in some they boil the Bark of the *Mango-Tree*, and other Barks of astringent Natures, and *Aloes*, which grow here in great Plenty by the Sea-shore; but to all of the fine *Chinam*, that is for outside Plaistering, they put Butter Milk, which is here called *Toyre*. And for inside Work they use Glue made very thin and weak, instead of Size, for White-washing; and sometimes they add a little Gum to it.

N. B. Whereas sundry Ingredients here mentioned are not to be had in *England*, it may not be amiss to substitute something more plentiful here, which I imagine to be of the same Nature.

As to all the astringent Barks, I take Oaken-Bark to be as good as any.

* *Oleum Sefami*,

Instead of *Aloes*, either *Turpentine*, or the Bark and Branches of the *Sloe-Tree*. Though *Turpentine* be not so strong, yet, if used in greater Quantity, may serve to the same Purpose.

But there is a Sort of *Aloes Hepatica*, often very cheap. Instead of *Mirabolans*, some Juice of **Aloes*; also instead of *Jaggery*, coarse Sugar, or *Molasses*, will do; instead of *Toddy*, which is a Sort of *Palm-Wine*, the Liquor from the *Birch-Tree* comes near to it.

Note, That in *China*, and some other Parts, they temper their Mortar with Blood of any Sorts of Cattle; but the Ingredients before mentioned are said to be as binding, and do full as well, and does not make the Mortar of so dark a Colour as Blood will do.

The Plaistering above described, is thought in *India* vastly to exceed any Sort of *Stucco-Work*, or Plaister of *Paris*; and I have seen a Room done with this Sort of *Terrass-Mortar* that has fully come up to the best Sort of *Wainscot-Work*, in Smoothness and in Beauty. I am,

S I R,

Your most Obedient Servant,

ISAAC PYKE.

* Sloes.