

Robert Dossie

The Handmaid to the Arts Vol 1(1758) London Nourse. Accessed via Google Play/Books.

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Of the grounds for fresco painting - The substance or matter on which fresco paintings are generally made, is either plaster or canvas. When plaster of Paris without lime is used, and the surface made smooth, there need (be) no further preparation: but when any lime is used in the plaster, and any other colours are employed, except earths, or such as are prepared from mineral substances, the surface should be washed over several times with size and plaster of Paris free from lime, and suffered to dry then thoroughly before it be painted upon.

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Of cement; for rock-work, reservoirs, and other such purposes; a variety of compositions are used as cements for purposes of this kind, in the application of which, regard should be had to the situation where they are employed with respect to moisture and dryness, as well as to the magnitude of the bodies to be conjoined together, or the vacuities or fissures that are to be made good.

Where a great quantity of cement is wanted for coarser uses, the coal-ash mortar (or Welsh tarras, as it is called) is the cheapest and best, and will hold extremely well, not only where it is constantly kept wet or dry, but even where it is sometimes dry and at others wet; but where it is liable to be exposed to wet and frost, this cement should, at its being laid on, be suffered to dry thoroughly before any moisture have access to it; and, in that case, it will likewise be a great improvement to temper it with the blood of any beast.

**This mortar of Welsh tarras must be formed of one part lime and two parts of well-sifted coal-ashes,** and they must be thoroughly mixt (P33) by being beaten together; for, on the perfect commixture of the ingredients, the goodness of the composition depends [*the coal will be anthracite, later to be preferred for burning hydraulic limes*]. Where the cement is to remain continually under water, the true tarras is commonly used, and will very well answer the purpose. **It may be formed of two parts of lime, and one part of plaister of Paris,** which should be thoroughly well beaten together, and then used immediately.

For the fixing shells, and other such nice purposes, putty is most generally used. It may be formed for this purpose of **quick-lime and drying oil, mixed with an equal quantity of linseed oil**; or, where the drying quicker is not necessary, it may be made with lime and crude linseed oil, without the drying oil.

The stone cement, prepared as above of the bees wax and resin, is also an extremely good composition for this purpose. But resin, pitch, and brick-dust, in equal parts, melted together and used hot, are much the cheapest cement for shell-work, and will perform that office very well, provided the bodies they are to conjoin be perfectly dry when they are used.

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TO make a coping of plaster for all exterior walls, such as garden-walls, pond heads, park-walls, &c. take a quantity of such plaster as is commonly used for floors. Any tarras, plaster, or calcined gypsum, may be applied to this purpose as well as that here mentioned to be obtained in Nottinghamshire [*alabaster*]. The fresh, which has been only once calcined, will be the best. For though Mr. Wych below mentions such as has been before employed and several times burnt, yet it is well known, that plaster loses much of its binding or cohesive quality every time it is calcined after the first.

(Use lime found) in and about the county of Nottingham, burnt in the manner there practised. Then beat it, and sift, till it be rendered quite a fine powder. This done, to every eight bushels of the powder, add one bushel of well-calcined ashes of Nottingham-coal, that are perfectly clear of sand or kitchen-dust : the best ashes for this purpose are those of brew-houses, or glass houses, if they can be conveniently procured. When this mixture is made, put it into a trough; and pour water thereon till you make a paste of it, like good mortar. Then cast it in frames on your wall to the thickness of two inches on at each side; and to rise to three inches in the center: after which trowel it. The four sides of the frames are to be made of wood, twelve feet in length, two inches high, and the breadth the thickness of the wall.

When you remove your frame in order to lay another length of coping, you are to leave an interval of two inches between the last and next succeeding length: because [*gypsum*] plaster has the property of extending itself; and that always in a straight line. Therefore, in a few years, those intervals will be filled up. If you find that the intervals fill up too soon, you are then to saw-off a part of it, to give it room to

extend : otherwise, it will rise in the middle; and a hollow will be left between the wall and coping. The appearance of this coping at first is in colour like lead, beautiful to look at: and the coping itself is (p18) as durable as free-stone. In Nottinghamshire, free-stone work, thus laid, is computed at two shillings the square-foot : whereas this plaster-coping will not stand you in more than three-half-pence; and answer all the purposes as well.

At Godeby, in the county of Leicester, Mr. Wyche has used this kind of coping prepared exactly as above-mentioned: and the work has stood perfectly sound for upwards of twenty years: and now gathers moss, which is a sure sign of durability. The utility of this coping is much to be esteemed: as, in a little time, a great quantity of work may be done. For what in stone-coping will take up six months, with the like number of hands, will be performed in plaster-coping in one month.

N. B. In the above account, it must be observed, that the proportion of eight buihels of plaster-powder, to one buihel of calcined ashes, is proper, when you use old plaster, that has served for several uses before, and has been often burnt. -- But if you use new plaster dug out of the pit for the purpose of coping, you are then, to every four or five buihels of powder, to add one buihel of ashes.

P. S. When you build your walls for this kind of coping, remember to lay your last course of bricks, so as to project one inch (p19) from the wall. This done, take care to level the top of the wall, with a thin coat of mortar, that the surface of the wall may be perfectly smooth, from one end to the other. When the mortar is quite dry, lay your coping on it, that by having a level foundation, it may extend itself freely. But, if by any hole's being left, in the work, the extension be retarded, its force will greatly damage the wall. December 3rd, 1760.

After some years, when the work appears rough, you may spread over it a thin coat of plaster, mixed as above directed ; and the whole will appear as new-laid, just as a ceiling appears fresh after white-washing.

P20 ARTICLE III. Account of a Method of making Mortar, which will be impenetrable to Moisture, acquire great Hardness and be exceedingly durable, presumed to be that used by the Antients.

The following method of preparing mortar was communicated, by me, to the Society for the Encouragement of Arts, Manufactures, and Commerce, in the year 1760. The advantages of this method were discovered, after trial of many others, by a gentleman, at Neufchatel, in consequence of the following circumstances.

He had a house, the back-part of which being cut out of a rocky hill, the springs of water forced their way through the walls, wainscot, plaster, or whatever he used as a facing to the rock; and rendered the rooms very detrimentally wet. He was necessarily led to endeavour, by the use of all the common compositions, to exclude the moisture: but every thing failed to effect this purpose, till he tried the mortar below described. This he found perfectly answered his end of preventing any transudation of the water: and it grew so tenacious and firm, by time, that he was induced to believe the method of composition was the same with that pursued by the antients in (p21) preparing their mortar.

In this light, as a discovery of the mortar of the antients, he communicated it to Lord M\_\_\_\_ I, at that time residing at Neufchatel, to whom he shewed the rooms he had rendered dry by means of it; and which had then been plastered with it about eleven years. The plaster appeared as white as marble; and nearly as hard: nor was there the least sign of any moisture's pervading it in the places where, before it was applied, the water from the rock had continually forced its way, in spite of the various other means that had been employed to exclude it.

Lord M\_\_\_\_ I believing this discovery to be a matter of utility, gave the recipe, and the particulars of the account, to me, as he had them in writing from this gentleman; in order that I might impart them to the public, in what manner I should think proper, if there were any prospect of their being of advantage. I accordingly delivered a memoir, containing a translation of them, with some additional remarks, to the Society for the Encouragement of Arts, &c. with the view of having them inserted in the Historical Register, which was then proposed to be published annually by them. But the design of publishing such a Register not taking place, and the memoir having been lost out of the Society's Gard-book, I thought it expedient to make a fresh communication of it in this place: as it may very properly follow (p22) the foregoing valuable article of a method for making coping for walls.

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The manner of preparing this mortar is as follows: **Take of unslacked lime, and of fine sand, in the proportion of one part of the lime to three parts of the sand**, as much as a labourer can well manage at once: and then, **adding water gradually**, mix the whole well-together by means of a trowel, till it be reduced to the consistence of mortar. Apply it immediately, while it is yet hot, to the purpose, either of mortar, as a cement to brick or stone; or of plaster for the surface of any building.

It will then Ferment for some days, in drier places; and afterwards gradually concrete or set; and become hard. But in a moist place it will continue soft for three weeks or more; though it will, at length, attain

a firm consistence, even if water have such access to it so as to keep the surface wet the whole time, After this, it will acquire a stone-like hardness; and resist all moisture [*this is very likely a feebly hydraulic lime*].

The perfection of this mortar depends on the ingredients being thoroughly blended together; and the mixture's being applied immediately after to the place where it is wanted. In order to this, about five labourers should be employed for mixing the mortar, to attend one person, who applies it.

P23 Chalk-lime, which is the kind most commonly used in London, is not fit for this purpose, on account of its containing flints; which makes it require to be skreened before it can be tempered with the water and sand. This skreening renders the slacking the lime previously necessary: and the slacking it before it be mixt with the sand **prevents its acting on the sand, so as to produce their incorporation; which power it loses, in a great degree, after its combination with the quantity of water that saturates it.** Lime made of limestone, shells, or marble, must be therefore had for this purpose: and the stronger it is, the better the mortar will be. If such lime be wanted for this end in London, though it is not commonly used there, it may be obtained at some of the wharfs; or at a Work, carrying on for making stone lime, on the banks of the river Thames, above Vaux-hall.

Besides this regard to the kind of the lime designed to be employed in making the above mentioned mortar, that which is intended for it should be carefully kept from the access of air or any wet: otherwise it will attract moisture; and, lose proportionably that power of acting on the sand, by which their incorporation is produced. It is proper, also, to exclude the sun and wind from the mortar itself for some days after it is applied: that the drying too fast may not prevent the due (p24) continuance of the fermentation, which is necessary for the action of the lime on the sand.

Over and above the value of a very hard and durable mortar, for general purposes, the property which this kind has in resisting and excluding all moisture, gives it very peculiar advantages in particular cases. For, as it may be used, and will grow perfectly hard, even though moisture have access to it when laid on, and while it is fermenting and setting, it is of very high utility for preventing the ousing of water through the floors or sides of many edifices; as well vaults as others, where mortar prepared in the common method would fail of that effect; and continue wet for any length of time. It is, likewise, of great consequence in the erecting bridges, or in making the foundations, or other parts of buildings raised in Water, or situated in very damp places, or for pointing, or plastering conduits, or reservoirs of water: for which last purpose, it appears to answer the end of tarras, or the gypseous plaster; and may save the expence of

those materials; which are generally much dearer than lime. The superiority of this to the common mortar is **owing to the intimate commixture of the lime with the sand, at the same time it is combined with the water**, before its attractive power, be diminished by its combination with water: and **this shews the defect in the common method of making mortar**: where the lime is slacked before it is (p25) commixed with the sand; and where, in part, old mortar, common earth, or other substances, with which lime has no peculiar specific attraction, are generally added, or used wholly in the place of sand.

Such mortar is frequently found, instead of growing harder with time, to appear, as it were, calcined in some years; and to moulder into dust: especially where the air has access.

The slacking the lime before its mixture with the sand is, in a great measure, unavoidable in the case of such as is made of chalk, for the reason above assigned: and other lime bears a higher price in London.

The expence of labour, also, **in mixing the lime and sand with a trowel, as directed in the recipe, instead of beating them together in the common way**, is, perhaps, too great everywhere for preparing mortar for general purposes. But in the extraordinary cases, above enumerated, it will be found to answer: **and in all cases it is proper** to have regard to the principles, on which the goodness of mortar so prepared depends; and **to come as near this method as circumstances will admit.**

**When a very great hardness and firmness are required** in this mortar, as in several cases where strong cement is wanted for stones; or for projecting parts of buildings, or other purposes; **the using of skimmed milk instead of water**, either wholly or in part, will produce the desired effect; and render the mortar extremely tenacious and durable.

(p26)It is confirmed, by the accounts, we have in Pliny, Vitruvius, &c. of the Roman mortar, that the gentleman, who concluded, from his observations of the similarity of the consistence of the mortar he thus prepared, with what is found in the antient buildings, **the manner of preparing them was the same**, was not mistaken in his conjecture. For it appears, the same method of preparation was followed then in the mortar made in great quantities for common purposes: only there is reason to believe, that milk, also, was used in some particular cases, either wholly or in part, instead of water. The appearance of perpetual durability, and the exceeding great hardness of the mortar now found in the remains of the antient buildings, are proofs of the excellence of this method; and shew, that **it ought to be attended to in all instances, where long duration is of moment.**

The total deviation from it in the preparation of the mortar for many of our buildings, particularly in London, is the occasion of the quick decay of them; or frequently of the immediate fall of houses or parts of houses, even before they are finished; and the means also, of great fraud on the purchasing proprietors of such houses; as well as danger to the tenants, and even passengers. Whence, it calls loudly for the control of the legislature, to punish such as do not use fit materials in the composition of mortar. Robert Dossie