

greatest merit is its reliability; upon that the testimony of years gives no discount.

The third class of amalgam is that known as "facing," or "white," a most desirable amalgam *for its purposes*, and which has zinc for its *distinguishing* metal.

Commencing twenty-five years ago with the formula: of tin, 50 odd; silver, 30 odd; gold, 5 to 7; zinc, 2 to 4; it was at first used either alone or in combination with "contour" as a means for increasing the maintenance of color, and thus giving a degree of beauty as well as utility to the then-growing frequency of amalgam filling; but as years passed the tin was increased to 55, the silver to 40; the gold was abandoned as non-compensating, and the zinc increased definitely to 5.

Meanwhile its value as a reliable covering to arsenical applications, when exigencies demanded such for long-continued periods; its adaptability for the filling of tap-holes, when such were regarded desirable in positions subject to attrition; its eminent appropriateness for amalgamating gold-coated porcelain inlays and for "cold-soldering" them to the cavity-filling, whether of gold, amalgam, or "combination" work, became so apparent that I do not now know how all these ends can be accomplished without this form of amalgam.

All these amalgams appear to be established as means for certain ends, and there remains but one other class of alloys for consideration. These are the "bastard" or "brass" alloys.

It has been noted that each class of alloys has its *distinctive* metal, used for a special purpose; and, with the exception of gold, this purpose positively assured. But it must also be noted that copper is used mainly for the assuring of discoloration (though incidentally for the control of expansion), while zinc is used for the prevention of discoloration and for the assurance of expansion. Thus copper, as copper, and zinc, as zinc, are diametrically antagonistic the one to the other, and for this reason I have never made such combination.

But by reference to page 50 in the first edition of "Plastics" (1883), it will be seen that as the result of "New Departure" metallurgic work I was early impressed with the alloys of copper and tin as productive of very white results; while in the edition of 1890, page 104, it will be seen that even then ten years of experiment had been given to the problem of a "front-tooth" alloy.

By this time I had reached the heavily gold and heavily zinc alloys, also had the experience that though they promised much the promise was not satisfactorily fulfilled; I had also worked up the alloying of copper with tin, and made some curious results