

coarse grained, or highly crystalline, steel, is also equally objectionable ; it acquires fissures under the die-press, and seldom admits of being equally and properly hardened. The object, therefore, is to select a steel of a medium quality as to fineness of texture, not too easily acted upon by dilute sulphuric acid, and exhibiting an uniform texture, when its surface is washed over with a little aqua-fortis, by which its freedom from *pins* of iron, and other irregularities of composition, is sufficiently indicated.

The best kind of steel being thus selected, and properly forged\* into thorough die, it is softened by very careful annealing, and in that state, having been smoothed externally, and brought to a table in the turning lathe, it is delivered to the engraver.

The process of annealing the die consists in heating it to a bright cherry red, and suffering it to cool *gradually*, which is best effected by bedding it in a crucible or iron pot of coarsely-powdered charcoal, that of animal substances being generally preferred. In this operation it is sometimes supposed that the die, or at least its superficial parts, becomes super-carbonized, or *highly-converted*, steel, as it is sometimes called ; but experience does not justify such an opinion, and I believe the *composition* of the die is scarcely, certainly not materially, affected by the process, for it does not remain long enough in the fire for the purpose.

The engraver usually commences his labors by working out the device with small steel tools, *in intaglio* ; he rarely begins in *relief* (though this is sometimes done) ; and having ultimately completed his design, and satisfied himself of its general effect and correctness, by impressions in clay, and dabs, or cast,† in soft metal, the die is ready for the important

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\* The art of forging dies requires much practice and experience; not only as to the choice of steel, but as to the manual part of the operation. They should be forged at a high heat, and great care should be taken to give a perfect and dense texture to the upper part of the die.

† Type metal is usually employed for this purpose. The die is warmed, and placed in a