

**ELEMENTARY METAL
WORK: A PRACTICAL
MANUAL FOR AMATEURS
AND FOR USE IN SCHOOLS**

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Elementary Metal Work: A Practical Manual for Amateurs and for Use in Schools by Charles Godfrey Leland

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REPOUSSÉ AND SHEET METAL WORK FROM A BRONZE BY GIBERTI.
Frontispiece.

ELEMENTARY
METAL WORK

A PRACTICAL MANUAL FOR AMATEURS
AND FOR USE IN SCHOOLS

BY

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of "Practical Education," "The Minor Arts," "A Manual of Design,"
"Wood Carving," "Leather Work," &c., &c., &c.*

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PREFACE.

THIS work contains an explanation of the processes of cold metal work, chiefly as applied to decorative or industrial art, and especially with a view to their being taught to children in elementary and preparatory schools. The author believes that it may be regarded as thoroughly adapted to this purpose, he having been founder and director for four years of the industrial art classes in the public schools of Philadelphia, in which some of these branches of metal work were taught with great success, so that many of the pupils on leaving school immediately obtained well-paid employment. As many as six girls at once thus went from the metal class to a factory, the proprietor of which declared that all the preliminary education, which gave him more trouble than anything else, had been perfectly imparted. On another occasion, a principal in an ornamental metal factory, after careful examination of the design and work of the pupils, offered to take *forty* together, and guarantee "living wages" from the beginning, and a rapid increase of payment, if their parents would consent. All that these children knew, and much more, is set forth clearly and briefly in this work, so that no person, young or old, who wishes to learn metal work either as an art or a trade, can with a proper degree of interest and industry fail to do so.

The principle which guides this and other books on the industrial or minor arts by the same author, is that the *rudiments, or first and easiest stages of anything to be mastered, must be very thoroughly acquired, and no step forward be allowed till the pupil is really a master in all that has preceded it.* Self-evident as this principle seems, it is as yet so far from having been understood or followed, that most writers on education in anything neglect it, and in a recent book on metal work for amateurs, not only is there no full description of what may be done in the early stage, but the latter is even spoken of contemptuously, as only fit to produce inferior objects.

I beg the reader to specially observe that in every subject treated there is something of special importance, which is either now published for the first time, or which was first taught and made known in my other works on industry and art. I refer here, for example, to *figures* in bent iron work, to an advanced style of cut metal work, to embossing for beginners on wood, nail-ornaments, and scale work.

In the Middle Ages in Europe, as in the East, the vast extension of decorated work was entirely due to the fact that the rudiments were so perfectly mastered, and the very utmost made of their resources. Thus an immense proportion of the carving, and, indeed, of most kinds of ornamental work, was actually such as would be included in the first two or three lessons in an industrial or minor art school. Nowadays all pupils hasten on as rapidly as possible to the "higher stages," despising the lower, the result being vast quantities of petty elaborate foliage and fine work, valued for great skill and labour, while on every house-front, and door, and elsewhere, we see dead blank space. The art education of the present day is all wrong in this, that it constantly holds up before pupils the idea that they are to become great *artists*, when what the country needs is good *artisans*. Practical result guided by good taste

is what the latter require, and I believe that I have had this before me in every paragraph of my work. I will now explain the nature of its subject and clearly set forth its subdivisions.

METAL WORK may be divided into two kinds, the *hot* and *cold*. Heated or hot metal, which is naturally produced by the aid of fire, includes that which is melted and cast in moulds, or simply heated and forged till it is soft enough to be hammered into shape, as a horseshoe is made. To this latter, but much connected with cold metal work, belong soldering and brazing, which is the joining of one piece of metal to another by heating, and using some intermediate substance, such as *solder*, or borax and resin, as a *flux* and cement which readily promotes an union. Two pieces of red-hot iron hammered together join with difficulty, but with a flux or binder, such as solder or borax, they unite at once when hammered.

COLD METAL WORK has many subdivisions, chief among which, in decorative and easy art, are :

- I. Band, strip, or ribbon work.
- II. Cut sheet work, and stencil cutting.
- III. Repoussé or embossed sheet metal work.
- IV. Nail or knob work.
- V. Scale work.
- VI. Sheet silver work.

To these might be added the remarkably difficult art mentioned by Vasari, of filing or cutting images out of solid ingots of iron, which is probably not practised by anyone at the present day, and therefore is not included among the current metal works.

As regards practical experience and qualification in these, I venture to mention, with all due reserve, what is, however, well known to hundreds in authority, that it was in my work on the "Minor Arts," published in 1879, and in my "Manual of Metal