ENGRAVING ON PRECIOUS METALS

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N.A.G. PRESS

This edition first published in Great Britain 1958
Reprinted 1964
Reprinted 1971
Reprinted 1973
Reprinted 1975
Reprinted 1980
Reprinted 1994
Reprinted 2004
Reprinted 2009
Reprinted 2010

This work first appeared as a series of articles in *Goldsmiths' Journal*

ISBN 978 0 7198 0022 1

NAG Press
Clerkenwell House
Clerkenwell Green
London EC1R 0HT

NAG Press is an imprint of Robert Hale Limited

www.halebooks.com

A catalogue record for this book is available from the British Library

Printed in the UK by the MPG Books Group, Bodmin and King's Lynn

FOREWORD

ENGRAVING is one of the few arts at which the English have really excelled. It is also one in which the best modern work can bear comparison with the best of any age. But all skilled engraving is not, alas, beautiful. If engravers want to earn the name artist as well as craftsman, technical efficiency alone is not enough. Craftsmen must continuously experiment with new ideas, enterprising, vigorous and unashamed: and they must have a sense of artistic good manners. Very few people have genuine creative ability; but most people, certainly those who learn to practise skilled crafts, can and should develop an instinct for style and proportion and scale. Without this artistic discernment, good works of craft become bad works of art. To create is noble, to imitate is dull; a bold experiment which is criticised is better than a timid copy which goes unnoticed. So, in reading this useful and instructive book, it must be remembered that technique is hideous without art.

Many ancient crafts are in danger of dying, but engraving is so decorative and useful in so many fields of production that its future seems secure. The machine is, indeed, used with good results for some types of work, but the hand-made letter remains supreme in its own field. The demand for high quality hand engraving is encouragingly big because no machine-made substitute has yet been evolved to replace it. This craft has a good future; nobody who shows the right talent for drawing and for meticulous workmanship need be afraid of becoming an engraver. To do fine work is always rewarding in a broad sense, and one can predict with some confidence that skilled engraving will continue to offer adequate rewards financially as well, even in the present highly mechanised times.

The authors are representatives of two well-known metal engraving workshops, one in England, one in America; and an English specialist in lettering cut in other materials. Among them their knowledge covers a very wide field, some of which has never before been dealt with in print. They speak with experience and authority, and their instructions will surely be helpful to

amateur and professional alike. There is a mistaken tendency to scoff at imperfect amateur attempts at craft work; but the amateurs themselves would be the first to admit their failings. In fact, it is only by attempting oneself to do a difficult piece of engraving that one realises that what the professionals achieve is almost impossible. Let us then praise the amateurs for trying, and the professionals for succeeding. The maintenance of traditional high standards of workmanship, which are now being challenged in so many ways, has never been more important than it is to-day. This book will help to gain public recognition for a craft that is much used, but strangely little known.

GRAHAM HUGHES,
Art Secretary,
The Worshipful Company of Goldsmiths.

December, 1957.

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INTRODUCTION

ENGRAVING is the oldest art of mankind. In prehistoric times it was more simple to scratch the side of a rock with a hard and sharp flint stone than it was to find pigments and chalks with which to paint or draw designs. Down through the ages examples of crude engravings are found in caves, tombs and monuments. All the glyptic arts spring from that of scratching or cutting a design on a plane surface—in fact, using a hard material to make marks on something softer.

At a later period the engraver was the only man whose skill could be called on to cut the type from which books were printed and to engrave wood blocks or metal plates for illustrations. Thus, the sciences, arts and all our learning owe much to the engraver.

Before studying the engraver's tools and methods, it is well to know a little about the art itself: it is actually the elder brother of painting. It is certain that engraving exactly as we know it to-day was practised as far back as 1,000 years B.C. It is mentioned in the Old Testament, when Moses is directed to take two onyx stones and grave on them the names of the Children of Israel. "With the work of an engraver in stone, like the engravings of a signet, shalt thou engrave the two stones with the names of the children of Israel" (Exod. xxviii, 11).

ENGRAVERS OF THE PAST

The Egyptian hieroglyphics on monoliths and on the walls of tombs are so engraved. The tools, weapons and ornaments of the Egyptians were often laboriously engraved too. Chasing, carving and sculpture, which are allied arts, flourished among these people. When the Israelites went out of Egypt, among them were many skilled in the art of engraving, as frequent allusions show.

The Greeks learned the art of engraving and chasing metals and it was much practised and considerably advanced in the time of Homer. Many specimens of Grecian engraving show the excellence which the art had attained. Among ancient peoples, the Etruscans seem to have reached the highest degree of skill in chasing, and their vases and other works of art are still unsurpassed for beauty of form. The principal engraving and chasing was done on armour, weapons, goblets, dishes and articles for personal adornment. The Romans engraved their laws on brass plates.

In the past engraving was sometimes used for making impressions in plastic material such as wax or clay, in the same way that seals are now used. Maso Finiguerra, a goldsmith, engraver, and niellist,[1] of Florence, is credited with having made the discovery of copperplate printing in 1452. The legend is that Finiguerra had just put the finishing touch to the engraving of a Pax,[2] and, wishing to see the effect of his work, he filled the lines traced by his graver with a liquid composed of oil and lampblack. By chance a pile of damp linen was placed on the prepared plate and, on removal, the lines filled with black substance were found to be reproduced on the linen.

ENGRAVING PRECIOUS METALS

But for our present trade purpose the instructions given in this book on the art of engraving is confined to that section of it used in cutting designs, pictures, lettering or figures on metal, wood and other substances on both flat and curved surfaces, keeping mainly to the skills of the engraver used in the jewellery and allied trades. The book deals specifically with engraving on the comparatively soft metals such as gold, silver and metals used in the manufacture of jewellery and goldsmiths' and silversmiths' wares, which include watch cases, cigarette cases, lighters, cups and salvers, trophies, prizes, presentation pieces and similar articles purchased from time to time from the average jeweller's stock.

Of the people who saunter into a shop, select a cigarette case and, as an afterthought, ask for the case to be engraved with a monogram, facsimile-signature, or a long inscription, few realise that a great amount of thought, artistic effort and labour will go into the actual execution of the work and this charge of, may we call it, nonchalance, can also be laid at the door of many salesmen behind the jewellers' counters. It is time the jeweller realised the importance of fine engraving in his business and the part it plays in adding to the personality, indeed to the preciousness, of most of the goods he sells. A cigarette case, for instance, taken out of stock, is just a few pieces of metal put together in a certain fashion, a useful article, but inanimate and cold. As soon as it has a little note indelibly engraved inside it which says, perhaps, "With all my love to Bill," then it acquires a personality. It has life and it carries sentiment. Further, it is cherished and shown with pride to the people who should see it. Also, be it noted, the engraving adds a little to the turnover and profit of the jeweller.

[1] Niellist—One who decorates silver with niello. A design is deeply engraved and filled with a lead-oxide compound providing a black pattern similar to inlay. Also known as tulla-work, from Tulla, a Russian town where the work originated.

[2] A crucifix for personal use.

Engraving is neither simple nor easy, but it can be learnt if one has a little artistic talent. The book aims to give a complete, practical and comprehensive guide to this difficult art. It explains the principles to the practical man who wishes to add engraving to his ability and to the salesman who wishes to use his salesmanship to the very best advantage. The student is introduced behind the scenes into an up-to-date engraving workshop, going thoroughly into the details of the tools that are used, and how they are used, and then he is initiated into the composition of the designs and lettering generally employed. Additionally, a considerable amount of space will be devoted to the methods used by the skilful engraver in tackling the many tricky or difficult jobs required of him.

The book is profusely illustrated by drawings made from sketches in the workshop and methods of working prepared by the authors and by others doing the same type of work. Particularly in the early stages, the tools are illustrated and the methods of holding and handling them. Keep in mind that engraving, being an art, the skill is in the hands, not in the tools, but it is imperative that good and properly shaped and sharpened tools are used.

In addition to forming a complete text-book on engraving, these writings will we hope, bring some healthy publicity to the craft and result in a certain amount of long overdue recognition of the hard-pressed engraver.

CHAPTER 1

THE ENGRAVER'S TOOLS AND EQUIPMENT

By A. Brittain

TOOLS for engraving metals are quite cheap compared with the cost of tools necessary to practice most other crafts. For a matter of a few pounds, a boy is able to fit himself up for life, leaving only the cost of occasional replacements from time to time. The tools are very simple and the whole job is probably one of the cleanest there is. There are no paints to make a mess, only a little oil for the oilstone, so the young engraver can find very little to dirty himself or his work.

In fact, in the trade it is recognised that the work should always leave the workshop in a cleaner state than when it was received. This may seem strange, but the work is usually cleaned thoroughly before it is despatched to the customer, to prevent any possible complaints.

THE BENCH

A good bench is essential; it must be strong and well made, and sufficiently high to stand at when a very large article has to be engraved, such as a large bowl or tray. It must be situated in the best light, preferably against a window facing north, when there will not be too much variation of light intensity during the day. The north light, because of sky reflection, is usually clear and white and not unduly influenced by the position of the sun.*

For night work there should be a lamp adjustable to suit individual requirements, that is, fitted to an adjustable arm and well shaded to throw an even glow over the work and bench. The drawing (Fig. 1) gives a good idea of the best relative proportions for a bench, which many engravers consider should have a footrest. The footrest will be found very useful when carrying out work on small articles such as signet rings and when engraving inside wedding rings. A firm, comfortable stool should be used, not a chair. The stool should, if possible, be adjustable for height so that the engraver may adjust it to suit his own requirements.

* In the Southern Hemisphere, of course, a south light should be used.

TOOLS

Gravers are the principal tools used and although when faced up by the different methods of whetting they take on various shapes, they are still essentially gravers. With half a dozen gravers, it is possible for an engraver to execute all the different cuts required in the execution of a piece of intricate ornamental work or inscription.

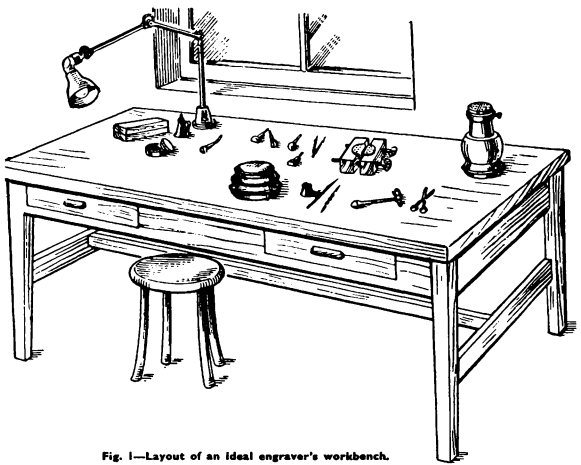

Fig. 1—Layout of an ideal engraver's workbench.

Every engraver will have different ideas about the quality, number and variety of tools to be used—I have, indeed, heard many arguments on this subject—but the following list should be suitable for a boy just beginning :—

3 sandbags or cushions of various sizes (including ring and round) (Fig. 10),
1 best quality oilstone (Fig. 9),
1 dozen gravers, best quality (Figs. 2 and 3),
1 dozen graver handles,
1 tracing or etching point, or scriber (steel with a wooden handle) (Fig. 5),
1 oil can,

1 burnisher (steel with curved end and handle) (Fig. 6),
1 scraper (Fig. 4),
½ dozen shading, or stitch, gravers (D threads, 2, 4, 6, 8, 10, and 12 widths) (Fig. 8),
½ dozen plain flat gravers (2, 4, 6, 8, 10, and 12 widths) (Fig. 8),
1 pair of spring dividers (Fig. 7), cement block,
jewellers' cement,
oil,
turpentine,
pencil, indiarubber,
pounce bag (calico bag filled with French chalk),
practice plate of copper, polished and surfaced ready for use,
copper plate printing ink,
rubbing stick (bone or ivory).

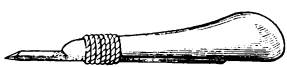

Fig. 2—A long handled graver.

Fig. 3—An ordinary graver.

Engravers do, of course, use more than half-a-dozen gravers for the simple reason that the more gravers they possess, shaped and sharpened to meet the requirements of special jobs, the less time they have to spend in putting a new face on another graver when a similar job is encountered in the future.

The bottom part of the graver handle is cut away to clear the work.

I shall not attempt to describe in the early stages each tool possessed by an engraver because, in the first place, a number of these tools have no ordinary designation as they are made up to meet the requirements of a single piece of work which may never be repeated. Also, no two engravers have the same idea or opinion on the shape or cutting angles of these special tools. Engraving inside a deep bowl is a good example of this. The straight tool as used for cutting on a flat surface is quite unsuitable for this type of work. The shaft of the graver has to be suitable curved in order to allow the hand to guide the tool in a horizontal direction. If an attempt were made to engrave with a straight-shafted graver, the tendency would be for the graver to dig straight into the metal without any forward movement.

The operation of engraving inside a bowl is very difficult and can only be satisfactorily executed by a really experienced engraver. The principles of making up special tools for this job and other difficult ones likely to be encountered are described in other sections of the book.

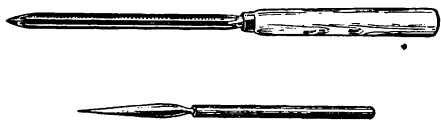

Fig. 4 shows a scraper and Fig. 5 a scriber, both essential to the beginner besides gravers.

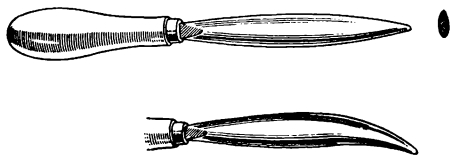

Fig. 6—Two types of burnisher.

The remaining tools may be listed :—

Scriber : Used for marking in the proposed engraving after it has been roughly drawn on the article by pencil or wooden point (Fig. 5).

Burnisher : The burnisher is not a cutting tool. It has a polished face or rounded edge which can smooth the surface of the metal and is very useful for eliminating the burr, or rough edge, thrown up by gravers, or for removing scratch marks, guide lines, etc. (Fig. 6).

Scraper : This is used for removing engraving altogether. The surface is scraped by the tool until all the engraving is removed. The surface is then finished by another means, to be described in another paragraph, to restore it as far as possible to a virgin state (Fig. 4).

Spring dividers : For marking circles or comparing measurements (Fig. 7).

Fig. 7—Dividers.

Lozenge graver : This is so called because the cross-section is the shape of a lozenge. (For gravers and cuts *see* Fig. 8).

Square graver : The cross-section of this is square. The tool is used mostly for outlining.

Scorper : Used for removing the metal to the required depth, which is done quickly and cleanly. It is of especial value for lettering.

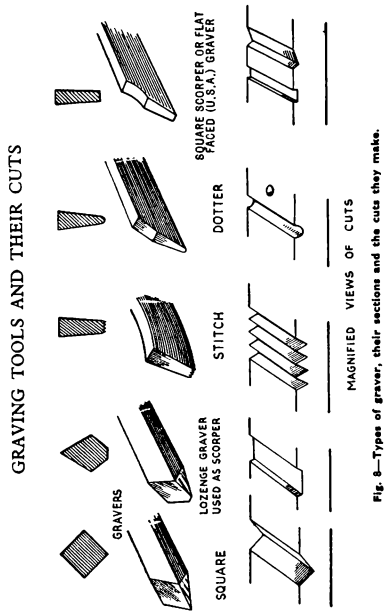

Fig. 8—Types of graver, their sections and the cuts they make.

Threader stitch, shading, or line graver : Flat tool with a number of fine grooves running along its cutting face so that it cuts several parallel thin lines at the same time. It is used for shading purposes in lettering or design, such as for pictorial work, the crests of trees, foliage, and grass.

The *round nose* tool, or dotter (Fig. 15), is a graver generally used for cutting dots such as the dot over the letter " i " and full stops. This

is a thin tool, without the belly part curved, so that the groove it ploughs in the metal is part of a circle or half-round in shape, corresponding in width to the thickness of the tool. Several sizes, varying in thickness, will be found useful. These tools are ground on the face only; the belly should never be sharpened or the semi-circular form of the cutting edge will be destroyed.

The tool is a good stand-by for ornamental work such as that seen on old-fashioned salvers or Victorian cups. It is useful in that it can be used for covering a great deal of ground very quickly (in fact, it is used for cheap work as a great deal of " nonsense " can be achieved in a very short time, leaving the general appearance at least presentable). This type of work is not normally encouraged in the average engraver's workshop, usually being handed over to someone who specializes in ornamental work. The ornamental engraver to-day is certainly not overworked, as there is very little call for his type of work. Ornamental engraving really belongs to the Victorian era. There are, of course, objects which call for a little ornamentation, but this is usually now done during the course of manufacture.

The oilstone is an essential part of the engraver's kit. It is again a matter of opinion as to the quality and type of stone to be used. There are three principal types—the India, Arkansas and Turkey. India stone is an artificial oilstone which is sold in three grades: coarse, medium and fine. The other two are natural. For most purposes, Turkey or India stone are used, but some engravers prefer the

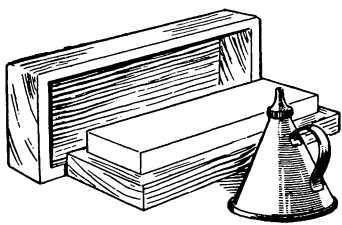

Fig. 9 —Oilstone and oilcan.

Arkansas stone for fine work. Only the fine grade of India stone should be used, however, although even this is considered by many to be much inferior to natural stone. A fault with Turkey stone is that it wears down quickly and after a short time presents an uneven surface with uneven edges. The Arkansas, being a harder stone, preserves its edges for a longer period.

The Arkansas stone is best when white as the veined variety is apt to work up irregularly on the surface. When set up in a wooden box and kept well oiled—in fact, constantly oiled—this particular type of stone will last for years, and will give a good polish to the facets of the graver.

A new stone may appear to be unsatisfactory to start with, but if the surface is roughed up with a rough soft stone using vaseline or plenty of oil, the gummy surface will be removed and the stone will be found to bite properly. A new stone will soak up oil greedily and must be kept covered with oil until apparent saturation point has been reached. It must be thoroughly cleaned periodically with a little paraffin oil. A good oil to use for sharpening on the stone is olive oil or a good quality thin machine oil such as Three-in-One.

There are several items of equipment or appliances that engravers find useful in the workshop. Only the main ones are given to begin with, and not the home-made variety that every engraver possesses and accumulates to meet unusual types of job. They are :—

Sandbags : These are circular pads made of leather and filled very tightly with fine sand. They are available in different sizes and also in the form of rings, and are used to place the work on so that it may be turned easily. The ring type is used for bowls or can act as a seating for another ordinary type sandbag when one is placed on another to raise the level of the work. They are illustrated in Fig. 10.

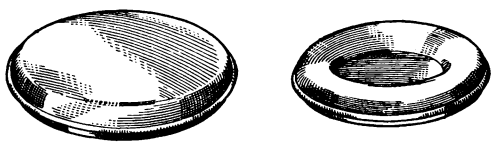

Fig. 10—Two types of sandbag, the round and the ring. They are leather covered.

Eyeglass : This is the usual standard watchmaker's eyeglass shown in Fig. 11. It can be obtained with one of several degrees of magnification, and care should be taken to select one to suit. The eyeglass is essential for working on small articles, but should be used with discretion in order to avoid undue strain on the eyes.

Fig. 11—A watchmaker's eyeglass.

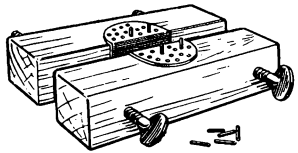

Fig. 12—A clamp for holding rings.

Clamps : There are various types of clamps to hold small or awkward work such as rings. They vary in shape and size. The most common type is the one which consists of two blocks of wood which act as a kind of vice (Fig. 12), with two screwed rods running through on each side to keep the jaws in position. The screws have butterfly thumb-piece ends. On the top centre are fitted two pieces of brass which turn over the inside edges of the jaws. The top parts of the brass together make a disc which is drilled with holes into which brass pegs may be placed to hold any particular job either on the inside or the outside. The position of the pegs is altered according to the size of the article to be engraved. These clamps are very easily made up and the most popular size is about 3 in. by 4 in. The clamps can hold a great variety of small articles.

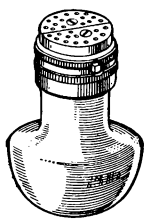

Fig. 13—An American pattern engraver's block for the same purpose as that in Fig. 12.

Chucks : The American type chuck (Fig. 13) is another method of holding small articles, and although it will not be found in every workshop it is an extremely useful article. The size is approximately $6\frac{1}{2}$ in. tall with a base diameter of 4 in. and top diameter at the broadest part of $2\frac{1}{2}$ in. The top section resembles a capstan and, in fact, revolves

freely in either direction on a pivot consisting of a steel rod which revolves in a socket (which must be kept well lubricated). The base rests in a piece of wood and acts as a ball-and-socket. Many engravers prefer to rest the top metal part of this in the sandbag ring, which prevents it from working too freely. The holding section consists of two half-sections—or rather half-circles—of metal which act as the jaws which are drawn in and out by means of a screw, on the principle of a vice. The jaws are drilled with holes for the purpose of holding brass pins in the same manner as the clamp. Although this chuck is very useful and should be in every up-to-date workshop, experienced engravers often prefer to use their own made-up gadgets for holding a small article, such as fixing it firmly on a block of wood by means of sealing wax.

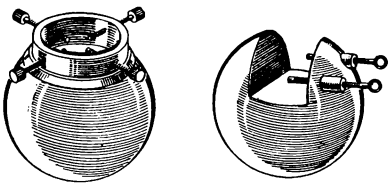

Fig. 14—Two types of bullet for holding work.

Bullet : This is another engraver's appliance for holding small jobs and is in the shape of a ball with the top section cut away, with two screws running through to hold the work in position. Two versions of the bullet are shown in Fig. 14, which is self-explanatory.

Universal engraving handle : This is alternative to a fixed handle, but not much used except for small special gravers (Fig. 15).

Planishing hammer : Although not essential, this is useful for flattening plates before engraving, but it tends to harden most metals, which must be annealed, by heating to red heat and allowing them to cool, to soften them (Fig. 16).

Fig. 15—A universal engraving handle.

Fig. 16—Planishing Hammer.

GRAVERS PREPARED FOR USE

An engraving tool has to be of a length to suit the hand of the user. Held in working position (how to hold the tool will be described later), the end of the tool should project half to three-quarters of an inch beyond the thumb.

A graver, when bought, will perhaps be too long and will have to be shortened. If only a small reduction in length is required, a small piece can be broken off the tang before the handle is fitted. The tang is not so hard as the rest of the tool, and the broken end should be filed to a point so that it is easily inserted into the handle.

If a tool has to be shortened considerably, the end will have to be ground off by using a grindstone and care must be taken not to over-heat the tool and " draw the temper "—that is, to cause it to become too soft for use as a cutting tool.

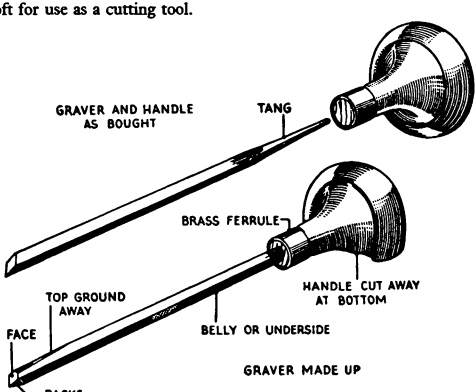

Fig. 17—Graver as brought and as made up, with part names.