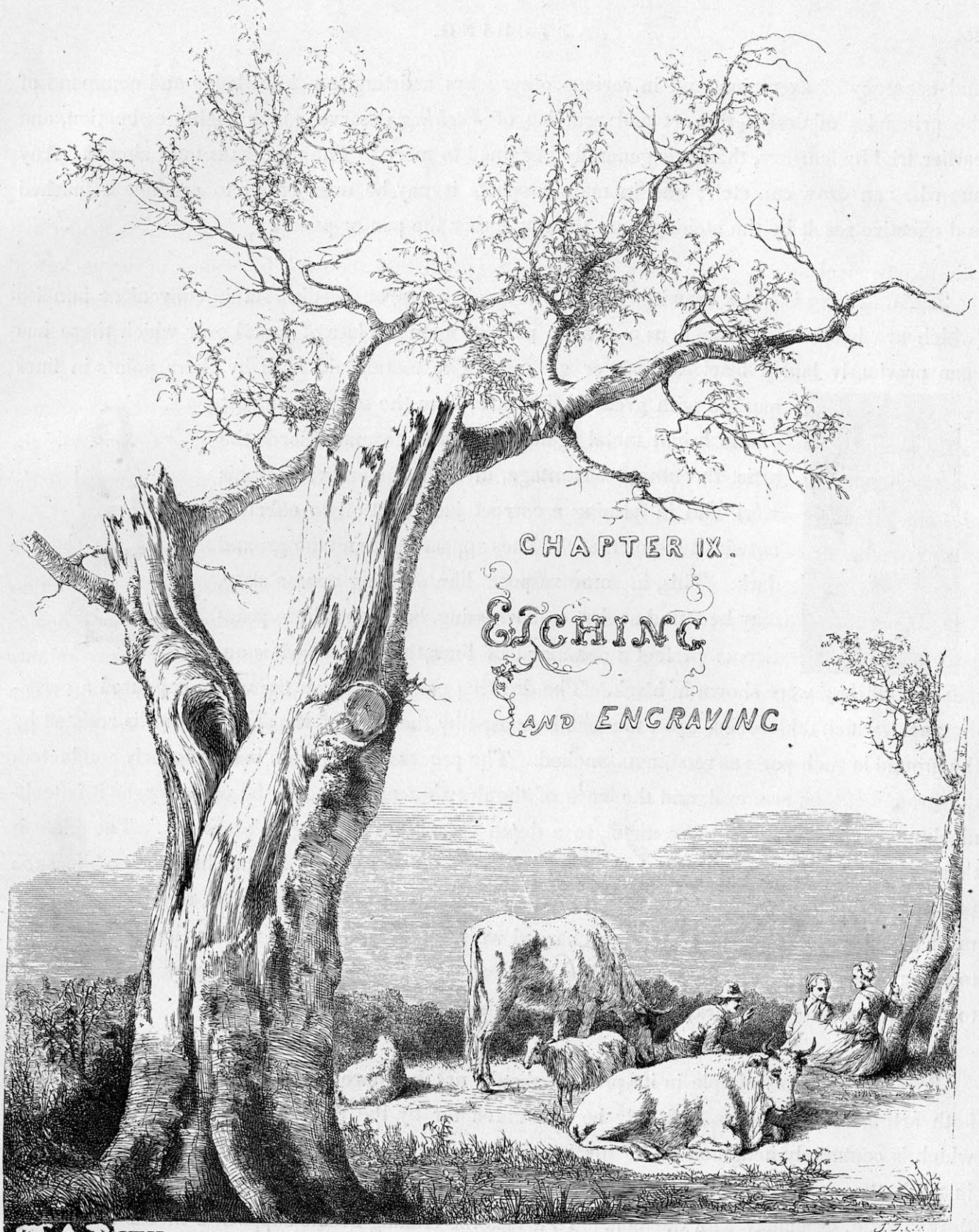


CHAPTER IX.

ETCHING AND ENGRAVING

WITH regard not only to its consideration as a valuable and effective application of drawing to practical purposes, but also to its service in maturing the hand to decision

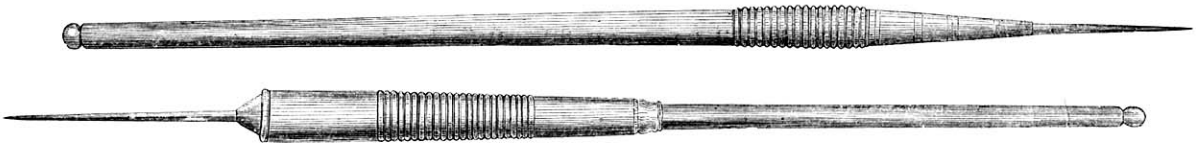
and accuracy of execution, and in various other ways assisting to a knowledge and command of the principles of design, the art and practice of ***Etching*** deserves much higher estimation, and earlier trial by learners, than it is generally imagined to merit. The process is most simple. Any one who can draw can etch; and in many respects it may be even easier to produce a finished and effective result by the etching-point than by either the pen or pencil.

2. An etching is but a drawing made with steel points or needles, set in convenient handles (which are held and managed as a pen or pencil), upon a plate of metal over which there has been previously laid a black varnish, or ground. The metal, laid bare by these points in lines

marked with great distinctness, from the strong contrast of the bright metal against the dark ground, affords the artist the utmost advantage, in both the progress of his work and in forming a correct judgment of its effect—notwithstanding that the lines appear light and the ground dark. This, in some respects like drawing upon a slate, may be found at first embarrassing, but with a little practice as perfect a command of lines, thus expressed, is acquired as if they were shown in black. The drawing completed, over the whole is poured a corroding acid, which takes effect upon the metal exposed by the lines of the drawing, and is resisted by the ground in such parts as remain untouched. The process of corrosion being properly conducted, the ground is then removed, and the lines of the drawing are found to be eaten, or, as it is technically termed, "***bitten in***" the metal, to a depth capable of holding printers' ink. The plate is then covered with such ink, which is wiped off in a manner to leave all the lines full, while such parts as were protected from the action of the acid by the ground, or varnish, remain clean. By means of a rolling-press the plate, thus charged with the design, delivers it with the utmost fidelity to paper, and with a capacity of repetition to thousands of perfectly similar impressions, according to the character of the work, and the nature of the metal employed.

3. That an art so simple in its process should not be more generally practised than it is, by both artists and amateurs, can only be accounted for by the unnecessary amount of difficulties which is commonly imagined to be involved in its successful management, while there is nothing, in truth, therein, to place proficiency beyond the reach of easy attainment by any one skilful in drawing, and especially with the pen. To artists the etching-needle supplies a means of meeting, in a most efficient manner, the extensive requirement which exists for design in literary illustra-

tions, of which they should avail themselves. An engraving at best is but a translation, often poorly compensating, by an exhibition of mechanical dexterity, for the spirit of an original work. Nor are the inducements to trial less with the amateur than with the artist, from the various resources of gratification as well as indulgence of commendable ambition which it may supply, even to those who seek the ways of art for the enjoyment alone which they afford.



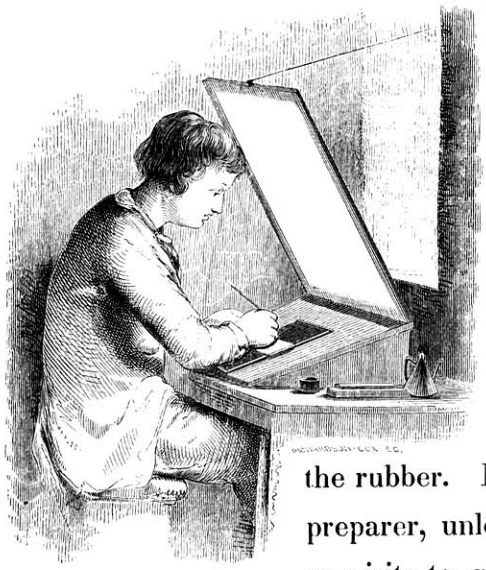
4. There is something irresistibly tempting to trial in the look of efficiency and feeling of aptness to the hand of an ETCHING POINT or NEEDLE—far more so than either pen, crayon, or pencil, or any other instrument for drawing that we know of—always preserving a firm and equal point—producing a certain and even line—no cutting away or breaking—no blotting or spattering—but true and reliable as the good steel of which it is made. Then the metal of the plate holds with such gently-yielding firmness to the pressure, affording an agreeable rest to the hand, and at the same time admitting the utmost freedom in its movements. That all who can draw do not avail themselves of the privileges they possess for its agreeable and efficient employment, can only be attributed to the fact that they can not be aware of the ease of its successful management, and of the advantages to be gained by its use.

5. The practice of etching formerly prevailed among artists to a much greater extent than at present, although there are many of our own time who have very successfully thus extended and perpetuated their reputations. How much has been lost for want of trial by many others, and how much may be yet accomplished by such trial, can not be doubted. Therefore should the attention of the art-student be called early and earnestly to the subject. For conducting the merely mechanical portion of the process, a very few directions will be sufficient; the skill requisite to its successful application rests with the artist.

6. The metal plates, upon which etchings are most commonly made, are either of copper or steel. The latter offers advantages in capacity of yielding a greater number of impressions; but for ease of management, especially to a beginner, the former is much more generally employed.

7. Plates are to be procured ready prepared. They should always, however, be carefully examined previous to beginning an etching upon them. In doing this we have occasion at once

for a suitable table or desk, and a blind of tissue-paper arranged with reference to the light, etc., in a manner which may be better understood by illustration than verbal direction, and which will further show the most convenient and generally-adopted disposition of appliances for etching. By placing the plate on the desk, and rubbing it over with an ***Oil-Rubber*** (which is nothing more than a long strip of cloth, or flannel, about two inches wide, rolled up as tightly as possible, and made solid by being well wrapped with twine, and then trimmed evenly on the ends with a sharp knife), all scratches and blemishes, which would injuriously affect the work, will at once become evident. A very little oil, either olive or lamp oil, should be applied with the rubber. If scratches are numerous, the plate should be returned to the preparer, unless the artist is willing to expend the strength and patience requisite to give it a proper polish, by means of pumice, oil-stone, charcoal, burnishers, and finally the oil-rubber, to which he will be obliged to have recourse. At all events, we would scarcely recommend a beginner to try the experiment.



8. If the plate is in good condition, of which it requires very little experience to be capable of judging, nothing further is necessary than to clean it carefully with whiting and a dry rag, cautiously observing that it is perfectly free from oil, or any greasy substance.

9. ETCHING-GROUNDS, in balls and of different qualities, may be procured of engravers, or at the shops where engravers' tools are sold, the harder kind being best adapted for use in summer and the softer in winter. Before using, these balls should be tied up tightly in stout yet fine silk.*

* The following are approved recipes for Etching-Grounds: —

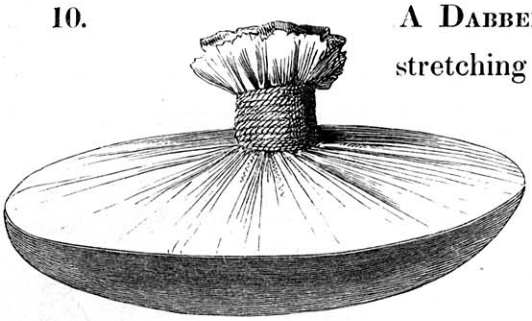
I.

"To two ounces of *Asphaltum* add one of *Burgundy Pitch* and one ounce and a half of *White Virgin Wax*. The asphaltum should be finely powdered, and then melted in a glazed earthen vessel over a moderate fire, before the Burgundy pitch is put in. The wax must be added last, when the whole composition must be well stirred, and then poured into warm water, to be further incorporated by means of the hands, and made up into balls."

II.

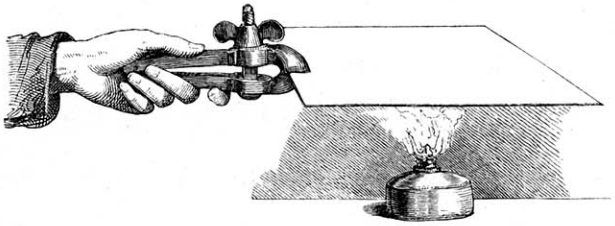
"Take of *Virgin Wax* and *Asphaltum* each two ounces; of *Black Pitch* and *Burgundy Pitch* each half an ounce. Melt the wax and pitch in a new earthenware glazed pipkin, and add to them by degrees the asphaltum, finely powdered. Keep the whole upon a gentle fire until it is in a state that, by dropping a little upon a plate, it will break, when it is cold, by bending it two or three times between the fingers. The varnish may be then taken off the fire, and allowing it to cool a little, should be poured into warm water, that it may be worked more easily with the hands into balls.

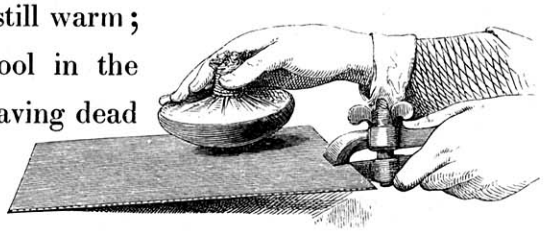
"N. B. — The mixture must be simmered only, not allowed to boil, and should be stirred continually. The water into which it is poured should be about its own temperature. More asphaltum will make the ground harder for use in summer, and less soft for winter."

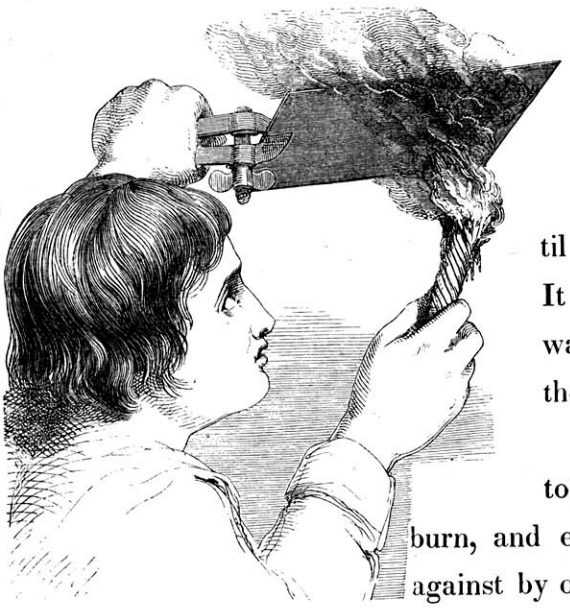
10. 

A Dabber is next to be provided, which may be readily made by stretching a piece of silk, of as even and fine texture as can be procured, over a disk of about two or two and a half inches diameter, made of stout card or pasteboard, between which and the silk there is a bat of fine wool, or a mixture of wool and raw cotton—the silk being gathered and tightly bound on the upper side to serve as a handle. Great care should be taken to keep both the dabber and etching-balls free from dust and grease of any kind.

11. To lay an Etching-Ground—the plate should be held by a hand-vice over the flame of a spirit-lamp, or of more than one lamp if the plate be large, observing to move it constantly over the flame, so as to effect an equal amount of heat to every part of it. Or, the heating may be effected by holding under the plate a roll of ignited paper. The objection to this latter method is, that burnt particles and ashes from the blazing paper are apt to be scattered about, and cause annoyance. Another method of heating a plate, and one well adapted for those that are large, is by means of the flame from a rag, placed in a tin or other safe dish, and saturated with spirits of wine. When the plate is sufficiently hot to produce pain to the touch, or a hissing from the contact of the moist finger, it is warm enough. Proceed to rub the ball of etching-ground gently over it in every direction. The heat from the plate causing the ground to ooze through the silk, it may be very evenly distributed thereon, which should not be more than sufficient in quantity perfectly to cover the plate. The distribution of the ground on the plate is to be completed by dabbing it with light touches, and by regular courses all over with the *dabber* while still warm; carefully observing that the plate does not get too cool in the process, which may be easily detected by the dabber leaving dead or matted impressions on the ground, in which case the plate must be again slightly heated until the ground presents a clear and flowing appearance. The utmost care should be taken to guard against the falling of dust or motes upon the ground while it is warm.







12. The plate is then, while still warm, to be held horizontally, face downward, and to be smoked with an ignited twist of wax-taper gently moved under it in every direction (at a sufficient distance from the flame to avoid risk of burning), until it become thoroughly and evenly blackened. It should be then placed carefully, face to the wall, to cool; after which the ground is ready for the best effort of the artist's hand.

Great caution is necessary lest the plate get too hot in the process, as in such case the ground may burn, and even break in minute cracks. This may be guarded against by observing that the heat is at no time so great as to cause the ground to smoke. If the slightest indication of smoke appears, it should be instantly removed from over the lamp.

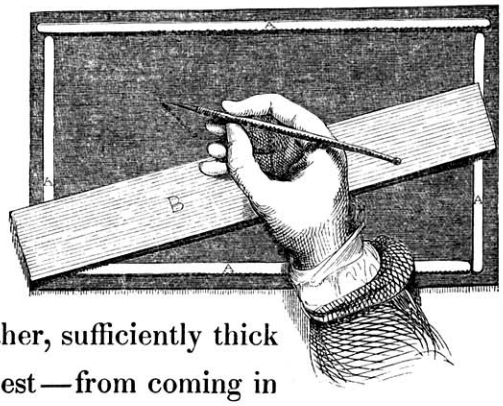
13. As the precise degree of heat which should be given a plate in laying an etching-ground is a matter of much importance, and somewhat difficult to regulate, without experience, the following surer means of conducting the operation may be advisable. Procure a water-tight box of tin or copper, about say a foot wide, eighteen inches long, and from two to three inches deep, with a small spout at one end, by which it may be filled with boiling water, and by which the steam may escape, if it be found necessary to keep the water to a boiling-point by placing a spirit-lamp beneath it. On this the plate may be laid, not only to heat, but to remain throughout the process of laying the ground, with greater certainty of its not getting too hot, besides being in many other respects more convenient and safe than by using spirit-lamps, etc.

14. To DRAW or CALQUE an outline or sketch of a design upon the ground, or to transfer thereto an elaborate drawing, which may be required to direct the artist in his work, without scoring through the ground, or exposing the metal, may be done in various ways. The learner may be advised in his first trial to make a slight but careful tracing of his subject upon *tracing* or transparent paper.* Adjust this tracing to its required position on the plate by means of bits of wax

* Very good and serviceable tracing-paper may be made by rubbing over a sheet of tissue-paper, with a soft rag or bat of raw cotton, a mixture of equal parts of boiled oil and spirit of turpentine or of mastic varnish, which must afterward be hung in the sun for a day or two, to dry.

on the margin, or at the corners, beneath which slip a piece of tissue-paper, prepared by being rubbed over with red chalk, or vermilion, on the side next the ground, and with a moderately hard pencil, or a blunt etching-point, retrace the whole, which, upon removal of the tracing and prepared tissue paper, will be found accurately calqued and repeated on the ground, without having broken through it, or touched the plate. Artists who are sure of hand, and experienced, often sketch in at once their design upon the prepared tissue-paper, or upon another piece of thin paper laid over it, with a lead-pencil, without a tracing. If a very elaborated drawing is required to be transferred to the ground, such as a careful reduction from a picture, etc., the drawing should be made upon smooth writing-paper with a moderately hard pencil (F—H or H—B), which is then to be well damped, adjusted face to the ground in its proper position, and passed through a copperplate printers' press, and the drawing is transferred to the ground in clear, silvery lines, with the advantage also of being reversed.

15. Previous to beginning with the etching, a rest for the hand should be provided, so that it may not in the progress of the work rub against the ground. A sort of bridge, made of a thin strip of wood, or a broad ruler, with supports at each end, of a proper height, is sometimes used for the purpose. An equally effective and in some respects more convenient method is, to attach to the margin of the plate, by means of wax, narrow strips of soft wood, of millboard, or, still better, of stout, solid leather, sufficiently thick to prevent a ruler laid across—upon which the hand may rest—from coming in contact with the ground.

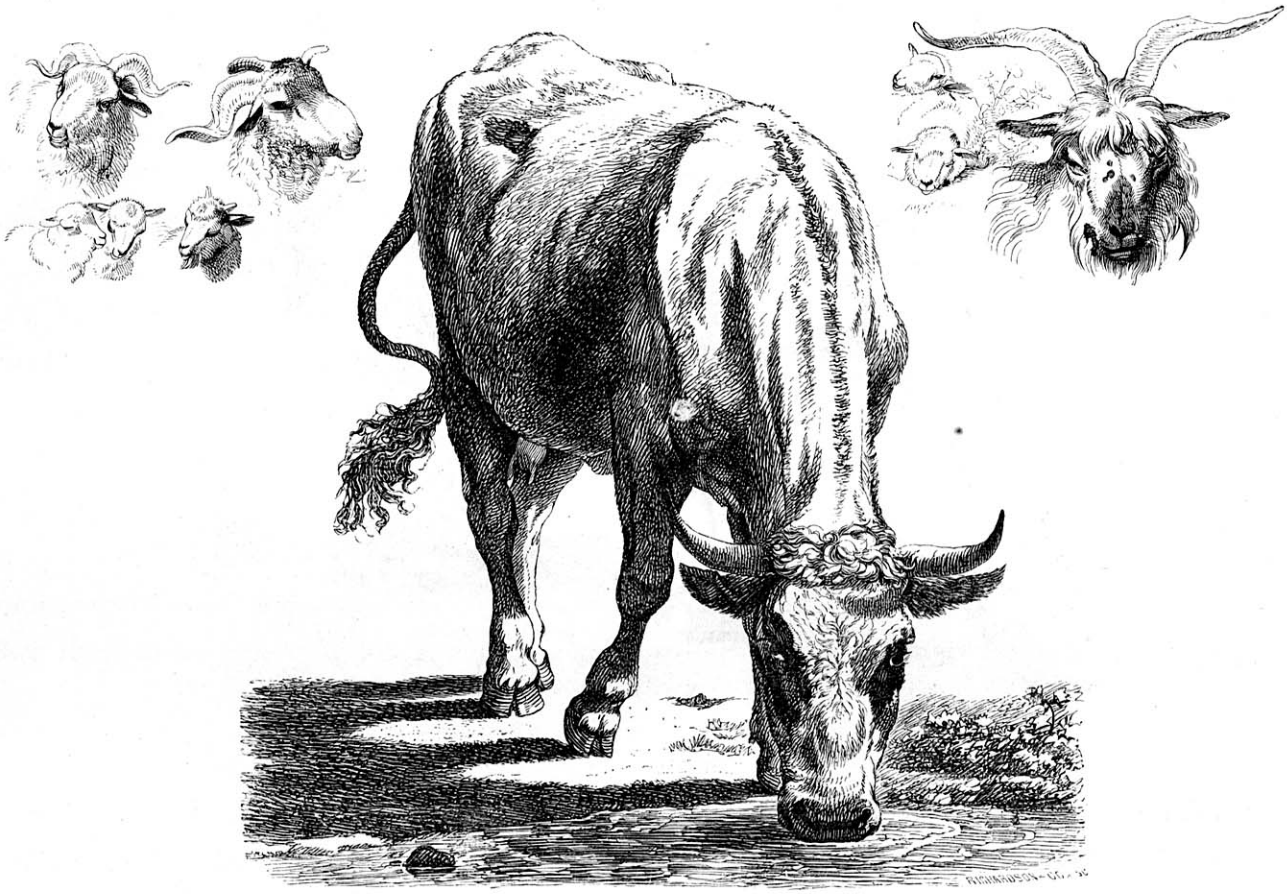


16. The plate properly prepared, the ground successfully laid thereon, the design traced in, and a conveniently-arranged desk and blind provided, the etching-point may be taken in hand, and the work commenced: in the progress of which we would rather leave the artist to the guidance of his judgment, skill, and ingenuity, than attempt to offer precepts for his direction which may be more effectively inculcated by trial, practice, and observation of the works of others. To say that there are not difficulties to be overcome in the attainment of excellence in etching, would be to mislead. How successfully, however, all may be met by a right spirit of perseverance, those who have given it fair trial know full well. Everything depends upon the skill of the artist in design, his knowledge of the power and effect of lines in representing forms and textures, lights and shad-

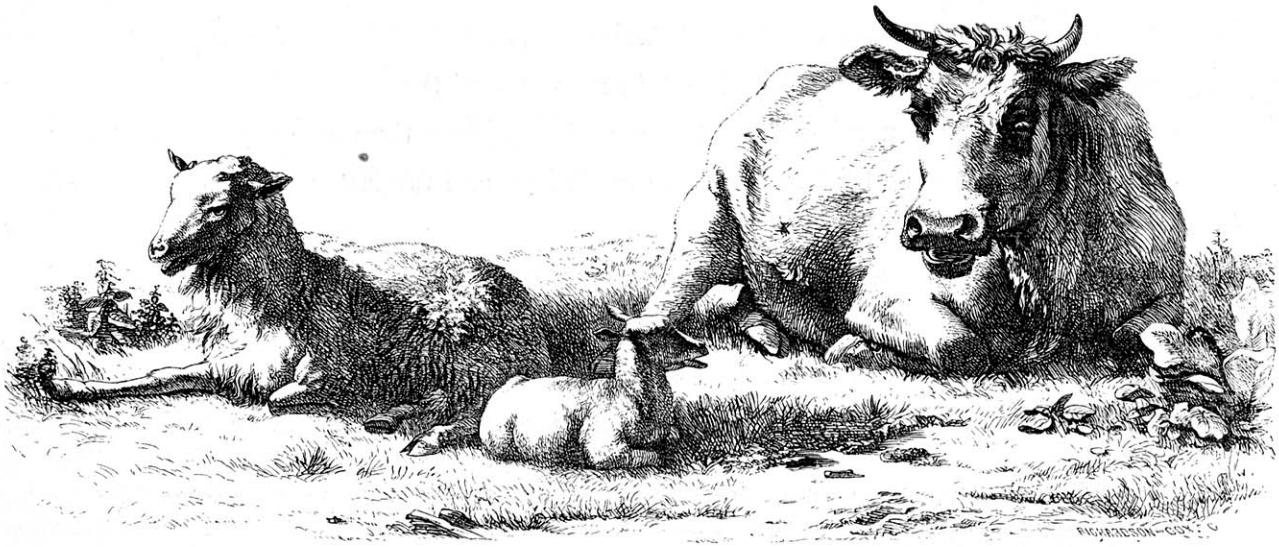
ows; and accordingly, as may be the maturity of his capacity in these respects, will be the measure of his success. Let him not look too ambitiously to emulation of the mechanical dexterity of the engraver, but rather seek suggestions which will prove more available to him from artist-etchings.

By engravers the etching-needle is much and efficiently employed. Almost all the lines in Landscapes are thus laid in. The highly-finished Landscapes of modern engravers are almost entirely etchings, as well as a great deal of all other subjects, especially in backgrounds and accessories.

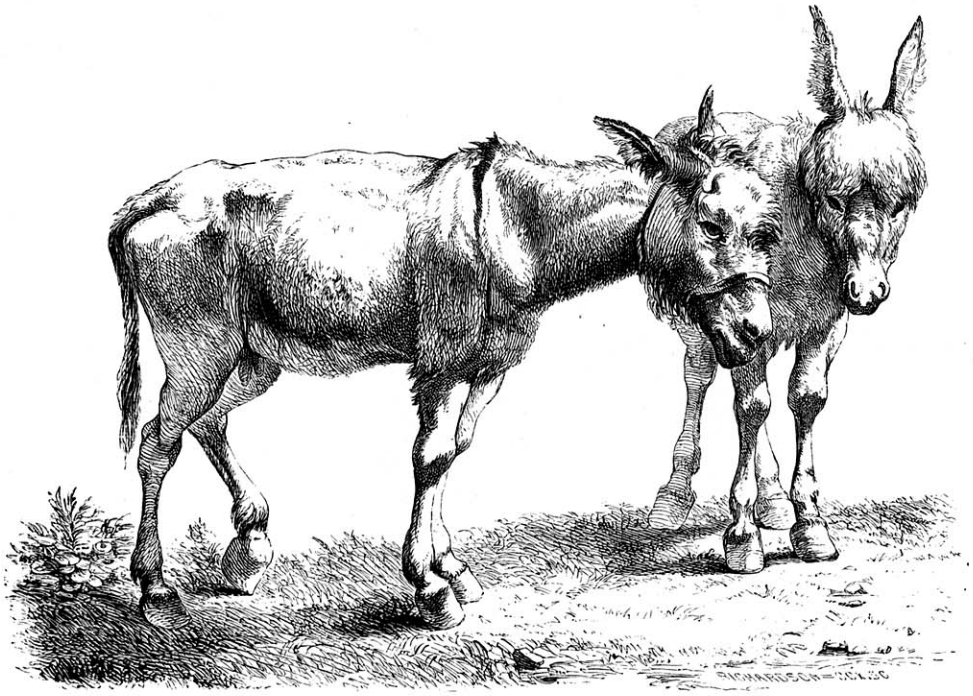
17. It is advisable that the beginner should try simple subjects first—such, if he can obtain them to copy, as some good specimens of *artist-etchings*, in which the management and effect of lines are obvious, and in which there are few dark and confused masses. It is well also at first that he should not embarrass himself by attempting to reverse his copies, so that when printed they may have the same direction as the original. His efforts should be favored in every way in gaining progressively initiation and practical knowledge of the means as well as of the capacity of the art. Heads and figures of animals—trees and groups of foliage—are particularly well adapted to early attempts.



C. REINHART.



CARL DU JARDIN

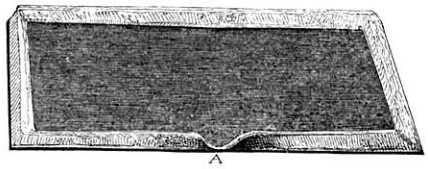


18. The etching completed, it should be carefully examined, and any accidental scratches or erroneous lines stopped out with a varnish made of *Asphaltum* dissolved in *Spirits of turpentine* applied with a camel's-hair pencil. Or, where the corrections are trivial, a little of the ground may be taken off the margin with a camel's-hair pencil moistened with spirits of turpentine, and neatly touched over the part. For this purpose a magnifying-glass may prove of much assistance, as indeed it may be employed to advantage in many if not in all parts of the work. Engravers make more general use of the magnifying-glass than artist-etchers: how much more advantageous it might be for the former to use it less, and the latter more, may be profitably considered.

The plate has now to be made ready for the acid by a wall or border of wax.*

19. To apply the Bordering-Wax.—Work it in the hands, or in tepid water, until properly ductile. Then form it into strips of from half an inch to an inch thick, according to the size

* Bordering-wax may be made by melting together, over a slow fire, one pound of *Burgundy Pitch* and five ounces of common *Beeswax*. When melted, add a little olive-oil. After the mixture has become somewhat cool, pour it into water, and work it well with the hands.—A mixture of five parts of *Beeswax* and one of *Venice Turpentine*, treated in the same manner, makes very good bordering-wax.



of the plate. While warm, press it down evenly around the margin of the plate with the thumb, and thus mould it into a complete and water-tight wall, observing to leave at a convenient place a spout by which the acid may be poured off. Test the security of the wall by flooding the plate with water, and after a few minutes pour it off by the spout as you would do the acid.

20. The Acid almost universally employed for *biting in* copper is *Nitric Acid.* Other mixtures are sometimes used, but for most if not for all purposes of the etcher, nitric acid diluted with water answers every requirement. The acid should be kept in a glass bottle, with a ground-glass stopper. Provide a similar bottle, with a large mouth. In this mix about one part of pure acid with five parts of water. Pour as much of this mixture over the plate as will cover it to the depth of at least a quarter of an inch, and let it remain for the biting of the delicate parts from ten to twenty minutes. Immediately on pouring the acid mixture on the plate, the effect of the corrosion, which takes place in the lines, will be perceived by their assuming at first a greenish-white appearance, and afterward by the formation thereon of minute bubbles, which must be gently swept off, as they accumulate, with a broad camel's-hair brush, or a feather. A sufficient depth of line having been obtained may be ascertained by pouring off the acid, washing the plate with water, and carefully drying it with a soft towel, or blotting-paper, and leaving it to the air for a few moments, and then scraping off a small portion of the ground from some unimportant place. Many give their plates but one biting, and rely upon after-expedients in their completion, while others manage by means of the acid to produce the utmost delicacy and at the same time the greatest depth of line. After a first biting, all such parts as are found to be sufficiently deep are stopped out with varnish, for which purpose that of asphaltum and spirits of turpentine answers very well. This soon becomes dry, and as thoroughly protects the metal of the plate from the action of the acid, in an after-biting, as the original etching-ground. The acid is again poured over the plate, and an increase of tint is given to such parts as may require it, which are again stopped out as before. The process is thus carried on in repeated bitings until a sufficient depth is obtained for the darkest parts.

21. The wall is now to be removed, by gently heating the back of the plate, and the ground and varnish to be washed off with spirits of turpentine. The plate is then to be rubbed over with the oil-rubber, when a pretty correct judgment may be formed of the success of the work, and which may be further verified by a proof from the printer.

22. Many may experience disappointment in seeing the first proof of their first work—some that it should be no better, others that it should be so well; some may wonder at their failure after much pains, and others marvel how they have been so successful. To all we say, try again.

If, on examination of the proof, the whole or parts of the etching may appear too feeble, although the process requires a good deal of nicety, the plate may be ***rebitten;*** that is, a ground may be replaced over the plate, by which its smooth surface may be protected from the acid, and at the same time the lines left exposed to its action.

23. To REBITE A PLATE—first wash it thoroughly with spirits of turpentine, then with lye, and lastly with water, carefully drying it with a clean rag. It is then to be heated as in the first instance. Have ready and heated in like manner another clean copper plate. On this melt and distribute a small quantity of etching-ground, as before directed. Then, with the silk ***dabber***, not overcharged with the ground, proceed by light and regular touches to cover the plate, to be rebitten, with it, but at the same time leaving the lines clear. To this end great caution is necessary, lest the plate get too hot, in which case it will be very difficult to prevent the ground from flowing into the lines; and, if not hot enough, the ground will be so imperfectly applied to the plate in general as not sufficiently to resist the action of the acid. To lay a good rebiting-ground requires both experience and dexterity. In laying a rebiting-ground the hot-water box will be found particularly serviceable (**13**). The ground successfully relaid, the process of biting in may be proceeded with as in the first instance.

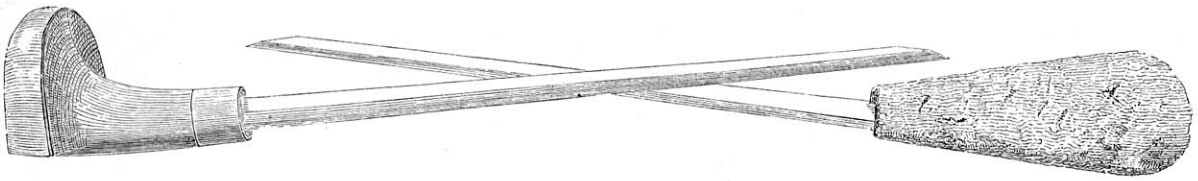
If only certain parts require to be increased in depth, a full ground may be laid over the plate, covering up equally the lines with the rest of it. The ordinary etching-ground will generally serve for this purpose, although in many cases it may be desirable to employ another through which the work on the plate may appear more clearly.* In such cases (as also in a rebiting-ground), the plate should not be blackened by smoking it with the taper. With care, the lines which may require to be increased in depth may be re-entered with the etching-point and rebitten. Or, recourse may be had to the graver.†

* Transparent etching-ground may be made by combining together over a gentle fire one ounce of *common rosin* and *two ounces* of *virgin wax*. When cool it is ready for use, and is laid as the ordinary ground.

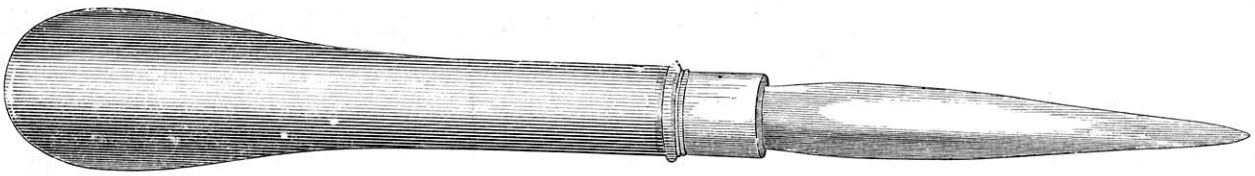
A good coating of mastic varnish, applied with a brush, and suffered to remain a few hours, makes a very good, transparent etching-ground. If left, however, for any length of time on the plate, it will become brittle.

† It may be recommended to learners to make memoranda of their experiments in conducting the process of biting and rebiting their plates—as to the strength of the acid employed the time that it is left on the plate, and the parts which are acted on at each biting. Such memoranda, compared with proofs from the plates, will be found of great service in directing future operations, and also as guards against failures.

24. **Gravers** are employed of different forms, square or lozenge. For the purpose of the etcher, the square tools are most to be recommended.



25. **The Burnisher**, if portions of an etching are found to be too dark, may be often very effectively employed in reducing the depth and width of lines, as well as in graduating or entirely erasing tints or lines if they are not too deep. In many ways this instrument may be used to advantage which practice and trial of its capacity for service will suggest.

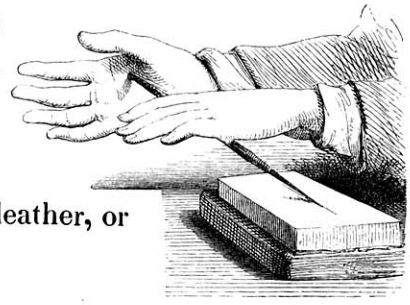


26. **The Scraper** is generally employed to cut off the burr made by the turning up of the metal on the sides of lines which are but slightly bitten or only dry pointed.

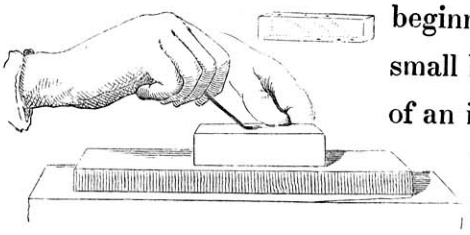
27. **Dry-pointed Lines** are such as are made on the bare copper with the etching-needles, without being bitten in with the acid. They are often very effectively employed in retouching and finishing a work, especially in light and delicate parts.

28. Many employ etching-points of several degrees of sharpness, so as to produce at one biting a greater variety of lines and texture, and by scoring the point lightly or deeply into the metal, which is much more readily done on copper than on steel.

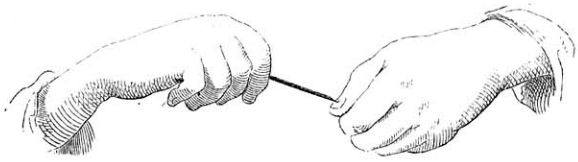
29. To sharpen the Etching-Point, requires some little dexterity. Cut in your oil-stone a slight groove, rest the handle of the instrument in the hollow of the right hand, and, placing the fingers of the left across it, by a compound motion backward and forward—at the same time rolling it in the groove—an even point may be produced, which should be slightly rounded or deprived of its extreme sharpness on a strap of leather, or on a bit of soft wood coated with emery and tallow.



30. To set the Point of a Graver, with an equal bevel, may also cause some trouble to a beginner. To preserve steadiness in the graver in setting it, have a small block of hard wood, about three inches long, and three fourths of an inch or an inch square, pierced with holes, into which the graver may be firmly retained at a proper angle, yet sufficiently free to be pressed on the stone in grinding it away.



Great caution is requisite, in using the graver, that the point is in good condition, lest it lose its hold on the metal, and be driven mischievously across the plate. The state of the point may be tested by touching it gently on the thumb-nail. By the same means, that of etching-points may be ascertained.



31. Gravers and etching-points as they are purchased generally require that the temper of the metal should be reduced, which may be ascertained by the brittleness of their points. To reduce their temper, either hold them in the flame of a lamp, or on a piece of hot iron, until they assume an orange or straw colored tint, when they should be instantly plunged into oil or tallow. If heated until they take a bluish tint, they will become too soft. The degree of reduction of temper, or hardness, of steel, which takes place under the application of heat, is very clearly indicated by the change of color which occurs on the polished surface of the metal in the following order, according to the intensity of heat to which it is subjected, viz.: straw-tint—citron—golden—orange—purple—pigeon's-wing—deep blue—dull blue—bluish gray—and gray.

32. Of the various expedients of which the etcher may advantageously avail himself, it is useless to make mere mention. Were it possible for us to place before the learner as numerous specimens as we desire of the many admirable works of painters and others who have exercised their skill and genius in this delightful and beautiful application of design, they might easier see for

themselves, than we can explain to them, the extent of its capacity. There is no subject, however delicate or however forcible—from the faintest outline to the most elaborate finish and depth of shadow, or effect—that may not be expressed by etching, and that too with all the ease and feeling of an original design.

In urging upon both artists and amateurs trial of their strength with the etching-point, we know we shall be acquitted of over-earnestness in the matter by results—not only by what they may be able to accomplish therewith, but by the advantages which they will hence derive in the practice of any other branch of art to which their impulses may be more singly and earnestly directed. To some, perhaps, there may appear to be involved in the practice too great an amount of mere mechanical manipulation to suit their tastes or convenience. True it may be that polishing copper plates, handling corrosive and staining acids, and tenacious varnishes, are not exactly suited to the delicacy of a lady's fingers; yet, for all that, even they need not be intimidated from trying. The operation of etching may be conducted with as much neatness, and as free of annoyance to one's self and to others, as any other of the numerous "modern accomplishments" professed and taught in our schools, though seldom practised to any valuable purpose out of them. In all our cities there are engravers from whom may be obtained plates with grounds ready laid thereon, etching-points and tools in proper condition for use, and who may be willing to relieve amateurs even of the trouble of biting in their plates. This may be well enough for a beginning; but there is little venture in the prediction that, if they go but a little further, they will be very unwilling to relinquish any part of the process to others.

On the other hand, there may be many who possess the inclination and capacity to make trial of etching without having facilities for procuring the few necessary instruments and materials required. Such even need not be deterred from the experiment, and may rest assured that the secret of success lies more in the artist's capacity of mind, and hand, and eye, than in the perfection of his tools. A common *darning-needle*, set in a wooden handle, makes as good and efficient an *etching-point* as the best that can be bought. A three-sided *saw-file*, ground down to a point at one end as a *scraper*, and at the other into shape, and well polished on a hone, and finally with emery upon a leather strap, as a *burnisher*, may as well combine both in one instrument. Any country blacksmith, from an old file, can shape a *graver*, and temper it rightly too; possibly not as well as Fenn of London, or Renard of Paris, yet still to serve. Even for copper plates, upon an emergency, there is scarcely a village in our land where they could not be prepared, to meet the requirement of a determined will to have them, by planishing with a smooth-faced hammer on an anvil—levelling with pumice-stone and water—and finally polishing by a progressive application of charcoal, emery, whiting, and the oil-rubber.


SB. fec.
Rembrandt
1643.

33. There is a recently-appropriated application of the etching-needle, which, by the aid of the photographic process, on many considerations, may offer greater facility of execution, and advantages in other respects over etching on metal, both to amateurs and artists.

A plate of glass is prepared—by first washing it thoroughly with the lye of wood-ashes, or a solution of potash in water, so as to render it perfectly free from greasiness, and to insure the adhesion of an even-coating of white-lead, finely ground in starch (not made too thick), and applied with a large soft brush. This coating, or ground, should not be laid too thick, but just sufficiently so to cover the glass, and to exclude the passage of light. The state of the ground may be readily tested by holding the plate between the eye and the light. When the ground is perfectly dry—the plate of glass should be laid upon a piece of black cloth, or paper, and the design made thereon with etching points of various degrees of sharpness, according to the nature of the work and effect desired. Every line and touch will appear in black with the utmost distinctness—and, by occasionally reversing the plate, the effect will of course appear equally clear in that position.

The drawing completed: the glass-plate is then to be gently immersed (in a horizontal position) in a bath composed of a solution of sulphurated potash (liver of sulphur) and water. In a few minutes the coating of white-lead will become intensely black—leaving the lines clear. As soon as this occurs the glass must be gently lifted from the solution and allowed to become perfectly dry. A thin coating of varnish may then be passed, or better still, floated over the whole, by which the ground will be rendered more firm. When the varnish is dry, the plate may be printed from, precisely in the manner of a photographic negative.

One of the greatest advantages of this process is, that drawings and sketches may be made directly from nature with the utmost facility. They can be worked upon by any light and under any circumstances that a design on paper can be made. Almost any number of impressions may be repeated with the utmost exactness, and much effectiveness may be further given in the process of printing by means which will be obvious to those familiar with that of photography—of whom the artist may readily learn all necessary practical details—which are extremely simple.

There are other methods of preparing the glass-plate, etc.—but that given we have found to be not only the most simple but in many respects most effective and certain of any with which we are familiar.

34. The process of etching on copper embraces the general principles of its application to all other metals, with such variation as their peculiar natures may require. Steel presents some difficulty, on account of the great uncertainty which attends its biting and rebiting, the difference in

the texture and degree of hardness of different plates, and other peculiarities, which experiment will render obvious, and practice and perseverance best direct to the means of overcoming. The various mixtures and combinations of acids which have been recommended for biting steel, would fill pages; and, after all, it may be very well doubted if, as a reliable corrosive, anything can be better adapted to the requirement of the etcher than nitric acid, more or less diluted with water. We know, indeed, that some of the best etchers on steel, after experimenting with endless recipes, have arrived at this conclusion. The proportions which may be recommended are from sixty to seventy drops of nitric acid to a pint of water. Less acid is even to be advised for early experiments, and great precaution is necessary. For the faintest lines, even on and off may be enough, while one or two minutes may suffice for the stronger lines. Steel plates, after being bitten in, should be very carefully washed, and dried as soon as possible, to prevent the rusting of the lines; and, after the removal of the ground, the oil-rubber should be instantly applied. When laid aside for any length of time, they should be heated and covered with tallow or wax, or a coating of asphaltum-and-turpentine varnish.

35. The various and effective applications of etching, in many of the ornamental arts, render a practical knowledge of the process of further importance. Thus the most highly-artistic designs may be wrought directly on metals with a degree of freedom and beauty attainable by no other means. In cases where an ordinary etching-ground can not be conveniently laid, mastic or any other such varnish may be employed, with the addition, if necessary, of any coloring substance, such as lamp-black, asphaltum, oxyde of bismuth, etc. For biting in an etching on brass or silver, nitric acid diluted with water may be used. Gold is acted upon by nitro-muriatic acid *(aqua regis)*. Designs may be drawn and stained upon ivory, bone, wood, etc., with great ease and effectiveness, by employing a staining solution in like manner that a corroding acid is used in biting in metals. Even glass, agate, rock-crystal, and silicious stones, may be etched upon by the employment of fluoric acid. Stones of a calcareous nature are acted on by nitric acid.

36. Soft-Ground Etching was formerly much employed, to imitate chalk or pencil drawings; but, since the invention of Lithography, it has fallen into disuse. The ground for this method of etching is made by adding to three parts of common etching-ground one part of hog's lard, for use in winter, and less lard in summer. It is laid, and blackened by smoking, as the hard etching-ground.

Having prepared an outline of the subject, on a piece of smooth and thin writing-paper, somewhat larger than the plate, damp it thoroughly, spread it carefully over the ground, and glue the

edges firmly on the back of the plate. When dry, it will be perfectly smooth. A rest for the hand must be provided (15). Proceed to draw the subject on the paper, with a moderately hard pencil (F. H. B., H., or B.), according to the temperature of the weather, the nature of the work, and the degree of hardness of the ground. The drawing completed, lift the paper carefully from the plate, and every touch and trace of the pencil will be marked by the sticking of portions of the ground to the paper, and a corresponding exposure of the copper. A wall is then to be placed around, and the plate is to be bitten in precisely in the manner of a line-etching. According to the success with which the acid is applied, will be that of the work. If too faint, a rebiting ground of hard etching-ground may be laid, and the plate managed precisely as has been previously indicated in cases of hard-ground etching.

37. Etching on Stone is so similar, as far as the artist's hand is required, to etching on copper, that any one who has practised the latter will find little difficulty therein. Lithographic printers are always ready to supply the stones prepared for the work.

Drawing on Stone, or Lithography, is of an easy acquirement to any one who can use the pencil or crayon with facility.

38. Engraving in Aquatint will be readily understood and may be successfully practised by any one familiar with the use of the camel's-hair pencil in water-colors, and with the process of biting in an etching by means of aquafortis.

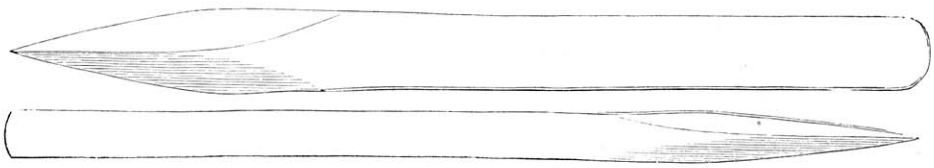
Grounds for aquatint are either laid by sifting over a plate finely-powdered resin, which, when partially heated from the back of the plate, gathers in minute granulations close together, but leaving sufficient space between each other to allow of action of acid upon the metal thus left bare; or, by pouring over the plate a varnish, or solution of resin in alcohol, which, after the draining off and evaporation of the fluid, leaves it in a similarly granulated state.

A proof from a plate thus prepared, and subjected to the action of acid, would, if closely examined with a lens, present the appearance of an elaborate network of lines. As the plate may have been more or less subjected to the action of the acid, these lines would be more or less deep and broad, and consequently producing a tint more or less intense, from the imitation of the faintest stain or wash, of Indian ink, to black. To arrest the action of the acid at a proper moment, so as to secure certain gradations of tints, by means of "stopping out" with an acid-resisting varnish, and at the same time to give to such tints their proper form, comprises the motive and effective application of aquatint.

Although this method of engraving is not so much practised as formerly, it affords many

advantages which recommend it to the consideration of artists and amateurs, whether employed alone or in combination with etching, etc. With skilful management, it is certainly capable of very effective results, and is particularly applicable to landscape and architectural subjects, or to any purpose of engraving in which the effect of flat tints, or washed drawings, may be desired to be expeditiously reproduced. Simple as the process of aquatint engraving is, however, it involves so many delicate operations, in laying the grounds, applying the acids, stopping out, etc., that, unless those who may desire to experiment therein can avail themselves of the instruction of a practical engraver, we would advise them to refer to some standard work upon the subject for more ample directions than we can take space to supply.* It is scarcely likely that many would be induced to make trial of aquatint engraving for merely amateur purposes, and the few who may have more practical objects in view will naturally desire all the information on the subject that can be obtained.

39. Mezzotint Engraving is particularly adapted to the capacity of painters and artists skilful in design. A mezzotint plate prepared for a design presents a surface entirely roughened by minute indentations in the metal, and by a burr raised by the tool with which they are made. A proof taken by a press from a plate in this state would present an intensely black tint. If the slightest portion of the ground be scraped off, it would be marked in the proof by a fainter tint which would be more or less intense according to the amount of burr and indentation removed; the untouched ground giving the deepest black, and white being only attainable by entirely removing the ground and burnishing the metal. The work of the artist, therefore, consists in availing himself of the nature of the ground to scrape out his design or picture from black to white, which is effected by means of lancet-shaped scrapers and burnishers of various forms and sizes.† Throughout the process, a very correct idea may be formed of the state of the plate, which under the blind of tissue-paper (**7**) is shown almost as clearly as it would be in an impression on paper from the press.



40. Mezzotint engraving, from the picture-like yet in many respects coercive character of the process, as well as its capacity, is more effectively applicable to original designs than indiscriminate copying, unless the original works in effect and character harmonize with and come within the

* "The Art of Engraving," by T. H. Fielding, London; "*Nouveau Manuel Complet de Graveur*," etc., par M. Purrot, Paris; etc.

† Scrapers should not have too acute an edge. In that state they are not only liable to scratch the plate injuriously, but also very soon to become dull, and in other respects to work to disadvantage. After whetting them on the sides, they should be held on the oil-stone at an angle of about forty degrees, and in that position they should be gently ground to an even bevel.

compass of its capabilities. Hence the artist who works from his own designs, or realizes it directly on the plate, does so with advantage over the mere engraver who is restricted by the exactions of his model. There is no species of engraving in which, for successful practice, more depends upon the skill and dexterity of the artist, and none less affected by accidental difficulties.

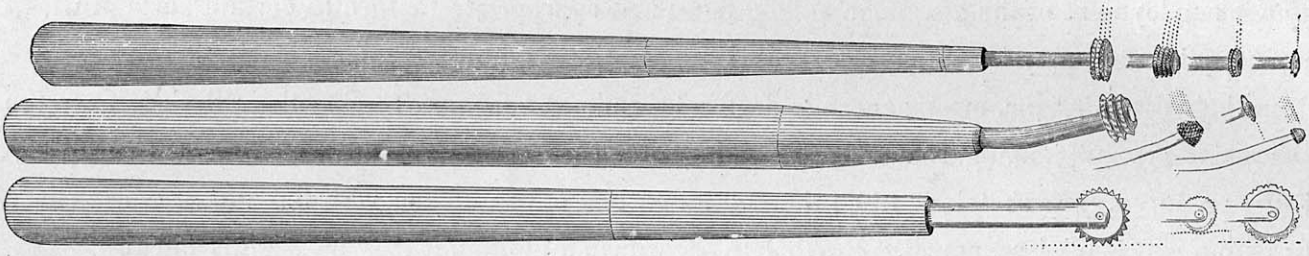
41. With professional engravers it is a very common custom to commence a work by etching a general outline of the subject in the plate, in a dotted or broken manner, to harmonize with the character of the ground, which is afterward laid thereon. Many carry this operation still further by the employment of the graver, in adding force and appropriate texture to certain parts in which such requirement may be anticipated. Artist-mezzotintists, however, particularly those who work from their own designs, most generally prefer to endeavor first to realize their designs from the mezzotint ground, holding recourse to etching, etc., as a reserve, or after-process. The ground being prepared, they sketch or trace thereon an outline of the subject with fine red or white chalk, or with a soft black-lead pencil. Further to secure such outline, it may be slightly but firmly dry-pointed with an etching-needle, by lines of great clearness, without injury to the ground, unless scored too deeply. As a precaution against accidental encroachment upon the parts and masses of intense black, which it may be desirable to preserve untouched by the scrapers, it may be prudent to touch, or draw in, such parts with Indian ink, asphaltum varnish, or something of the kind, especially in the early stages of the plate. After the design has been in a sufficient degree developed upon the plate, such guards will be no longer necessary, and may be washed off. This expedient may be further resorted to, not only with regard to the deepest tints, but also to subordinate masses.

The operation of scraping down the ground, from dark to light, should be conducted with the utmost caution, and with constant reference not only to the effects of light and shadow, but also to the details of the subject. The scraper should not be too vigorously employed; and the whole process should be gradually carried on by gentle and well-guarded erasure of the ground. Burnishers should only be used on the lightest parts, and after the burr has been entirely removed. Proofs may be taken at any period of advancement of the plate.

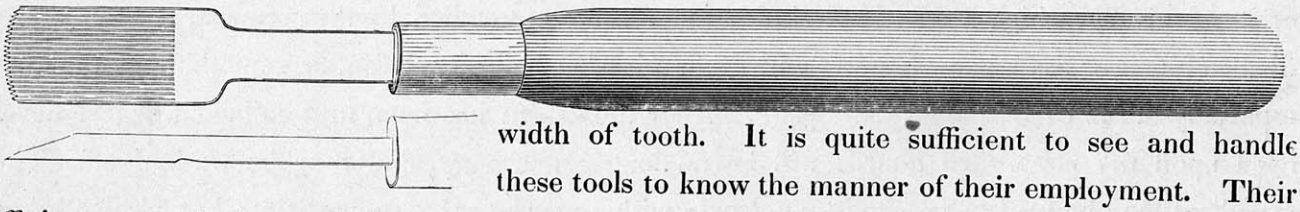
It is certain that very beautiful and effective results have been produced by pure mezzotint, without recourse to any other process. Still, much that may be not only difficult if not impossible to produce by mezzotint alone, such as extreme sharpness and decision of outline, texture, etc., may be added after the plate has been advanced as far as it can be by its means, by laying over the whole a transparent etching-ground (23), through which the work may be sufficiently distinct to add whatever touches, force, or further finish, that the etching-needle can supply. It may be

further stippled in the lighter parts with the graver, but great care is requisite in so doing, especially in removing the burr left by the graver. As all, however, who may attempt mezzotint wil be naturally led to the examination and study of the numerous productions in that style that can be so readily obtained, and in which the various methods and expedients that have been resorted to in their execution, a little practical experience will render easy of discovery, they may hence learn more of the art than any written directions can afford them.

42. Roulettes of various forms, character of teeth, and effect, are often advantageously

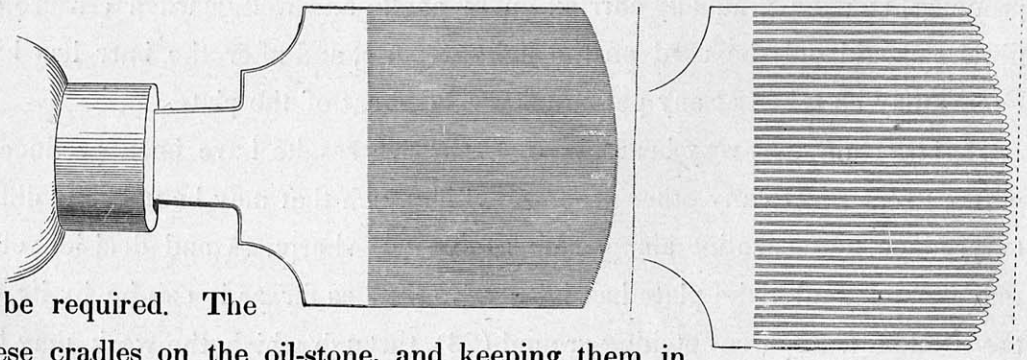


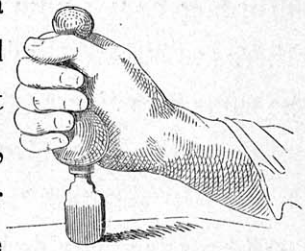
resorted to. to recover texture and tints, or to vary the character of the former according to the nature and requirement of the subject; also Shading-Tools of different sizes and degrees of



width of tooth. It is quite sufficient to see and handle these tools to know the manner of their employment. Their efficiency must be learned by use of them.

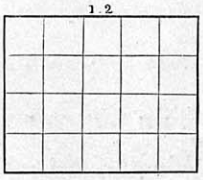
43. To lay a Mezzotint Ground is an undertaking that few are advised to venture upon as an essay in the art, unless it be impossible for them to procure one ready prepared. It is, however, rather a laborious than difficult process, requiring the exertion of much care and patience. The tools with which grounds are laid are called Cradles, and are of various sized teeth according to the nature of the ground for which they may be required. The method of setting these cradles on the oil-stone, and keeping them in proper order in using, will be readily understood.



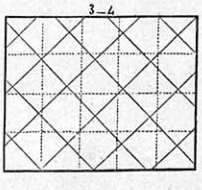


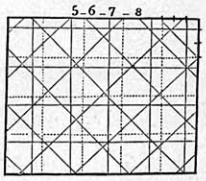
The feeling of a cradle to the hand, and its effect upon the surface of a plate of metal by a rocking motion, will clearly indicate its purpose and action, which will be further exemplified by impelling it gently forward, at the same time that the rocking motion is continued. This forward motion, if extended across the plate in a direct course, leaves a track of dots or indentations therein, corresponding to the teeth of the cradle, and at the same time a slight burr around each dot. Such courses, repeated in every direction over the plate, produce a perfectly and equally roughened surface, capable of holding a sufficient quantity of ink to produce, from the press, an intensely black impression on paper.

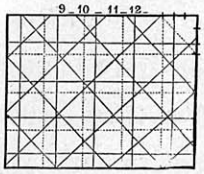
As it is of much importance that these courses should be laid with the utmost regularity, and that all parts of the plate should be equally acted upon by the cradle, some method may be found necessary in regulating them. To this end various expedients may be resorted to, of which the following is one very generally adopted:—



First, with fine charcoal, chalk, or pencil, divide the plate by a set of parallel lines, the space between each line being about one third the width of the cradle. Start the cradle in the middle of the spaces, and work it forward with a regular and steady pressure, at the same time rocking it, as directed, until the plate is entirely worked over in one direction. For the ***second*** course, draw a set of parallel lines, of the same distance apart as the first, at right angles thereto, and proceed with the cradle in like manner. The ***third*** course requires to be laid in a similar way in all other respects, except that it be diagonal to the first; and, consequently, the ***fourth*** will be equally in a diagonal direction. For the ***fifth*** course, draw a set of parallel lines upon the basis of a line one third of the space between those already drawn, and either above or below those of the first course. These are to be again crossed by others at right angles thereto, and at a point one third of the space between the parallels already drawn. A set of parallels, diagonal to these, will give the limits and direction of the ***seventh*** and ***eighth*** course. For the ***ninth*** and ***tenth*** course, the basis of the remaining third of the division of the parallels is to be taken, and so on their diagonals for that of the ***eleventh*** and ***twelfth***—observing that each set of parallels should be worked over by the cradle as they are drawn. These twelve single courses make what is called one ***complete course***; but the plate will be found to be not sufficiently wrought over to produce a full and reliable ground. Whatever traces of the lines remain may now be washed off with spirits of turpentine; and,







according as the number of full courses may be requisite, must be the premises upon which the others are started—avoiding, as far as possible, ever to repeat a track of the cradle precisely in the same direction as that of one already made. For a well-prepared ground, often five or six full courses, each of twelve sets of single tracks, may be required.

44. It is advisable that a first trial in laying a ground should be made on copper, as it is less liable than steel to break the teeth of the cradle, which can only be avoided by preserving the utmost steadiness of hand. The cradle should always be kept in perfect order. The disadvantage of copper for mezzotint is that of its want of capacity for yielding more than a very limited number of good impressions; and, further, in requiring the utmost precaution in handling, as the slightest scratch or bruise on a mezzotint ground may seriously injure it. For the latter reason, however, it may not be considered objectionable for beginners, as it thereby exacts more neatness and carefulness, leading to habits which, if not equally requisite in working upon the harder metals, are still important.

45. Engraving in Line and Stipple, being more professional in character, and coming less within the capacity and probable purposes of the artist and amateur, can scarcely be considered subjects for treatment in an elementary work, however skill in design and comprehension of the leading principles of art may be essential to their successful practice.

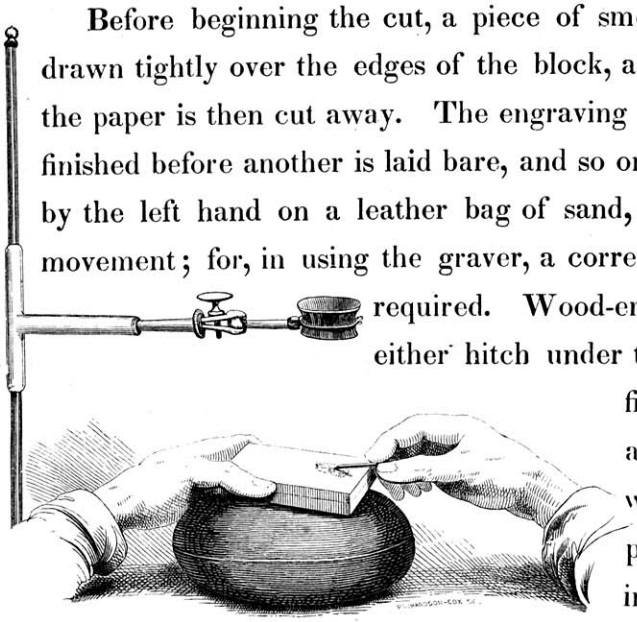
Engraving on Wood is also a branch of art which few artists or amateurs would desire to undertake, unless for the satisfaction of experiment. Many, however, possessing taste and skill in design, as well as those who delight in employments exercising delicate manipulations, might most profitably indulge their inclinations in its practice. To whatever extent this method of engraving may involve a great and absolute requirement of a certain amount of purely mechanical dexterity, it equally requires the exercise of a degree of proper judgment and comprehension of the principles of design, which deservedly elevate the art beyond that of a merely mechanical employment.

In engraving and etching on metal, lines are expressed by incision; while on wood they are left untouched by the graver, and in relief. The method by which impressions are made from them is also entirely different, being precisely the same as from ordinary types. Hence its advantages over all other styles of engraving for book-illustrations, as they can be printed with the letter-press at one and the same operation.

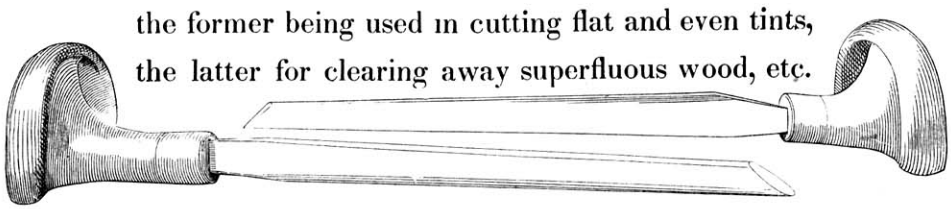
Box-wood is most generally employed for wood-cuts. The blocks are sawed from well-seasoned logs, crosswise the grain, after which they are planed and dressed down to a thickness equal to the exact length of types, and further prepared for the drawing by rubbing over with pumice-stone and water, or Bath brick, to which may be added a slight coating of white lead, or of Chinese white. The white rubbed off a glazed card, with a broad brush with water, and applied to the surface of the block by a rapid motion, which should be continued until the moisture is absorbed, produces an admirable preparation for the drawing, which is required to be made directly on the block.

The drawing may be made in various ways—either entirely with a hard lead-pencil, or by a combination of penciling and washing in Indian ink, etc. Many of the best draughtsmen for wood-engravers in Europe, instead of using Indian ink, make a very effective application of the stump. Drawings made entirely by pencil-lines are generally engraved in fac-simile, the skill of the engraver being mainly exerted to preserve them as far as possible without variation. In washes and flat tints, he must necessarily exercise his judgment in the selection of their character.

Before beginning the cut, a piece of smooth paper is laid over the face of the drawing, drawn tightly over the edges of the block, and firmly pasted to its sides. A small portion of the paper is then cut away. The engraving of the portion of drawing thus exposed is entirely finished before another is laid bare, and so on until the whole is completed. The block is held by the left hand on a leather bag of sand, or shot, so as to allow the utmost freedom in its movement; for, in using the graver, a corresponding action of both hands may be frequently required. Wood-engravers generally work with a lens, which they either hitch under the eyebrow, in the manner of a watch-maker, or fix in a stand with a moveable arm, and a ball and socket-joint, or by some such contrivance, by which it may be kept in a proper and convenient position; to be employed or not, as may be required in the progress of the cut.



47. The Gravers employed for wood-engraving are similar to those for metal. They are, however, set with more acute points. Tint-tools and Gouges of various sizes are also requisite; the former being used in cutting flat and even tints, the latter for clearing away superfluous wood, etc.



48. To take a Proof from a Wood-cut, without a Press.—With a dabber of silk, kid, or Indian-rubber, gently but evenly cover the lines with type-printer's ink, avoiding its application to excess. Lay upon an open book, or upon several folds of paper, a piece of India paper of a proper size, which should be previously rubbed smooth with an ivory folder. Breathe on the India paper, to give to it a slight degree of moisture, and gently press the inked block thereon; to which it will at once adhere. Next, turn the block face upward, and, placing over the India paper a card, or slip of stout paper, proceed by gentle friction thereon with an ivory folder, or a flat burnisher, to impress the engraving upon the India paper; carefully guarding against injuring the sharpness of the cut by pressing too heavily, and regulating the degree of friction by the nature of the work—the darker and more solid parts requiring more, the fainter and those in which the lines are more widely separated, much less.

49. For working by lamp-light, a glass globe filled with water is very frequently employed—upon which there is a recent improvement of a hollow glass bull's-eye filled with water and set upon a convenient stand, which is much better adapted to the purpose, not only of the engraver, but to all who are compelled to make use of lamp-light in their work. With one good lamp in the centre of a table, any number of persons that could find place around it may, each being provided with one of these bull's-eyes, be as well accommodated as if they had the lamp to themselves. By slightly tinging the water with blue vitriol, a light more pleasant and less trying to the eyes may be produced. After all, however, we would advise, not only wood-engravers, but all others engaged in the pursuit of art, to be up early in the morning—to make the most of daylight—and to let lamps light their hours of rest and recreation rather than those of study or labor.