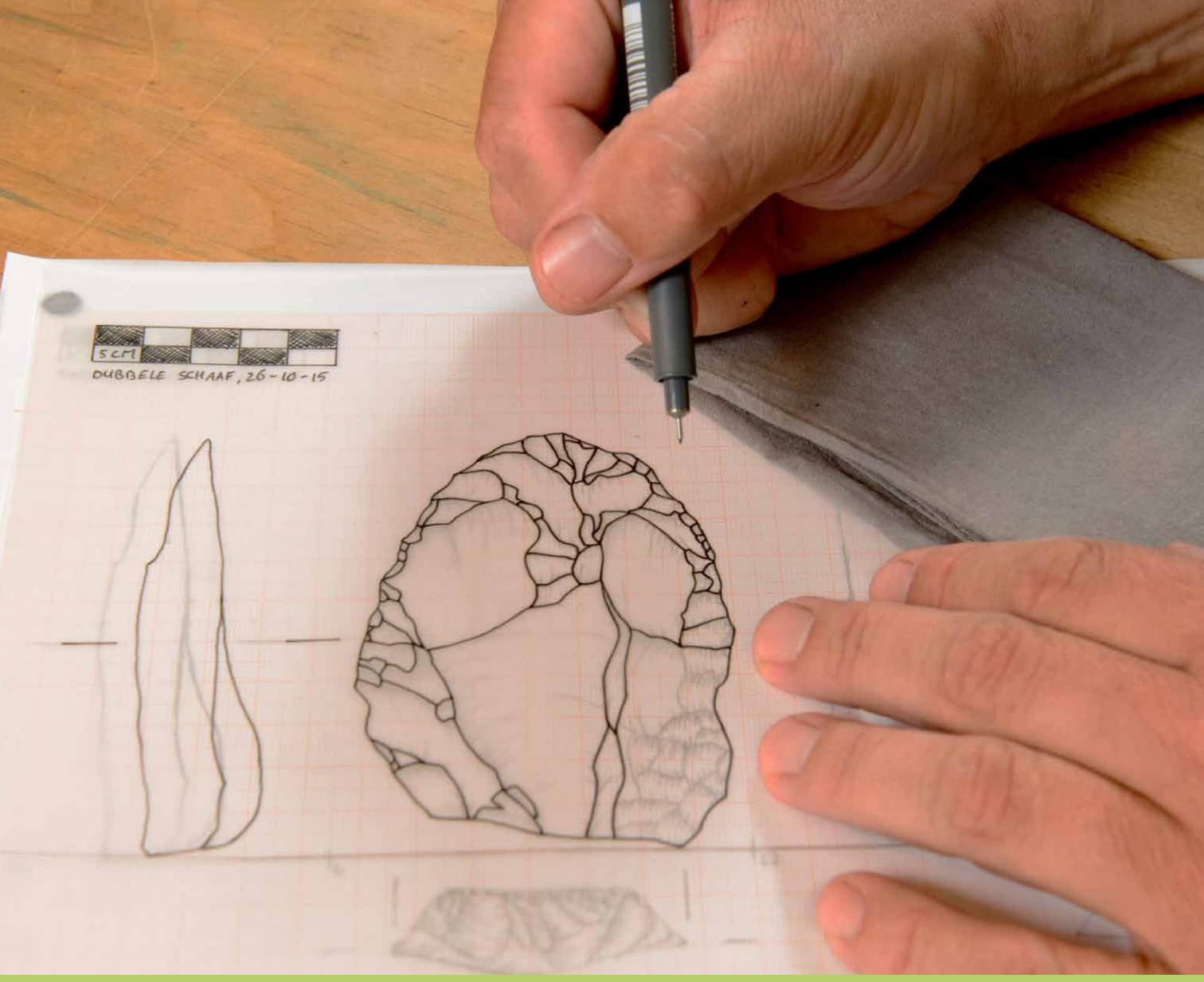

DRAWING LITHIC ARTEFACTS

YANNICK RACZYNSKI-HENK

DRAWING
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Sidestone Press

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Contents

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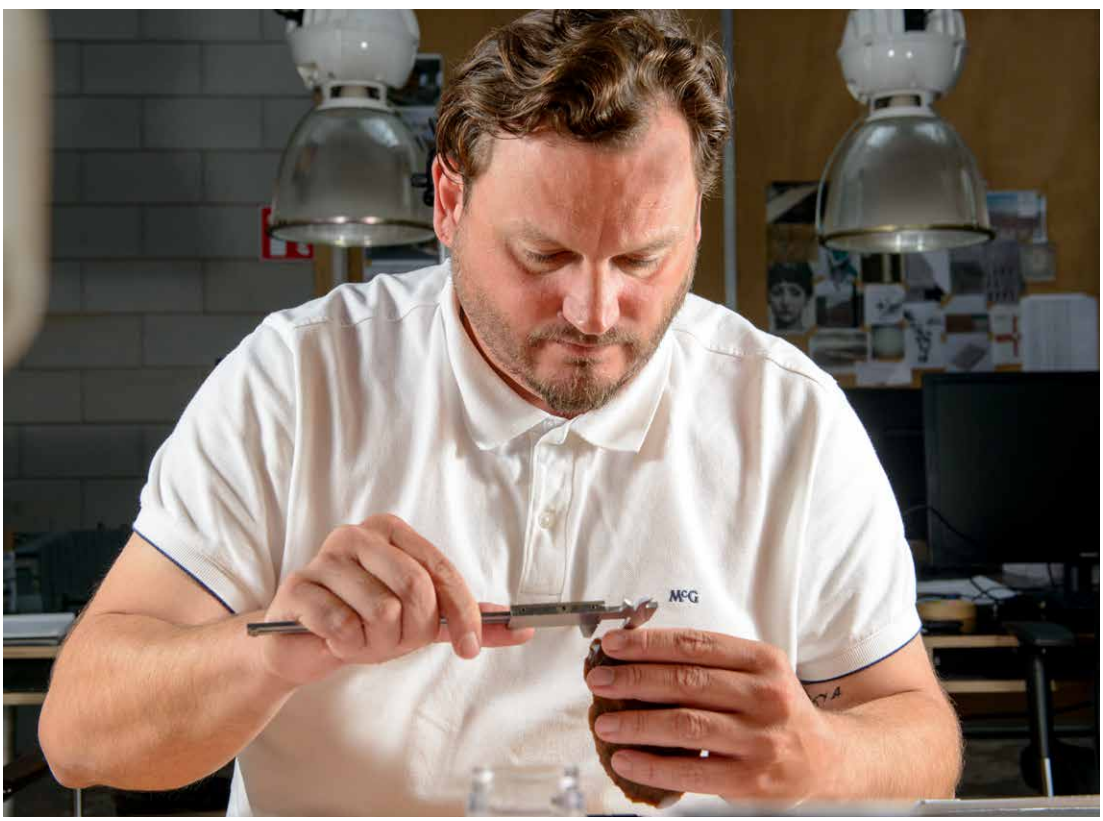

List of figures

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16. The first stage is completed. The outline and any necessary guidelines have been put on paper.

17. All of the main lines have been drawn; the image is ready to be shaded.

18. Under oblique light the ripples are clearly visible.

19. Positioning the artefact in order to draw the ventral surface.

20. Drawing the lateral view using kneadable rubber.

21. Using the profile gauge to determine the circumference in order to draw the cross-section.

22. Measuring landmarks with calipers.

23. A cluster of refits by Phil Glauberman (Adler *et al.* 2014).

24. The completed pencil drawing.

25. Ready tot trace the first drawing.

26. Tracing the drawing.

27. Finished!

28. The digitised illustration, ready for publication.

29. Hammered lines and ring and dot decorations on a sword from the Late Iron Age (van Hemert & Kerkhoven 2014, photograph by the author).

1 Introduction

1.1 Art or craft

The main purpose of this book is to serve as a guide for drawing lithic artefacts. While an expert depiction of an artefact requires an equal footing in both the arts and the sciences, it is not a work of art; artefact illustration is a craft. Anyone can learn how to do it; it comes down to mastering the proper techniques and conventions and beyond all else, as is the case with many things in life, it is a matter of ample practice.

One of the earliest known illustrations of a flint artefact is an engraving of a hand axe from 1797, made by John Frere, an English antiquarian and collector of artefacts recovered from the early prehistoric site of Hoxne. Frere's rendition differs widely from modern day illustrations of hand axes (Figure 1). Photography had yet to be invented so drawing an object was the only way to capture its likeness. The primary goal of Frere's rendition was therefore to reproduce his subject matter as true-to-life as possible.

A present-day illustration is distinctly different in character: it is not intended to be a lifelike artistic rendition of an object. Artefacts are commonly drawn at actual size (1:1 scale) and depicted with a scale bar. The latter is a clear indication that the illustration in question is intended as a technical representation. The primary goal of such a technical representation is to offer information through graphical conceptualisation on the shape and, most importantly, on the method and order in which the flakes were removed from the artefact. Frere's rendition, beautiful as it may be, provides none of the information on size or other characteristics of the hand axe that a modern illustration does. A well-crafted artefact illustration should there-

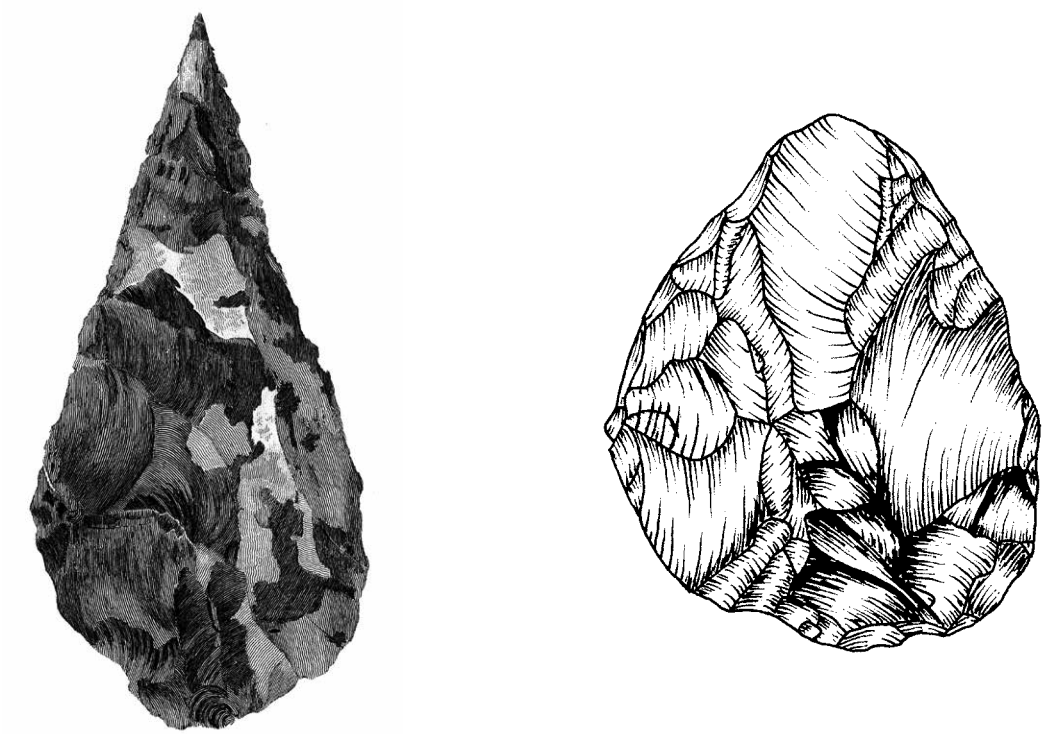


Figure 1. An 18th century engraving and a modern drawing of a hand axe (left: Frere 1800; copyright Wellcome library London; right Adler *et al.* 2014).

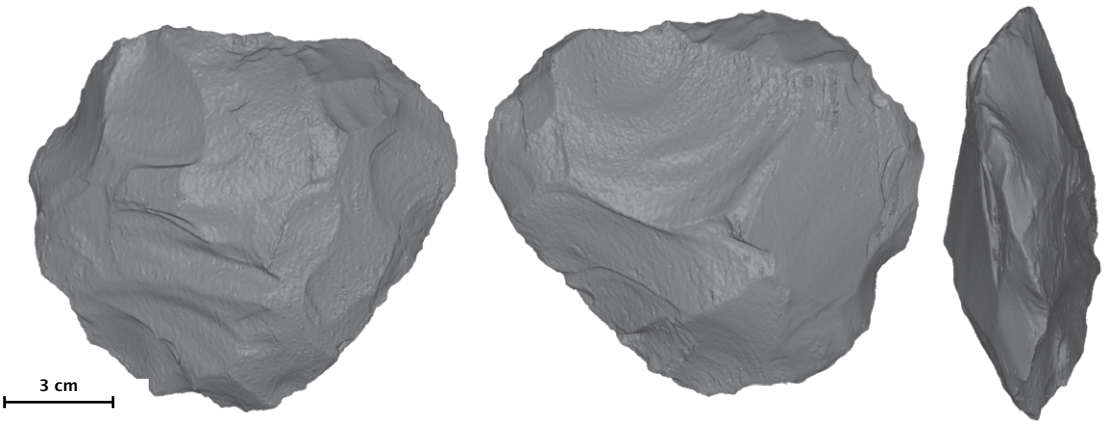


Figure 2. A 3D scan of bifacial tool, created using a NextEngine Desktop HD 3D scanner (courtesy of Jayson Gill, Anthropology Department, University of Connecticut).

fore function somewhat as a reversed blueprint, in which the reduction sequence of the artefact can be traced to a certain degree. As such it provides important tangible information for those studying the artefacts without actual access to the objects in question.

1.2 Why draw in the digital age

Artefact illustrations are intended as a source of information for the audience and not as aesthetically pleasing 'works of art'. Of course, it does no harm for an illustration to be visually appealing, but it is not its primary goal. Producing such illustrations is time-consuming work and, as the information value is considered the most important aspect, experimentation with alternative methods of documentation, which are faster, is well under way.. A prime example of this are three-dimensional scanning techniques. Who would not love to see a free-floating, rotatable, digital copy of the artefact under analysis on their computer screen? The technology for creating 3D scans of objects is becoming increasingly sophisticated and attainable and may therefore eventually replace the analogue illustration as the primary source of information (figure 2), and making such a scan will cost only a fraction of the illustration time.

While this may seem infinitely more convenient and less time-consuming than physically drawing each artefact, one must keep in mind that, for now, 3D scanning is not refined enough to provide the same level of information a drawing does. The lengthy process of making a drawing familiarises the illustrator an artefact in a way quicker documentation methods do not. While illustrations show the finer details of an artefact to the audience, they do so even more for the illustrator. Drawing lithic artefacts is a relatively simple yet effective way to gain insight into how artefacts were made. At the same time, the illustrator creates a graphic database of the knowledge acquired. While drawing, the illustrator simultaneously examines the artefact for clues on the strategy employed by the flintknapper and tries to incorporate these into his depiction. Scrutinising every aspect of an artefact in order to identify ridges and negatives, to determine the direction of the ripples, to locate the bulb of percussion, to identify pre- and post-depositional damage and to look for other distinguishing features will yield insights that merely photghaphing or scanning the object will not produce.

A true lithics illustrator makes drawings for his own satisfaction!

1.3 Reading guide

While flint may have been the preferred natural resource for the production of tools in the Stone Age, it was far from the only material used. Next to flint various other fine-grained rock types were also well suited to the task but even coarse-grained materials such as basalt, quartz and granite were regularly worked. These various materials come with their own sets of conventions when drawing

them, but within the context of this book the term flint is predominately used (see also chapters 2.6 and 5). The artefact serving as an example further on is likewise made from flint.

Technical illustrations are not drawn free-hand; they are required to meet certain standards and conventions. The lines, the shading, and the various other symbols in artefact illustrations all serve an established function and are designed to represent a specific type of information. For these reasons drawing artefacts is done according to a relatively fixed pattern and all artefacts are illustrated in a comparable manner. This book will guide you through the process of making a quality artefact illustration step-by-step.

Firstly chapter 2 will introduce the conventions an illustration must adhere to and chapter 3 will provide an overview of the materials needed to get started. Subsequently, chapter 4 will go on to instruct on the techniques required for producing a pencil drawing of an artefact and chapter 5 will in turn focus on how to transfer your pencil drawing onto tracing paper, thus resulting in a well-crafted illustration, befitting of any official publication or report.

Throughout the course of this book you will encounter a fair amount of technical jargon. Rather than hindering the overall readability by explaining these individual terms in the chapters themselves a glossary is added to the back of the book for reference. Literary references were similarly omitted from the running text. A bibliography can be found behind the glossary. This bibliography also provides a perfect stepping-stone to readers eager for more information.

2 Conventions

2.1 Introduction

Just how legible artefact illustrations are depends entirely on the strict application of the relevant conventions. In this light, it would be helpful if these conventions were the same the world over. Unfortunately, this is not the case. The differences are generally not significant and centre mostly around different views on artefact projections and attribute depiction. Luckily, the conventions pertaining to hatching and other 'grids' are relatively uniform so all in all these differences should not lead to any real issues. Personally, I think it matters little whether you choose to apply the French or American projection method, or whether you employ an open circle or a cross and arrow to indicate the point of percussion, as long as you do so consistently. Those of you fortunate enough to be commissioned to produce artefact illustrations would do well to discuss the choice of such conventions with the client, editor, lecturer or supervisor in advance. The following paragraphs will discuss the various aspects of the conventions and where needed, will delve deeper into the differences between them.

2.2 Terminology

Describing the various properties and elements of lithic artefacts is subject to a specific terminology. This terminology was drawn in part from the terms used by physical anthropologists and zoologists to describe bones. Seeing that stone artefacts, just as bones, are mobile three-dimensional objects, terms such as top, left side, front or back would only act to create confusion. The flake shown in figure 3 illustrates the various terms one will encounter whenever people discuss or describe stone tools.

artefact type	striking platform	stem/handle	point	(retouched) working edge
flake/blade	bottom			
retouched flake/blade	bottom			lateral
scraper	bottom			lateral or transversal
burin				top
combined artefact with burin			as burin	
perforator			top	
point			top	
arrowhead		bottom	top	
dagger/knife		bottom	top	lateral
(polished) axe/adze				down
biface			top	
core	top			

Table 1. The projection of artefacts for the purpose of illustration (after Peeters 1990).

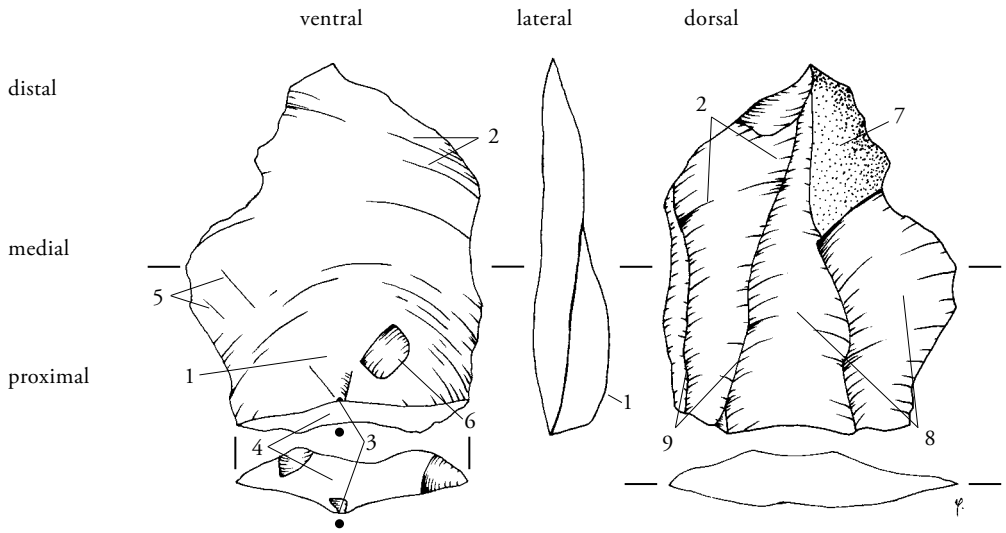


Figure 3. Illustration of a flake: 1: bulb of percussion, 2: (percussion) ripples, 3: point of percussion, 4: striking platform, 5: fissures, 6: errailure scar or bulbar scar, 7: cortex, 8: negative or flake scar, 9: dorsal ridges.

Figure 4. The light should always come from the upper left hand side (collection National Museum of Antiquities, Leiden).

2.3 Angle of incidence

In the introduction to this chapter it was noted that, despite the need for standardised conventions for the illustration of artefacts, a certain level of divergence has occurred. There is however one rule that everyone agrees upon: the angle of incidence. When composing an illustration the artefact is always assumed to be illuminated from the top left-hand side. This results in the left side of negatives requiring more shading than the right side, whereas the right side of the artefact itself, is, in turn, always depicted as being darker than the left side (figure 4).

2.4 Projections

In order to visually represent a three-dimensional object like a flint tool effectively on a two-dimensional medium such as paper, each artefact will consistently be illustrated in several standard projections. These standard views were derived from the methods employed by physical anthropologists and zoologists when illustrating skulls. This means that each consecutive image is rotated 90° compared to the previous one (figure 5). In practice,

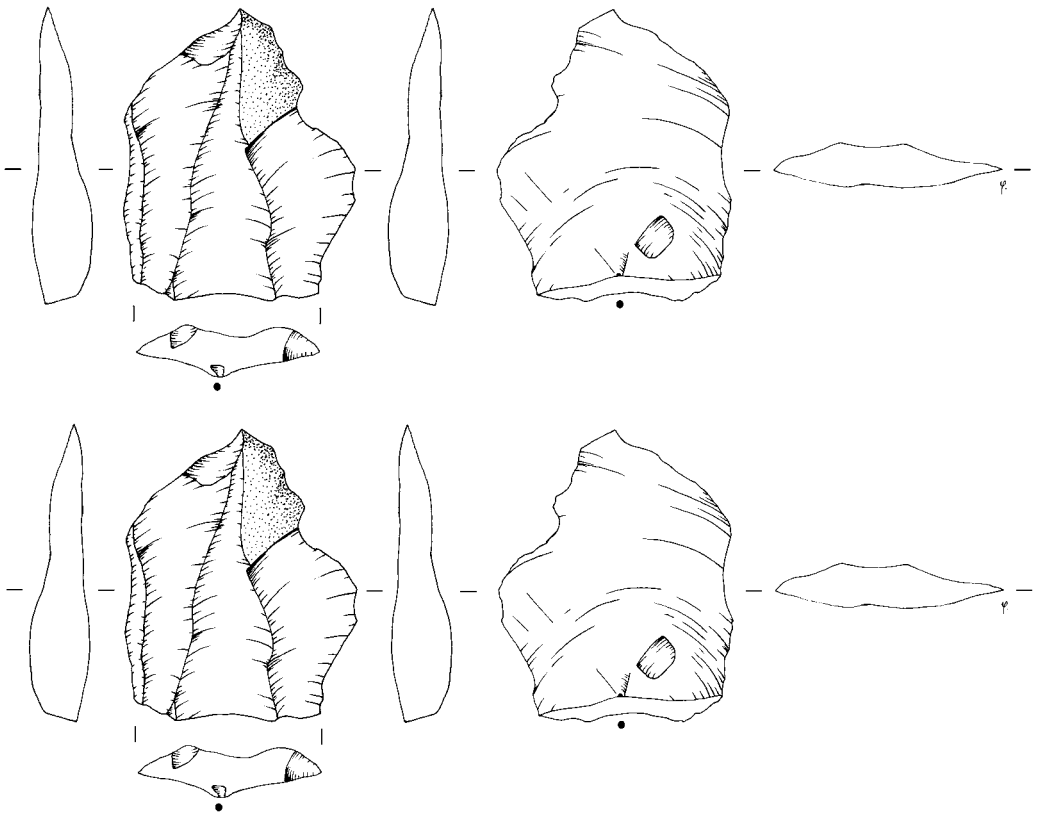


Figure 5. Schematic representation of the projections and the order of turning according to the French (top) and American projections (below).

this means that you flip the artefact a quarter turn several times, so to speak. The following projections are drawn by default:
- the dorsal surface;
- the ventral surface;
- two lateral sides or profiles;
- the striking platform
- one or more cross-sections.

If the artefact is especially erratic of shape, you might want to draw multiple cross-sections (figure 6). Cross-sections and striking platforms are always illustrated with the ventral surface facing down. On bifacially retouched and polished tools it is often impossible to distinguish the ventral and dorsal surfaces, but as these are usually symmetrical in shape it should not matter too much. Commonly, a cross-section consists of little more than an outline of the artefact, but sometimes the edge of the artefact is also depicted with a single line. Next to these standard projections, work edges, unusual retouching and other noteworthy features, may warrant the illustration of additional views or details.

2.5 French or American projection

The first choice facing an illustrator is the matter of projection: the order in which the various views of an artefact are put to paper. For reasons unbeknownst to anyone, the western world has given rise to two schools of thought: the French school, used predominately in Europe, and the American school. A common denominator between both schools is that both always project the proximal end of an artefact in a downwards position. Some artefacts however, such as hand axes and polished axes, have been so heavily worked that it is no longer possible to determine the proximal end. Thus, hand axes are always illustrated with the point facing up, whereas polished axes are always

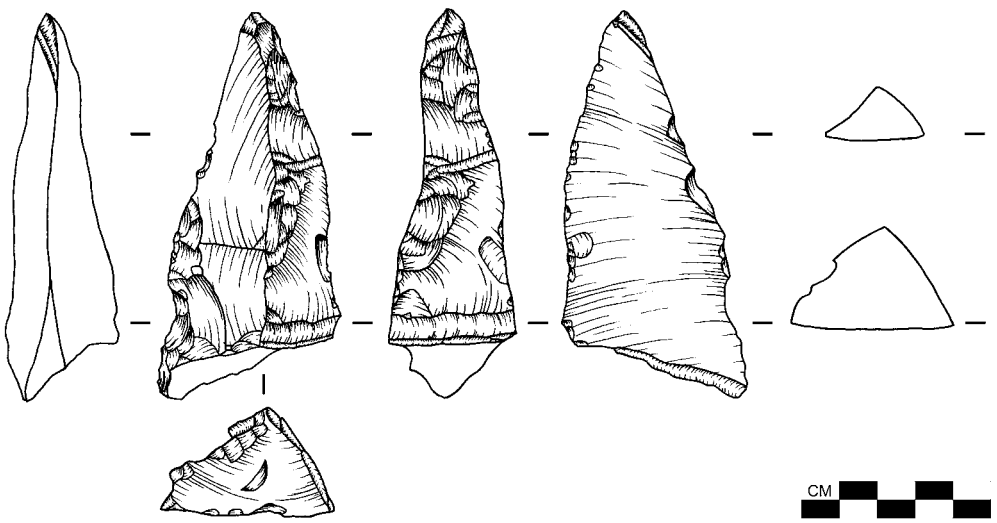


Figure 6. An artefact illustration featuring several distinct cross-sections (Adler *et al.* 2014).

illustrated with the cutting edge facing down. Several other artefact categories (e.g. cores and burins) also come with their own distinct sets of conventions (table 1).

When using the French projection (figure 5) you start by placing the artefact on its side with the ventral surface facing to the right in order to draw the first lateral projection. You then flip the artefact a quarter turn to the right so the ventral surface is facing down in order to draw the dorsal surface. You subsequently flip the artefact another quarter turn to the right allowing you to draw the second lateral projection and end by turning it one last time, leaving the ventral surface face up. In order to draw the striking platform, which is always placed beneath the dorsal projection, you position the artefact upright with the ventral surface facing down on the drawing. The only difference between the French and American schools is that in the latter school the two lateral views trade places. When dealing with relatively simple artefacts it may be enough to only draw one of the two lateral projections. Where this is the case, this lateral projection is usually placed between the dorsal and ventral surfaces.

Similar to the lateral views, the cross-sections commonly consist of little more than the outline and edge of the artefact. Neither the legibility nor the informational value of an illustration is affected by the choice of projection, it is however important to use a single method within a particular collection or publication to avoid confusion. Within the Russian sphere of influence different rules apply altogether, but these will not be covered here.

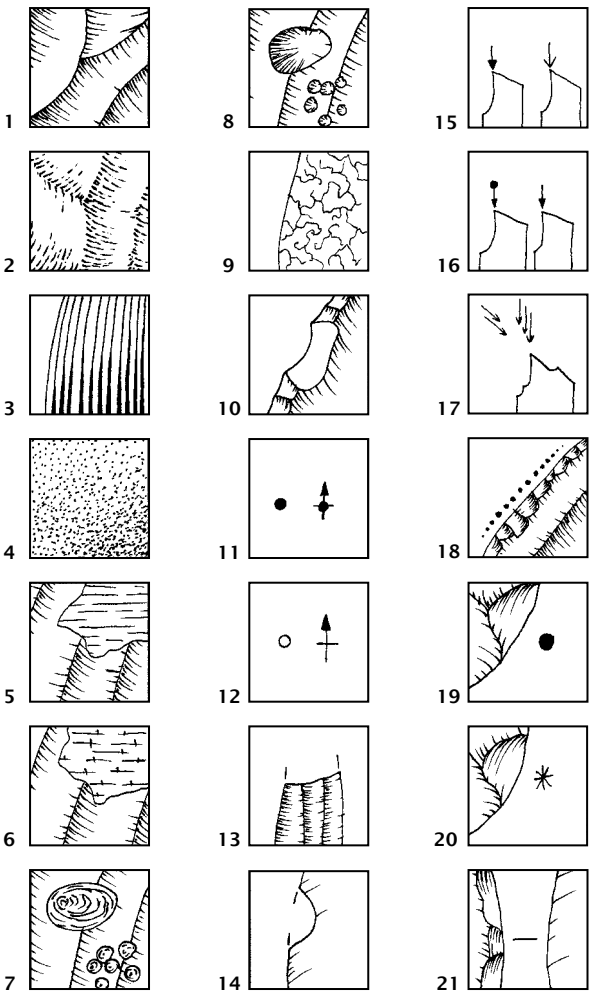
2.6 Lines

The outline of the artefacts as well as other 'hard' lines, such as fractures and fissures are drawn as accurately as possible. The dorsal ridges are also illustrated as hard lines, unless weathered down, for instance through erosion, or a type of stone was used that lacks such features (figure 7).

After drawing the outline, the ridges and other hard lines of the artefact, you have before you an illustration composed of several blank planes. These spaces, such as negatives and the ventral surface with the bulb of percussion, but also including areas with cortex, inclusions, diaclases, pot lids, frost fractures, recent damage and polished surfaces are then filled in with a specific 'grid', consisting of different forms of hatching and other types of symbols.

2.7 Ripples

One of the most characteristic features of flint artefacts is the visible presence of (percussion) ripples in the negatives on the dorsal surface. These ripples are the result of the energy expended by



1 negatives on flint
2 negative on rolled flint, quartzite and other coarse grained rocks
3 a polished axe
4 cortex
5 fracture/natural break
6 fracture/natural break
7 potlids resulting from frost or heating/burning
8 potlids resulting from frost or heating/burning
9 craquelure resulting from heating/burning
10 recent damage
11 location of the striking point (striking point visible); advantage of the second option is that it can also be used to indicate the axis of propagation
12 assumed location of the striking point (no visible striking point). In lieu of an open circle sometimes a triangle is used.
13 break on the end of an artefact
14 break along the edge of and artefact
15 burin spall with and without bulbar negative
16 burin spall with and without bulbar negative
17 successive generations of burin spalls
18 use-wear (sometimes used to indicate the working edge on microliths), the size of the dots indicates the (relative) extent of the damage
19 black dot to indicate obsidian (rarely used)
20 indication of burning using an asterisk
21 connecting lines between projections to indicate the location of the cross sections

Figure 7. An overview of the various types of hatching and other symbols.

the flintknapper when striking the artefact during production. The energy causes a rippling effect on the ventral surface and in the negatives. This phenomenon is also used when refitting flint, as the ripple pattern is unique for each flake bed and only the flake that was removed will fit it exactly; it will click neatly into place, so to speak.

These percussion ripples are indicated with the use of curved lines that extend from the left ridge towards the middle of the negative (figures 3 and 7). The direction of flaking dictates the direction in which the lines curve. The curve also functions to indicate the depth of the negative: shallow negatives are represented by slightly curved lines placed far apart, whereas deep negatives are represented by strongly curved lines with little space in between.

A faster and simpler, but also less visually appealing method to indicate the direction of flaking is to place an arrow in the negative. This however offers no real information on the ripples or the depth of the negative.

2.8 The ventral surface

The ventral surface is generally far less exciting than the dorsal surface; with the bulb of percussion and ripples commonly representing its foremost

features. Just like ripples the bulb of percussion is indicated with curved hatching, yet unlike the lines used in shading the negatives these are far more concentric in nature in order to convey the contours of the bulb. There are several additional features that can often be found on or in proximity of the bulb such as radial fissures and bulbar scars. A bulbar scar is essentially a small negative and is therefore illustrated accordingly (figures 3 and 7).

2.9 Burins

Burins represent a category of chisel like tools that are fashioned by the removal of one or more long and narrow flakes or blades called burin-spalls. The resulting negatives, called burin-facets, create a chisel like edge known as a burin-bit. Occasionally these facets can also be found on the edge of other tools, in which case they are referred to as a combination tool. When drawing a burin or a combination tool, (the edge with) the burin-spall(s) is always illustrated in an upward position. The location and direction of percussion are indicated with a single arrow. If there is more than one burin-spall present, then each individual one receives such an arrow. Alternating between open and filled arrowheads is a way to communicate the order of reduction (figure 7). A filled arrowhead signifies that the 'imprint' of the bulb of percussion can still be seen in the corresponding negative, an open arrowhead that it cannot. The latter would indicate that the bulb was obliterated by subsequent flake removal.

2.10 Polished artefacts

During the Neolithic people discovered that the durability of stone axes increased considerably when fashioned with a smoother surface. From that moment onwards, polished stone tools become part of the lithic toolkit. An undamaged polished axe will generally not display any obvious negatives (figure 8). The surface of such axes is drawn as a series of parallel lines in the direction of polishing, most commonly along the longitudinal axis. Thickening the lines in those areas of the surface where relief is encountered. Polishing does, however, not necessarily obliterate all traces of negatives. Moreover, the axes were often damaged during use and, when nearing the end of their lifespan as a tool, were sometimes given a second life as a core.

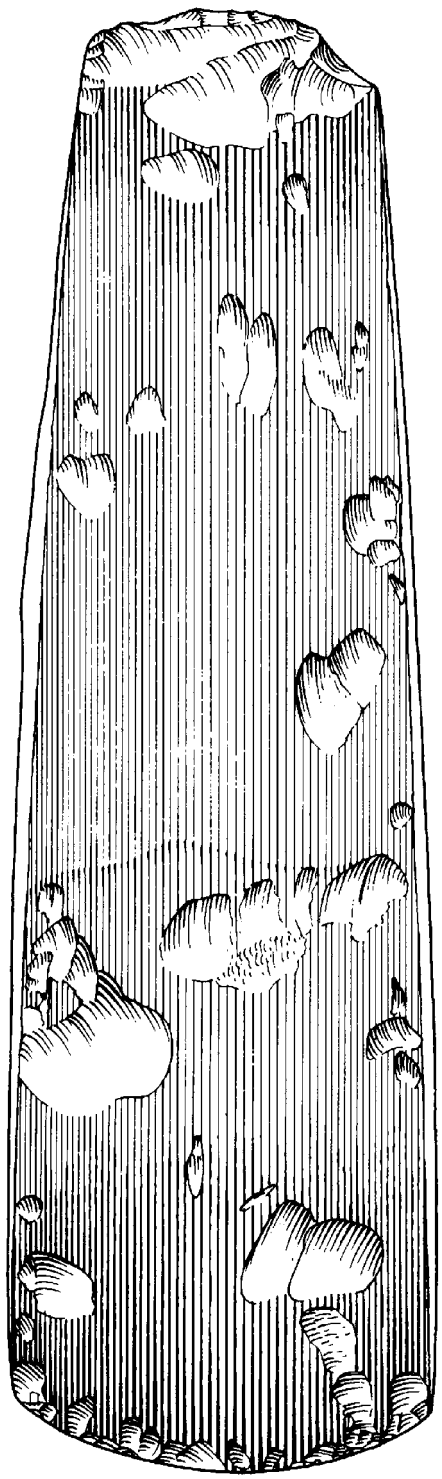


Figure 8. A Neolithic axe-head showing both negatives and polished facets (Wentink 2006).

Given these circumstances negatives could certainly be encountered, and are drawn in the same manner as explained earlier (figure 7).

2.11 Natural phenomena and damage

When our ancestors collected the flint and other types of stones they needed for making tools, these rocks were already millions of years old. During their formation and throughout their existence they endured a great varity of stresses that in many cases altered not only their surface but also the interior. This inevitably affected the manufacturing process of the tools fashioned from them. As such these phenomena should also be included in any illustration (figure 7).

The chalky exterior of flint known as cortex is indicated by means of stippling. Increasing or decreasing the density can be employed to illustrate relief and shadows on the surface of the cortex. Natural fractures within the material may be caused by frost but can also be the result of a myriad of other factors. A fracture is illustrated by drawing parallel horizontal lines in order to differentiate them from negatives, or through the use of small crosses with three arms of equal length and one slightly longer horizontal arm. Flint and various other types of rock also often contain inclusions: foreign materials that were deposited in the rock before or during the sedimentation or solidification process. These are only ever included in an illustration when they noticeably influenced the properties of the material, and had an impact on the ultimate shape of the artefact.

A different type of frost damage is represented by the so-called potlid fracture: a concave, round or oval area of damage caused by variations in thermal expansion due to rapid or intense temperature fluctuations. They are depicted as concentric rings around a central pressure point, a small bulb that is often readily visible, especially in larger examples.

During their time in and on the ground, many processes can and will affect stone artefacts, which will inevitably lead to damage. The edges are especially vulnerable and damage here will often take the shape of small negatives of varying shapes and sizes. Whether these are illustrated is essentially a matter of personal preference. They are often omitted, except where this would severely hamper the legibility of the artefact. When they are included, generally only the outline is illustrated without further shading.

2.12 Burnt flint

Burnt flint is an often-recurring element in most stone-age artefact assemblages. In most instances, it (probably) is a case of accidental deposition in a hearth or other source of fire. Burnt artefacts are seldom selected for illustration because under the influence of extreme heat most artefacts disintegrate into irregular fragments, but there are a few symbols to depict the effects of heat on stone artefacts (figure 7). Additionally flint changes colour under the influence of fire, but conveying such changes are beyond the possibilities of a pen drawing.

Potlid fractures are also common on burnt flint, the difference with frost-induced potlids is that those created by fire are generally smaller (no more than circa 5 mm) and they are often grouped together. They are however illustrated in a similar fashion. A second feature of fire damage one can encounter are heat fractures. These are conveyed through the use of short erratic interlocking lines (similar to craquelure in porcelain). Illustrating heat fractures however carries the risk of making the drawing illegible. Another option is to place an asterisk next to the artefact to indicate that it has incurred burn damage. Ultimately the artefact will have to be photographed; any heat damage will be clearly visible.

2.13 Other symbols

In addition to the symbols and styles of shading that relate to the artefact itself there are a number of supporting symbols that are placed alongside the drawing and convey additional information (figure 7). Unfortunately, there is no consensus on the use of the symbols, but here too it matters little which of the conventions you select as long as you use them consistently and with the consent of any possible client, editor, lecturer or supervisor.

2.14 Microliths

During the Upper Palaeolithic and Mesolithic periods a considerable portion of the flint production consisted of microliths: these often very small artefacts were used to form composite tools. In addition to microliths there are a number of other artefacts that are simply too small to draw using the guidelines outlined above. Microliths are generally not drawn to actual size but rather to a 2:1 or larger scale. The representation of percussion ripples is also often omitted, as these are so small they would otherwise muddle the drawing. At times the illustration will consist of no more than a basic outline illustration with a blank interior. Thickening the lines in these areas in comparison to the other lines conveys retouched edges.

3 Preparation

3.1 Introduction

Anyone can draw artefacts and you can do it anywhere (figure 9). Unlike many other archaeological endeavours, illustrating does not require a specialist toolset: a chair, a lamp and some art supplies will generally suffice, and these supplies should be commonly available at your general art and craft store, office supply depot or high-end bookstore (figure 10).

3.2 Residue and use-wear analysis

Before continuing on, there are a few things to keep in mind. In addition to describing, measuring, drawing and photographing there are several other research methods used to study lithic artefacts, such as residue and use-wear analyses. Through residue analysis researchers attempt to establish the function of a tool by looking at traces of organic or mineral residue on the surface or within irregularities of an artefact. Use-wear analysis aims to do the same, but does so through the identification of distinctive wear markers left by different types of activities (figure 11).

Figure 9. The author at work in a cherry orchard in Yerevan, Armenia. Please note that the desklight is positioned on the wrong side of the artefact (photograph by Phil Glauberman).

Throughout the course of drawing an artefact it will pass through your hands continuously; in order to study it, hold it to the light, to put it aside or back on the paper and so on. In addition, the artefact will come in to contact with paper, eraser, kneadable rubber, possibly the graphite of the pencil and objects such as calipers and contour gauges but also, and I speak from experience, coffee, cherry stones and other things (see figure 9). The traces that these various activities inevitably leave behind will make residue and use wear analysis highly problematic if not downright impossible, as researchers will be hard pressed to distinguish between those marks left in the past and those left more recently.

It is therefore of the utmost importance that the artefacts are not drawn until after any possible residue and use wear analyses have taken place. Nevertheless, contact between the artefact and the graphite of the pencil or objects that may damage it should always be avoided. When using a metal calipers consider covering the jaws with some adhesive tape. Both calipers and contour gauges are also available in plastic.

3.3 Digital illustration

If you are in possession of a digital drawing tablet, the required software and the skills to use them then you will likely not need the majority of the items on the supply list below. You can simply use a millimetre graph paper background and draw directly on the tablet. The added benefit of this method is that the illustration is instantly available in both digital and finished form. A downside however is that drawing on a tablet requires skills that are far removed from the techniques detailed in this book. So if you are not sufficiently used to working on a digital drawing tablet, I would recommend starting your first drawings on good-old-fashioned paper, using a pencil instead of a stylus.

3.4 Supply list

- a sturdy desk or table with a smooth surface;
- a desk lamp;
- a small torch (optional);
- graph paper (ruled in millimetre squares);
- tracing- or chalk paper;
- a retractable pencil (HB or B: 0,5 mm);
- black illustration pens (1 en 0,5 mm);
- an eraser;
- kneadable rubber, also known as putty rubber;
- (plastic) calipers ;
- a set square;
- a (plastic) profile or contour gauge with thin pins;
- a scalpel or double edges razorblade;
- a magnifying glass;
- a sketch folder or binder with plastic sleeves.

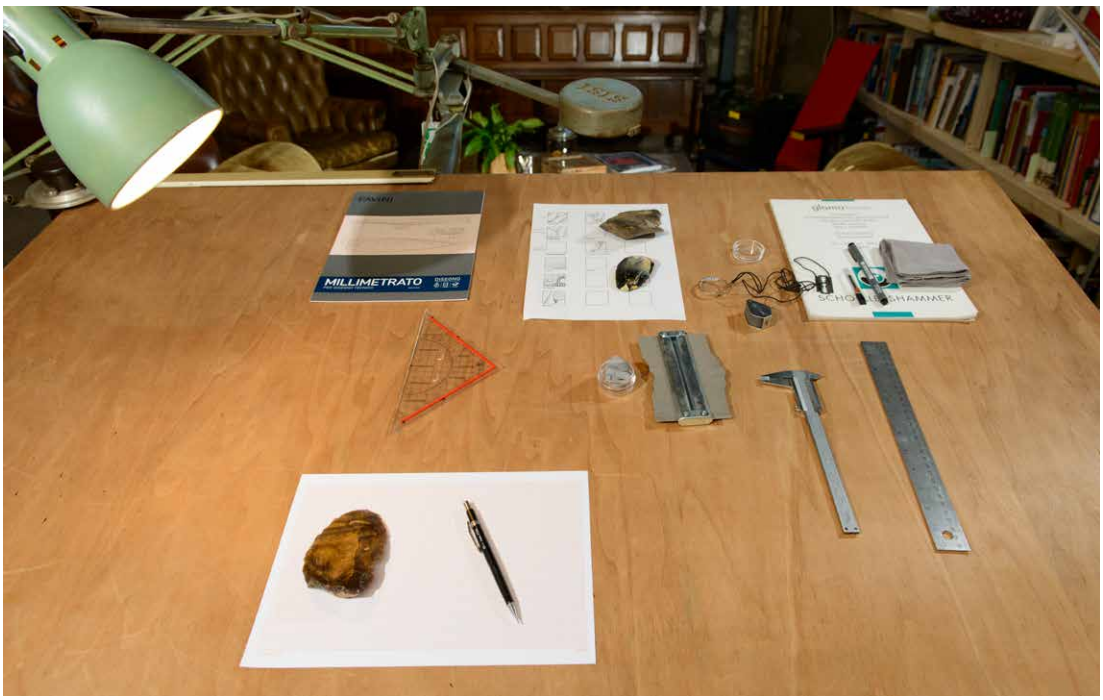


Figure 10. The work station with all the materials needed to make artefact illustrations.

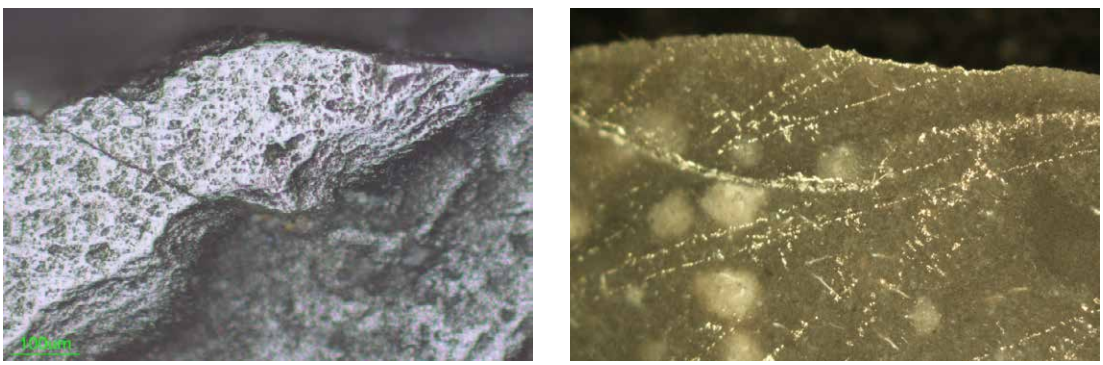


Figure 11. Microscopic images (magnification 100x) with use wear traces from harvesting grain on a burnt sickle on the left (van Gijn & Amaze 2008) and traces of an archaeologist on the edge of a flint tool in the form of metallic scratches on the right (photos property of the Center for Material Culture Studies, Leiden University).

3.5 Function of the assorted supplies

A steady hand is essential when making an illustration, so the first requirement is a solid table. Make sure the table you are using has a smooth surface or failing that use a hard placemat to create a smooth work area. As conventions dictate that the light source should always be located on the upper left hand side of the object it is recommended to position yourself so that the nearest window is on your left. The desk lamp in turn will help to create the necessary shadows regardless of the time of day and lighting conditions. A small torch may also be helpful for identifying fine details while the object is fixed to the paper.

The pencil drawing is made on one millimetre squared graph paper, available in both A4 and A3 format. For the vast majority of Stone Age artefacts A4 should more than suffice. The inked drawing will require the use of tracing paper. Artefact illustrations require a high level of detail, but the first draft will rarely be faultless, especially when you are just getting started. The lines of the drawing must be clean and sharp whilst also allowing for the use of an eraser. Pencils with a graphite grade of either HB or B are best suited for this work. Better yet would be to use a retractable pencil (0,5 mm) with leads of the same grade. The advantage of using a retractable pencil is that the point is always the same thickness, allowing for greater consistency in the line work. In addition, due to the thin point on a mechanical pencil you can place it on the paper with greater accuracy.

For the inked illustration convention dictates that the outline, the (primary) dorsal ribs and any other 'hard' lines present on the artefact are to be drawn using a 1,0 mm illustration pen, leaving the various types of shading and symbols to be done with the 0,5 mm illustration pen. When it comes to dealing with small artefacts or a particularly high number of small negatives using the 1 mm marker may prove to be counterproductive. The decision whether to use the thicker of the two pens is subject to circumstance and you may find that at times only the thinner one is actually needed.

The function of the eraser is evident, and in that light the kneadable rubber might seem redundant. This is because you will not be using it to erase errors whilst drawing but rather to steady the artefact on the paper. This is particularly important during the initial stage of the illustration when accurately trying to capture the outlines of the different projections (see chapter 5). The kneadable rubber is also useful in later stages, for example to secure the tracing paper to the graph paper.

The calipers will prove to be an indispensable tool for measuring the various landmarks and features of the artefact, and transferring them onto the paper. The set square really only comes into play during the initial drawing stage. Once you have secured the artefact onto the paper using the kneadable rubber, placing the set square against the most apparent features on its edge will allow you to transfer them perpendicularly downward onto the paper. More on this in chapter 5. The profile gauge is used to record the contour of the artefact for the cross section(s). The pins of the profile gauge are generally made of metal and often require a fair amount of force to move. To prevent damage to the artefact it is best not to push the profile gauge onto the artefact when doing so. Instead place the artefact on the table, steadying it with the kneadable rubber if necessary. Then push the pins of the profile gauge up by hand, creating bridge of sorts, which is subsequently placed over the artefact. By pushing the pins down gently until they touch the surface of the artefact the contour can be recorded without unnecessarily damaging the artefact.

While the eraser is there to remove mistakes from the pencil drawing, room for such mistakes is minimal when tracing and filling out the inked drawing. Here the scalpel or razor can be used to remove minor mistakes by gently scratching the ink of the tracing paper. It is advised to do this as sparingly as possible, since by doing so you will roughen the surface of the paper. New lines drawn on these roughened patches will inevitably blot.

If you are planning to make large quantities of drawings a sketch folder or a binder with plastic sleeves is good way to store them. Adding a list of the artefacts drawn in the front will aid in maintaining an overview. At three drawings this may seem exaggerated, but once you hit thirty it will definitely prove helpful.

3.6 The work station

Once you have accumulated all the necessary supplies, the time has come to arrange your work area so you can get to work. Make sure the table you have selected is positioned in such a way that your primary light source is on your left hand side or position yourself at the table to make it so. Make sure the cable of the desk lamp does not cross your work area and place your drawing and measuring supplies within arm's reach (figure 9).

The sheet of paper you will be using is best taken from the pad and placed on the table on its own. Not only does this provide a hard surface to work on it also prevents the lines of your drawing from being pressed into the underlying sheets of paper. Do not fix the paper to the table. As lithic artefacts are three-dimensional objects, it is important that you are able to turn the paper in order to study all possible sides.

When working for extended periods of time your drawing hand may become damp from perspiration. To prevent your hand from smudging the drawing or billowing the paper make sure to have a handkerchief, dish towel or sheet of paper close by to act as a coaster for your hand.

3.7 The artefact

Now the time has finally come to bring out the artefact. If this is your first attempt at artefact illustration it is of the utmost importance to start simple. Learning to draw artefacts is challenging enough as it is and starting of with the prettiest hand axe in your collection may well set yourself up for a disappointment. Find yourself a nice sizeable flake or blade with some retouch and preferably a bit of cortex on the dorsal surface.

Before actually putting pencil to paper, you should study the artefact from all possible angles, using both daylight and the desk lamp. The desk lamp in particular can be used to create a skimming light effect that will highlight even the smallest details. Identifying beforehand key features like the primary dorsal ridges, the exact dimensions of the bulb of percussion and in particular the axis of propagation, will help to smooth out the process of illustration. Artefacts are always illustrated with the proximal end at the bottom and the axis of propagation perpendicular to the horizontal axis. The latter may at times lead to an artefact being drawn in such a position that seems to be askew.

4 The pencil drawing

4.1 Introduction

The following paragraphs will guide you through the various steps of producing a nice pencil drawing of a lithic artefact. Or rather, it will guide you through the various steps I go through in order to produce a nice pencil drawing of a lithic artefact. Because, while the conventions are fixed, how to translate those conventions onto paper will differ from person to person. What works for you will quickly become apparent after you have tried your hand at drawing a few times and you will eventually develop your own personal style and technique (figure 12). Repetition will make each consecutive drawing a little better and will make the work itself a little more effortless. So do not feel discouraged if you do not succeed from the get go!

You'll notice that working for extended periods of time may lead you to experience cramped fingers or other inconveniences. To prevent this, it is important to take regular breaks and to get up from behind the table from time to time, or simply to look up from your drawing and 'stare into the distance' for a while. This will benefit both your health and your illustration, as it will prevent shaky hands, camped neck muscles and strained eyes from affecting your work.

4.2 Preparing the graph paper

Before beginning the actual illustration, a number of things must be recorded. Start by drawing a scale bar in one of the corners of the sheet. While the illustration itself is produced to actual scale it will most likely be scaled down when reproduced in a book, article or report. Further list as fully as possible any data belonging to the artefact at hand, such as the year and name of the excavation, the find number, the name of the illustrator and the date on which the illustration was produced. If the finds have been entered into a database this would also be the appropriate time to enter that the artefact is being drawn there.

Place the artefact on the sheet and distribute the various projections in your mind's eye (or mark the sheet accordingly) to make sure they will all fit onto the sheet. Draw a single horizontal line with the set square to act as a baseline for the longitudinal projections. This will aid in correctly sizing and

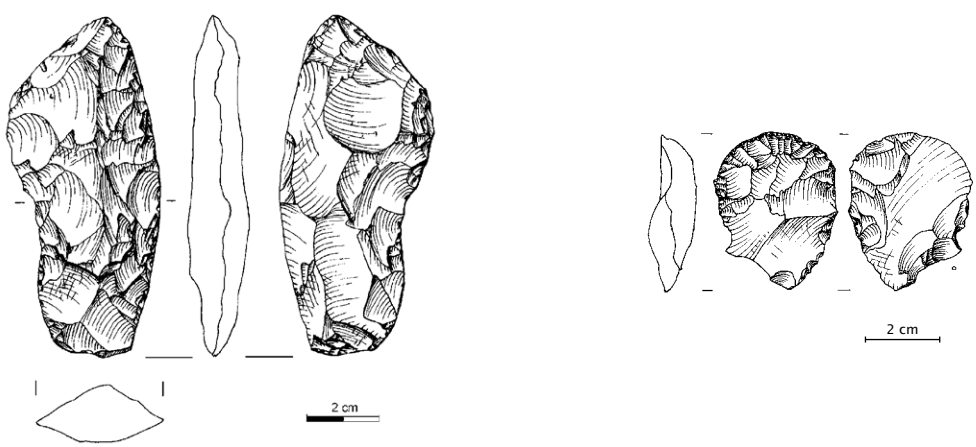


Figure 12. Artefact illustrations by various makers. The differences in style are evident. Left an illustration by Lykke Johansson (Verpoorte *et al.* 2015), on the right a drawing by Bernard Versloot (artefact from personal collection).

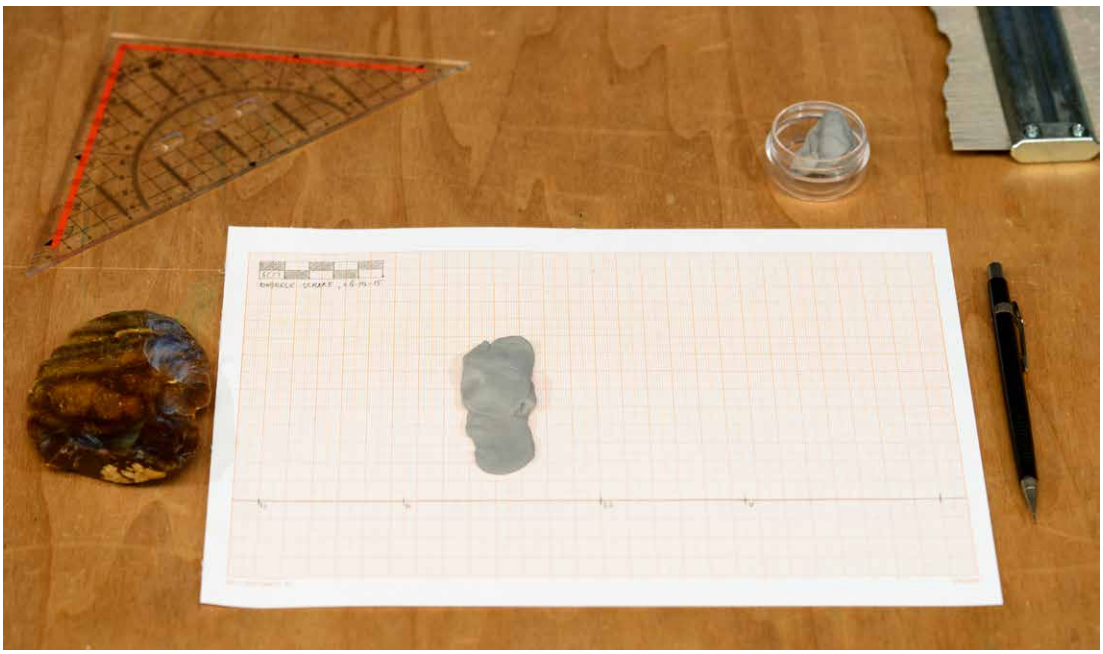


Figure 13. The sheet of graph paper, ready to get started. The kneadable rubber is in place for the first drawing.

positioning all of them (figure 13). You may also find it helpful to draw rectangles in order to ensure that the ventral and dorsal surfaces are exactly the same size. Once the artefact has been correctly positioned to draw the dorsal surface, draw a rectangle along it outermost edge. You can then draw a second rectangle with the exact same dimensions where the ventral surface will go.

4.3 The outline

Start by drawing the dorsal surface. This will generally be the most intricate and time consuming projection thus the hardest to draw correctly; the techniques used are, however, no different from the ones used for the other projections. The illustration must be drawn as close to true scale as humanly possible. Stone tools are rarely flat however, and you will find that by and large they will not lie nicely on the sheet for you to draw them.

This is where the kneadable rubber comes into play. Place a lump of kneadable rubber on the paper where the drawing is to go (figure 13). Take the artefact and lightly press the ventral side down on the kneadable rubber with the proximal part in a downward position. Now move the artefact back and forth gently until the axis of propagation is perpendicular to the baseline you drew earlier. The set square helps to ensure that the lowest point of the artefact is positioned exactly on the baseline (figure 14). When the artefact is placed correctly, you can proceed with drawing the outline.

The edge of the artefact will likely not touch the paper (everywhere); so use the set square to duplicate the outline as exactly as possible. By placing the vertical side of the set square up against the edges of the artefact you can transfer these points down unto the paper. Place a dot with the pencil where the vertical side of the set square meets the paper. You can repeat this process as many times as you want. When all sides of the artefact are done, close one eye and peer down onto the edge of the artefact from above. Keep your eye positioned above the tip of your pencil and move along while connecting the dots (figure 15). When doing so make sure the dots do not become vertices; you want the lines to curve smoothly.

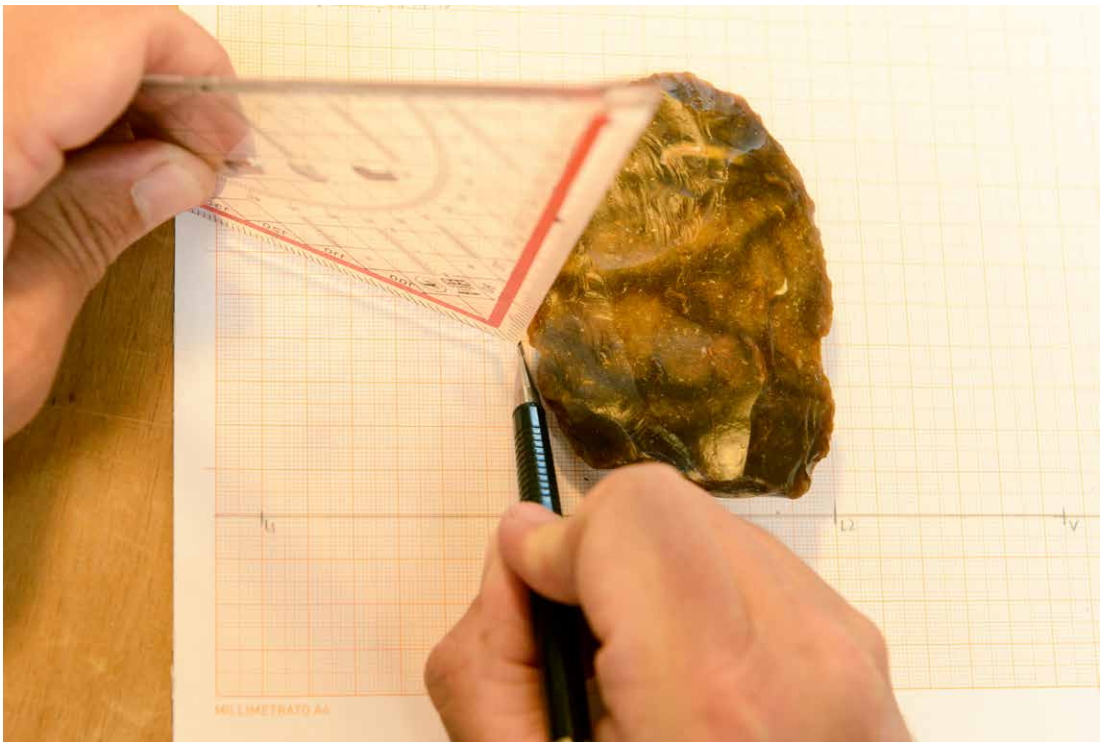


Figure 14. The artefact is positioned correctly and the first point is being transferred onto the paper using the set square.

The ventral outline is drawn using the same techniques. Fix the dorsal side of artefact to the paper and gently move it into such a position so that the lowest point is again neatly on the baseline and the rest of the artefact is exactly mirrored in comparison to the dorsal projection. Use the graph paper together with the set square to confirm that any projections on the right-hand side of the dorsal view line up with the corresponding projections on the left-hand side of the ventral view. The top of the artefact should likewise line up in all the different points of view. For your own convenience you could opt to draw the dorsal and ventral surfaces side by side on the pencil drawing. This will make comparing them far easier. The two lateral margins are then in turn also drawn side by side. When tracing the different points of view to the inked drawing you can simply move them to the correct positions relative to one and other.

Figure 15. Drawing the outline. The illustrator looks straight down with one eye closed and moves his head in conjunction with the point of the pencil as he connects the dots.

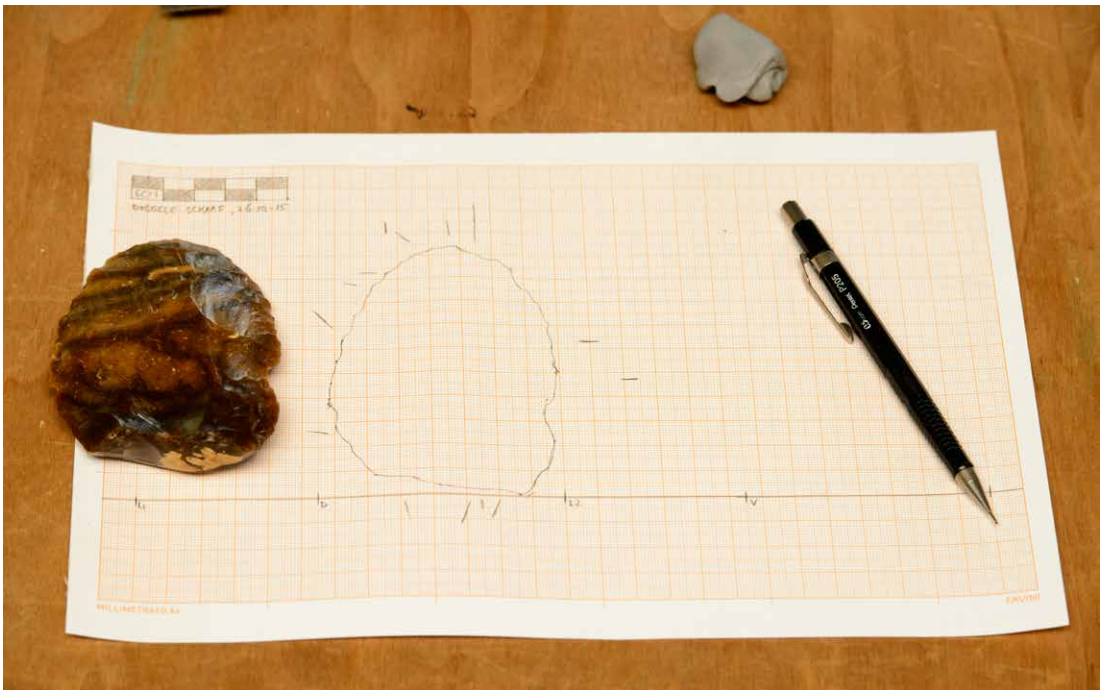


Figure 16. The first stage is completed. The outline and any necessary guidelines have been put on paper.

4.4 The dorsal ridges

With the outline completed you continue by adding guides where the ridges meet the perimeter of the artefact. These guides are essentially small lines, placed outside of the outline and oriented in such a way as to indicate both the position and orientation of the (first part of the) ridges. Using the calipers or the profile gauge in conjunction with the graph paper you can then place additional guides on the outside of the outline that indicate where the primary ridges on the artefact intersect (figure 16). With all the guides in place the easy part of the illustration is concluded, from hereon in it is chiefly a matter of practice, practice and more practice.

You are now free to remove the artefact from the paper. Make sure to leave the kneadable rubber fixed to the artefact when doing so however, because this will function as a 'pedestal' and will keep the artefact in the same position relative to the illustration making it easier to compare the two. Position the artefact next to the sheet of paper, on the left-hand side if you are right-handed and the right-hand side for the left-handed. Use the guides drawn earlier to illustrate the primary ridge intersections within the outline. Then connect these intersections to the corresponding guides on the perimeter of the outline. Your main concern here will be to reproduce the orientation and curve of the negatives as accurately as possible. This is by no means an easy feat and you may find it helpful to use the calipers to measure in one or more waypoints along the way, once again taking care not to let these points act as vertices.

Once the main lines have been drawn to your satisfaction, it is a matter of continuing on to the increasingly smaller lines, until all ridges and other lines have been illustrated (figure 17). At this stage of the process it is important to create a balance between measuring in (way)points and lines and drawing freehand, although in time this is will become easier through practice. Just keep looking at the artefact, continue moving it around in the light and keep using the desk lamp to let the light skim the surface of the artefact to ensure that even the smallest and faintest of negatives do not go unnoticed. This can be a rather frustrating part of the process to master. It is practically guaranteed that you will overlook negatives during your first

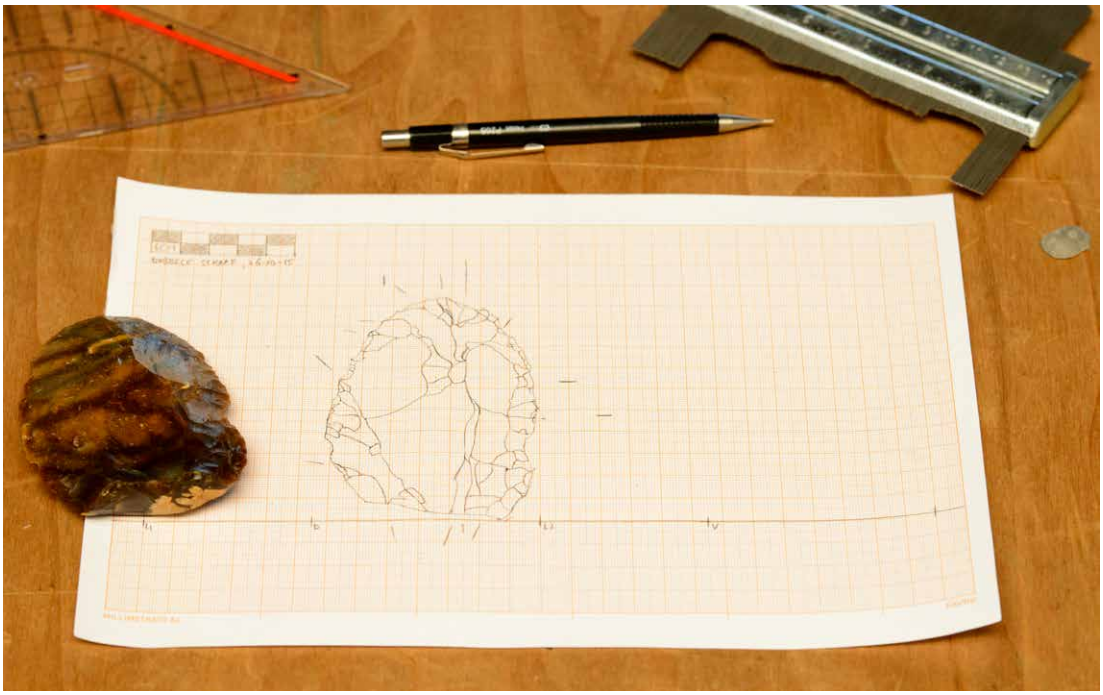


Figure 17. All of the main lines have been drawn; the image is ready to be shaded.

attempts only to discover them the moment the drawing is being inked.

In chapter two the various conventions for drawing rolled flint and other types of stone were shown. When drawing such an artefact, especially when you are only just getting started, it is advisable to start your pencil drawing by using continuous lines same as you would when illustrating flint, and to preserve the dotted lines and other non-linear symbols that indicate the type of stone to the tracing stage for the inked drawing. It is hard enough to make a legible pencil drawing. I would also recommend you practice all of these techniques repeatedly before moving on to the inking stage.

4.5 The dorsal negatives

Illustrating the dorsal ridges was mere preparation for the real work. The principal information on how the flintknapper fashioned the artefact is contained within the dorsal negatives. This information can range from the order of knapping to the force expended, and at times, even to the type of hammer used.

Now it is time to fill the illustration with (one of) the required hatchings. Before starting on the actual illustration however it is essential to practice on the corner of your sheet or on a separate piece of paper, and not just the first time you attempt these techniques, but every single time you move on to the shading stage of an illustration. Simply sketch curved lines that thin out towards the end. After repeating this for several minutes you will notice the motion becoming more fluid and the space between the lines becoming more uniform. Then you move on to the actual illustration.

In order to ensure correctly identifying the axis of propagation of the various dorsal negatives it is essential to keep studying the artefact continuously and from all possible angles during this stage. As a result, there is a good chance that in this stage you will discover negatives that you overlooked previously. Make good use of the desk lamp to let the light fall on the surface of the artefact under a very small angle (figure 18). Lighting the artefact in this manner will reveal even the faintest of ripples. Start with the primary negatives and keep in mind that the light should come from the upper left-hand

corner at all times! You will quickly notice that not all the ripples within a negative are the same size. Start by illustrating the thicker ripples and then fill in the spaces in between as you see fit. Concentrate the bulk of the lines on the left-hand side of the negative, placing lines on the right only to accentuate the thickest ripples or to emphasise especially deep negatives. In addition, you should vary the curve of the lines in accordance with the depth of the negative; increasing it with depth. In a shallow negative the curvature is less pronounced.

Figure 18. Under oblique light the ripples are clearly visible.

Not only the relief of the individual negatives is indicated through hatching/shading, but also the curvature of the artefact itself. In order to do so the negatives on the right-hand side of the artefact are more heavily shaded than the ones on the left-hand side, creating a sense of depth. This can be achieved by increasing the number of lines on the right side in comparison to the left side, and drawing them closer together (figure 4). Always start shading on the left side of the illustration and then work your way to the right, as it is far easier to add lines than it is to remove them. You could of course use the eraser on your pencil drawing but you will often end up removing more than you had been aiming for. By starting out with too many lines, you risk ending up with an illustration that is entirely too dark. In addition, too many lines will tend to clutter the image, affecting the legibility of your illustration.

4.6 The ventral surface and the bulb of percussion

The outline of the ventral surface is illustrated in precisely the same manner as the dorsal surface. In almost all cases this will mean that the ventral outline is an exact mirror copy of the dorsal outline. This fact can also be turned into a convenient

Figure 19. Positioning the artefact in order to draw the ventral surface.

tool. Using the set square, the graph paper and/or auxiliary lines the artefact is placed onto the paper in such a way that the proximal side, the distal side and any possible prominent features on the lateral sides are all lined up perfectly. When this is the case for all points, the artefact is positioned perfectly (figure 19).

If negatives (such as erraillure scars, but also bifacial retouch) are present on the ventral surface, then these are illustrated in the same way as the negatives on the dorsal surface. Once these have all been drawn in it is time to move on to the bulb of percussion. Using the oblique light of the desk lamp to try and assess the exact size of the bulb. The bulb of percussion is indicated through the use of parallel curved lines just as negatives are, but unlike those lines these extend further and are concentric in nature. They are drawn heaviest on the right side of the bulb, since you are depicting a convex rather than a concave shape (figure 24).

Figure 20. Drawing the lateral view using kneadable rubber.

On the medial and distal parts of the ventral surface you will also find ripples. They are the 'positive' of a negative on the piece of stone the artefact was removed from. These ripples are drawn in the same manner as the ones on the dorsal surface, although usually less heavily shaded.

4.7 The lateral sides

The lateral sides are relatively easy to illustrate, since these generally consists of little more than the outline, the edge of the artefact and maybe, where necessary, the most prominent negatives. That having been said, it can be quite tricky to put them to paper properly as you cannot balance the artefact on its sides. There are two methods of working around this issue, which one you use will depend in large part on the shape and size of the artefact in question.

The first method consists of balancing the artefact on its side through the use of of kneadable rubber to prop it up. The outline can then be drawn in the same way as detailed in paragraph 4.4, with the use of the set square. When dealing with larger artefacts however, such a balancing act may not be an option as these will often remain unstable regardless of how much kneadable rubber you throw at them (figure 20).

The second method makes use of the profile gauge. Start by fixing the artefact to the table with some kneadable rubber, and then push the pins of the profile gauge up. Place the gauge over the point of the artefact where the profile is to be taken, now gently slide the pins down until they reach the surface of the artefact (figure 21). You have now created a fairly exact approximation of the artefact's

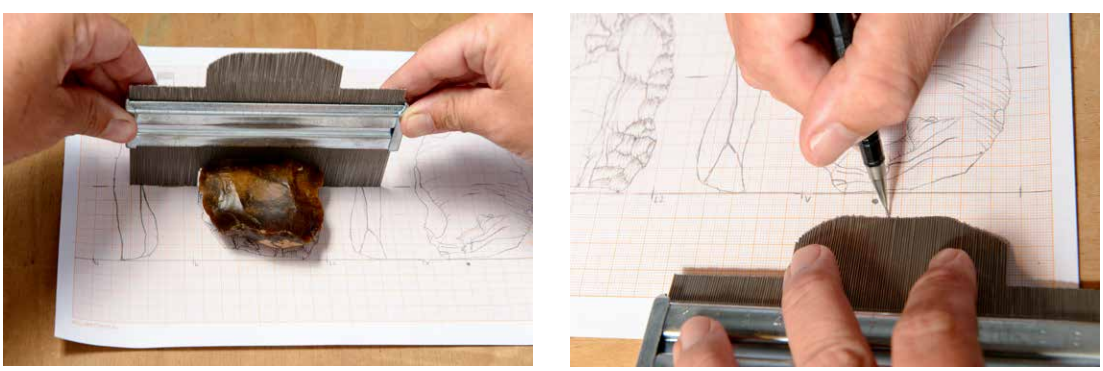


Figure 21. Using the profile gauge to determine the circumference in order to draw the cross-section.

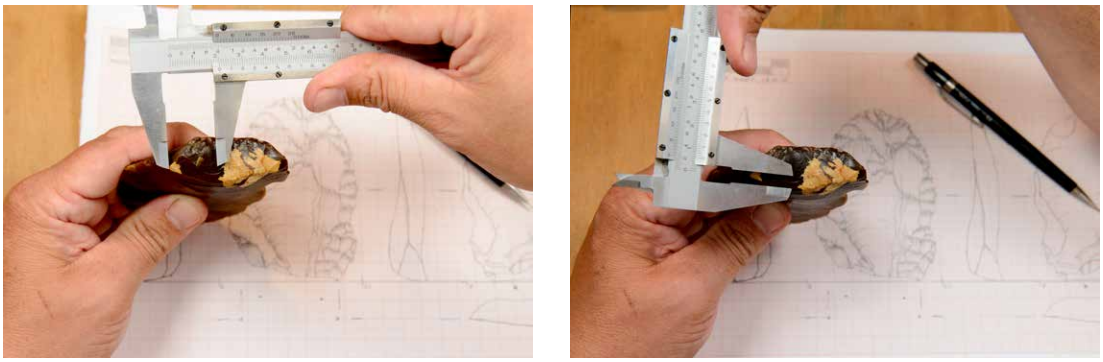


Figure 22. Measuring landmarks with calipers.

profile. Put the gauge down onto the paper with the top and bottom of the profile along the vertical axis of the proximal side of the baseline, and carefully draw the line as indicated by the profile gauge. Repeat this process for the other side of the artefact and draw the artefacts edge in the outline thus created, after which any other prominently visible lines can be drawn where required (figure 24). The second lateral margin can then be drawn an equivalent manner.

Keep in mind that the method employing the profile gauge is unlikely to be suited for artefacts that are strongly curved along the transverse axis. In these cases, it is the edge of the artefact and not the longitudinal axis that will determine the contour of the lateral margin.

4.8 The cross-section

For every artefact at least one cross-section is drawn. This cross-section is always illustrated with the ventral surface in a downwards position. Determine the position of the cross-section and mark this point with a horizontal connecting line. A similar line will connect the depictions of all the different projections.

In order to draw the cross-section you use the profile gauge. The most convenient way to do so, is to fix the artefact to the paper or table with some kneadable rubber and then measure the contour at the point where the cross-section is to be drawn (Figure 21). Put the gauge containing the contour down onto the paper with the edges along the same horizontal line as the connecting lines you just added, and carefully draw the line of the contour as indicated by the profile gauge. Repeat this process

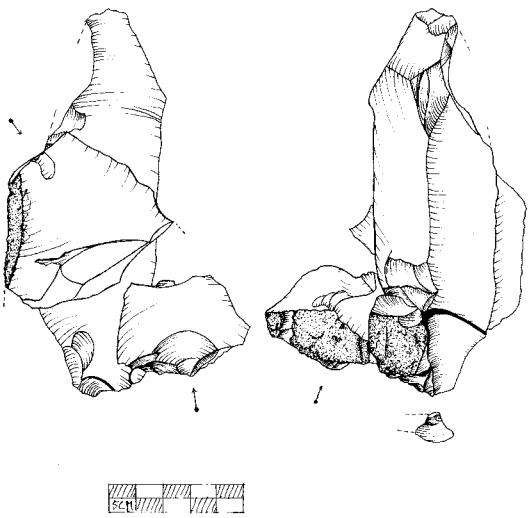


Figure 23. A cluster of refits by Phil Glauberman (Adler *et al.* 2014).

for the other side of the cross-section and draw a line depicting the edge of the artefact if so desired.

4.9 The striking platform and additional details

Similar to the lateral margins, the act of drawing the striking platform and any noteworthy details along the edge of the artefact will prove more cumbersome than drawing the dorsal and ventral surfaces. As you are now dealing with the 'sides' of the artefact, there is probably no easy way to position and balance the artefact in order to draw the outline. For this reason, these drawings are 'constructed' with the help of the calipers.

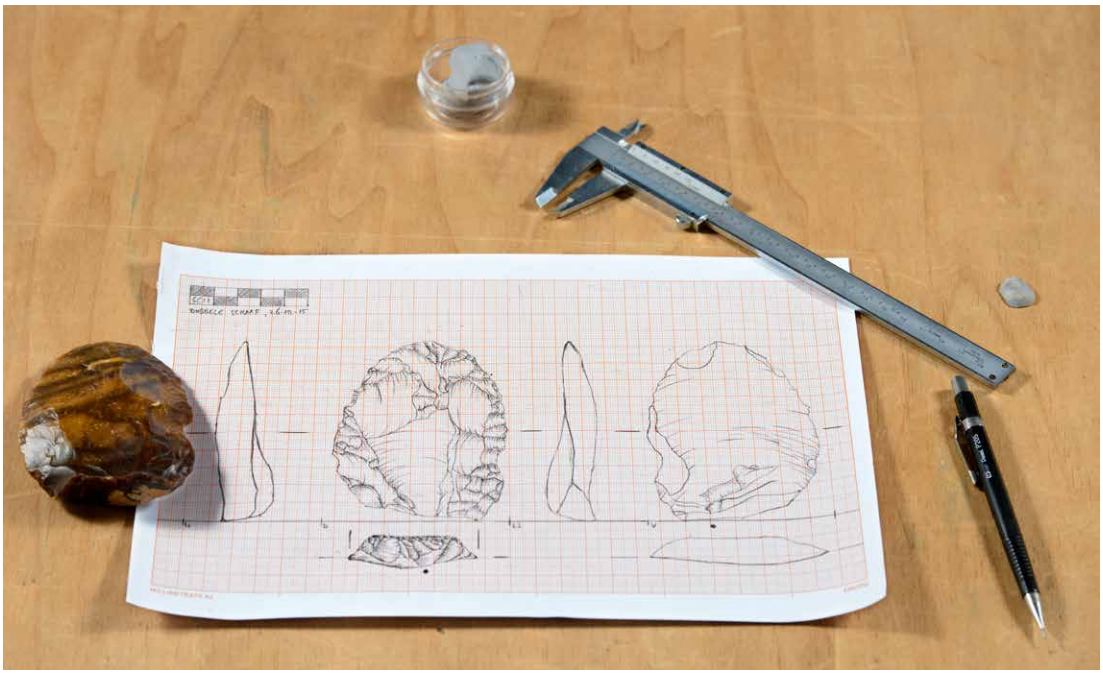


Figure 24. The completed pencil drawing.

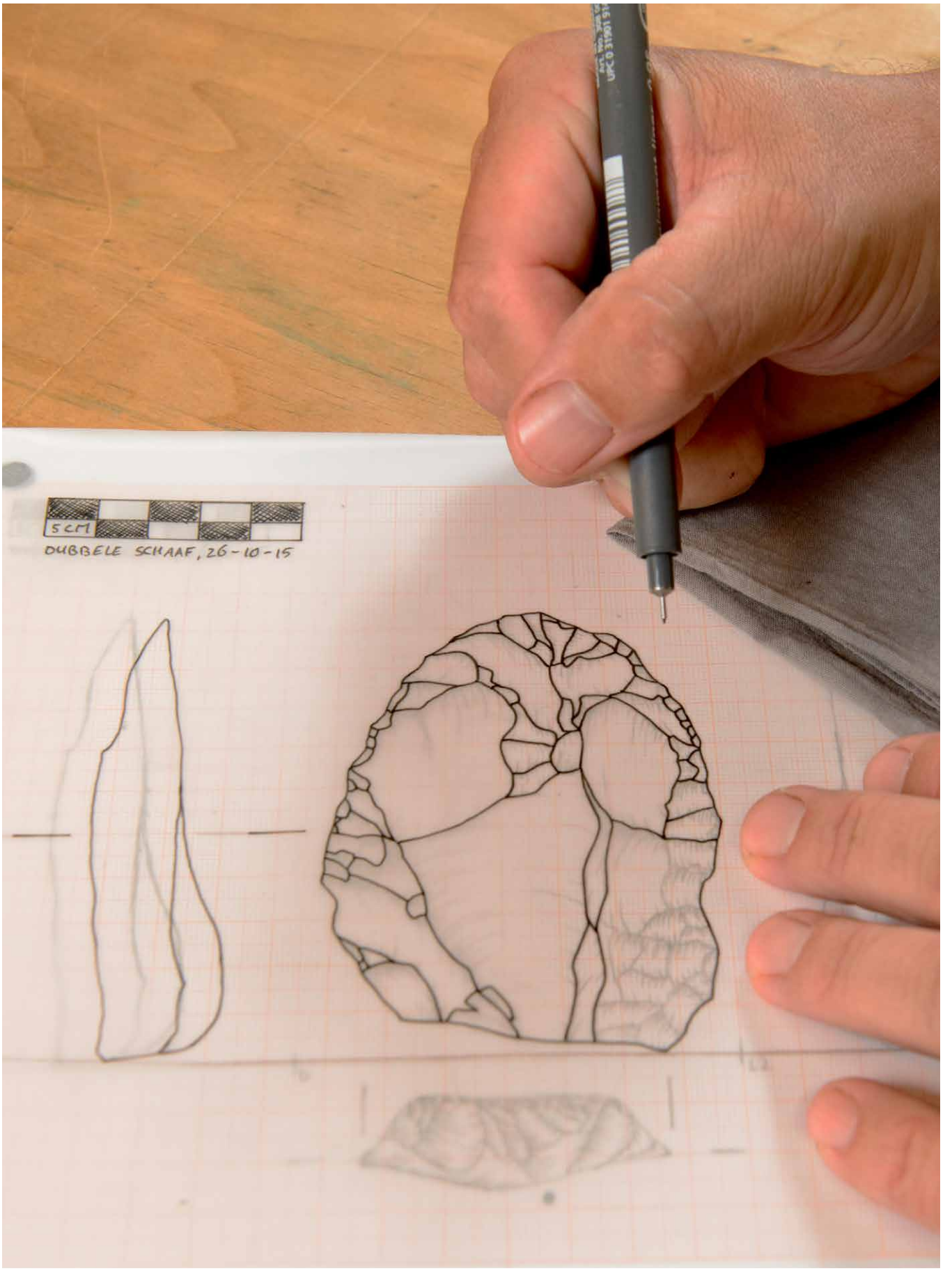
The striking platform is always drawn with the ventral surface facing down and placed beneath the dorsal projection. Start by determining the far edges of the striking platform and measure the total width with the calipers. Transfer these two points onto a single line on the graph paper. This line will act as your baseline for any further measurements taken for the striking platform. Identify the furthest protruding point along the perimeter of the platform and measure its distance to the nearest edge (one of the two points measured earlier). Continue by measuring the distance from that same point perpendicular to the baseline (figure 21). Two such measurements should allow you to transfer any protruding point from the striking platform onto the paper. Repeat this process until you have enough points to draw the outline. After the outline has been completed it is time to draw any negatives as previously explained in paragraphs 4.5 and 4.6 (figure 24).

4.10 Refits

Through refitting clusters of artefacts may be linked to one-and-other and depicting all of them on a single illustration is an excellent way to demonstrate their relationship. The conventions for drawing the individual artefacts and components of a cluster are exactly the same as those for singular artefacts, although the projection will often deviate. The reason for this is that the choice of projection for each of the individual elements of a cluster will depend entirely on the information the illustration needs to provide. Consequently, the projections chosen should represent the most informative ones. The lines used to indicate the edge for each of the individual refits are drawn slightly thicker than all other lines in the illustration (figure 23).

4.11 Finishing touches

The pencil drawing is now all but finished. The only thing remaining is to erase all the guides littering the various views, except for the baseline. The baseline still has a function during the next stage; inking the illustration. When all the guides have been erased, you can start adding any required ancillary symbols, for instance, marking the location of the bulb of percussion, any dots needed to highlight evidence of macroscopic use-wear, lines indicating a fracture, and, where not yet present, the lines connecting the various views. Once all of that has been illustrated, the time has come to start your pen drawing (figure 24).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5 The pen drawing

5.1 Preparations

Before you begin inking the drawing, it is advisible to test your pen on a piece of tracing paper, to get a feel for the pen so to speak. Draw a few lines and try your hand at some hatching so you know how and at what speed to move for the best results. As the ink often takes a few moments to dry, it is important to work deliberately and avoid unnecessary contact with the paper. In addition, tracing paper has a tendency to billow under the influence of warmth and perspiration. A sheet of paper or a handkerchief to act as padding for the drawing hand is indispensable.

When ready, start by tracing the scale bar and transferring the written information in ink. When tracing the scale bar (and other straight lines) keep in mind that the ink in illustration markers tends to blot when used in conjunction with straight edged rulers. Set squares with a bevelled edge, designed for use with drawing pens, should be available at most stores carrying office or art supplies. Remember to position the ruler with the bevelled edge down; this way the edge does not touch the paper and the ink will not blot.

5.2 The lay-out

In order to create a visually appealing final illustration it is essential that all the different views are lined up neatly with equal spacing between each. If and where this is not the case on the pencil drawing, now is the time to correct it. There is no set standard for the size of the spacing nor is it contingent on the dimensions of the artefact being illustrated. To determine the final lay-out you simply place the tracing paper over the pencil drawing in such a way that there is enough space to the left of the dorsal surface for the first lateral margin whilst also leaving enough room on the right for the second lateral view, the ventral surface, and any cross-sections. Copy the baseline from the pencil drawing onto the tracing paper with pencil. This line can be erased at a later stage, but for now it will help to position the different projections evenly (figure 25). If you want to you can also pencil in a few guides, be it in the form of lines or points, to help with the orientation of the tracing paper.

When the tracing paper has been positioned to your satisfaction, it needs to be fixed in place so it will not shift during the inking process. You can

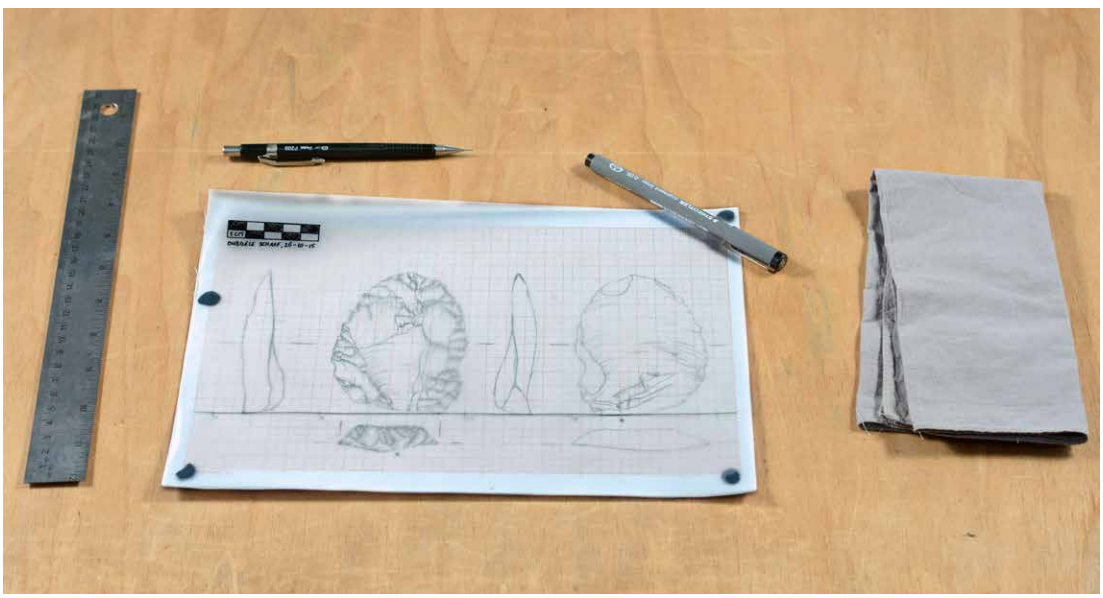


Figure 25. Ready tot trace the first drawing.

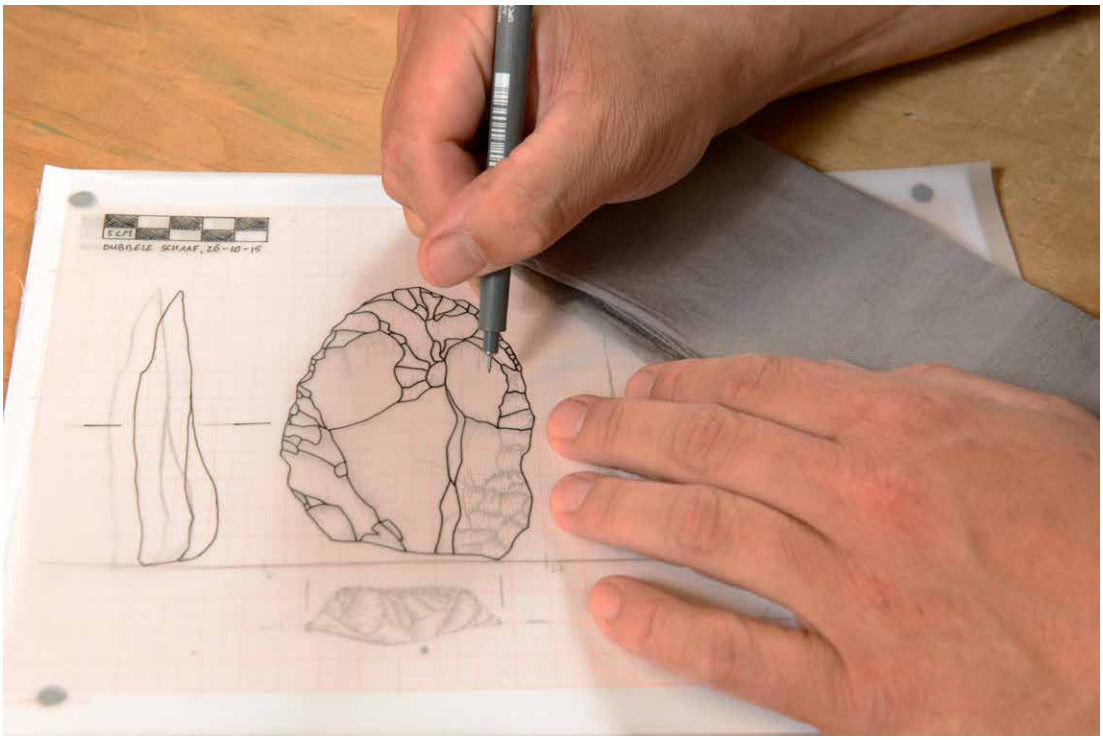


Figure 26. Tracing the drawing.

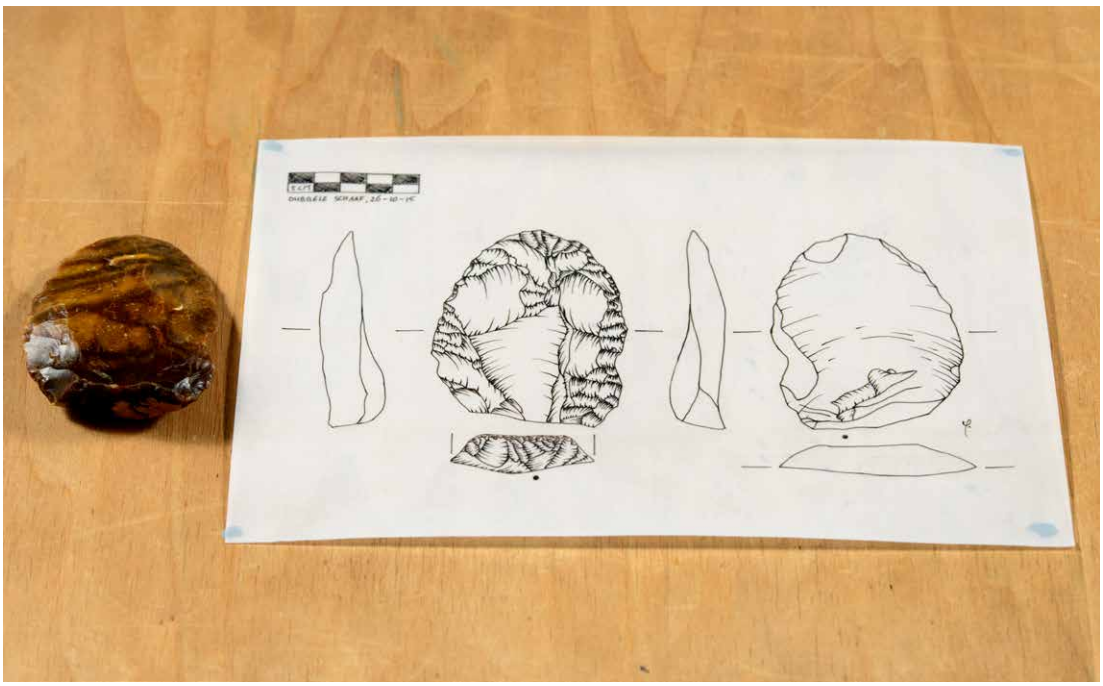


Figure 27. Finished!

use masking tape but little balls of kneadable rubber should work just as well and are much easier to remove, which, seeing as you will likely have to move the paper several times in order to trace all the different views, is a worthwhile consideration.

5.3 Tracing the illustration

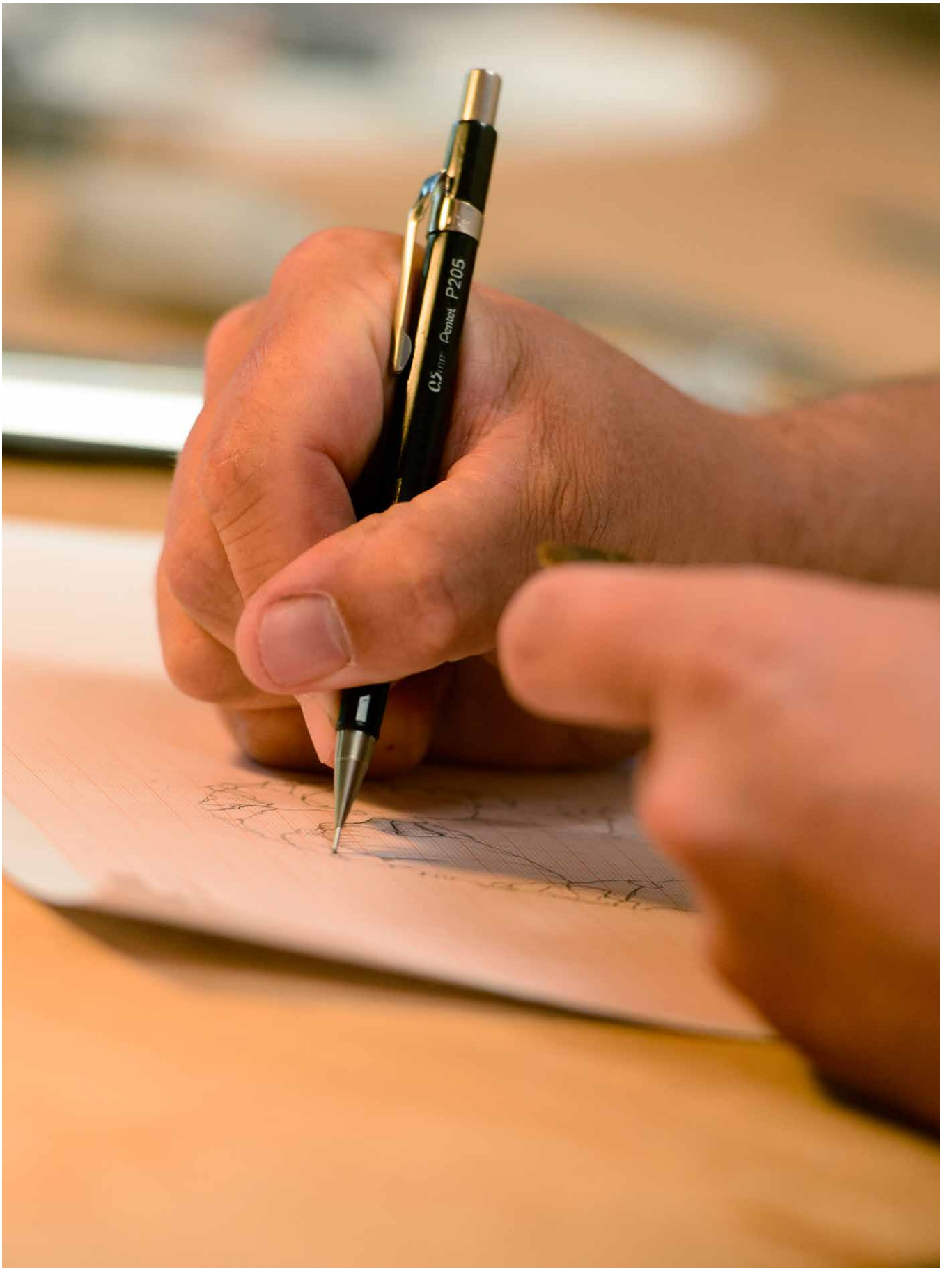
With all the preparations concluded you can begin tracing your drawing. The method itself is fairly obvious. Start with the outline, the dorsal ridges and any other hard lines. Next copy the various grids filling the negatives and finally duplicate all the ancillary symbols (figure 26). Work slowly and deliberately. There is very little room for error at this stage and any mistakes that cannot be corrected will render the illustration useless.

Small errors or smudges can be gently removed with a scalpel or a razorblade. Try this method out on the sheet of paper you tested your pen on first! This way you will know how much force you can use without damaging the drawing too much before applying the scalpel to drawing. Careful as you may be, removing ink in this manner will permanently roughen the surface of the paper. Any lines drawn over such a patch will therefor inevitably be less solid in appearance.

When you have completed the first projection, move the tracing paper if necessary, and start the process anew for the next, until all projections have been inked.

5.4 Finishing touches

Once all the views of the artefact have been copied to the tracing paper, the drawing is just about finished. When you remove the tracing paper from your pencil drawing, there will probably be some leftover bits of kneadable rubber on the back of the sheet. You can remove these by 'dabbing' them with another piece of kneadable rubber. In addition, you should carefully erase the baseline and any other pencil marks still present on your pen drawing. The last thing left to do is to enter your name or initials on the bottom of the drawing and then your inked illustration is finished (figure 27)!


Pentel P205

6 Scanning and editing your illustrations for publication

6.1 Scanning

At this point your artefact illustration is finished, but it is also fairly vulnerable. In order to make the illustration widely accessible, be it for study or publication purposes, it needs to be digitised. Added advantage of a digital file is that, if you are not entirely happy with the lay-out of your pen drawing, you can move the elements around digitally. The optimal format to store these types of line drawings is as a TIFF-file with a resolution of 600 dpi. That should be more than adequate for images reproduced at twice their original size, true scale or smaller.

6.2 Editing your illustration

You will notice that the quality of the scan often leaves much to be desired. The background is likely not completely white and a shadowy effect will frequently manifest itself around the line-work. To improve the overall look of the illustration and to make it meet the standards set for publication you need to edit the image. This may sound intimidating, especially to people who are not experienced in the use of graphical computer programs (such as myself), but you can produce digital images suitable for publication in just three easy steps.

To begin with, always make a copy of the scan to work on and keep the original as a backup in case you make a mistake you cannot undo. Next, open the copied TIFF file in Adobe Photoshop or a similar program for editing.

6.3 Step one: paint it black

Generally, your scan will be rendered as a colour file whereas the original illustration was drawn in black and white. Therefore, the first step in editing is to convert the image to grayscale. In most cases, this will drastically reduce the size of the file. In Photoshop you do this by clicking on ‘image’, then ‘mode’ and subsequently selecting ‘grayscale’.

6.4 Step two: increasing the contrast

Setting the properties to grayscale did little to enhance the image. The background is likely still not evenly white and the image littered with little blemishes. All of this will be dealt with during step two. Go to ‘levels’ by clicking on ‘image’ and then on ‘adjustment’.

In the menu that just opened you can adjust the contrast by shifting the track bars under the curve to change what you want to be white, to white and what needs to be black, to black. My advice would be to slide the outer two track bars to the inside; the right one will both brighten and whiten the background and the left one will make the lines thicker and darker. This combination will increase the contrast of the image and will eliminate the shadowy effect along the lines that was caused by the scanning process. There is no fixed procedure for this, you will just have to do it by eye. Where needed you can now use the eraser tool to remove any remaining blemishes, but there will be opportunity to do so later as well.

By increasing the contrast between black and white the illustration will appear trimmer and cleaner to the eye. This is only true when viewing the image in grayscale however. After printing you will notice that all manner of white specks and grainy edges will have suddenly worked their way into the image. This is because a black and white print cannot distinguish the many shades of grey pixels in the original illustration. To avoid this effect we will move on to step three.

6.5 Step three: making the illustration binary

By turning the illustration (into) binary the last of the noise is removed from the (printed) image. This will turn all pixels in the image either white or black. However, this is only possible when the image is already set to grayscale. Go to ‘bitmap’ by clicking on ‘image’ and then ‘mode’.

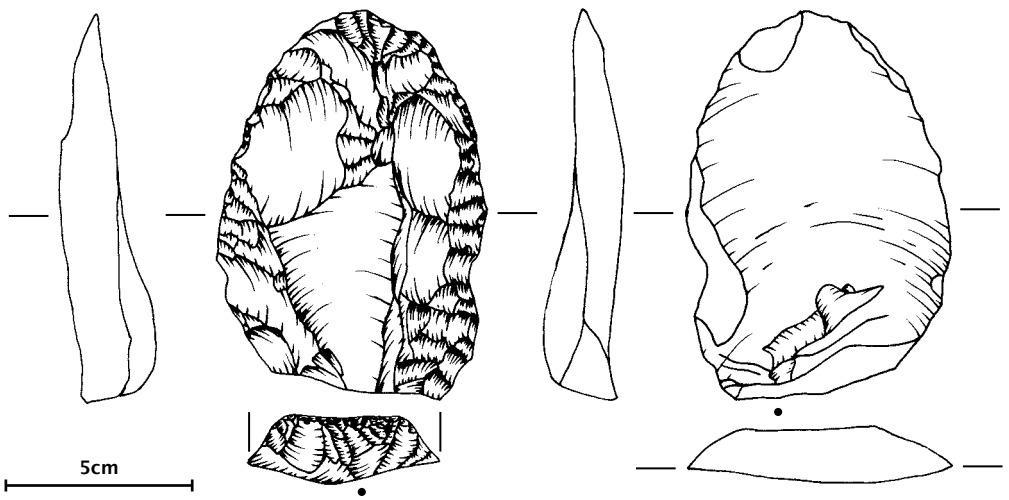


Figure 28. The digitised illustration, ready for publication.

When you click on bitmap a menu will appear. This menu will consist of two fields, the top field displaying input, for instance '600 dpi', the bottom field displaying output. Make sure both fields are set to the same number. If this is not the case, the bottom field needs to be adjusted.

Beneath these two fields you will find a selection screen titled 'method'; select '50% threshold' here. What this does is turn everything that is less than 50% grey to white, and everything that is more than 50% grey to black. Confirm by clicking OK.

You may be unpleasantly surprised by the look of the illustration when you see it on the screen for the first time. This however, is the result of the inherent properties of a computer screen, and the final printed version will actually look far better, not in the last place because of the simple fact that it will generally be much smaller than what you are seeing on your screen. In the event that the test print comes out looking worse than anticipated, this may be the result of having set the contrast too low during step two. In that case it is best to return to and repeat this step of the process. Select the eraser tool again and try to remove any remaining blemishes from the image. When finished go to 'save as' and save the image as a TIFF-file.

6.6 Cosmetic alterations

For publication purposes, it is recommended to replace the scale bar, the connecting lines and any written information by digital counterparts (figure 28). You could also replace any supporting symbols, such as the dots indicating the bulb of percussion and use-wear, if you wish.

7 Conclusion

If all is well, you should now be looking at a beautiful illustration of a flint artefact on the table in front of you and a digital representation on your screen. You may have found it easier than expected, or it may have been trying. In either case the end-result may not (yet) meet your expectations. But do not let this dishearten you.

Drawing lithic artefacts is a skill that needs to be trained and maintained. By doing it regularly you will not only improve your drawing skills, making each illustration a little more effortless, but you will also enhance your perception. Those little negatives that you only discovered when you were already inking your illustration, will not escape your attention so easily when you are working on your tenth drawing.

You will benefit from the sharp eye and skills you acquire through drawing lithic artefacts in other areas as well. Recently a sword was discovered in the Meuse River, dating back to the La Tène period. The sword was studied, described, photographed, scanned, x-rayed and much, much more. But after all was said and done, it was the illustrator who first noticed that there were some vestiges

Figure 29. Hammered lines and ring and dot decorations on a sword from the Late Iron Age (van Hemert & Kerkhoven 2014, photograph by the author).

of parallel lines and point-circle decorations left on the sheath (figure 29). This does not mean that the other researchers failed to do a good job! An experienced illustrator simply views objects in a different way and has trained himself to distinguish details that others may overlook.

So keep drawing, because a true lithics illustrator makes drawings for his own benefit!

Glossary

A

angle of propagation: the direction in which a *flake* breaks off a *core*, recognisable by the orientation of the *ripples*. *Inclusions*, fractures, older *flake scars* and other factors can influence the angle of propagation.

artefact: a generic term for all (mobile) archaeological objects made through, or influenced by human interference.

B

biface: often used as a synonym for handaxe, but every *artefact* which has been modified on both the dorsal and the *ventral side* can be called a biface. As a noun it is generally reserved for artefacts dating to the Early and Middle Palaelolithic. The terms 'bifacial artefact' and 'bifacial reduction' are also used.

blade: a *flake* which is at least twice as long as it is wide and with parallel *dorsal ridges*. This morphological definition is artificial; the difference between a flake and a blade is not always easy to make. More important is the difference in technological sense: a blade is generally the product of blade technology, a flake is produce through flake technology.

bulb of percussion: a bulbous protrusion on the *proximal part* of the *ventral side* of an *artefact*. The bulb is the result of the part the energy of a blow with a hammerstone takes through the flint. In combination with *ripples* the bulb (or its negative on a dorsal scar) it is one of the most important indicators for the *angle of propagation*. When soft percussion is used, for instance using a wooden or antler hammer, the bulb of percussion is usually very small or even absent. The bulb is also often deliberately thinned or removed, especially in the case of hafted implements.

bulbar scar: see *eraillure scar*.

C

core: a flint nodule which has been prepared in such a way that multiple *flakes* or *blades* can be struck off it. Certain *tool* types, such as (polished) axes sometimes end their working life as cores themselves.

cortex: the original, outer surface of a flint nodule. Cortex is the Latin word for crust or bark. It consist of a white to yellow, chalky layer which is usually several millimetres thick. The first step in the reduction sequence of a flint nodule is the removal of this cortex by the flintknapper.

D

debitage: as a verb, it is used to describe the process of retouching (see there), as a noun it is a collective term for the waste products of the flint knapping process.

diaclase: natural fractures in a flint nodule. They are especially prominent in flint from rivers, ice pushed ridges and glacial till deposits, but can also be found in fresh nodules. Diaclases can be the result of *frost cracking*, but these two terms are not synonyms.

distal part: That part of an *artefact* which, when viewed along the longitudinal axis, is farthest away from the *striking platform*.

dorsal negatives: see *negatives*.

dorsal ridges: see *ridges*.

dorsal side: the back of a *flake*, derived from the Latin word for back. The side which is struck from a *core* or nodule is considered the front side (*ventral side*).

E

eraillure scar: one or more small *negatives* on the bulb of percussion as a side effect of the knapping process.

F

feather: the distal end of a *flake* showing a thin, sharp edge. A feathered edge is usually the most desired result when producing flakes. See *hinge* and *step*.

flake: a shard of flint which is deliberately removed from a nodule or *core* with a hammerstone or other percussion tool.

flake scars: see *negatives*.

frost cracking. Under the influence of extreme frost thaw cycles stone *artefacts* can sustain damage. Differential expansion and shrink caused by the warm-cold cycles cause cracks which can result in the complete or partial destruction of artefacts. See *potlids*.

H

hinge: the distal end of a *flake* showing a rounded edge, curving sharply towards the dorsal side, often with a small, residual lip. Hinges occur when the energy of the knapper's strike suddenly travels towards outside of the *core* or flake which is being worked. Although generally not desired, hinged flake scares are often found on *artefacts* with certain types of *retouch* where it either was not considered a problem or was even found beneficial. See *feather* and *step*.

I

inclusion: foreign objects encased in flint or other types of stone, often unrecognisable, sometimes in the form of (fragments of) shells or sea urchins.

L

lateral side or view: the side view of an *artefact*.

M

median part: That part of an *artefact* which, when viewed along the longitudinal axis, is between the *proximal* and *distal part*.

N

negatives: the 'imprint' left by a *flake* on a *core*, a nodule or another flake. This imprint is unique, just like a fingerprint. Only the exact same flake that was struck from it will fit exactly in the negative, a property which is used when *refitting artefacts*. Also called *flake scars*.

P

post-depositional damage: stone *artefacts* have spent thousands of years buried in soil or lying on the surface. In that time many things happen to them, from trampling (people or animals stepping on them) to archaeologists damaging them with their trowels. Fresh *negatives* which are clearly younger than the artefacts (based on colour, sheen or other properties) are considered post-depositional damage. Since trampling damage itself can be thousands of years old, the difference between *retouch*, *use-wear* and post-depositional damage is not always evident.

potlids: circular or oval damages to the surface of flint. They can be cause by severe frost or fire. Especially in the latter case they can be very small (< 5mm) and appear in clusters. When frost is the agent, they can be up to several centimetres in diameter.

proximal part: That part of an *artefact* which, when viewed along the longitudinal axis, is closest to the *striking platform*.

R

refitting: reconstructing the reduction sequence of a *core* by matching available *flakes* together.

retouch: the process of altering the edges of a blank *flake* to shape it into the desired shape or sharpness for a *tool*, by knapping small flakes off the edge. Also used as a collective term for the waste products of the knapping process (see *debitage*).

ridges: the edges of the (dorsal) *negatives* which can be seen as slightly raised ridges. Especially when producing *blades*, these ribs are used by the flintknapper to predict and direct the *angle of propagation*.

ripples: ripples are the result of the wave of energy travelling through an *artefact* when hit with a hammerstone. They are shaped like (partial) concentric rings which dissipate away from the point of percussion like ripples in water. Ripples are unique for each *flake* and the corresponding negative they are struck from, which is important when *refitting*.

rolled flint: flint which has been exposed to the erosive effect of water for extended periods of time, either before or after being knapped. Edges and surfaces will often look abraded.

S

step: the distal end of a *flake* showing a sudden, sharp angle towards the *ventral side* of the *artefact*. Often the result of using too much force, a step can also be caused by *inclusions* or faults in the material. The lower part of a *core* will basically remain attached to the flake, thus rendering both useless. See *feather* and *hinge*.

striking platform: The (more or less) flat top of the *proximal part*. When knapping flint, this is the top of the *artefact*; when drawing it, the base. The striking platform is a remnant of the striking platform of the *core*. The edge of the striking platform and the dorsal side is where tot point of percussion can be found.

striking point: a small lesion, sometimes accompanied by a pressure cone, indicating the exact location where the hammerstone struck the *core*. It is not always easy to see and can be missing entirely when the bulb of percussion has been removed or thinned.

T

tool: a *flake* or *blade* which has been deliberately shaped for one or more or specific activities. It is a techno-typological term, since an unmodified flake can also be used as a tool.

U

use-wear: microscopically or macroscopically visible damage to the working edge of an *artefact*. Use-wear may appear as a series of small *flake scars* and other traces of wear which may be hard to distinguish, from *post-depositional damage*.

V

ventral side: the front of a *flake*, derived from the Latin word for belly. The bulb of percussion can be found on the ventral side.

W

weathering: surface alterations as the result of long term exposure to the elements. Weathering can manifest itself in different ways, incusing a coarsened surface, rounded edges and *ridges* and in some extreme cases of wind erosion, polished, flat facets (ventifacts).

References

Below you find a short list of books and papers about the Stone Age and lithic tools in general, and about drawing lithic artefacts specifically. They are the same books I used to learn the craft and on which I fell back while writing this book, but it is apparent that no publications about lithics illustrations later than 1999 are available. As far as the content is concerned that does not matter since drawing conventions have been the same for many decades, but it does sadly mean that most of these books will no longer be available for purchase, unless second hand and even then often for steep prices. They've often been printed in relatively small quantities and most of the copies are buried in the libraries of universities and other institutions. For those who have no access to these libraries, or who cannot read German of French, these books are virtually inaccessible. However, some of them are, legally and for free, available online as PDF files.

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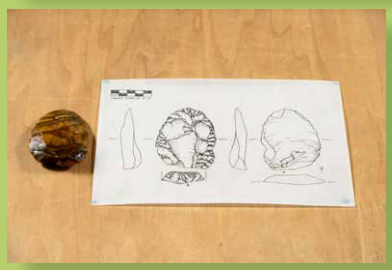
DRAWING
LITHIC ARTEFACTS



Stone Age researchers spend a lot of time studying and documenting lithic artefacts. Since it is impossible to study all these artefacts physically, they often rely on images. Drawings are often the most informative because the lines and symbols in these drawing contain technological information which tells the audience how the artefact depicted was made. Conversely, *making* these drawings is an excellent way of learning to recognise and understand this technological information.

In a distant past Yannick aspired a career as an artist and while the art world is probably better off without him, he managed to find a new purpose for his artistic bend in his career as an archaeologist in the form of making lithic illustrations.

Both professional and amateur archaeologists ask him questions about the drawings regularly with "*It's probably very difficult, I'm sure?*" the most prominent. Drawing lithic illustrations is bound to rules and conventions anybody can learn. Of course it helps if you have a deft hand at drawing, but this style of drawing is a craft, not an art form. A craft anybody can learn with a little perseverance.

Starting from there, Yannick gives courses in drawing artefacts. While preparing these courses he noticed that almost no books or papers suitable as course material are available, a realisation eventually resulting in this book.

Sidestone Press
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