Making woodwind instruments

10.3 The baroque oboe: some history

Section 10.1 (in Comm. 2077) was an introduction to the chapter of double reed instruments. I wrote that I had some luck with my first copy of a baroque oboe, which I made in the early 1980s. Since then, I have made perhaps no more than 10 oboes, experimenting with techniques and with the aim of trying to understand its secrets. I am by no means an experienced maker of this type of woodwind instrument and I can play it only in a very restricted way. But I had the privilege of investigating many historical oboes and discussing the results with professional makers and players. It is in that light that you must see the information in these chapters: some history, some theory (about the acoustics of the oboe) but also a bit of basic practical information, which I hope will be useful for beginner instrument makers. Perhaps my strongest advice for them is: do your own research and carry out experiments. Also important: widen your view, try to become a good player yourself; be in touch with other instrument makers and players.

For this chapter I have compiled a supplement with drawings, tables with measurements and colour photos of eight interesting baroque oboes. Seven of them are historical instruments by Robbert Wijne, Hendrik Richters (2), Richard Haka, Coenraad Rijkel, Jan Steenbergen and Jacob Denner. The other one is a baroque oboe as it was made for fifty years, designed in the Moeck factory by Otto Steinkopf. This 20-page supplement is printed as the following Comm, but can also be requested as a hi-res file by email to the secretary of Fomrhi.

Several people gave me kindly their support when I asked them for their advice. My thanks go to Piet Dhont (Utrecht), Lucas van Helsdingen (Amsterdam), Jem Berry (England), Mary Kirkpatrick (USA) and finally, but sadly, posthumously: Bruce Haynes who wrote such fine books (such as *The Eloquent Oboe, A History of the Hautboy from 1640 to 1760*) and gave me his advice when I was working on my dissertation and the catalogues for the Gemeentemuseum in The Hague.

The oboe is for me perhaps the greatest invention within the new group of woodwinds (nowadays called ‘baroque instruments’) which were developed in France in the course of the 17th century. The oboe became an orchestral instrument, the sound perfectly blending with string instruments. But the oboe could also be used as solo instrument or in wind ensembles. The oboe became popular outside France and often kept its French name (hautbois, hautboy with several variations) in the languages of other countries.

I became interested in these instruments when I started my research into Dutch woodwinds. Over 90 oboes, made by at least 15 Dutch *fluytenmakers* (as they called themselves) between c.1670 and 1770 are preserved in collections all over the world. The challenge for me was to find the connections between these oboes: the resemblances and differences between them. And then the difficult question about the acoustical consequences of those differences.

That research implied: measuring the oboes and assessing the data. But also: playing them, where ever that was permitted and possible (depending on the condition of the instrument). The problem of such playing tests however is that the outcome always has very much a subjective element, and that is even stronger on oboes because of the great influence of such a highly personal item as the reed (with the staple) on the results.
It is possible to reduce that subjective character in two ways: one instrument can be evaluated by a group of players, or one player compares the properties of several instruments. And that is what we did with the oboes in the Gemeentemuseum, with interesting results. There were differences between the instruments in pitch, attack and sound. There were also all sorts of variations in bore profile, placing and shape of the tone holes and other aspects (luxuriously made oboes versus cheaper ones).

How to explain those differences and variations? Thinking about this, I realised that the answers are leading us to the heart of instrument making, and making music. These are my considerations:

- The makers had their own ideas how an oboe should sound.
  But how good were those makers as players themselves? Most fluytenmakers produced all types of instruments: recorders, traversos, oboes and even bassoons. It is hard to believe that they were individually expert players on all those instruments.
- The makers adapted their instruments to the wishes of the players.
  Here is a problem: we do not know much about those wishes, we can often only deduce from the music which was composed for the instruments (and from some contemporary reports) how good the players were. But were they just as critical about their instruments and did they have the same detailed wish-lists for their makers as many professional players have today?
- We must not forget that although many (but what percentage?) woodwind makers learned the trade as pupil in the workshops of other makers, they had to (re)discover the secrets of the oboe when they started for themselves, designing and making reamers and so on.
  That also applies to us. We all have to go through an important learning process which you can’t get round: advice for every instrument maker, also in our modern times.

10.4 The choice: which oboe to copy?

Before you start building an oboe, you have to make a choice: which instruments are best for you to copy, what are their characteristics, qualities and faults. Where to find information? There are not so many publications (and I am afraid that they are hard to find) with measurements of historical oboes. One of them is from 1988, by Mary Kirkpatrick about the oboe collection of Michel Piguet, published as an appendix to an article ‘Neun Oboen aus der Sammlung Michel Piguet’, in the Basler Jahrbuch für historischer Musikpraxis 12 (1988), p. 81-107. The other one is the Niederländische Doppelrohrblattinstrumente des 17. und 18. Jahrhunderts - Dutch double reed instruments of the 17th and 18th centuries by Rob van Acht, Jan Bouterse and Piet Dhont (Laaber Verlag, 1997). But furthermore you must find drawings in the webshops of some museums or perhaps via the websites of some instrument makers.

What you also must know:
It is not easy to assess the pitch of historical oboes: no original reeds and staples have survived from before c.1770; the oboe is in addition a flexible instrument: the same oboe can be played up to 50 Cents (or even more) lower or higher with another reed. Unlike recorders and traversos you can’t estimate the pitch of a baroque oboe so easily from the concept of ‘sounding length’: not only because of the uncertainty at the upper end (the length of missing reed and staple), but also because at the bell the pitch of fundamental (c1) depends more on the size of the tuning holes than of the physical length of the bell. Even more so: the c1 is not the most reliable tone as starting point for tuning the oboe, as it sounds often a bit sharp, on some early baroque oboes so sharp that you can even manage to play the tone c#. 
Piet Dhont told me that for an oboe in a-415 Hz, the distance from the top of the instrument to the third fingerhole should be c.203 mm, or to the distance the hole of the great key should be about 410 mm. I myself think that it is easier to play a shorter oboe with a longer staple and reed in a lower pitch than forcing a longer oboe into a higher pitch.

What you also must realise is that the baroque oboe is nowadays played in a way that is different from the past, concerning for instance the finishing of the reeds, and some fingerings. I will discuss this later on, but it is good to read the article ‘Oboe Fingering Charts, 1695-1816’ by Bruce Haynes. It is published in the *The Galpin Society Journal*, Vol. 31 (May, 1978), pp. 68-93, but you can find it on internet (https://www.jstor.org/stable/841191).

### 10.5 The baroque oboe: parts and construction

The baroque oboe is made in three sections: head, middle joint, and bell. These parts are connected by tenon-and-socket joints. The oboe is played with a so-called double reed which is fixed to a brass staple, see the picture below. That staple with the reed is inserted in the counter bore at the top of the head. The bore of the head has its smallest diameter, on most descants (the common oboe in c), of about Ø 6 mm in the ‘passage’ just after the counter bore (at ‘A’ in the drawing). From there the bore widens gradually to about 11 mm at the lower end of the head. In the middle joint the bore widens further to about 16 or 17 mm at its lower end. On most oboes there is a clear and visible leap in the bore profile between middle joint and bell: the bore of the bell begins wider (between 18 and 20 mm): from the socket to the tuning or resonance holes (B in the drawing) or a little after them, the bore widens only slightly conically, thereafter broadly following the profile of the surface of the bell flare until the widest point, the top of the inner convexity behind the bell lip where on Dutch oboes the widest diameter of the bore is often c.45 mm or more. There are three fingerholes on the head, two of them single (1 and 2) and no. 3 with two small holes. On the middle joint there are three more fingerholes (4, 5 and 6), of which hole 4 is on many oboes double with two small holes. These holes are used to avoid fork fingerings for notes such as f# and g#. To enable players to feel the double tone-holes and close them properly, makers cut tone-hole coves. The construction of most baroque oboes is such that they can be played with either the left or right hand below. This not only means that the tone-holes are aligned in a straight line, but also that there are paired...
small or e-flat keys (7) and that the great or c-key (8) is symmetrical, with a touch on the left and the right.

Left: the two small keys are closing both holes 7 when they are not used. The great key is made in two parts and leaves hole 8 open when it is not used.

Two more holes are drilled in the flank of the bell; they are generally called ‘resonance holes’. But ‘tuning holes’ is also correct as they are used to tune the fundamental, the c1 (C4 in modern or American notation) on the ‘descant oboe’ (which term is hardly used by players, you will find it in encyclopedias and museum catalogues). A fifth lower and much rarer than the baroque oboe in C is the tenor oboe in F; be aware that modern oboes in F are called altos, which is rather confusing. A special type of the tenor is the oboe da caccia, with curved joints and often a widely flare lower part of the bell, made of brass.

Between the descant in C and the tenor in F is the oboe d’amore in A. This instrument has a short bell, without resonance holes but with a lip which only leaves a small opening. Special chisels (such as the ‘swan neck hollowing tool’ in the catalogue of Robert Sorby) must be used to turn the bore behind this bell opening.

To the photo: this bell in the Bate Collection in Oxford is the only surviving part of an oboe d’amore by Johannes van de Knikker, a woodwind and clock maker from Tilburg (second half of the 18th century).

10.6 Making a baroque oboe: drilling, reaming, turning, the keys

Making the parts of a baroque oboe is not too difficult for people who have some experience in making recorders or traversos. The basic rules are the same:

1- use pieces of wood with some overlength and a bit thicker than the maximum diameter
2- drill pilot holes through the wood
3- drill, ream or turn the bore profiles and the sockets
4- turn the exterior of each part
5- drill (but a bit too small) the fingerholes and key holes
6- make the keys, cut the key channels and drill the axle holes for the keys
7- tuning the instrument (therefore you must have a good reed and an appropriate staple, which will be discussed later)

There is of course some other work to do: oiling the wood, finishing the exterior, attaching thread or cork to the tenons.

There are two points which need special attention: the bore of the head and the question of how to turn the bore of the bell. As the bore of the head is very narrow at the passage (between 5.5 and 6.5 mm, on later oboes even narrower, you have to make a narrow pilot hote.
But drilling such holes in a long (c. 250 mm) piece of wood is not easy. Often a thin drill of such a length does not go straight enough, making a curved hole, and that destroys the wood. I prefer making a pilot hole in sections: with diameter 10, 8 and 6 (or 5) mm. I have made some d-bit drills (see chapter 7.2 in FoMRHI Comm. 2060), which work fine as long as you are not forcing them too hard into the wood. Gun drills are of course the best solution for making long and narrow holes in wood. But you need then some special equipment, as you have to use compressed air.

Making reamers for the head is another point to which you have to give great care. Because the bore profile is so narrow, small deviations of the reamer may cause severe problems. In the bore of a bell there is no problem if you are 0.2 mm or so inaccurate. But in the head you have to be much more precise as reaming 0.2 mm too wide results in deviations up to 3%.

The retired oboe player Piet Dhont made his own instruments. For the head joints of one of his oboes he used a set of 5 reamers, all made of long flat bit drills (photo above). He ground these drills in a conical shape. These reamers are self-centering in a pilot hole, I don’t think that the drill points were used for making that hole. The advantage of such a set of reamers is that you can make some bore corrections, for instance when you want to have one section in the bore a little wider. Such bore corrections, or even complete bore profiles, can also be made with adjustable metal reamers, which I have from 6.0 mm upwards (see under 8.6 in FoMRHI Comm. 2060 how to use them).

I have made for my oboe heads a few reamers in one part, turned from an steel rod (see 8.4 in the same FoMRHI Comm.) or from a flat piece of steel (see 8.5). It is wise to check the bore that is made with a reamer on another piece of wood before you do it on your oboe joint.

The middle part of a baroque oboe can be made with the same types of reamers (and sometimes even with the same reamers) as for alto recorders or traversos. But be always be sure that you make the socket at the upper end at first: the bottom ledge of that socket is the point which is also the end position of the reamers which is put in from the lower end.

There is an identical situation at the bell end: the socket must be made from the upper end, the rest of the bore from the lower end. When you are doing the job on a lathe (using a
lunette, see the pictures in section 6a in FoMRHI Comm. 2056), it means that you have to change the position (left and right) of the wood. A point for attention: centering the wood must be done with great care. And that might sometimes be difficult. At first you must turn the wood perfectly round with the pilote hole exactly in the centre. The following step is fitting the round piece in a lunette with a minimum of play. But the wheels or contact points of the lunette (and the chuck at the other end) may cut traces in the wood - and that can have a disturbing effect. And after changing the position of the wood, you have to do it all again.

The bore of the bell is executed with two techniques: reaming out the upper part, where the bore is only slightly conical, and reaming the flaring lower part. There are special chisels to turn behind the bell lip, but I have simple ground a piece of steel in the desired shape. The inner side of the bell lips can have all types of profiles (see sketches below). They are acoustically perhaps not very important, but why not try to copy the original profile?

It is clear that for all the work on the bell you must have a good lathe, where you can mount a chuck and a lunette. I have been thinking about making a bell without the help of a lunette (for instance with a separately turned lower bell ring to avoid reaming behind the bell lip). But I am afraid that such a strategy does not really make the work easier.

I made these drawings for my dissertation. A problem: I had to invent some technical terms in my native language (Dutch) and translate them into English. I am not sure whether these terms are used by other (native English-speaking) instrument makers.
There is always some distance between the tool rest and the place where the chisel (or whatever you are using) is cutting the wood. Together with the mounting of the wood in the lunette some instability can occur, resulting in vibration chatter or ripple marks, as I have seen on one of the finest instruments, a particular interesting oboe by Robbert Wijne (see photo).

On another instrument, it was apparent that the maker in question (Jan Steenbergen) had to solve problems because the bell had not been centered correctly: the bore profile in the lower part was slanted, causing an irregular thickness of the wall of the flare. Steenbergen solved the problem by gouging out some wood by hand (Museum of Musical Instruments, Brussels, Inv. No. 2611).

After finishing the interior of the bell, you must make two plugs: one for the socket, and one which fits nicely in the lower bore. Make sure that you can remove those plugs easily!

Turning the exterior of the bell is rarely a problem, but you must be accurate so that the wall of the wood in the flare is not becoming too thin. I have seen an old oboe (I can’t remember by which maker) where the wall of the flare was so thin that you could see light shining through.

10.7 Making a baroque oboe: the keys

The small key on the oboe works in the same way as the key on a baroque traverso: see the information in section 9.15 in FoMRHI Comm. 2074.

The great key is made in two parts, the connection between the parts is quite simple: the pilot of the upper part goes through a hole in the upper part: see drawing below. Other constructions are possible, but are not often seen on original baroque oboes.
I make my keys mainly from brass, between 1.0 and 1.5 mm thick. Using a fine saw, hammer and files. The guides or flaps must be bent over a metal holder and then hammered and filed in the desired shape. See instructions on the drawing.

It is interesting to see the difference in the construction of the shanks of the great keys of the two tenor oboes by Haka (photo above) in the collection of the Verein der Musikfreunde in Wien (Vienna, where it is not allowed to measure the instruments any more). On the lower one, the shank is hammered straight (in cross section), on the upper one the shank has a curved cross section. There are some more differences between the instruments. Both are made in boxwood but one of them has a widely flaring bell in fruit wood, where the other one has a much less flaring boxwood bell.

This photo is from the oboe by Engelbert Terton in the Smithsonian Institution, Washington DC - USA. It shows the very deep key channels (it takes some courage to cut them out so far) and how the springs are inserted in the channels. Positioning them so far in reduces the risk of breaking: they bend less sharply when the key is pressed.
For the keys, I have measured their actions, which means how far they are opened at their lower end. On several Dutch oboes these key actions are rather low, which has a flattening effect on the notes for which the key holes are the tuning holes.

Drilling the holes for the key axles is a delicate work: the direction of the holes can go wrong in several ways (left/right, up/down). I mainly make the holes with simple 1.2 mm drills. At first I make a small hole or indentation so that the drill can’t slip away. Do not push too hard and retract the drill several times, otherwise there is a chance that some wood will break out at the end of the hole. You have also to make a hole in guides of the key. What I do is at first to fit the key nicely, which means that often some material has to be removed from the key channel or from the sides of the key. Then drill again through the axle hole, that results in a mark on the key. I prefer to do the actual drilling of the hole on my drill press; the hole must be finished with a fine file (removing the edges).

I have always used for the axles steel needles, simply because I couldn’t find brass in the right diameters and I had (and have) no experience of reducing thicker sizes to smaller diameters. What can happen is that the wood of the oboe will shrink through the years, the keys will become stuck and you can’t remove the axles. It is a good idea to redrill the axle holes after some time. What I do is to grind one of those steel needles (lengthwise), but leaving the wire edge. Then I drill through the hole with that needle, because of the edge it results a slightly larger diameter.

It is recommended to make a small hook at the end of the axle, so that you can pull it out of the hole. That is much harder to do on oboes where the axle is flattened with the surface of the wood, as on this oboe by Willem Beukers (photo left).
Hendrik Richters, famous for his luxuriously made instruments, often drilled blind axle holes. That means that you can’t push the axle back from the other side. That causes problems, as can be seen on the photo above (one of the Richters oboes in the Gemeentemuseum in Den Haag, inv. no. Ea 284-1933), where also the axles have become so short that in attempts to remove them, the wood is damaged around the opening of the axle holes.

This photo is from a boxwood oboe by Hendrik Richters in the Bate collection in Oxford (Inventory number: 2040). The upper part of the C-key is probably not original, likewise the key axles with their untypical long hooks. I think that these axles were also a bit too thick and forced into the blind-drilled holes; that is likely the reason that at the lower key ring a piece of wood is broken out.

10.8 The preparations for voicing and tuning: the staple

Voicing means: optimising the sound and playing qualities. Tuning: bringing all tones to their desired pitch. Voicing and tuning are very much correlated on an oboe: making a hole (which you have initially drilled a bit to small) bigger or wider by undercutting changes not only the pitch but also the sound of a note.

But the first task is making or finding a good reed and an appropriate staple. There are three methods for combining reed and staple: 1- Attaching the reed to the staple (as in the picture in section 10.5); 2- Using a multipiece staple; that consists of an upper section made from a cut-off modern oboe d'amore or modern alto oboe staple (on which the reed is tied) combined with one or more conical brass tubes which fit into the oboe. Bruce Haynes writes: this telescoping staple is especially useful for experimenting with different types of staple, or for trying out a new instrument when one is unsure of the type of staple it needs. The reed, of course, effectively remains the same for various 'different' staples (in the article ‘Baroque oboe reedmaking’, see www.idrs.org/publications/controlled/DR/DR2.1/baroque.html (the quality of the pictures is rather low)); 3- the bassoon method: making a reed that is tied on its own wood and can be put on one or more several (long) staples (see picture next page).
1: reed tied on a long staple; total length 78, length of staple 58 mm;

2: multipiece staple with a reed tied on a short upper staple which is put on the lower staple; total length of combination 74.5 mm;

3: reed (for a bassoon or larger size of oboe) tied on its own wood.

It is obvious that for the combinations 1- and 2- you must have a staple before you can make a reed. Bruce Haynes gives useful information in the same article. He writes: ‘Staple making from brass stock is time consuming, especially if one is experimenting with designs and cannot re-use old staples, but the possibilities which it opens for control of intonation, response, and tone will repay the effort. Because the modern staple is more or less standardized (as is the modern oboe compared to earlier ones), the art of staple design has nearly been lost to us. Rediscovering it is perhaps the longest and most complicated aspect of baroque reed making, and certainly one where much experimentation is still needed’.

Haynes wrote these lines in 1976. Nowadays you can order for only a few euros complete staples in several lengths for baroque oboes (Chiarugi is one of the providers).

See for instance on www.oboe-shop.de (also in English) under ‘staples’. Example: one of the staples I bought has a length of 60 mm, widest diameter (inside) 5.5 mm, at the (flattened) top 2 x 3.5 mm, the brass is 0.5 mm thick. Some other staples are a bit shorter.

Making a staple yourself means that some calculations have to be carried out first; then cut out accurately the shape on a flat piece of thin (0.4 or 0.5 mm thick) brass. Then you must fold the brass (after annealing) around a mandrel. Bruce Haynes describes the process in detail in his article ‘Baroque oboe reedmaking’. He doesn’t mention soldering the seam, and you can do it without that.

Diagram of a staple with internal diameters from 5.5 to 3 (flattened to 2 x 3.5) and a piece of brass, 0.5 mm thick. Calculations: $5.5 + 0.5 = 6$ and $6 \times 3.14$ (pi) $= 18.8$. In the same way: $3 + 0.5 = 3.5$ and $3.5 \times 3.14 = 11$ mm.
Some tools for making reeds, with a knife and a self-made mandrel.

About the mandrels: these tools can also be bought (together with the staples). My problem is that on the websites no dimensions are given (only length, not diameters). I have made a few mandrels myself, on a metal lathe. But that is because of the small diameters not an easy job. The advantage is that you can make mandrels with a different conus.

From the article by Bruce Haynes:
1. Cut out a piece of brass with metal cutters (scissors) to the calculated dimensions. Cutting should be accurate to within .1 mm tolerance. A file can be used after cutting to help touch up the dimensions.
2. Anneal (soften) the piece of brass by making it red-hot and then cooling it immediately in water. This can be done by holding the brass with pliers over a flame, such as that of a kitchen stove. When the brass is annealed but still flat, scribe horizontal lines in it from side to side with an old knife, which will later help to keep the thread and cane in place.
3. Make an initial bend down the middle (lengthwise) of the annealed piece of brass by pressing it into a groove with a mandrel. Then bend it roughly around the mandrel with your fingers. (The brass should be soft enough so this is quite easy.)
4. Avoid any rough hammering of the staple, so that the bore will be as smooth as possible when finished. Tap it along the seam so that it forms a butt-joint but does not overlap. Use a wooden or plastic hammer, on a wooden surface. Even this small amount of hammering will "work-harden" the brass sufficiently. The bottom of the staple must be perfectly round when finished, in order to fit exactly into the oboe bore.
5. File both ends of the staple straight (i.e. at right angles to the axis of the staple). File the bottom rim of the staple at about 45 degr., so that there are no sharp corners to damage the oboe bore when the staple is inserted.
6. Tightly wrap the staple with beeswaxed linen or cotton thread of about .15 mm. thickness, beginning near the top but leaving room to tie on the reed, and progressing nearly to the bottom. Be sure the seam closes completely over its entire length. Before wrapping, the staple should be inserted into the oboe to determine if it extends far enough into the bore, if it does not, check (1) if it is absolutely round, (2) if it closes completely at the seam, and (3) if the dimensions are still accurate.
7. Continue to wrap the staple with thread so that it forms an airtight seal when inserted into the oboe. This is critical. Regularly check, while wrapping, to be sure that the staple remains projecting the proper length out of the oboe.
8. Flatten the upper end of the staple with pliers as desired. In the interests of avoiding leaks, put the seam on one of the flat sides so that the cane will seal it when it is tied to the staple.
Bruce Haynes gives in his article also ample information about the effects of the length and the conicity of the staple, and how far the staple must be put into the bore of the oboe. He writes: *to avoid leaking, the bottom of the staple should come as close as possible to the oboe bore walls.* (Leaking is a major problem on the baroque oboe, and is the main cause of squeaking. If the staple is too short, it creates turbulence in the bore just below the reed, the direct result of which is squeaking on the middle d2', e-flat2, and e2.)

The top diameter of the staple affects the response of the extremes of high and low registers: generally, for low notes the bigger the better; for high notes vice-versa. For an average baroque oboe, the range lies between about 2.4 and 3.2 mm. Since the top end of the staple is usually somewhat flattened, it should be kept in mind that the flatter the final opening, the wider the original round diameter can be, as the area of the opening becomes smaller as it flattens (to the extreme of completely flat and no area), and it is this area which is significant to us. The last active variable, exposed length, determines the basic pitch of the reed. To control this variable, one must of course maintain a constant basic shape, approximate cane thickness, and scrape. The further the staple is exposed, the lower the pitch; 30-40 mm is average. Generally a mm or two more or less in the length of the staple has little effect, although this same difference in the length of the cane itself is quite noticeable.

See the original article for more important information!

**10.9 The preparations for voicing and tuning: the reed**

Reeds for baroque oboes which are ready to use can be bought nowadays from several providers via the internet. It is better to go yourself with your oboe to the maker of the reeds, or visit a music festival where instrument makers exhibit their products.

But many players make their own reeds. I refer again to the publication of Bruce Haynes (https://www.idrs.org/publications/controlled/DR/DR2.1/baroque.html): it obtains more or less all information you need.

The cane used on modern woodwinds comes from the plant *Arundo donax*, which grows in countries around the Mediterranean and Asia. Haynes says that it is difficult to imagine using any other reed material on an instrument as sensitive in its reed as the oboe has always been. But I am told that in Central America maize leaf is used for reeds of folk instruments. And perhaps other plants might be suitable as well for our oboe reeds.

*Left: two pieces of cane, and three of those ready-gauged pieces which I bought in a music shop.*

There are two ways to begin: buying canes with a diameter of 14 to 15 mm, which must be split lengthwise in four with a knife. The pieces are much too thick and must - after being soaked in water - be gouged (at the inner side) to the desired dimensions. That gouging
is a science about which I can’t tell you much. The other way is buying ready-gouged unshaped English horn (= modern alto oboe in F) cane, which has just the right dimensions for a descant baroque oboe.

From the Encyclopédie by Diderot & D’Alembert, plate X. Fig. 12 is the wooden bed with the blind end for supporting the reed when it is gouged with some of the other tools.

Professional players use sophisticated machines and tools for gouging the canes. Again Bruce Haynes: Reeds were probably gouged by hand in the baroque period, as many oboists in Holland and other countries continued to do until recently. This involves using either a tool similar to those shown in Diderot's and Garnier's plates, or a hand-carving gouge (a kind of round-bladed chisel) with the ground (sharpened) side on the bottom, and a diameter approximately equal to that of the cane used. Gouges for hand-carving work better than the similar but more heavily built ones used with a hammer.

During the gouging process, the cane is supported by a wooden bed of somewhat larger diameter than the cane, about 110 mm. long, with a blind end toward which one gouges. In order to keep both hands free, the bed can be clamped to a table. In gouging, try to make a continuous cut from one end of the cane to the other, in order to keep a consistent thickness. The gouging tool should be kept quite sharp. Leave more wood in the middle than on the sides, so that the cane has a slight crescent shape when seen from the end. So far from the article by Bruce Haynes.

Back to some more basic information:

The next step is shown here (work with damp reeds only!): cut a small groove and bend it carefully (diagram left).

Cut the reed - which is now double - in the right shape (diagram right).
Now it is time to attach it, airtight, to the staple. Then follows the hard work: scraping, at both sides (front and back) of the reed and symmetrical (left and right). How the scraping is done can be seen on some videos: www.youtube.com/watch?v=83CAPfjwaOU shows how to make a reed for a modern oboe, but the information (no spoken text) is also very useful for baroque reeds. On www.youtube.com/watch?v=JfLBDmT3THc&list=RDJfLBDmT3THc&t=13 you can see how Giuseppe Nalin shows the long process of making a baroque oboe reed, but without any explanations.

Harry Vas Dias wrote an article ‘Making reeds for the baroque oboe’ for *Tibia*; it is in English on internet (www.idrs.org/publications/control/ed/Journal/JNL9/making.html) with useful information, but the photos are of a terrible quality.

From that article: *There are, however, many different ways of scraping a reed, many of them good. A knowledgeable teacher can be of great help, but do not be afraid to experiment on your own. The experience gained can help be very rewarding. The way any one person’s reeds are finished is greatly influenced by their “embouchure” and manner of blowing on the oboe, and varies to a certain extent. Blowing on baroque oboe should be much less forceful than on modern oboe. Good reed making, and especially the finishing stages, can best be learned by experiencing the changes in response that occur as one gradually scrapes the reed to its final dimensions.*

One of the difficulties in scraping reeds is that you can’t measure exactly how thin a good reed must be. It also depends on the quality of the cane: softer cane must be left a bit thicker. Shining a light through the reed gives useful information about the shape of the scraped areas.

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A = response and staccato. Scraping produces an easier response; cutting off the tip produces a harder response.

B = response in the middle register. Scraping makes response easier.

C = response in the low register. Scraping makes response easier.

D = response in the low register and source of elasticity in the entire reed. Scrape here only if the reed does not "speak".

There are many possible ways of scraping and of adjusting the clamps, and one must experiment with care. Except in zone A, one can remove a considerable amount of wood without damaging the reed. Always scrape left and right and on both parts of the reed. In every instance, be sure to examine the reed for irregularities and humps. Before scraping in the middle, ascertain that both sides are already thin enough.

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I found this drawing in my archives, but could not find where it comes from; maybe from a publication by Moeck (Germany. It seems to me that it is not especially describing the reed for a baroque oboe. But the remarks about the zones make sense and might be helpful to understand how a reed works.
The properties of the finished reed very much determine the sound and other acoustical qualities of the baroque oboe. But which type of sound do we prefer? There has been (and still is) some discussion about the way that reeds were scraped in the past, and how it is done in recent times. Piet Dhont wrote a letter (in English) about this discussion, which is published on internet: see www.barokensembledeswaen.nl/html/rieten.html (I do not know for how long this website will be active, so don’t wait too long before downloading this important article).

What is going on? Piet Dhont writes: **Holding a modern oboe reed in front of a lamp, you will see a figure like this (left) and right the profile. This figure varies from player to player, but all reeds have in common a very thin tip (as thin as possible) followed by a thicker section (called the 'heart'). This seems to be essential to all modern oboe reeds. The method of scraping however is relatively new (from about the 1950's).**

In older days the scrape was made in a more straightforward way, without a heart and with a slightly thicker tip (figures right).

Piet Dhont then says that baroque oboe players nowadays mostly use the modern American way of scraping. This because the modern tone ideal is a dark, velvet, focused sound. The old schools of scraping produce a much brighter, thinner tone. Piet ends: on old recorders like Furtwängler, Toscanini and Mengelberg you can hear this bright, (vibrato less) style of oboe playing.

Lucas van Helsdingen (player and maker of baroque oboes) told me that he makes his reeds now in the old way. These reeds has the advantage that they last longer, even up to a year.

For some final remarks I return to Bruce Haynes, who compares the baroque oboe with the modern instruments. **The differences in reeds are naturally a reflection of differences in instruments. The baroque oboe is considerably larger in overall dimensions than the modern oboe; the bore is much wider, usually 1.5 to 2 mm. and the pitch is lower, usually one half tone or more. To accommodate this bore, the staple and reed must be proportionally wider. A wide reed tends to play low notes more easily, helps the response of the cross fingered notes like the b-flat, g# and f#, causes less squeaking, and has a generally rounder and sweeter tone. Beyond a width of 10 mm, however, the high notes stop responding.**

**The size and shape of the tone holes is also quite different. On the baroque oboe, these are much smaller and proportionally longer. This causes a greater resistance in the general response of the instrument, so that reeds must be scraped softer and freer. The resistance that the modern oboist often consciously creates in his reed, for the sake of tone quality, is automatically built into the early oboe. Softer reeds allow more of the dynamic nuance and tonal range demanded by baroque music.**

For a number of reasons, frustratingly little was written by contemporaries about early reeds. In no case is there any information on scraping or finishing, and what little is said about dimensions is not to be trusted unquestioningly. Pictures are our best early source, although oboe reeds hardly form important parts of compositions, and are consequently rarely depicted in detail. Our best key to reconstructing early reeds, though sometimes misleading, remains the practical and empirical experiments each player makes with his reed in one hand and his knife in the other.