The Northumbrian Bagpipes

The Northumbrian Bagpipes

by

W. A. Cocks, F.S.A. (Scot.)

and

J. F. Bryan, F.S.A. (Scot.)

Published by The Northumbrian Pipers' Society
Newcastle upon Tyne
1967

Printed in Great Britain by
Northumberland Press Limited
Gateshead

Foreword

(By His Grace the Duke of Northumberland)

This book is interesting from many points of view; historical, musical and technical.

The Northumbrian pipes may not be widely recognised outside the area of the Borders but of recent years they have, I believe, become more widely appreciated owing to their presentation on the wireless and on television.

The authors have therefore chosen a particularly appropriate time for the publication of this book which has been compiled in order to assist in the preservation of the art of pipemaking in Northumberland.

One recalls Sir Philip Sydney's well-known lines in his Defence of Poesy:

> "I never heard that old song of Percy and Douglas that I found not my heart moved more than with a trumpet; and yet it is sung but by some blind crowder with no rougher voice than rude style; which being so evil apparelled in the dust and cobweb of that uncivil age, what would it work trimmed in the gorgeous eloquence of Pindare."

Many of such ballads have been set to music on the Northumbrian pipes, which have given them an added romance and appeal.

This book will, I hope, be an encouragement to anyone wishing to make either the Small Pipes or the Half Longs. As such I would commend it as a worthy contribution by the authors to the identity of Northumbrian tradition, and I hope it will encourage both the making and the playing of a fine musical instrument.

Northumberland

Preface

There has been a considerable revival of interest in recent years of the art of Northumbrian Small Pipe making. It was therefore felt that some instructions with scale drawings would be an advantage to the would-be makers, as all were amateurs. Accordingly the present book was prepared, and it is hoped that it may be of some service.

The authors would wish to place on record their deep sense of gratitude to His Grace the Duke of Northumberland, K.G., who has done so much for the preservation of the small pipes, for his encouragement and his very kind foreword.

They would also thank the North Eastern Association for the Arts for their generous financial assistance. And to all who have helped in any way, grateful thanks are accorded.

W.A.C.
J.F.B.

Contents

Plates

Introduction

The origins of the Northumbrian Small Pipes have been traced back to the early seventeenth century. The instrument possesses four main characteristics by which it may be identified. These are:

(*a*) Air is supplied by bellows operated by the elbow.

(*b*) The drones, up to six in number, are carried in one common stock.

(*c*) The bore of the chanter is cylindrical.

(*d*) The end of the chanter is closed.

Other kinds of bagpipe also have one or more of these peculiarities, but only the Northumbrian Small Pipes have all four. With the possible exception of the Irish Union Pipes, this instrument, in its final form, is the most highly developed bagpipe in existence, its chanter being sometimes fitted with as many as seventeen keys.

The earliest known set of English bellows-blown pipes, inscribed with the date 1695, had the "shuttle" type of drones, and a description of it will be found in the *Newcastle Weekly Chronicle* supplement of January 27th, 1894. Another set of these shuttle drones with a Northumbrian chanter forms part of the "Cocks" collection.

This shuttle type of drone, with its double reed, being difficult to construct and wasteful of wind, was abandoned, about 1700, in favour of the continental type, a long straight-jointed tube fitted with a single reed. Early small-pipe drones were three in number, had open ends, and accompanied a plain open-ended chanter often made of ivory. The eight finger holes of this chanter correspond to the eight notes of the scale of G Major* and, when all of these holes were stopped, a ninth note, F♯ was sounded by the open end.

The mounting of the drones in a single stock may have been derived from the old Irish pipes or from the old German pipes. The old English bagpipe, now defunct, generally had its drones in separate stocks, as do the Highland pipes of today.

There is no record of when the chanter was first closed at the end. All we can say with certainty is that it was done at some time during the eighteenth century, and that it gave the performer the ability to play in the manner known as staccato, in which the notes are separated or "detached" from one another. The way in which this effect is produced is now the standard method of fingering the chanter. All finger holes are first stopped so that no air can escape and a note is then produced by raising one finger. This finger is replaced before another is lifted to produce the next note and, except for the production of vibrato, it is not usual to have more than one finger raised at a time. This is a system similar to that used for the musette (see C. E. Borjon in his "Traité de la Musette", Lyons, 1672).

Closing the end of the chanter reduced the range of the instrument to eight notes but, about 1805, John Dunn and John Peacock of Newcastle, working together, added for the first time additional notes operated by keys. These were D, E and F sharp below the scale and A above it. At the present time, the small-pipes chanter may have as many as seventeen keys, giving a fully chromatic scale of twenty-five notes from B below the treble stave to B in alto. The majority of chanters now in use, however, have seven or nine keyed notes and are usually played in the keys of G or D major, although the nine-keyed chanter may also be played in A major and E minor.

* Although nominally G. the keynote of the small-pipes generally lies somewhere between the F and F sharp of the modern International Pitch.

STAGES OF DEVELOPMENT

Date	Number and type of drone	Type of chanter	Compass	Keys in order of addition
1695	Three or more, shuttle.	Plain, open ended.	F to G	—
Before 1700	Three pipe.	Plain, open ended.	F to G	—
During 18th century	Three pipe.	Plain. End closed.	G to G	—
1805-10	Three pipe.	4 keys.	D to A	D, E, F♯ & A.
1811	Three pipe.	5 keys.	D to A	C♯.
	Three pipe.	6 keys.	D to B	High B.
	Three or four pipe.	7 keys.	D to B	D♯.
	Four or five pipe.	9 keys.	D to B	Low and high G♯.
	Four or five pipe.	12 keys.	D to B	Low D♯, low and high F natural.
Before 1837	Four or five pipe.	14 keys.	D to B chromatic	Low & high A♯.
Before 1874	Four, five or six pipe.	17 keys.	B to B chromatic	Low B, C and C♯.

Chanters with eight, ten or eleven keys are rare. They are of later manufacture and do not appear to have formed contemporary stages of development. Drones usually number three or four, rarely five or six. The sixth drone was added shortly before 1866.

The Lord Mayor of Newcastle at one time had his own official piper, and the Corporation pipers, or waits, were established under a charter of 1677 to play at banquets and on official occasions. On their nocturnal tours of duty around the city, they would chalk up their mark thus  , wherever they paused to play.

The most notorious Northumbrian piper was undoubtedly Jimmy Allan, born of gypsy parents in 1734 at Hepple in Coquetdale. He travelled the fairs, playing to the admiring crowds, while his gang of companions mingled with his audience, busily picking pockets and cutting purses.

The Earls, and now the Dukes, of Northumberland have retained a succession of pipers in their service at Alnwick Castle for over two hundred years, and others were appointed for the Baronies in different parts of the County. William Green, Piper to the Duke of Northumberland, and William Lamshaw, senior, played the Northumbrian pipes in the American Civil War.

Up to the middle of the nineteenth century, the small pipes were in general use all over Northumberland but, about that time, the Anglo-German concertina came into fashion and the small pipes suffered a decline in popular demand. The instrument did not lack devotees, however. One of its most ardent admirers was the Revd. Dr. J. Colling-

wood Bruce who, commencing in the year 1877, toured the North giving a series of lectures, featuring the pipes, entitled "Northumbrian Ballads and Music". In that same year, together with a number of associates, he organised the first public competitions, for players on the Northumbrian Small Pipes, in the Town Hall, Newcastle, and further contests took place during the next seven or eight years.

In 1893, a number of his friends decided to carry on the work which he had begun and formed the Northumbrian Small Pipes Society "to encourage the art of playing the Northumbrian Small Pipes; to preserve the melodies peculiar to the English Border; and to exhibit the musical pastimes of Sword Dancing and the other traditional accompaniments of our Folk Music". The Society held its first competitions on Wednesday, 31st January, 1894, in the Art Gallery Theatre, Newcastle, the names of the first three prize-winners being R. M. Mowat, Henry Clough and William Hills, in that order.

The Northumbrian Small Pipes Society lasted only until about the turn of the century but, in 1928, it was succeeded by the present Northumbrian Pipers' Society which has steadily gained in popularity over the years. Its aims are almost identical with those of its predecessor; it holds yearly piping competitions and organises other entertainments where the public have the opportunity to hear the pipes played and where, curiously enough, the Tyneside Rapper Sword Dance, alluded to above, is almost always performed.

It is fitting that a kindly interest is taken in our Society by the Society of Antiquaries of Newcastle upon Tyne, which allows us to use the Black Gate for our ordinary meetings, usually held on the third Saturday afternoon of each month. The Black Gate also houses a small collection of bagpipes on exhibition to the public.

1

Materials and Tools

When it has been decided which of the two illustrated sets of small pipes we wish to make, the next thing to be considered is the choice of materials from which to produce them. Formerly, ivory was extensively used, both for the pipes themselves and for the mountings, but the present high cost rules this out. Wooden pipes, although not so beautiful, actually produce a more mellow tone and, as this is the chief quality to be aimed at in pipe making, wood should be our choice. Formerly, native hardwoods such as box, laburnum, apple, pear and other fruit woods were used and these can still be employed, but better in every way are various imported hardwoods. Perhaps the best of these is African blackwood, but ebony, cocuswood, partridge wood and lignum vitae are all quite suitable, nor is this list exhaustive.

Whichever wood is selected, it should be thoroughly seasoned, otherwise a drone slide may become stuck by shrinkage and, of all difficult problems, a stuck drone is one of the most hazardous.

The end mountings of the drones and chanter in old sets were almost invariably of elephant ivory and, if expense is not a first consideration, it still may be used. Sometimes old billiard balls may be utilised. If cut into three sections, like an orange, the tops may be turned from them. Artificial ivory may be bought in either sheet or rod form. It works easily, but is inclined to become a rather unpleasing shade of yellow with age, quite unlike the warm cream colour of old ivory. This criticism may not, however, apply to some of the more modern plastics and it is likely that much improved materials are now available.

Metal work may be of brass, nickel silver or sterling silver. The last named is by far the most pleasing but, here again, expense enters into consideration. Nickel keys and mounts look quite well, and the material is as easily obtainable as brass.

Wood for the bellows cheeks was usually of mahogany, as it looks well when polished but, if re-leathering becomes necessary, it is difficult to remove the old stitches without splitting the wood. For this reason oak, beech or birch is better.

Leather for the bellows should be stout yet pliable and some of the green chrome tanned leathers are to be recommended. Sheepskin is too porous, but calf is ideal.

If leather is used for bags, it should never be of the salt-dressed variety, for it draws moisture and this is fatal to small-pipe reeds. Bark tanned skins are free from this fault and good sheepskin, tanned in this way and seasoned with tallow and oil dressing, will be found satisfactory. Scottish bag dressings are to be avoided, as they contain water.

Many bags are now made of rubber fabric which is entirely satisfactory, being perfectly air-tight and pliable, and requiring no dressing of any kind. They also last a long time if properly cared for, their only drawback being that the sulphur in them is apt to tarnish the metalwork, especially silver, very quickly.

The foregoing covers the choice of the main materials needed, and the next thing is to consider what tools are required. Extra-long drills are necessary for boring out the chanter and drones, and each drill should be about two inches longer than the longest hole for which it is to be used. The recommended diameters are seven-sixty-fourths of an inch, one-eighth of an inch, nine-sixty-fourths of an inch and five-thirty-seconds of an inch, as shown in the diagrams. A long, parallel-shank reamer of eleven-sixty-fourths of an inch diameter is also required for the chanter. Ordinary twist-drills and the reamer may be suitably lengthened by being

silver-soldered or brazed to a silver-steel rod of the correct diameter and, if carefully made and used, will be found satisfactory. To prepare the ends for soldering, a hole about three-eighths of an inch deep is drilled down the centre of the shank end of the drill, and the end of the silver-steel rod is turned down to fit into it. Another way is to cut a slot in the drill end and to file the end of the rod to fit. Long spoon-type drills may be purchased, and these have less tendency to wander, though they are more expensive.

The other drills needed are of standard sizes and are easily obtainable. Should difficulty be experienced in making the insides of the drone slides exactly parallel, it may be necessary to make special reamers for these.

A good lathe is, of course, essential, together with ordinary wood-turning tools, files, hacksaw, burnishers, needle drills, calipers and other general workshop equipment. It goes without saying that all drills and cutting tools must be kept razor sharp.

2

Construction of Bag and Bellows

(Plates 2 and 3)

Before cutting out the material for the bag, it is advisable to make a full-size pattern on stout paper, from the scale drawing on plate 2. Do not attempt to use plate 1 except as a guide to final assembly. If a leather bag is being made, it should be saddle-stitched around the seam, using an inch-wide strip of leather, folded over, as a binding. Bags made of rubber fabric are glued around the seam with rubber solution and, here again, a binding strip is required of the same material as the bag itself. Assuming that the stocks have been made and are ready for tying in, the drone and blowpipe stocks should now be laid on the bag in their proper positions and their outlines marked round with a pencil. From the centre of each pencilled ring, radial cuts are made with a sharp blade not quite to the pencilled line. Care must be taken not to cut too far and not to damage the other side of the bag.

The chanter stock is now inserted into the bag through the drone-stock hole, and worked along into place. It is tied with waxed hemp thread, and it is often necessary to insert two wedge-shaped pieces of leather under the thread and against the seam, to make the joint air-tight. The blowpipe stock is next inserted through the drone-stock hole, brought out through its own, and tied. In tying, each fresh turn should nip in one more thread thickness of the bag. Finally, the drone-stock is brought into position for tying, by being pushed right into the bag and then partially withdrawn, ferrule first. Before tying, the stock should be rotated so that, in use, the largest drone will lie next to the player's body.

The shapes of the bellows leather and the bellows cheeks should be drawn out full size from the scale drawings in plates 2 and 3; these plates also show, in detail, the construction of the bellows. All holes and grooves must be cut in the bellows cheeks before stitching is commenced. The combing of the inlet bush must be wrapped round with hemp thread to give an air-tight seal, the clack valve leather being simultaneously bound into place. The inlet bush is then placed into position in such a way that the clack will hang downwards during use.

One end of a small air-tight tube, of leather or other suitable material, is securely bound to the bellows outlet, and into the other end is tied the bellows outlet bush (plates 1 and 5). The best length for this tube will depend upon the girth of the player, but three inches is about normal.

For the waist belt, an ordinary $\frac{3}{4}''$ leather strap is firmly screwed to the inside bellows cheek. At least two screws are needed, spaced some distance apart, and it is essential to use washers to prevent the leather from tearing. Better still, a brass plate about 2″ long can be screwed down on top of the belt.

Some method of fixing the bellows to the player's arm must now be provided. One way of doing this is to thread two loops of leather thonging through the hole at the rear of the outer bellows cheek. One of these should be long enough to reach to about the bellows inlet bush, and the other should be about three times as long, the best lengths being

found by experiment. In use, the player's arm is placed over one loop and under the other. The long loop is then threaded through the short one and hooked over the front end of the bellows. Sometimes only one loop is used and this is brought over the arm to a small hook screwed into the wood behind the inlet bush, as shown in the diagram on plate 3. Whichever method is used, it must prevent the player's sleeve from covering the bellows inlet and cutting off the air supply. It must be perfectly secure in use but easy to attach or remove with one hand.

When the pipes have been assembled it is usual to make an ornamental cover for the bag with velvet or other cloth. Except at the top, all edges are provided with a fringe and this includes the holes for the various stocks.

The pipes are inserted through a slot at the rear of the cover and this aperture is closed with a zip or some other method of fastening.

3

The Drones

(Plates 4, 5, 6, 7)

No description is given here of the turning of the various stocks, the blowpipe or the bellows inlet. These should present no difficulty if the diagrams are followed carefully. The stocks and drones for the smaller set are shown on plate 4. Plate 5 shows the stocks for the four-drone set, and the drones themselves appear on plates 6 and 7.

The first step in making the drones is the boring of the pieces, and this calls for considerable care and patience. The piece is chucked and the free end centred dead true. If it is not exactly true, the drill will wander gradually more and more until, in bad cases, it may even emerge at the side. Especially in the case of the longer pieces, it is advisable to support the free ends in a ball-race of suitable internal diameter, about one inch, mounted in a wood block, and bolted to the lathe bed at the exact height of the lathe centres. The end of each piece must, of course, be turned to a true round before this can be done. A bore which is slightly curved throughout its length is no drawback, even in a chanter, and many old ones possess this feature.

The drill must be fed up very gently and be frequently withdrawn to clear the chips, and no attempt must be made to force it. Drills frequently become very hot and, if this occurs, they should be dipped in water, otherwise they may overheat enough to soften them.

When the boring of a piece has been completed, it should then be centred by the bore at both ends and roughed out all over. Presuming it to be the drone top joint (plate 1, no. 9) the end should be very carefully turned to fit the ferrule which is to support the sliding joint. The ferrule ought to be a tight fit, and be cemented in position with shellac. Sealing wax or shoemaker's wax, sometimes used in amateur repair work, absorb oil and become very messy, thus they are quite unsuitable. Epoxy resins such as "Araldite" are excellent for this purpose, as well as for general repair work, but they must on no account be used where there is the slightest possibility that a ferrule might need to be taken off again, for instance, to repair or replace a tuning bead.

When the ferrule has been fitted, the remainder of the turning may be completed and the slide bored up in the same way that the long bore was done. It is generally necessary to use a reamer to ensure a truly parallel bore which will give an air-tight slide in all positions.

With the drone slide bored and turned, the drone standing part (plate 1, no. 8) may now be taken in hand, and this requires even greater care in the turning, on account of the long and slender sliding part. The end of this nearest to the tailstock is very liable to split up, and it is a useful safeguard to bind the end of each piece very tightly with fine wire. This sliding joint should be a nice easy fit in the drone slide, but not unduly slack. It will be made an air-tight fit later with thread wrapping, and it should be noted that, wherever thread is to be wrapped on, the wood must be combed with fine lines and left rough for gripping.

A suitable piece of ivory for making the ivory cap for the drone should now be taken, and a hole bored into it just far enough to fit the end of the wood and wide enough to allow for thread wrapping. A piece of waste wood is then chucked and turned so that the ivory piece will push on to it tightly. The latter may then be turned to shape and the small hole drilled in the centre for the stopper stem. This hole must be of smaller diameter

than the bore of the drone. The ivory, when turned as smooth as possible, is lightly touched with a worn piece of the finest glass paper and finally polished with whiting and oil on a rag or, better still, on the fingers. It should then be finished with dry whiting and twisted off the wood, care being taken not to split it, as this happens very easily. The metal stopper is most easily turned from a piece of wire of the same diameter as the drone bore, the small bead at the end being fixed in position after the stopper stem has been inserted through the hole in the ivory drone cap. Metal beads can be riveted to the stems, or ivory beads may be fixed to metal stems which have been threaded with a die to receive them. If a small hole is drilled in the bead, and care taken not to use force, the wire can be made to cut its own thread in the ivory. Finally, a little epoxy resin may be used as a cement. Stoppers may be made entirely of ivory, but these require gentle handling, both in the making and in use, as they are easily broken.

The sliding parts of some of the drones are fitted with a tuning bead which can be rotated to open or close an additional sound hole. These beads are turned to shape on a piece of waste wood and fitted as closely as possible upon the drones which have been turned to receive them. They are fitted against a shoulder of the wood and, if a metal ferrule is placed next to them, this will hold them in position. Of the drones depicted on plate 6, only the large G drone was originally fitted with a tuning bead. The shorter beads on the other drones were at first designed to anchor fine chains which linked the two halves of each drone together for safety. The actual tuning bead thus served a dual purpose, and it is to this that it owes its different construction.

Nowadays, chains are rarely, if ever, used and, as in the present case, the short beads are often found to have been drilled through into the drone bore in order to turn them into improvised tuning beads. These extra tuning facilities allow the drones to be tuned up to the key of A and it is then possible, even with a seven-keyed chanter, to play in a modal key closely resembling that of the Scottish bagpipe scale. Properly made and fitted, tuning beads should give no trouble but if, through bad workmanship, or because of shrinkage of the drone, air is able to leak past the bead when the sound hole is closed, the note produced will waver in pitch, and it will be impossible to tune the drone correctly. If all else fails, the bead should be removed and its seating covered with a fine layer of sheet cork glued to the drone and sanded down until the bead is a comfortable, but air-tight, fit.

The base of each drone must have its bore enlarged to take the reed. The general practice has been to taper these holes and, if this is done, the taper should not be too abrupt, as there is a tendency for reeds fitted in this way to fall out into the bag. Great care must always be used when fitting drone reeds. They must never be forced into position, as there is a risk of splitting the drone at this point.

4

The Chanter

(Plates 8, 9)

The chanter has been purposely left until last, for it is by far the most difficult part to make, and extremely accurate work is required. The practice gained in making the drones will now be found useful.

Bore out the piece to five-thirty-seconds of an inch and ream to eleven-sixty-fourths of an inch then, centring by the bore, true it all over to the maximum diameter required. From the dimensions shown on the chanter drawing on plate 8, mark out the exact positions of the collar and the key brackets and then turn down the chanter to size, leaving the key brackets as complete rings around it. To ensure accuracy, it is advisable to start with the stock seating and collar at the tailstock end of the lathe, and gradually work back along the chanter to the headstock. There is no need to make provision for a metal ferrule below the ivory cap unless this is especially desired for ornament. Early chanters did not have them, and it was not until the Reids added so much metalwork that they appeared.

Having completed the turning of the chanter, proceed to remove the waste wood by means of a rasp and files, leaving only the portions which are to hold the keys. At this stage, the positions of the sound holes may be marked with dots, using a template made to the measurements shown on the extreme right of plate 8. This simple jig consists of a long strip of brass with a projecting step near one end corresponding to the position of the collar on the chanter, and on which the positions of the sound hole centres have been accurately marked with notches. In use, the step end is placed against the shoulder of the chanter collar, all measurements being taken from this point.

The chanter wood is now ready to receive the keys (plate 9), which must now be prepared. There are several ways in which this may be done, depending on the material used. In the event of castings being available, it is only necessary to clean up each key with files, smooth them off with emery buffs (pieces of flat wood or round rods covered with fine grade emery paper) and finally polish with an oiled steel burnisher. However, if sheet metal is used, much more labour is involved. There are five methods which may be adopted, and there is not much to choose between them.

1. Each key may be sawn from sheet thick enough to form the pin bearing, the unwanted thickness of the remainder being removed by filing.

2. Metal just thick enough to form the width of the key may be sawn out leaving a projection for the pin bearing on one side. The shank of the key is then annealed and twisted, when cold, through a quarter turn, to bring the bearing at right angles to the plane of the key. The twisted parts are then consolidated by hammering and the key finished in the ordinary way. All but the very short keys may be twisted with safety, provided that they are first well annealed and allowed to cool.

3. Similar cutting to the last, except that a swelling is left at each side of the key where the key bearing is to come. This swelling is then hammered so as to compress it and raise its thickness in the other direction—not a very easy thing to do, and not recommended.

4. Perhaps the quickest method is to use three-sixteenths of an inch diameter brass wire, filed to a flat surface at each side and drilled for the pivot

pin. The pad end may then be sliced from five-sixteenths of an inch diameter rod and silver-soldered into place.

5. The last way is to cut the key from sheet just half the thickness of the desired width, leaving a projection at each side of the pin position. This part is then folded upon itself to form a double thickness through which the pin hole is drilled. This method is not really recommended for small-pipe keys, though it has been used successfully, especially on the Irish pipes.

Whichever method of key making is adopted, the method of finishing is the same. The key is shaped by filing, and the file marks buffed out with successively finer grades of emery sticks. Finally, the surface is burnished all over with an oiled steel burnisher. A piece of a thick steel knitting needle is suitable for the purpose.

The keys are now fitted to the wood, and this must be done very carefully, as there must be no possibility of side shake when they are operated. Each key bracket is first slotted, either in the lathe or by means of a thin saw followed by filing to widen the cut. The key must fit tightly enough to avoid side play but should not have to be forced into position, as this could easily break the wood. The pin hole is next drilled through and a pin fitted, the pin being of brass or german silver and never of iron or steel. Iron pins rust and cannot be removed without considerable labour and risk. In an ivory chanter, a rusted pin will stain the ivory for some distance around it and it is almost impossible to get the pin out. Rusty pins eventually split off the tops of the brackets by their expansion.

The seating of each key must be very carefully filed flat over the position of the sound hole, and the key pad adjusted in such a way that it lies exactly parallel to the chanter when raised by the thickness of the leather pad. If this adjustment is not made very nicely, it will be impossible to make the pad air-tight later on.

It now remains to make and fit the springs. These should be of well hammered springy brass, and the ends which rest upon the wood must be slightly turned up and made very smooth in order that the keys may close promptly and tightly. The rivet holes in the key stems and springs must not be too large, or the stems will be weakened and may break. When the springs have been riveted into place, they must be carefully adjusted until the keys work satisfactorily.

The leather pads may now be fitted, and shellac is the best cement to use. A flake of shellac is laid on the key pad and the latter heated until the shellac melts. It is then pressed on to the flesh side of a small piece of sheepskin of suitable thickness, and the excess leather is trimmed off. The surface of the key which is to receive the pad should always be scraped bright and free from oil.

Finally, the bore at the top end of the chanter must be enlarged, as far down as the shoulder, so that a reed can be fitted.

5

Tuning the Chanter

If all has gone well up to this point, we now have a bored chanter, fitted with all its keys in a finished condition, and ready for holing and tuning, and it is here that a warning is necessary.

There are three attributes which a pipe maker must have if he is to be able to tune a chanter successfully. He must have a keen musical ear, great patience and the ability to tune the drones accurately and to produce from them a steady, harmonious chord. If he does not possess the first of these requirements, he must seek the help of someone who does. If his musical ear is irreproachable but he cannot manage the drones, he must practise until he can, for it is upon the musical ear of the maker, as well as upon his mechanical skill, that success or failure depends.

The positions of all the sound holes are now checked for accuracy with the aid of the template described in the last chapter, and a small pilot hole of about one-sixteenth of an inch diameter drilled at each point. The purpose of this is to prevent the full size drill from wandering. The holes are now enlarged until they are slightly smaller than their finished sizes, this drilling being done very carefully, for it is fatally easy to split the chanter if the drill should happen to bind or bite suddenly. Straight-fluted drills are the safest form to use.

When the holes have been drilled, a reed must be fitted and, for preference, it should be a sharp one which has been well tried in a good chanter and is known to be correct. Before inserting the reed, however, it is essential to ensure that the key pads are absolutely air-tight. With the finger holes covered, it should not be possible to blow air through the chanter nor, when the reed is inserted, must air be allowed to leak past it in its seating. Failure to attend to this can result in a spoiled chanter. A little olive or castor oil applied to the leather pads will help to make them air-tight.

With the reed in place, the chanter is now sounded and the reed adjusted until the pitches of low and high G are approximately right. These holes will have to be undercut both upwards and downwards in the bore until they give a clear and true note when sounded along with the small G drone. Undercutting upwards, towards the reed, sharpens the pitch of the note and in the opposite direction it prevents whistling and makes for a pure tone. The cutting of the top notes, especially, calls for great care, as a very small cut makes a big difference in pitch—far greater than the same cut would make in a low note. Most of the holes are tuned with reference to the small G drone but some, notably A and F♯, must be checked against the small D drone which, at all times, must be kept in tune with the G. This work of tuning must be very carefully done and cannot be hurried. If the maker's ear becomes "tone-tired", a rest is necessary.

One word of warning may be sounded here. It will often be found that certain notes are definitely false, particularly high E, A and B. If this is the case, no amount of cutting in either direction will be of any avail. The fault does not lie in the positions of the holes, but in the length of the bore, and this will have to be altered. An easy way of testing this is to drop ball bearings down into the chanter one at a time so that they rest on the end plug, and to keep trying the chanter repeatedly until the false notes disappear. A short wooden plug of the same diameter as the bore should then be inserted as far as the point reached by the pile of balls these, of course, having been removed, and the tuning may then be resumed.

6

Reed Making and Setting

(Plate 10)

General Remarks on Reeds:

Small-pipe reeds are of two varieties, viz., double and single reeds. The former pattern is like that of the oboe in principle and is used in the chanter, whilst the latter resembles the clarinet reed and is employed to set up the vibrations in the drones. The reeds used in the Northumbrian Small Pipes are very delicately made, and the least moisture is injurious to them. They must never on any account be blown with the mouth, for once they have been damped, they are irreparably spoiled. To test a reed during making, air must be sucked through it, not blown through.

All reeds when fitted to the pipes must be perfectly air-tight at the point of insertion; a little bees-wax or shoemaker's wax will ensure this. If any wind from the bag has access to the chanter except through the reed there will be false notes and a poor tone, whilst the same condition in a drone will cause the reed to waver or stop entirely.

Each reed must be set perfectly straight so that it does not touch the side of the stock. Failure to attend to this will result in all kinds of troubles.

A reed which has become choked with dust, or with grease from the bag, but which is otherwise satisfactory, may be cleaned by blowing petrol through and allowing it to dry.

Reeds once set satisfactorily should never be interfered with. They may go out of condition for want of use, but playing will bring them back to their proper form. Well made reeds will last almost indefinitely (accidents excepted) with careful use, and cases are known where a chanter reed has still been in perfect condition after thirty years' playing; drone reeds may last even longer.

On account of the great variations in length and bore found in small pipes, it will be evident that reeds made to suit one set are very seldom correct for any other. It is therefore highly advisable that every piper should be able to make and adjust his own, and the subjoined instructions, combined with practice, should enable anyone to accomplish this. Failures at first are inevitable, but experience will soon show the best sizes and style of reed to suit any particular set of pipes.

Before fitting a set of pipes with reeds, the key pads and drone slide wrappings should be looked over and made air-tight where necessary. Poor tone and false notes will result if leaks are left unremedied. The bores also should be proved to be free from obstruction, however slight, for this causes all kinds of troubles. The chanter reed should always be fitted first, and the drone reeds made to speak with the same pressure. As, however, the latter are easier to construct, they have been dealt with first in the following pages. After a few successful drone reeds have been made, the manufacture of chanter reeds may be attempted.

Drone Reeds (also known as Guills):

Materials required: Spanish cane of suitable diameter (about three-sixteenths of an inch); elderberry (bour-tree) twigs of similar diameter, well seasoned; thin sheet brass for metal reeds; waxed hemp thread.

Tools required: a fine triangular file; an old knife with the edge left rough from the grindstone; an old razor, or safety-razor blade mounted in a handle; files, pliers, etc., if metal reeds are to be made.

Method: take a piece of cane of suitable length and diameter, or a piece of elderberry wood free from bark, and burn out the pith by means of a hot wire. Close up one end air-tight with a drop of sealing-wax unless it is closed naturally by a joint. Lightly nick the skin through about one-quarter of an inch from the closed end with a file, completing the cut through to the bore of the cane with the razor-blade.

Split a tongue back towards the open end from this cut, and wrap three or four turns of waxed thread round at the end of the split, finishing with a half-hitch. This wrapping provides the "tuning string" or "girdle". The tongue, being the vibrating portion of the reed, must be so adjusted that its frequency is suitable to the drone for which it is intended. As a rough guide, when air is sucked through it, it should sound about an octave above the required pitch of the drone. It will probably require to be thinned at the root end in order to make it vibrate easily, and for this purpose it may be scraped with the rough-edged knife.

Taper the open end of the reed perfectly circular, wrap a few turns of waxed thread round to fit it in its seating, and try it in the drone.

It should play in pitch with the drone slide about one-third drawn out. This does not always apply, however, to drones which have been perforated to sound more than one note at will, i.e., fitted with tuning rings. If the note sounded is too sharp, that is, if the tongue vibrates too rapidly, it may be flattened (a) by having the root end of the tongue thinned down, (b) by having the tongue split further back, (c) by placing a drop of wax on the free end of the tongue.

If it is too flat it may be sharpened (a) by shortening the acting part of the tongue by means of the tuning string, drawing it a little towards the free end, (b) by making one or more nicks near the free end of the tongue, thus lightening it, (c) by removing a little of the wax if any has been applied to the tongue.

A drone reed which stops easily may often be cured (a) by warming gently at a candle or match flame and holding the tongue open slightly meanwhile, (b) by inserting a very thin hair in the cut, right down against the tuning string. This strengthens the spring of the tongue, flattens the pitch a little, and makes it rather heavier to blow.

Roughness and poor tone are often improved by rolling the reed between the palms of the hands backwards and forwards, afterwards springing the tongue outwards a little. This beds down the tongue and helps to make it air-tight.

Metal Reeds:

Reference to the illustrations will make the construction of metal reeds clear. The thickness of the vibrating tongue must be found by trial, as must also the position of the tuning piece.

The root of the tongue is tightly wrapped to the body of the reed, and the tuning piece is held in place by a separate wrapping. This enables it to be moved without upsetting the position of the tongue.

The reed is sharpened by reducing the acting length of the tongue (as in a cane reed) and it is here that the adjustable tuning piece is an advantage. The nearer the tuning piece is drawn towards the free end of the tongue the sharper will be the reed; the reverse movement will naturally flatten it.

It often happens that a drone which has an exceptionally small bore, making a cane reed unreliable, can be successfully fitted with a reed of metal; but in other cases metal reeds sound very harsh. It is quite an easy matter to fit a metal tongue to a cane body and a useful reed is often produced in this way. The approximate total lengths of metal reeds should be one-inch, one-and-a-half inches, one-and-three-quarter inches, two-inches.

Chanter Reeds:

Materials required: slips of Spanish cane, which may sometimes be procured from florists in the shape of flower baskets; hemp thread waxed with shoemakers' wax for wrapping; staples or tubes which may be made of tinplate or other thin sheet metal; thick shellac varnish; floral wire or copper electric bell wire.

Tools required: half-inch gouge ground with the bevel on the inside; a block of wood grooved to fit the outer curvature of the cane; a block of wood

rounded on one edge to fit the inner curvature of the cane; a fine triangular file; an old knife with the edge left rough from the grindstone; an old razor; a tapered piece of steel set in a handle, upon which to hold the metal staple during the making of a reed; a pair of pliers; fine glass paper; a pear-shaped metal tongue one-and-a-half inches by nine-sixteenths of an inch tapering to three-eighths of an inch, and about twenty-thousandths of an inch thick, thinned to nothing at the edges. This is inserted between the blades of the reed while scraping, to support them against the pressure. It must not be inserted so far that it opens the edges of the reed, but only enough to fill the mouth of the blades.

Method: there are two main methods in use, viz., wet and dry, each having its own slight variations. The wet process is, on the whole, easier to a beginner, as it lessens the risk of splitting the cane, and is therefore to be recommended.

A slip of Spanish cane, free from cracks and irregularities, seven-sixteenths to half-an-inch wide and three-and-one-half inches long is taken and laid in the block of wood which has been grooved to accommodate it. With this support, it may be safely gouged out until it is approximately one-sixteenth inch thick down the centre, tapering off to almost nothing at the edges. It is now to be smoothed on the inside, and this is done by laying a piece of fine glass-paper over the rounded edge of the wood block, and sliding the slip to and fro upon it until all gouge marks have been taken out.

Now it must be soaked in water for a few minutes and have the ends trimmed to blunt points of about three-quarters of an inch in length. These points need trimming a little on the inside to fit them closely to the metal staple which is a tube seven-eighth inch in length and about five-thirty-second inch bore at the circular end. The other end, flattened a little to an oval section, lies inside the reed. It may be made of thin sheet metal of almost any kind, even old tin-plate being quite suitable. Some workers use a tapered piece of steel set in a handle, bradawl fashion, upon which to hold the staple during the wrapping and trimming of the reed. It is not essential but may be found convenient.

The slip, now pared, smoothed and pointed, is laid on the glass-papering block, and nicked lightly across the exact centre and exactly at right angles with the triangular file or rough-edged knife, and again soaked in water. It is now possible to double it at the nick with very little risk of breakage. When doubled it is fitted to the staple and wrapped with a few wide open turns of hemp thread. The outsides of the points may now be trimmed up smooth and rounded if necessary, after which the whole of the junction between the staple and cane is to be closely and tightly wrapped with waxed hemp thread. The wrapping extends from a little above the shoulders of the cane to three-sixteenth inch from the end of the staple. There must be no open space down the edges between the cane sides; they must fit quite closely to each other. At this stage the reed must be laid away for a day or two until it becomes perfectly dry. This is of the utmost importance, as any further work upon it will be labour wasted if it is in the least damp. After varnishing the wrapping and again allowing to dry, the two sides are separated at the fold by rubbing either side alternately on fine glass-paper, holding the reed at an acute angle. When they are finally separated, a few turns of iron floral wire or two turns of copper bell wire are laid carefully round the reed right against the end of the thread wrapping, and the ends twisted up at one side. This wire serves to control the mouth of the finished reed. The blades or sides of the reed are now to be thinned down gradually and carefully by scraping from wire to point with the rough knife, until the reed will sound a note when air is sucked through it at the staple end.

From this stage it must be scraped with the razor, which must be kept very sharp, and a very light pressure used. The reed should now sound easily and have a kind of "crow" in its note. If it lacks this "crow" it will not be very much use. The thinning process and intermittent tests are continued until the reed is judged to be about correct; this judgment only comes by experience, and the great art of reed-making is in knowing when to scrape and when to stop. This comes only with much practice.

The ends of the blades require trimming up square and clean. This is done by one steady pressed

cut by a sharp razor, the reed being supported meanwhile upon a piece of perfectly smooth, hard wood. The razor must not be rocked in this cutting, but pressed straight through.

The bare end of the staple is now wrapped with enough beeswaxed thread to fit it tightly to the seating in the chanter, and its pitch and tune tried in the pipes. Here again some experience will be found necessary in order to obtain good results, but the following points will assist in the process of fitting.

If the reed is very heavy to blow and is wide open at the mouth, close the latter by nipping the control wire at the centre of each side. If it is close at the mouth and still heavy to blow, the blades are too thick, and the remedy is to thin them, principally at the edges. Supposing the reed to speak at a suitable pressure, but sounding the top notes flat by the lower ones, it must have a few turns of wrapping removed and be inserted farther into the chanter. The reverse process is used if the top notes are sharp. If the pitch of the whole chanter is too flat, the reed requires to be shortened by cutting a very little (one-sixteenth of an inch) at a time from the end of the blades with a razor. Never in any circumstances should scissors be used for this, as it is courting disaster to employ anything except a very sharp razor.

When fitted correctly and in good tune, the extreme corners may be cut off. This lessens the chance of their being caught on anything and split. It also makes the reed a little easier to blow and sometimes it has the effect of sharpening the top notes. It should be remembered that a reed should not be scraped very thin near the control wire, but should be of an evenly graduated thickness from this point to the tip, if a perfect result is to be attained.

The making and fitting of a chanter reed is work requiring patience and gentle handling, and it is best, when one becomes wearied and impatient, to lay the reed aside for a time. It is advisable to have two or three reeds in the making at once, thus helping to keep one's hand in.

Narrow reeds are sharper in pitch than wide ones, and it often happens that a chanter which has been badly made, having flat upper notes, may be greatly improved by having a very sharp reed fitted. Here again the experience of the piper with his own set is invaluable. There are, however, some chanters in existence which, unfortunately, cannot be reeded in tune at all; they are badly made and ought to be burnt to avoid giving trouble to the pipers of the future.

The dry method of construction is the same as the foregoing, except that two slips of cane are used, each about one-and-thirteen-sixteenth inches in length, and these are worked without any soaking; the long slip also may be worked dry if desired, but it is safer if soaked.

The best average chanter reed is one-and-three-quarter inches in length, and seven-sixteenth inch in width.

When a reed has been finally set and judged correct, it is an advantage to fasten it round at the point of junction with the chanter by means of a little beeswax, shoemakers' wax, or even paraffin wax, although this last does not adhere so well, and is brittle.

The chanter reed, set and playing, should not be tampered with, nor taken out to try in another set, but should be preserved as a thing of value—which it is. Finally NEVER alter a chanter to suit the reed, but always the other way about. If a faulty chanter needs correction, leave this to the expert.

7

Care and Maintenance

Every set of pipes needs regular maintenance, and all players should learn to do certain things for themselves.

Leather bags and bellows sometimes dry out and become porous, and they must then be dressed with a mixture of castor or olive oil and tallow or beeswax. This mixture must contain enough oil to prevent it from caking, since hard wax on the inside of the bag breaks up, and the resulting pieces find their way onto the reeds. A treated bag is greasy and tends to soil the outer cover unless this is protected. An inner cover of thin polythene is useful here.

Key pads and the leathers on the clack valves may be kept air-tight by an occasional application of castor or olive oil. The thread wrappings on the drone slides will also benefit by having a drop of oil applied to them. If a clack valve has to be re-leathered, the skin side of the leather should be placed against the seating. The flesh side is porous and allows air to escape.

When it becomes necessary to replace a key pad, the key should, wherever possible, be removed from the chanter, though in dire emergency, the following method is sometimes used. The replacement pad is put in place over the sound hole, and a flake of shellac inserted between it and the key. The key is then heated with a match flame until the shellac melts and cements the pad to the key. Because of the risk of damaging the chanter, great care is necessary in carrying out this operation.

All thread wrappings should be looked over periodically, especially where the drones and chanter fit into the stocks. It is too late to think about doing this when the chanter has fallen out onto the floor, breaking the reed and possibly, also, the chanter itself. As an added safeguard, the habit should be cultivated of always holding the chanter in the hand when putting on or taking off the pipes, or when tuning the drones. The wrappings on the drone slides should be sufficient to keep them air-tight, but never so tight that a slide will bind, as this can split the drone.

Olive or castor oil in a small bottle, key pads, a few flakes of shellac, a length of hemp thread and a spare set of reeds should be carried in every pipe case.

Keep the pipes in a strongly made case and always return them to it when they are not in use. Never lay them on a chair, never lend them to anyone else and never lose them. Insurance may cover their monetary value but it cannot replace the pipes themselves. And very important, never keep them in a damp place, nor leave them, even for a short time, lying in the sun or beside a radiator.

8

Half-Long Pipes

(Plates 11, 12, 13, 14)

The Northumbrian Half-long bagpipe is one of several variants of the instrument usually referred to as the Scottish Lowland pipe, although it is by no means peculiar to Scotland. It was formerly in very common use on both sides of the Border, and perhaps a more suitable name for the whole class would be the Border Bagpipe. All are bellows blown.

Each maker seems to have been a law unto himself, and very few indeed stamped their names on their products. They are known, however, to have been made as far north as Aberdeen by Duncan Macdougall; also in Glasgow by Gunn; in Alnwick by Young; in Newcastle by Coullie; and doubtless in other places.

The chanters are all much alike in appearance but they vary considerably in bore and sound hole spacings. They are open ended and conically bored, similar to the Scottish Highland chanter, but are not so powerful, being more like the Highland reel or half-size chanter.

The three drones, which are all set in one stock, lie either across the player's chest, or upon his shoulder, and they fall into four categories in their tuning. The commonest is A,a,a, that is to say, two tenors sounding one octave below the keynote of the chanter, and one bass which is an octave lower still. All the bass drones are approximately two feet in length. The other drone tunings sometimes found are A,a,a', A,e,a, and A,e,a'; the set illustrated sounds A,a,a'.

When used on the march, the drones lie on the shoulder, and the two tenors are uncomfortably close to one's ear, whilst if they lie horizontally, the bass projects so far as to inconvenience the man on the player's right. In order to overcome these disadvantages Robert Reid of North Shields devised and produced an instrument which is only slightly larger than the Northumbrian Small Pipe. It has an open conical chanter with two keys, of which one covers the lowest finger hole, and the other sounds one tone above the top thumb hole. The three drones are in one stock as usual, and sound A,a,a' (bass, tenor and treble), but the bass is six inches shorter than the usual type. This is made possible by having three parallel bores in the foot joint, connected in series, thus attaining the necessary length. There is no outside loop such as the Irish Union bass drones have, and which looks like a trombone. The whole of this instrument is of the most superb workmanship, carried out in rosewood, brass and ivory. It is typical of Reid's work at its very best.

Many sets of old Border pipes have survived, although they are no longer played, or at any rate only rarely. A few of them may be dated fairly closely by their known associations, and among them are the following:

1. Set in walnut, brass and ivory, played by one of Prince Charles's rebels of 1745, who settled in County Durham.
2. The Milburn set in laburnum (?), brass and ivory, presented by Col. Reed of Chipchase Castle to "Muckle Jock Milburn" of Bellingham in 1772, and known to have been old at that date.
3. Set in boxwood, brass and ivory, which was played by John Tate, Bank House, Acklington about 1780-90. This instrument was made at Alnwick, and may be Young's work.
4. The set illustrated, supposed to be of date

1740-60 and to have been played in the Peninsular War, C. 1808-1814.

5. Set in cocuswood and ivory, by Gunn of Glasgow, when Border pipes had almost died out. Gunn died shortly before 1877.
6. Set in rosewood and ivory by Thomas Coullie of Newcastle Upon Tyne, between 1820 and 1838, in which latter year he died.

All the above sets except no. 4 are in the Cocks collection.

The notorious Jimmy Allan, piper to the Duchess of Northumberland, is reputed to have played the half-longs during his service as a piper in The Northumberland Militia.

A vigorous attempt was made about 1925-30, to revive the instrument, but it met with only partial success. The chanter used as pattern was that of the Milburn set, and the drones were modelled on a set which had belonged to the Duke's Piper, James Hall. The new pipes were made by the firm of James Robertson, of Edinburgh.

Drones were tuned to A,e,a, and exception was taken to this in some quarters, as the "e" drone did not harmonise when the piper wished to play tunes in the key of D. The obvious answer was to stop the "e" drone on these occasions.

It is often very difficult or even impossible, to be reasonably sure whether an instrument is of Northumbrian or Scottish make. They are very similar in many ways, but one peculiarity is noticeable in that the Scots makers generally, but not invariably, made all the ferrules and mounts of ivory or horn, whereas the Northumbrian makers frequently made use of metal ferrules on their drone slides and stocks.

The method of construction is similar to that used for the small pipes, with the exception of the chanter, for which a flat triangular-shaped reamer must be made from a piece of three-thirty-seconds of an inch thick steel plate. If an old bayonet can be obtained, especially one of the early triangular type, this makes an excellent reamer when ground to the proper dimensions. Such bayonet-reamers are frequently used by Irish pipe-makers.

Bore the chanter through in the normal way to the smallest diameter required, and step drill to remove most of the surplus wood. Once this has been done, the reamer can be used, being frequently withdrawn to clear the chips. The bore having been reamered to the dimensions given, the chanter must be turned end for end in the lathe and the surplus wood removed from the outside. At this stage the sound holes may be marked, and drilled in the manner described for the small pipes.

The reeds shown on the chanter drawing are those fitted in the instrument; they will serve as a guide when ordering, or making new ones.

LIST OF SUPPLIERS

Bags—James Robertson, 58, Grove St., Edinburgh. Jobson, Saddler, Market Place, Morpeth.

Leather for Bags, Bellows, latex, wax ends—George Rye & Sons, Groat Market, Newcastle.

Woods—Shepherd & McGhee Ltd., Burdon House, Burdon Rd., Sunderland. Watterman & Ross, Old Ford Rd., London E. Joseph Gardner & Sons Ltd., Twig Folly Wharf, Roman Rd., London E.2. A. Keen Ltd., Heaton Sawmills, 28, Heaton Rd., Peckham, London S.E. 15.

Ivory—M. Myers, 15, Tower Hill, London E.C.3. W. Barrett & Son, Ltd., 9, Old Bond St., London W.1. Chalmers Bros., Ltd., 27, Old Gloucester St., London W.C.1. T. E. Prickett, 73, Bredgar Rd., London N.19.

Imitation Ivory—Catalin Ltd., Waltham Abbey, Essex (Waltham Cross 23344).

Metal Ferrules—Watson, Shell Mex House, Northumberland Street, Newcastle. Hood & Co., Piccadilly Street, Glasgow.

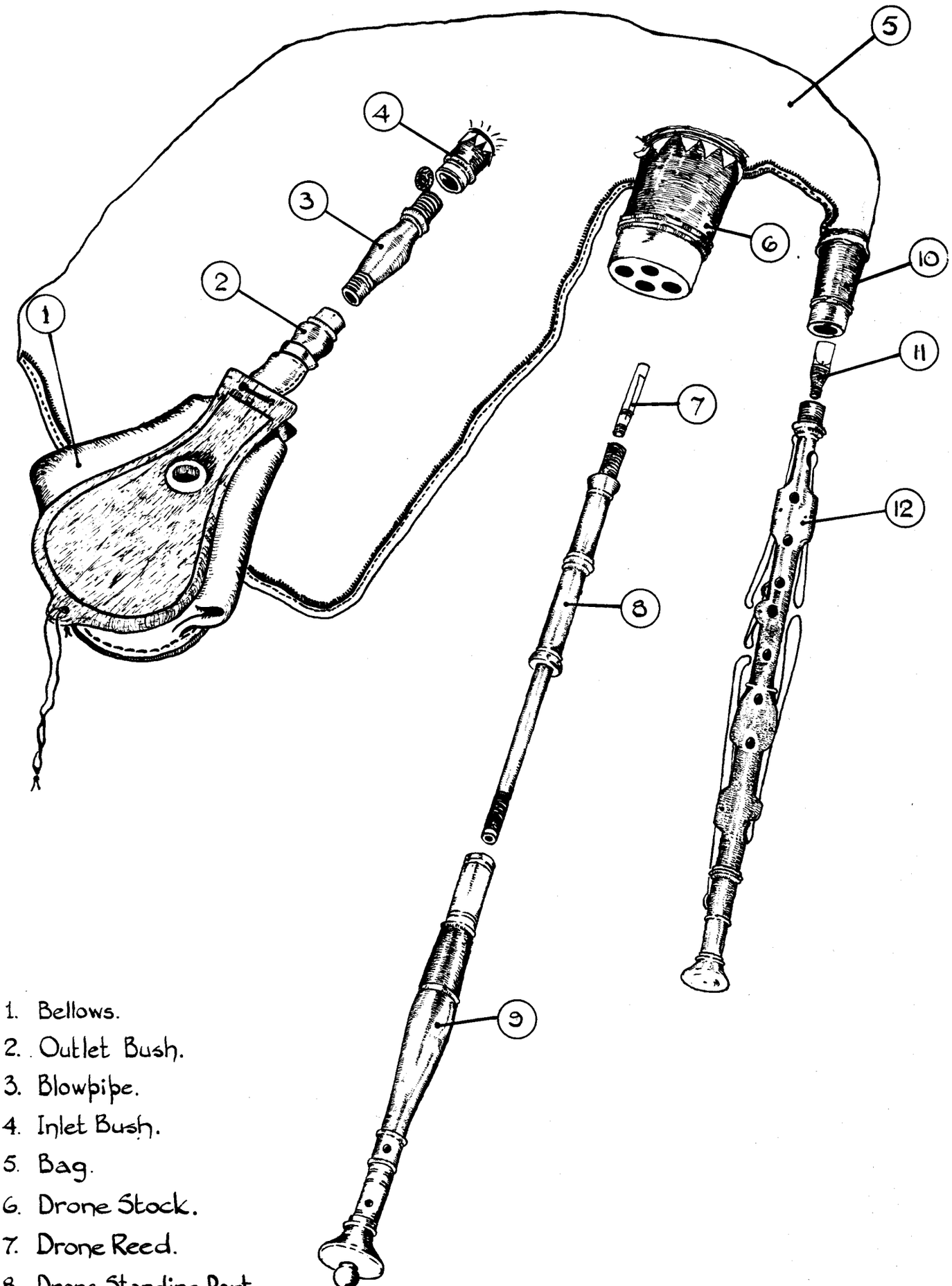
Nickel Tubes—Pumphrey & Williams, 3, Fore Street Ave., London E.C.2. J. Smith & Sons, (Clerkenwell) Ltd., St. Johns Sq., London E.C.1. Fine Tubes Ltd., Britannia Works, King Charles Rd., Surbiton.

Reed Cane—James Robertson, 58, Grove St., Edinburgh. Jacob, Young & Westbury Ltd., J.Y.W. House, Bridge Rd., Haywards Heath, Sussex. Smith & Co. Ltd., 210, Tower Bridge Rd., London S.E.1. A. Hurst & Co. Ltd., 54a, Tottenham Court Rd., London W.1. Gray & Cahill, 122, Queens Rd., London S.E.15. A. E. Davies & Co., Ltd., 164, Lever St., London E.C.1.

Boring Tools—Bain & Herbert, Millwrights, Cross Carliol St., Newcastle 1. C. D. Monninger, St. Annes Works, Overbury Rd., London N.15.

ERRATUM

The positions of the drone and blowpipe stocks in the diagram on plate 1 are incorrect. The correct positions can be seen in the small sketch at the foot of plate 6.

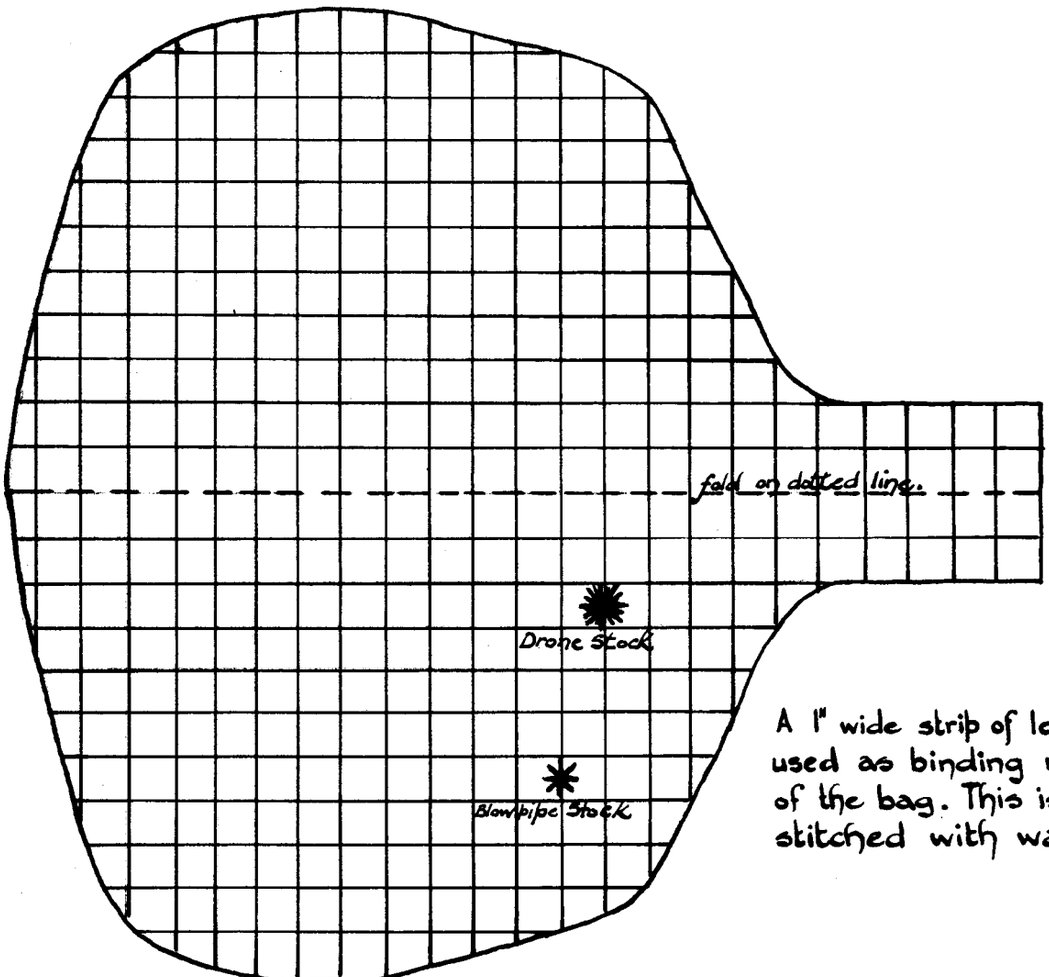


1. Bellows.
2. Outlet Bush.
3. Blowpipe.
4. Inlet Bush.
5. Bag.
6. Drone Stock.
7. Drone Reed.
8. Drone Standing Part.
9. Drone Slider.
10. Chanter Stock.
11. Chanter Reed.
12. Chanter.

Plate 1.

Sketch showing assembly details for the Northumbrian Small-Pipe.

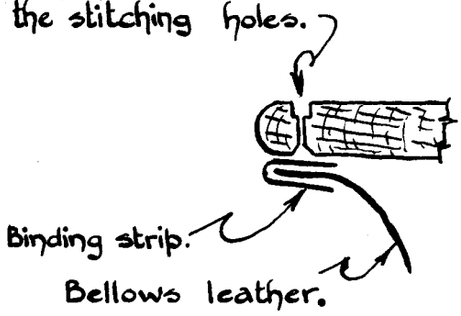
del. J.F.B. '65.



A 1" wide strip of leather must be used as binding round the seam of the bag. This is then saddle-stitched with wax ends.

Draw the above patterns out to full size on stout paper.
Scale: ¼" = 1 inch.

When stitching is completed the groove is filled with heel ball, or a wooden strip to seal off the stitching holes.



Suggested arrangement of bellows leather to give an airtight seam.

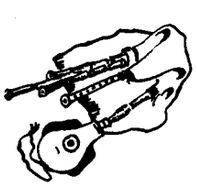


Plate 2.

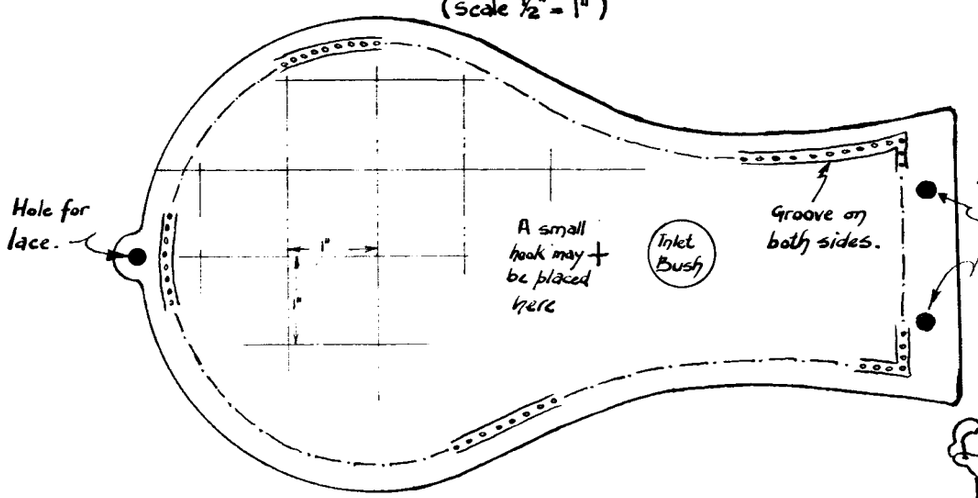
Sketch showing bag and bellows leather.

del. J.F.B. 1964.

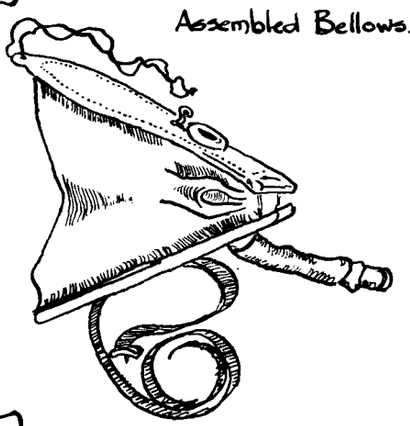
Outer Face.

Section, showing stitching hole.

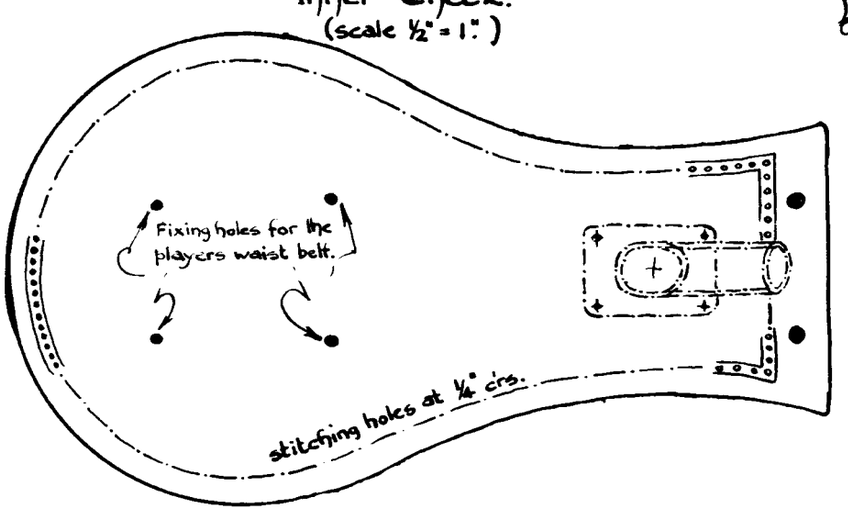
Outer Cheek.
(scale ½" = 1")



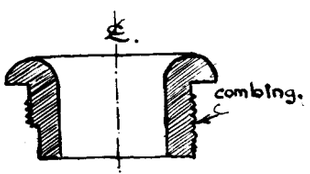
Assembled Bellows.



Inner Cheek.
(scale ½" = 1")

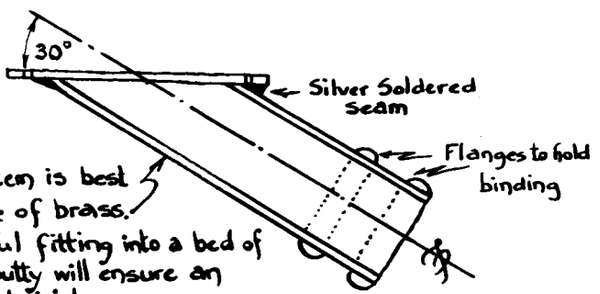


Note.
After the stitching holes are drilled out 1/16" dia. a channel should be cut on each side of the bellows cheeks to allow the leather and stitching to lie close, making an airtight joint; saddle stitching should be used.



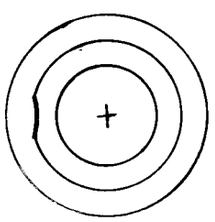
Section through Inlet Bush.

Clack Valve.



This item is best made of brass. Careful fitting into a bed of soft putty will ensure an airtight joint.

Bellows Outlet.
(Full size.)



Plan of Inlet Bush showing flat for Clack Valve
(Full size.)

Plate 3.

Sketch showing details for Bellows construction

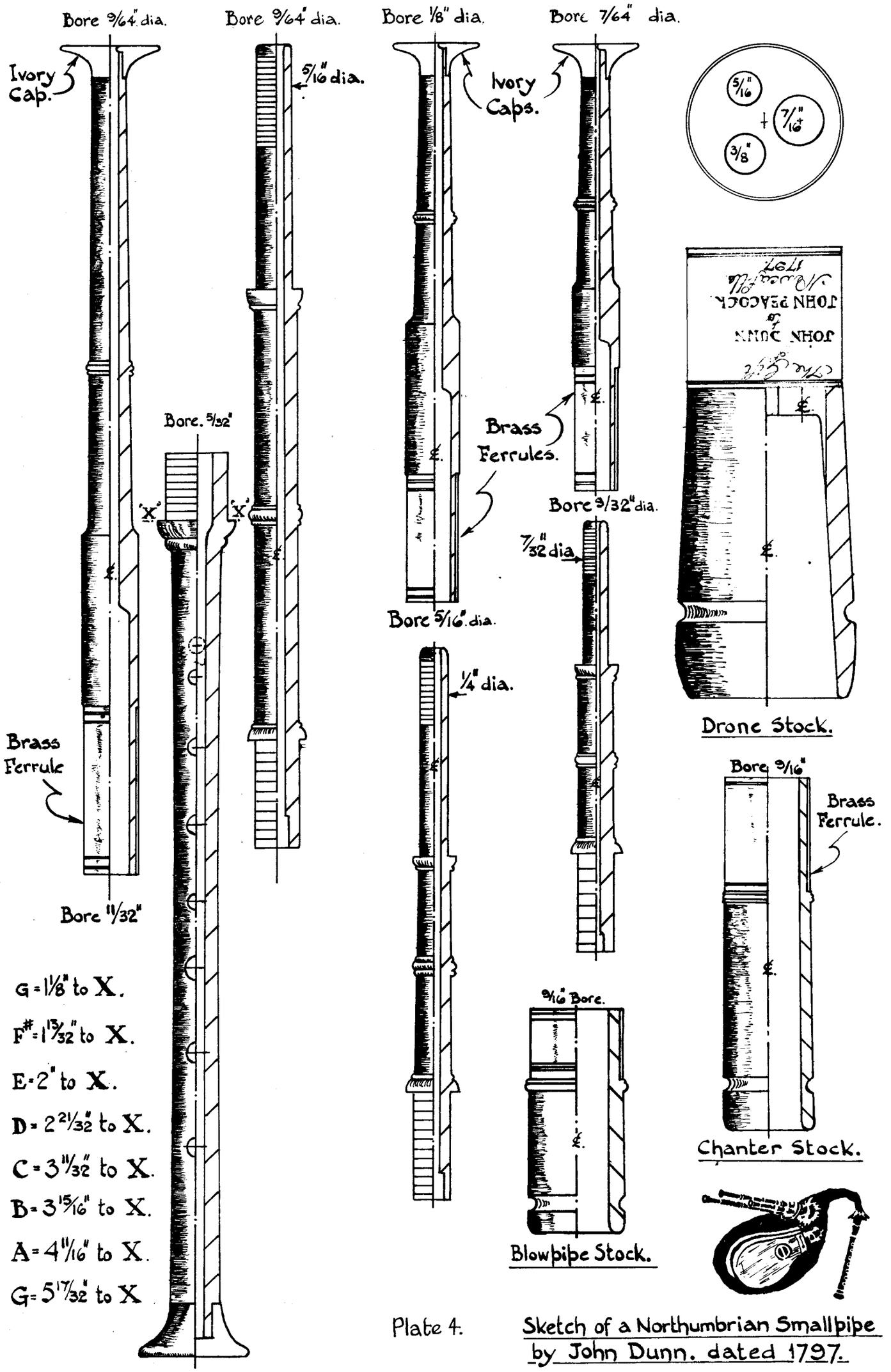
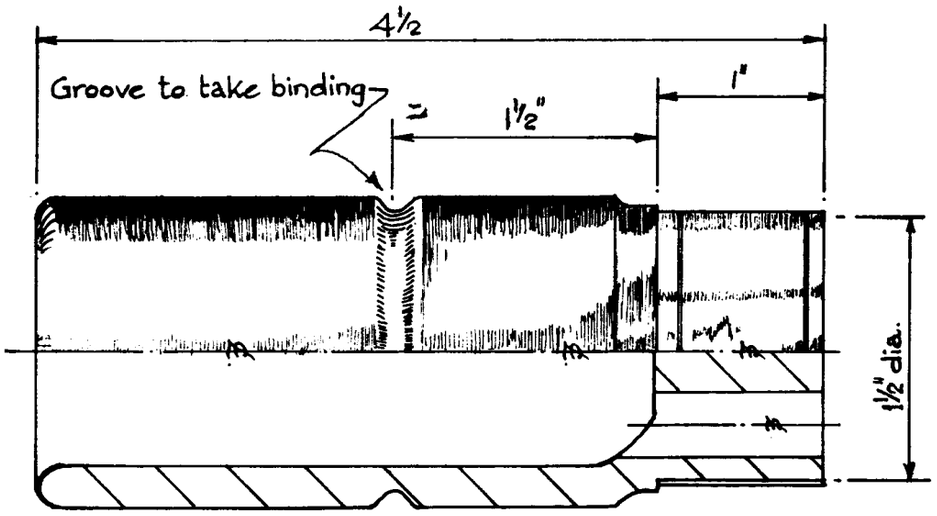


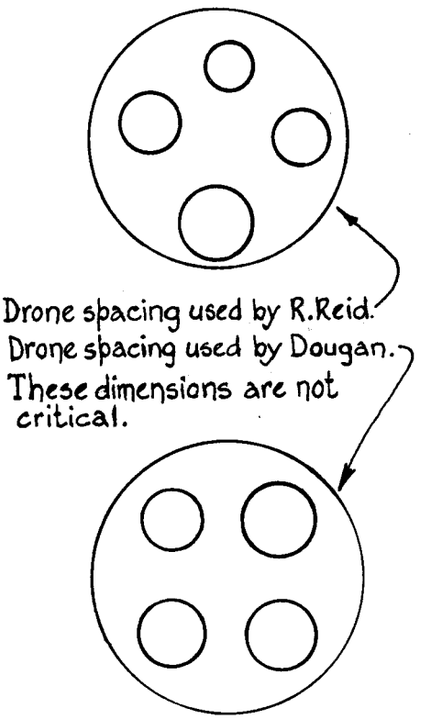
Plate 4. Sketch of a Northumbrian Smallpipe by John Dunn. dated 1797.

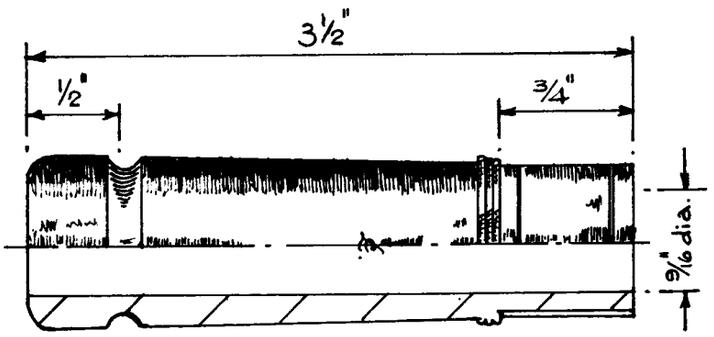
Scale: Full size.

del. J.F.B. '65.

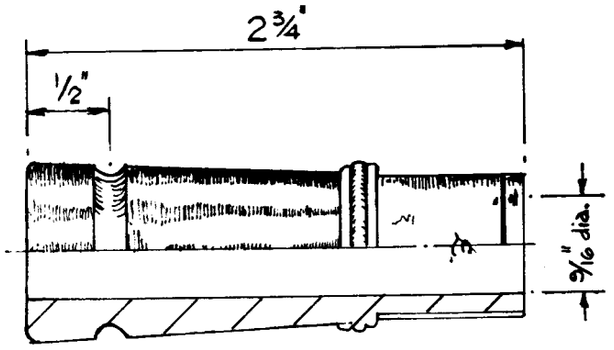


Drone Stock.

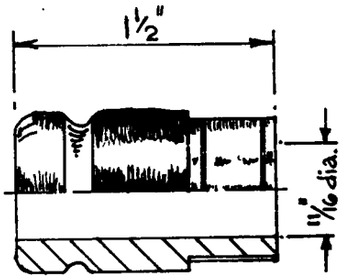




Chanter Stock.



Blowpipe Stock.



Bellows Outlet Bush.

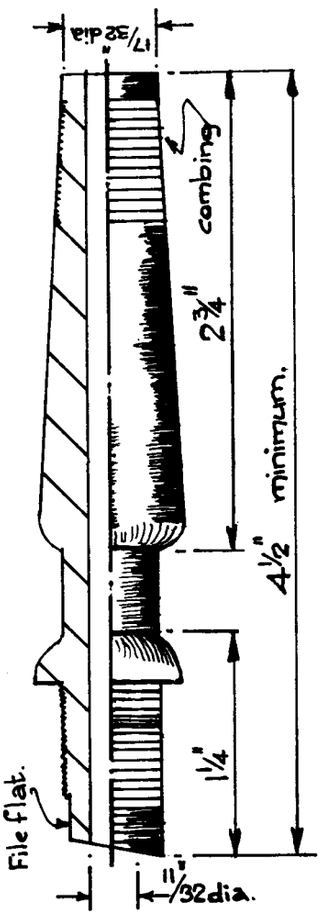
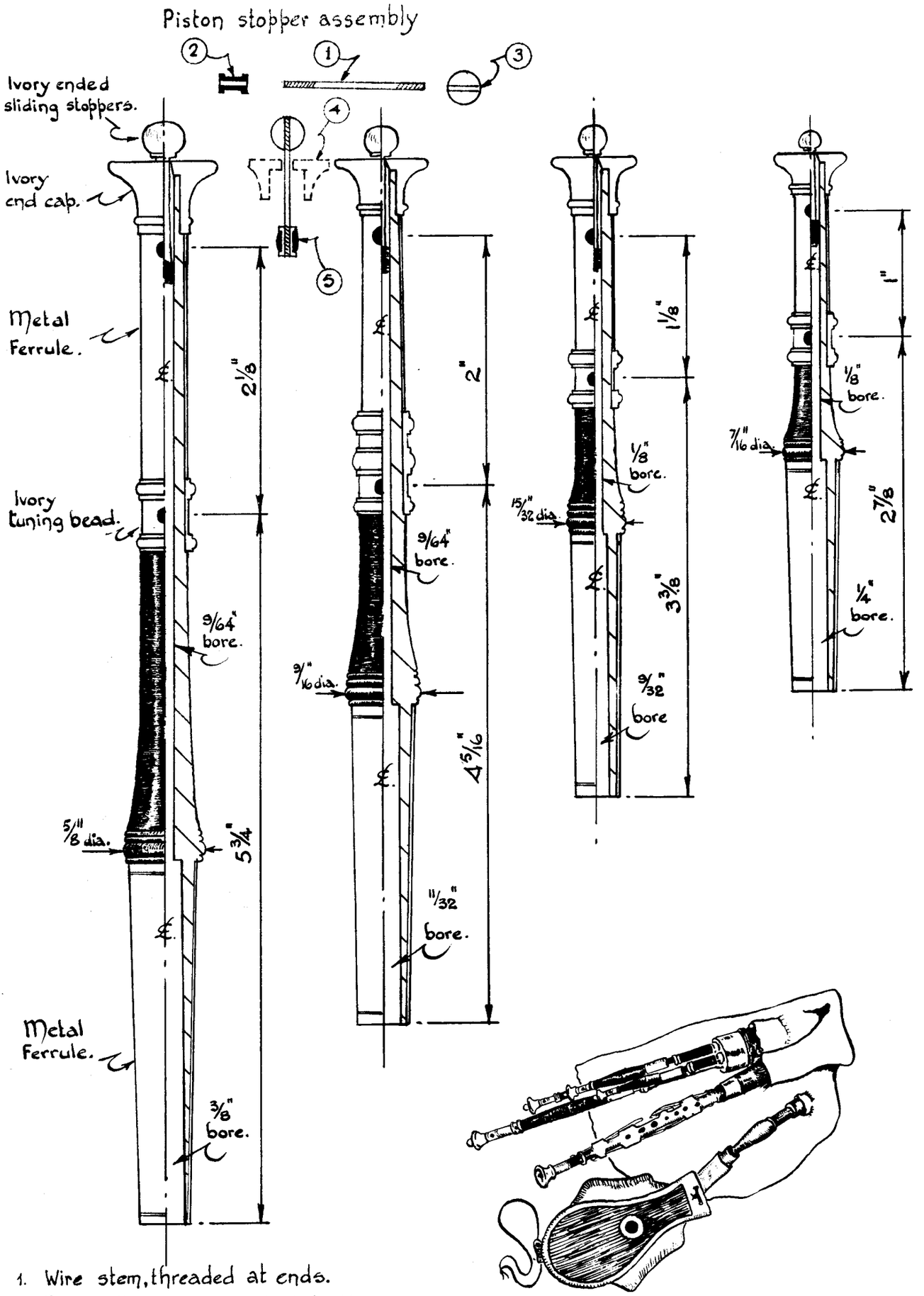


Plate 5.

Sketch of Stocks, Bush, and Blowpipe for the Small pipe.

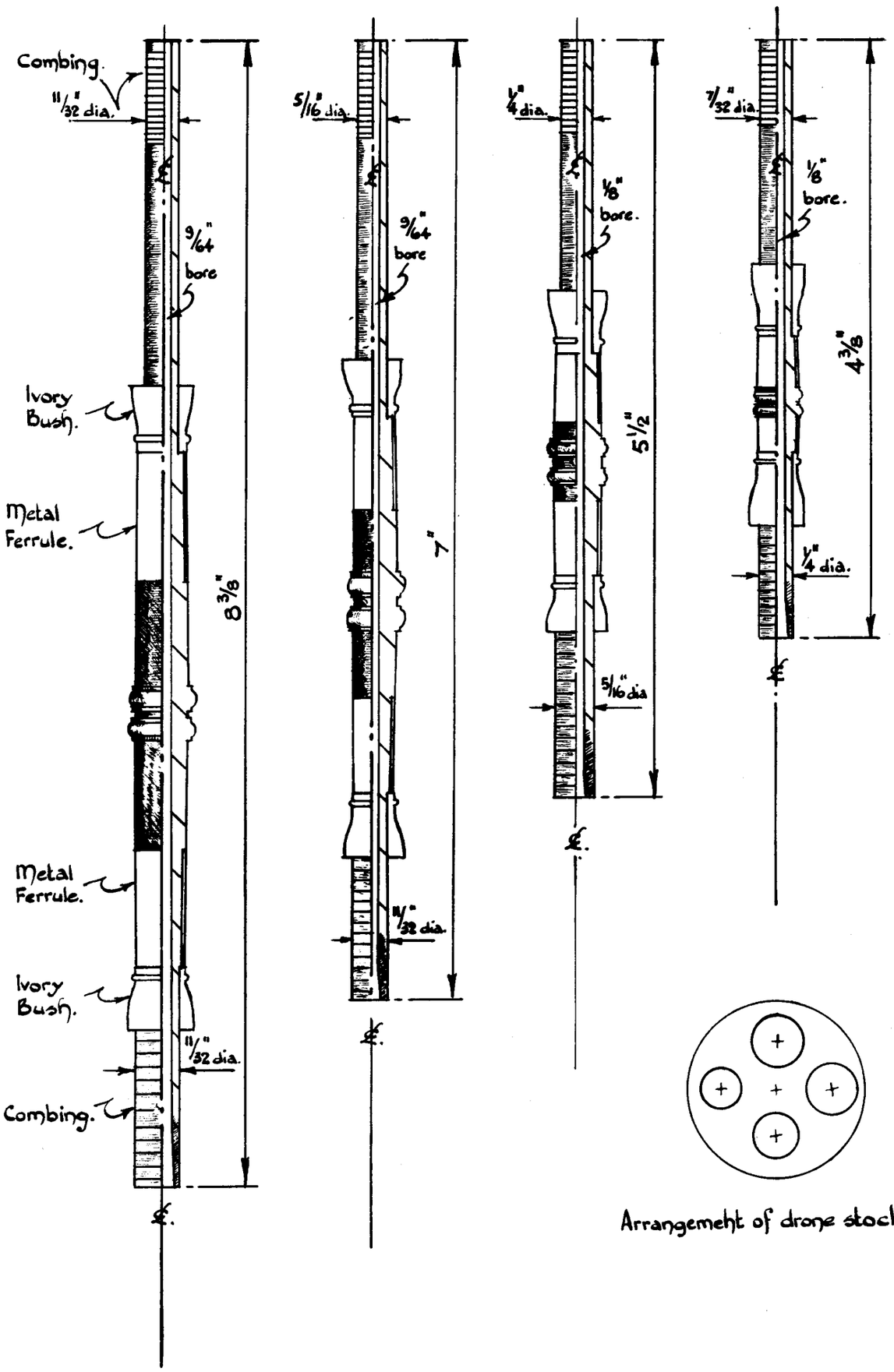
def. J.F.B. '64.



1. Wire stem, threaded at ends.
2. Piston of metal, grooved to take thread wrapping.
3. Ball, of metal or ivory, screwed on,
4. Drone end cap.
5. Thread wrapping.

Plate 6.

Drone slides of a Set in wood, silver, and ivory for use with a nine or more keyed chanter, note the four tuning beads. This set made by Robt. Reid.

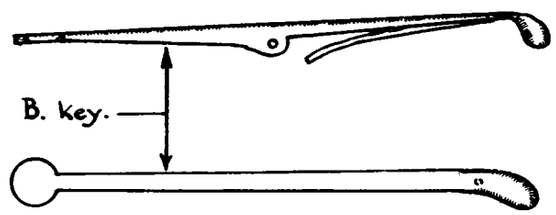


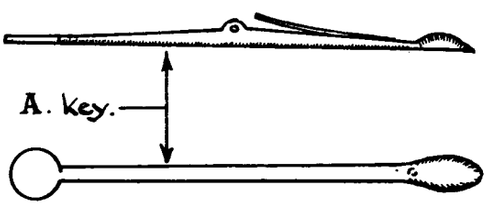
Arrangemeht of drone stock drillings.

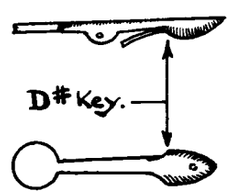
Plate 7.

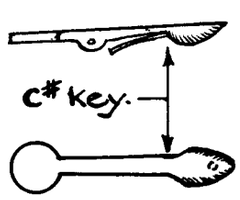
Set of wooden drone standing parts mounted in ivory and silver, for use with a nine or more keyed chanter. This set made by Robt. Reid.

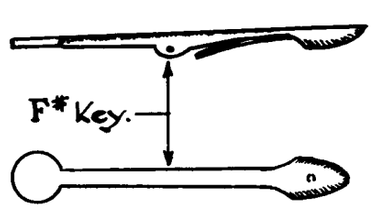
del. J.F.B.'64.

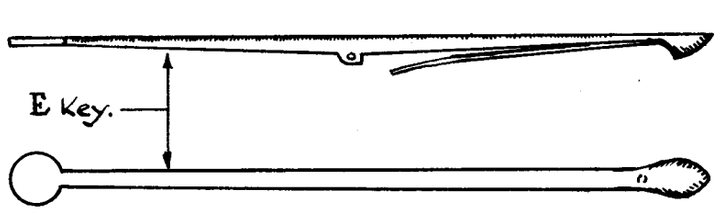












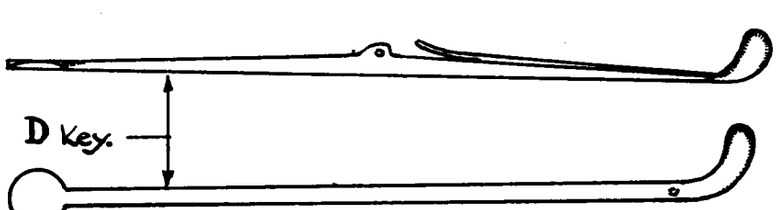
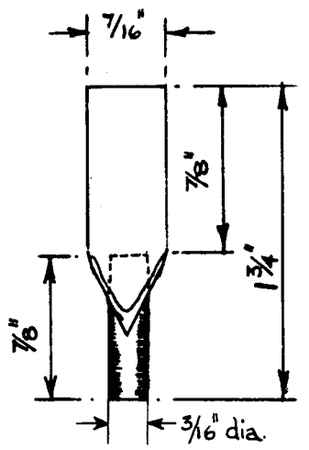
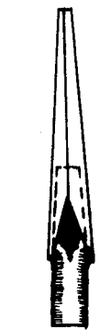


Plate 9. Sketch of keys, as fitted to a seven keyed 'G' chanter by R. Reid.

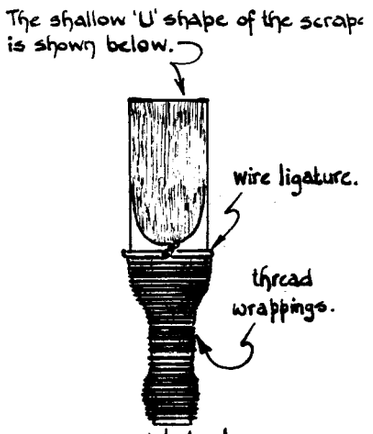
del. J.F.B. '65.



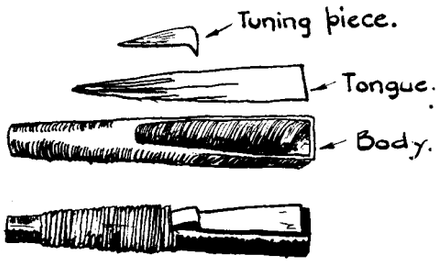
Chanter reed.



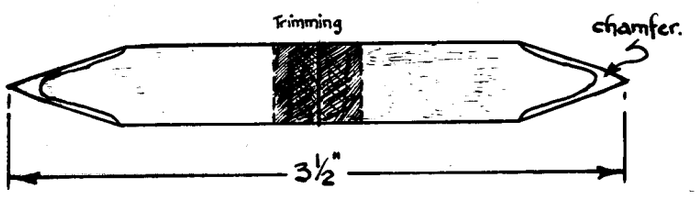
Side view.



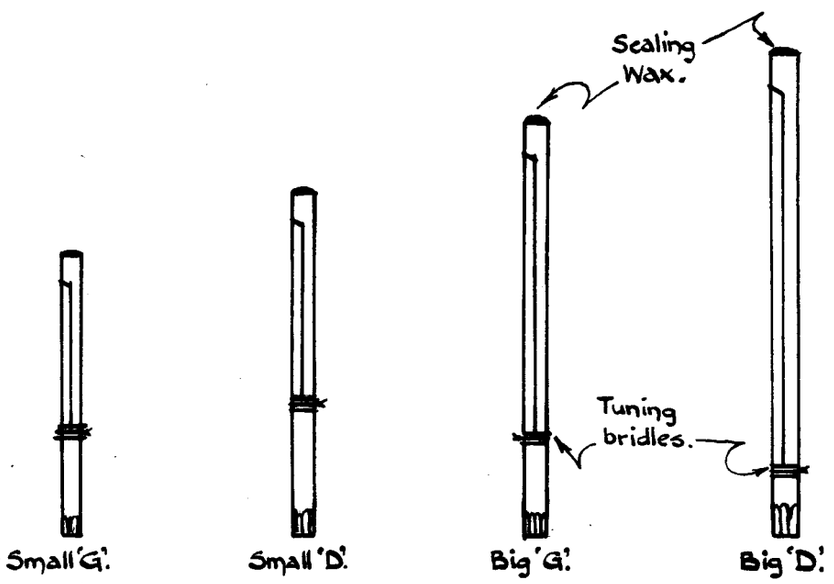
Completed Reed.



Metal Drone Reed.



Shape of cane slip.

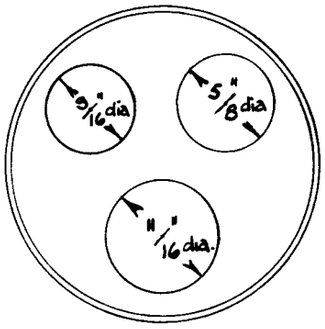


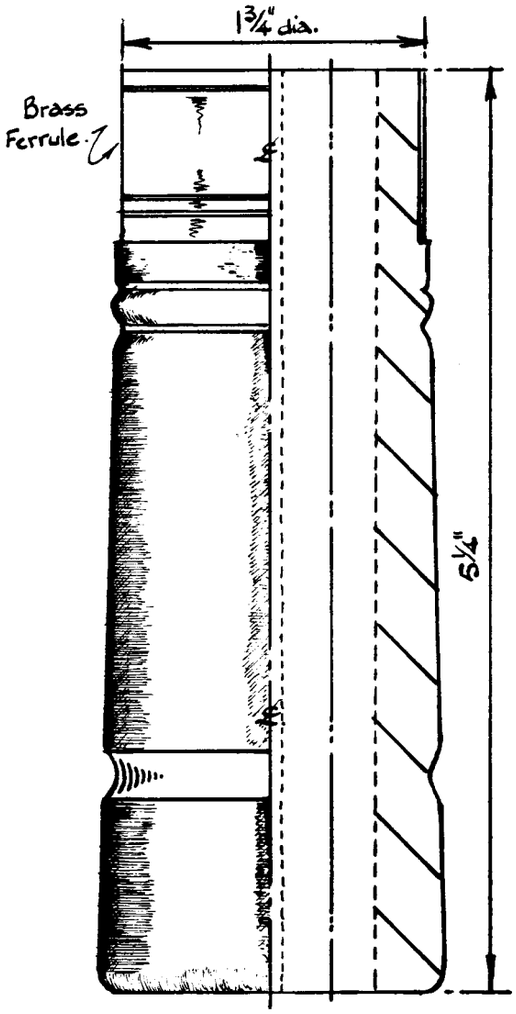
Approximate sizes of Drone Reeds. (cane.)

Plate 10.

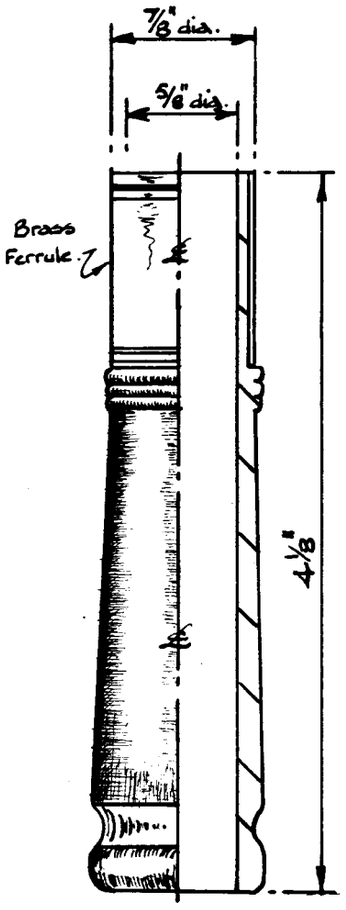
Sketch showing chanter and drone reeds for the Small-Pipes.

del. J.F.B. 63

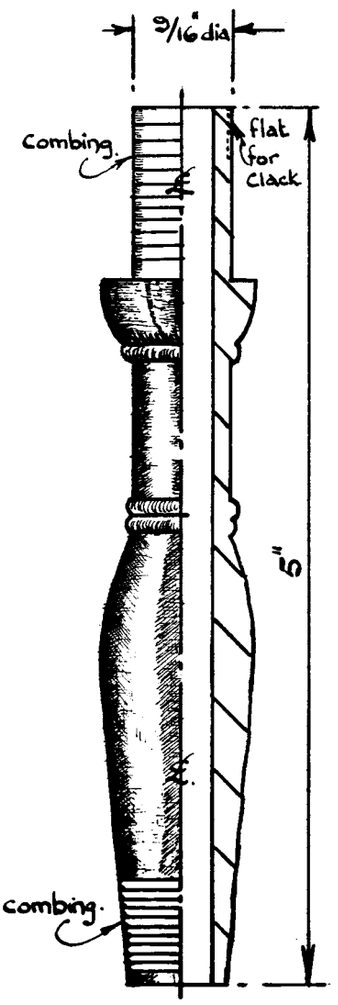




Drone Stock.

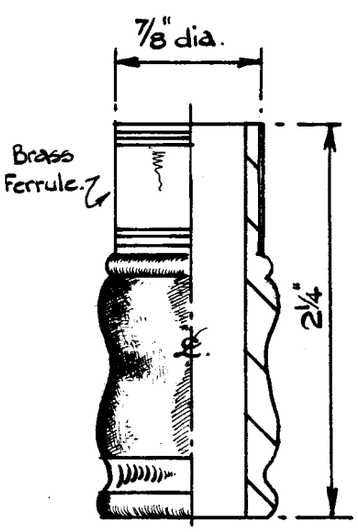


Chanter Stock



Bore ⅜" dia.

Blowpipe.



Bore 5/8" dia.

(Two required.)

Blowpipe Stocks.

Plate 11. Northumbrian Half-long Pipes. Sketch showing the stocks for drones and chanter, the blowpipe and its stock.

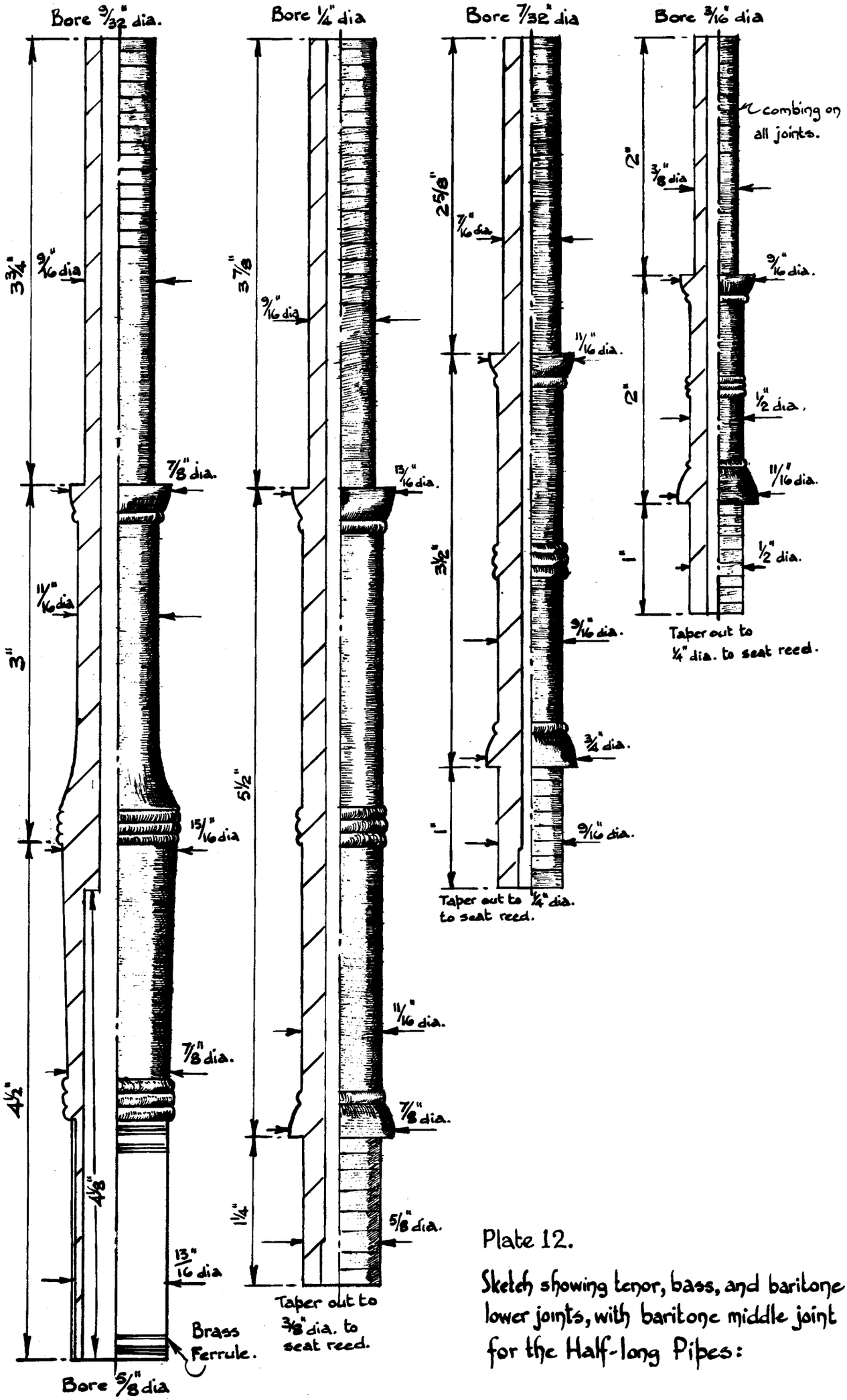


Plate 12.

Sketch showing tenor, bass, and baritone lower joints, with baritone middle joint for the Half-long Pipes:

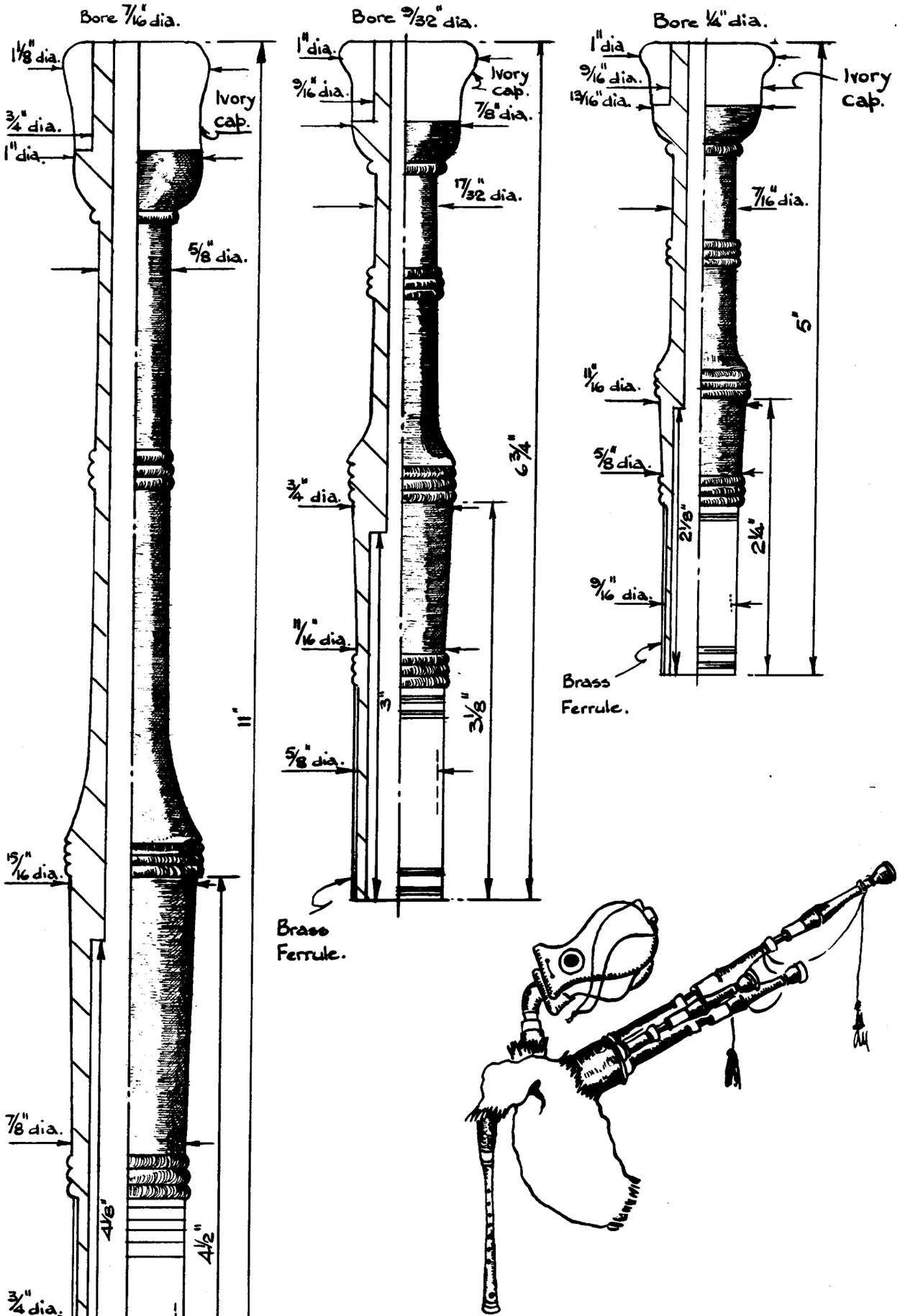
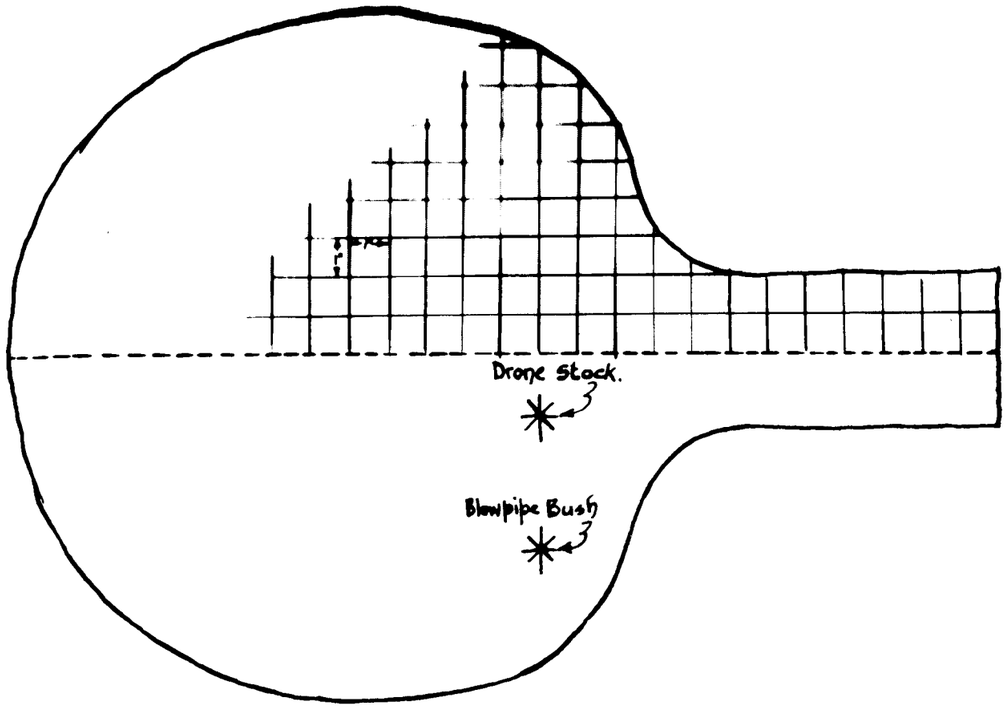


Plate 13. Sketch showing tenor, bass, and baritone drone sliding joints, for the Northumbrian Half-long or Border Pipe.
These details are taken from an existing set of pipes which are datable, circa 1710-60.



Bag, scale 1/4" = 1 inch. draw out to full size on stout paper for pattern, an inch wide strip of leather must be used to bind the seam.

Chanter Reed, (actual size.)
A cut down practice chanter reed will be suitable:

Plate 14.

Sketch of Chanter for the Northumbrian 'Half-Long' pipes, the details are taken from an existing set of pipes dated circa 1740-1760