

2 In the twentieth century

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Progressive popularity

By the time of his death in 1894, Adolphe Sax had already achieved the near-impossible, though like many great inventors he would neither recognise this nor profit from it; to introduce a new musical instrument and gain acceptance of typically conservative musicians and public is a feat probably partially paralleled in the last 300 years only by Arnold Dolmetsch's *re-introduction* of the now common recorder. Sax's early liaison with the Garde Républicaine had assured the saxophone of a continuing presence in the French army bands, and it was this strength which eventually fed the instrument into other musical areas as the twentieth century dawned. His efforts in the classical field reaped little reward, and this was to remain a much less active arena for many years.

It is to Sax's credit that most of the acoustical and mechanical improvements to the saxophone constitute refinements which do not significantly depart from the original patents or render the early instruments unplayable today: most are developments appropriate to more modern manufacturing techniques, greater performer agility, or the optimisation of the tonal requirements of players. Since Sax's original patent rightly includes the mouthpiece, it is necessary to record a parallel development here also.

At the beginning of the twentieth century there was a firm and continuing role for the saxophone in the military bands of France, Germany and elsewhere in Europe, with a rather recalcitrant England soon to follow. In America the Gilmore and Sousa showbands did much to extend the exposure of the instrument to the general public. However, in classical music the saxophone made only an occasional appearance, due in large part to the lack of substantial repertoire and the disinterest of orchestral musicians. Indeed the tenuous thread spun by Adolphe's early teaching at the Paris Conservatoire seems barely discernible until reinforced by Marcel Mule and Sigurd Rascher some fifty years later.

Whilst recognising the importance of Sax's own early teaching in the promotion of the saxophone, the lack of any other influential teacher until Mule's appointment at the Paris Conservatoire in 1942 might suggest that the saxophone was generally played badly. However, there

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Fig. 2.1 A Hawkes & Son tenor saxophone, from an early 1900s catalogue exhorting English bandmen to explore its sonority, exhibits a mechanical simplicity alongside its current Yamaha YTS 62 counterpart

were a few brilliant musicians who, for diverse reasons, decided to apply their inherent talents to the instrument. General popularity does not necessarily produce excellence, particularly on an instrument which appears deceptively easy to master. It is therefore important that in all types of music there have been exponents of the highest calibre.

Edouard Lefèbre, through the bands of Patrick Gilmore and John Philip Sousa, delighted American audiences with fine quality playing for nearly forty years. Shortly afterwards the masterful Rudy Wiedoeft was recording, composing and promoting the saxophone to the public in a manner allying the instrument with high-class control, nuance and first-rate entertainment. Wiedoeft's choice of instrument was a happy one for champions of the saxophone, and fortunately coincided with early growth in the recording industry and the public's post-war appetite for novel entertainment. So unfolded the unprecedented saxophone 'craze' of the 1920s in America, directly responsible not only for the spawning of so many good quality performers and a large listening public, but also for tremendous amateur interest. C. G. Conn's manufactory was, from 1921, encouraged to increase its production threefold until the Wall Street crash signalled an end to this phenomenal boost to the saxophone's popularity.

Although this 'craze' was not matched outside America, the events of those years contributed so much to the technical development of the saxophone, the demands and abilities of its exponents, and the launching



Fig. 2.2 Saxophone section of the John Philip Sousa Band, 1926

of the saxophone into the jazz and dance bands, that it begs appraisal. Despite the original patent specification for a bass instrument, it is the alto in $E\flat$ and the tenor in $B\flat$ which dominate history. But post-war elation demanded excitement and novelty; during the 1920s the soprano and C-melody saxophones were to join the bass in providing that novelty, before all three members of the family slipped into near obscurity for the best part of forty years. Wiedoeft delighted everyone with his witty and sensitive playing, often on the C-melody, which surely influenced the beautifully sonorous playing of Frankie Trumbauer. Adrian Rollini is rightly remembered as a leading player of the bass saxophone. It is interesting to note that several women can be numbered among performers at this time.

One of the effects of the popularity of the saxophone in the 1920s was its reluctant inclusion by New Orleans style bands. Fortunately for the survival of the genuine New Orleans style, this was but a stepping stone on the way to the dance bands and new forms of jazz very suited to the saxophone's rich blending sound. During the 1930s, makers vied to introduce advanced features in an effort to maximise a drastically curtailed market, and saxophonists benefited greatly from this competition, with soloists exhibiting sounds and styles hitherto unexplored. By this time Marcel

Mule, following his appointment to the Garde Républicaine, had formed an SATB quartet whose excellence was to encourage the writing of some of the great classical repertoire for the medium (see chapter 5). The period was particularly fruitful: Sigurd Rascher, Mule and Cecil Leeson all engendered fine pieces for the saxophone and this in turn encouraged others to play classical repertoire. The typical classical sound differed considerably from that produced on mouthpieces designed for jazz, and the sound and its production will be discussed below.

The saxophone continued to evolve during the 1940s. Saxophone production was considerably curtailed until the second half of the decade, but the army bands and the big bands of America flourished as public and troop entertainment media. Dance bands often sported the full AATTB saxophone section in close harmony; Marcel Mule reopened Conservatoire classes in 1942; and Charlie Parker presaged a whole new jazz era, at first misunderstood but destined to be followed and refined throughout the rest of the century. Before 1950, the Selmer factory in Paris had already surpassed pre-war production. The much-beloved Mark VI, destined to reign for twenty-one years, was soon to appear as the culmination of a development since 1935. For jazz and classical players alike, this model was to prove a firm favourite.

Dance bands flourished in many countries after World War II, boosted both by radio and the advent of television. Many saxophonists were able to find full-time employment, and the amateur and semi-professional likewise could find plenty of work. Learning was largely by imitation, and teaching was *ad hoc*, particularly with regard to jazz, yet there was no shortage of playing talent. In the post-bop era jazz idols influenced many of the amateur dance-band saxophonists both in sound and style. A potential disaster arrived towards the end of the 1950s in the shape of rock and roll, ousting hundreds of the dance bands which provided saxophonists with somewhere to grow. Twenty years later the rhythmic world frequented by the saxophone could acknowledge considerable enrichment by the rock era, without applying brakes to a steady increase in interest.

Since 1950, the classical world has embraced many fine exponents like Deffayet, Londeix, Rousseau and Hemke, all teachers and performers of high standing who have encouraged major works to be written. Gradually over this period the repertoire, standards of performance and quality of teaching have expanded to the extent that in 1969 the first World Saxophone Congress was held in Chicago, to be followed by others in later years, and the British Saxophone Congress is now a regular feature of our calendar.

Three-quarters of the way through the twentieth century, American manufacturers amalgamated and rationalised to become more world-

competitive. The large European centres of manufacture were actively producing cheaper saxophones for an increasing student market, and the Japanese were already gaining considerable expertise. In America high school bands and an increase in effective teaching encouraged the playing of the saxophone, and universities pushed standards higher in both jazz and classical idioms. In Europe, too, the saxophone enjoyed increasing popularity from school through to conservatory. The most satisfying outcome has been the growth of good quality teaching, combining a classical discipline with enriched knowledge of jazz, rock and pop.

Greater interest in the classical and quartet repertoires has encouraged manufacturers to apply their technical expertise to the neglected soprano saxophone and this has transformed a difficult-to-master instrument into a much more approachable member of the family. Even the bass, Sax's original invention, has been the subject of some updating, and new soprano designs have appeared.

Acoustical elements

It has frequently been said that the saxophone is a relatively easy instrument to master. This is at once both true and deceptive. Musicians glibly talk of large bores, hard and soft reeds, and ease of response, without any specific reference points. It is always difficult to delineate substance which is composed of mechanics and art, and the saxophone and its player undoubtedly constitute exactly that. The following discussion attempts to enable the player to appreciate more readily where the manufacturer's responsibility ends and that of the player takes over, to see the relativity of hard and soft, ease of response and resistance, simple and complex, so that mismatches can be avoided or the consequent difficulties at least better understood.

Relative to other woodwind instruments the saxophone has a large bore, and this is of great significance to many aspects of its sound capabilities and player response. The use of a conical tube renders the soundwave richly harmonic, yet the fingering system rivals that of the flute in simplicity. In common with other large-bore instruments the fundamentals are easily formed, yet the reduction in bore towards the mouthpiece facilitates both an evenness of timbre throughout the instrument, and the extension of the two-and-a-half-octave 'normal' range. Sax, as a master maker, always knew that the range surpassed three octaves and would probably be unsurprised to witness its growing use today.

The extended range was little used during the first fifty years or so. Acceptance of the saxophone as a useful member of the marching bands

stemmed from its ability to produce a large volume of sound. Using a mouthpiece of large and round internal volume and a single reed, players soon realised that everything from a whisper to full-blooded support of the brass section was possible. Today, players expect to achieve even greater volume, more focused projection and crisper texture, without sacrificing the ability to control extremely soft nuances. This ability to soar into distinctly soloistic mode from one largely of a supporting role reveals the true greatness of Sax's invention, and begins to give credence to the multitude of quite different and distinctive sounds produced over the years of this century from an instrument so often maligned as an easy option.

A tube of large diameter in relation to length favours production of the fundamentals. Moreover, to facilitate a scale of fundamentals the holes will also be relatively large. The consequence of this to the player, assuming a suitably efficient excitation medium, is the ability to effect a great range of volume, flexibility of intonation, and considerable influence over the tonal quality. *Notice how much these three factors demand player responsibility, awareness and expertise.* The astute clarinet player, for instance, will recognise that the relatively small French-bore clarinets favoured today offer, by comparison to earlier examples, more accurate and stable intonation. Such a luxury is much less easy to achieve on the saxophone. Indeed, the desire to create great intonational nuance in playing styles of the 1930s, together with suitable mouthpiece and reed combinations, reflects in designs of the time. The unthinking now frequently blame (top-class) manufacturers for producing out-of-tune saxophones, or may unwisely recommend such an instrument to a raw recruit.

Whilst this book is not a technical treatise in acoustics, some basic tenets specific to the behaviour of a conical pipe stopped at one end, together with cognisance of the complexities introduced by requiring that tube to produce more than a single pitch, should help the player to command control and avoid all-too-common mismatches in equipment.

The air stream from the blower constitutes an energy source, hence the direct relationship between the *speed* of air passing the reed and the ultimate *volume* of the sound produced. The reaction of the reed, held on the mouthpiece table, constitutes an excitation system which sets up vibration of the air column contained by the mouthpiece chamber and the tube. *Furthermore, the oral cavity constitutes a couple on the outer side of the reed, influencing basic pitch and tonal light and shade.* The intensity of the sound depends on the amplitude of the vibration and the pitch depends on the number of vibrations per second, or frequency. In common with other sounding bodies, air columns may produce tones of different



Fig. 2.3 Viewing a design sketch to incorporate four cones and their relationship with the complete saxophone

frequencies simultaneously and of different strengths, so that the ear hears a complex note. For a given fundamental pitch the relative strengths of these harmonic frequencies, adhering to the physical laws of the pipe in question, determine the timbre or tone-colour which the ear distinguishes as belonging to, say, a clarinet or an oboe.

Consider the conical air column of a saxophone. Without the mouthpiece the cone is truncated, and the mouthpiece of necessity has to provide the equivalent volume of the missing completion of the cone (see Fig. 2.3). Under resonating conditions the stopped, or mouthpiece, end has an antinode formed, where the motion of the air is a maximum at constant pressure. The open, or bell, end communicates directly with the atmosphere and the air is still, with rapidly alternating pressure – a point called a node. As the soundwave reaches the atmosphere to reflect back again it extends beyond the end to a degree dependent on the tube's diameter, so the length of pipe calculated to produce a given pitch will require some adjustment by shortening.

Musical instrument makers, particularly those of good quality recorders, are well versed in the process of constricting or widening the bore locally in order to lower or raise the pitch of a note which requires slight attention. The principle involved, applied to the conical air column, is that enlargement of the diameter at a node will produce a rise in pitch; conversely, a reduction in bore at a node will lower the pitch of the note.

The degree of conicity for a given length will determine the veracity of the complete series (both odd and even) of harmonics within a sound of the pitch required. Richness and ease of emission demand that the harmonic strengths are well defined, and that the degree of conicity enables an exact octave higher in pitch on overblowing. A cone that is too closed renders the upper harmonics progressively sharp, whilst a cone that is too open will overblow flat.

All this procedure would be relatively straightforward if the instrument was only required to play a single pitch, but an embryo sketch has to be made of a cone which will best support a chromatic scale, say, from low D to high C#. The necessity of raising toneholes from the body, flat-topped to enable a mechanism to effect good sealing, adds volume to the basic cone. Each one will flatten or sharpen the sounding note according to whether it coincides with an antinode or node, and therefore constitutes an area of the designers' art equal in importance to the tube itself. A simplification of the above constraints, always observing first principles, might be to imagine, say, two adjacent cones – one correct for low D to middle C# and the other correct for middle D to high C#.

On pursuing this idea (see Fig. 2.3), Adolphe Sax's preference for a parabolic bore becomes clearer and his grasp of an instrument's acoustical behaviour, a quarter of a century before Helmholtz presented his basic wave theory, is quite amazing. The greatest degree of alteration to a right cone in converting it to parabolic shape coincides substantially along the length of the saxophone's crook, and this has great significance for the discerning player.

Perhaps the best philosophy for the player to follow, irrespective of his degree of understanding of the acoustics of his chosen musical companion, is one of regarding the crook and mouthpiece as the 'business' end, to be treated with great respect. Oboe players soon learn that because the oboe's bore is so small the upper part in particular needs to remain spotless. Saxophonists appear generally to be less fastidious in this respect, and in extreme cases severely malign the embouchure in attempts to maintain reasonable intonation – all quite unnecessary with a little good housekeeping!

The crook then, or the upper end of a crookless soprano, will exhibit greater conicity than the main body of the saxophone in order to obtain optimum accuracy for the second register of each note, and this also affects the relative strengths of the partials in the sound spectrum. The fact that different makes have different inherent tonal characteristics and emissive response can be largely attributed to the design of this part of the tube. It is a simple though somewhat scientifically flawed exercise to transfer the crook of one make to an earlier model and to note the

different characteristics produced; totally opposed designs will reveal the extent of mismatch to the discerning player. It should come as no surprise, therefore, given musicians' penchant for choosing from a vast variety of available mouthpieces, to find that some are working very hard to produce what they desire while others find a much more suitable choice. The best acoustic match of mouthpiece to saxophone may simply fail either to be comfortable for a player or to have the ability to generate the characteristics which that player desires, and in some cases a player could find improved intonation by wearing a palette to decrease the oral cavity.

The original mouthpiece, part of the saxophone patent and constituting the missing termination of the conical tube, consisted of a round chamber somewhat larger than in later designs. In general it can be said that any intrusion upon this plain round bore will favour the upper partials and thereby 'brighten' the sound rather in the manner of increasing treble dominance on a hi-fi system. Taken to extremes this will result in bright but projectionally thin sound emission. Saxophonists of the 1930s soon discovered that raising the baffle (using plasticine) to restrict the entry into the chamber caused an increasing sense of ambience, or 'presence,' to the blower, with perhaps less exciting results to the more distant listener. The effects on intonation, predictably and distinctly non-linear throughout the scale, produce an added distortion, often negating the painstaking work of the saxophone manufacturer. It is, of course, quite feasible in theory to start the saxophone design at the mouthpiece, so that the tube is scaled to suit the most exciting jazz mouthpiece, though in practice the differences in embouchure control necessary between various characteristic mouthpieces are the province of the player, and the design of a tube as near acoustically perfect as possible is the domain of the experienced manufacturer.

Elements of a mouthpiece are shown in Figure 2.4; the contribution of these elements to the sound is very important to players. The table and the mating face of the reed need to be absolutely flat so that the minimum of restraint is required to hold the reed in place, and various ligatures have been designed to do so with the minimum constriction of vibration. Beyond the table and extending to the tip, the dimensions of the rails forming the lay should be exactly even to enable undistorted propagation. This propagation starts by means of the reed vibrating across the opening made by the lay, trajecting to and reflecting from the baffle into the chamber. If the baffle is raised, as in so many jazz mouthpieces, there will be several deflections before reaching the chamber, tending to emphasise the higher partials or favour the treble end of the spectrum – musicians often refer to this propensity as 'edge'. More often than not they will use an

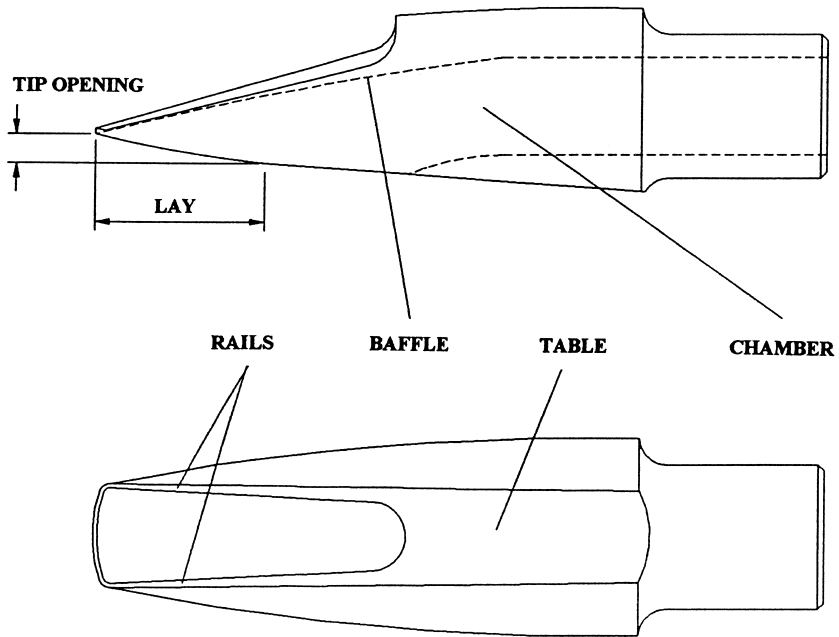


Fig. 2.4 Mouthpiece elements

American- or straighter-cut reed which also favours edge, whereas the classical players favour French- or multi-cut 'long heartwood' reeds with lower baffled, closer lay mouthpieces in order to suppress the edge and favour the purity of fundamentals (see Fig. 2.5).

Early jazz and popular music players found the sounds they wanted by using softer reeds, more open lays, and more restricted chambers than their classical counterparts, helping to distinguish between the sweet clarity of Marcel Mule, the masterful nuances of Rudy Wiedoeft, and the soft engaging auras of Ben Webster. Gradually jazz soloists worked on harder reeds, to produce the delicate brittleness of sound typified by Paul Desmond on alto, and to favour the wonderfully projective richness of Stan Getz's tenor playing. By 1950, Selmer's D-chambered Soloist mouthpieces, ideally matched in design to their Super Action saxophones, enabled a flexible and full projection from *pp* to *ff* with an adequately bright tone, thereby suiting a range of players from dance bands to orchestras. The American equivalent which enjoyed great popularity was designed by Arnold Brillhart. This type of mouthpiece, in conjunction with French-cut reeds, is well suited to today's classical players, the best of whom are thoroughly conversant with other types of music and may only need to change the cut of reed to feel comfortable outside the orchestra or recital situation. Both Otto Link and Selmer metal mouthpieces, together

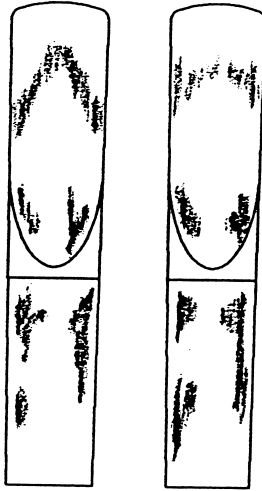


Fig. 2.5 A French-cut reed reveals a longer heartwood (left) which suppresses the edge associated with the American cut equivalent on the right

with the British Berg Larsen and Lawton makes, were much in demand in the 1950s and 1960s, and continue to have many firm adherents.

Since that time jazz soloists have demanded mouthpieces with a somewhat searing quality – reminiscent of Michael Brecker’s playing against amplified electronic instrumental accompaniment – without losing the full tonal qualities normally associated with high baffles and restricted chambers. Many specialists offer variations on this theme, using combinations of fine handwork and computer-controlled precision in manufacture. The degree of influence attributable to the material used in the manufacture of the mouthpiece is the subject of many rather overstated claims, yet classical players rarely choose metal, whose relative rigidity is likely to favour the higher partials. Ebonite has long been a universal mouthpiece material, to be joined by metal and plastic about midway through the twentieth century, but never ousted. Player comfort should be the deciding factor here; of far more import is the choice of lay, tip opening, and internal design. In general classical players prefer the control of closer tip openings with more supportive reeds, whereas jazz players take on board the problems associated with small-bore chambers and choose much greater tip openings in order to control intonation and tonal nuance by embouchure. It is important for a player to realise just what choices are being made, particularly when teaching or advising beginners.

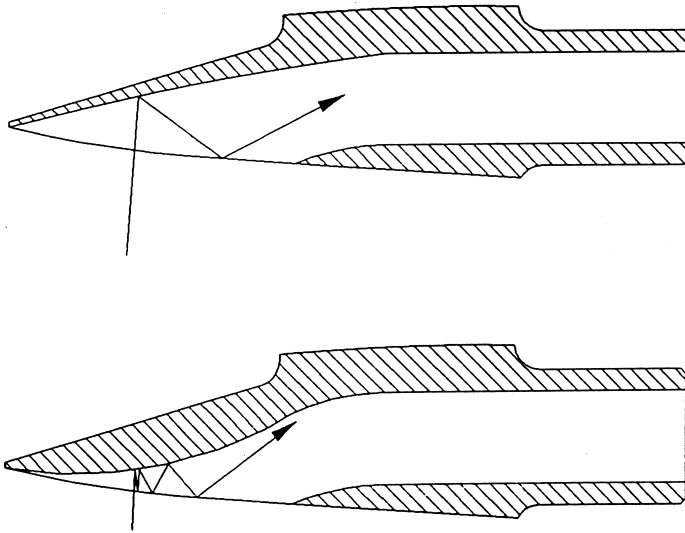


Fig. 2.6 Baffles and chamber designs considerably influence the characteristics of the sound by different propagation

Developments and choices

As far as possible the fingering mechanism necessary to operate an instrument should be straightforward, since the interpretation of music is demanding enough without requiring the player to negotiate awkward fingering. The saxophone system, except for the fact that like many other instruments it is somewhat illogically built around the key of C, benefits from its relative youth, and the improvements and additions throughout the twentieth century have not destroyed its simplicity.

Right into the 1920s some cheaper models sported double-octave key operation, though most had the familiar automatic change-over mechanism from around 1900. This was usually achieved by a system of two levers, one operating and one intermediary, plus the two actual octave keys, and relied on the different strengths of four springs not counting that of the G key which changed from lower to upper vent halfway up the second register. It was in the early 1930s that the major manufactories of Conn, Buescher and Selmer all devised a simpler knuckled link requiring less pressure, the shape of the Selmer link giving rise to the famous Cigar Cutter sobriquet. Urged on by the Wall Street crash and the loss of saxophone sales, these companies led the way to many mechanical improvements which did not spoil the earlier simplicity of fingering.

The provision of a 'front F' key was universal by the early 1900s (by contrast a top F# key became almost universal only three-quarters of a

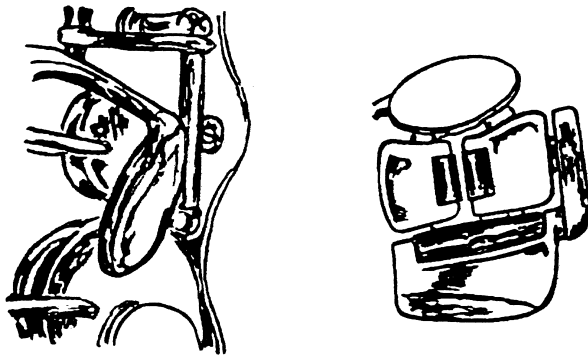


Fig. 2.7 Modern front F spatulas facilitate a technique similar to clarinet throat A operation, and the left little finger now benefits from G \sharp to low note articulation incorporating a C \sharp and B \flat link via a tipping B \flat spatula. Introduced by Selmer in 1935, this ensures that the spatula remains close to the level of the finger on depressing low C \sharp

century later), though many companies produced cheaper instruments under stencil names, omitting some of the niceties. In the early 1930s the G \sharp key became the subject of much design work. This normally closed key, opened by its own spring, needed a strongly sprung lever with short leverage to keep the G \sharp shut, placing strain on the left-hand little finger. A requirement to articulate this lever to low C \sharp , B and B \flat , particularly useful for the fifth patterns common in baritone parts, motivated basic design changes which culminated in Selmer's removal of the bell keys to the opposite side of the bell, thereby easing the leverages and taking the keywork away from the player's clothing at a stroke. The Balanced Action of 1935 created a modern layout which, peculiarly, the Americans did not follow until years later. The alternative E \flat , fingered 1–2–3–4–6, disappeared at this time after a relatively short lifespan – it had had a propensity to go out of adjustment and cause leakage.

Both the left- and right-hand main keys have largely remained in their respective stacks – with few exceptions, the right-hand main keys have employed a single steel axle rod since the first saxophones. From about 1935 the G \sharp key was frequently hinged on its own axle to avoid the old short leverages, and both Selmer and Conn saxophones favoured the B \flat *bis* key and G key, each supported separately from the main upper stack; this arrangement remains common. Longer keys are usually supported on point screws of various designs, and in fact because the basic methods of keywork hinging pre-date the invention of the saxophone, it is not surprising to find little change other than in materials and precision throughout its life. Because the pillars holding the screws and needle springs are soldered on to the metal body, their rigidity precludes many of the problems arising on wooden instruments. Many manufacturers soft solder each pillar in place, but Selmer have always made extensive use of

straps combining many pillars without detriment to the acoustic of the tube; in fact, Selmer's use of the hardest brass of all no doubt influences the sound, and certainly contributes to a crisp key action. Because saxophone tubes are pierced with relatively large holes, good sealing is only effected by the use of considerable skill, and strongly made keywork helps to keep the action regulation at its optimum for longer periods.

Around the time of Sax's death, Buescher was constructing C. G. Conn's first soprano saxophone, and within a decade or so Conn, King, Buescher and Martin all offered both straight and curved sopranos, the last displaying less tendency to a rather raw nasal quality. French manufacturers also made curved models in the early 1920s, though the American Conns and Bueschers are the most common survivors. At the time of writing, a number of cheaper curved sopranos are available, but the Japanese Yanagisawa is possibly the only quality one. In the late 1920s, Conn heralded the ill-fated mezzo-soprano in F, which together with the mythical sopranino and baritone in F might have completed a whole F/C family, for the soprano in C and C-melody 'tenor' are not rare.

All sopranos require dedication for any degree of mastery, and their sparse use after 1930 until a revival around the mid-1960s did not encourage the sort of design research which has spawned the excellent Selmer Paris, Yanagisawa and Yamaha models of today. By comparison, the alto and tenor saxophones have been the subject of continuous acoustical development so that one may choose either from a number of characteristic earlier sounds or from current models; some explanation of these choices may be useful. Instruments of the 1920s are still in abundance and the primary consideration should be wear in the mechanism, since a complete retube and new axles may prove prohibitive. Otherwise, the main ingredient to look for is a delicacy and purity of sound, matched ideally by a mouthpiece of the time. Particular attention should be paid to the crook, remembering the importance of the upper cone; Conns whose patent tuning slides have been removed irresponsibly may exhibit impossible intonation problems.

As already noted, the mid-1930s was a period of transition. C. G. Conn produced their 'underslung' model (upper octave key slung underneath the crook) with rolled toneholes, in conjunction with L-shaped metal rings built into the pads which pulled the leather covering tight and flat. These helped to keep the seals healthy for a lengthy period as long as the holes remained undamaged. Factors which reduce the longevity of these sonorous and free-blowing favourites include irresponsible polishing of the body during subsequent relacquering, particularly from an initially frosted silverplated finish; denting close to toneholes; or removal of the rings on repadding. Buescher Aristocrats from this period arguably

display the most free-blowing properties of all, with rich, full tones and the ability to produce a markedly full subtone from the lower notes. Some players will find the ability to bend notes, a well-used feature of the era, all too often makes for less easy intonational control. The Buescher bore has seen little change to this day, and was used in 1948 as the basis of the remarkable Grafton venture into plastic moulding. Almost by contrast the Selmer Balanced Action of 1935 featured a less easy full subtone than its forebears, in favour of a brighter (but not thinner) upper end and a well-balanced roundness of harmonic spectrum throughout the whole range. Classical use of the saxophone during mid-century was subordinate to the big band sections and developing jazz soloists, no doubt influencing designs in the quest for richness and brightness, with the ability to sing hard against large brass teams and to respond flexibly to the smallest of oral nuances.

The classical player has undoubtedly benefited from all this acoustical and mechanical activity, and indeed has also been able to contribute to design during the latter half of the century. Perhaps the most notable examples of this are the collaboration between Selmer and Marcel Mule towards the birth of the Mark VI, and the growth of Yamaha models under the player input of Eugene Rousseau. His advice to a determined and scientifically orientated team has produced a top-class saxophone with a distinctive purity of tone, yet bright in character. Any claim to being the easiest responding of saxophone tubes, particularly on lower notes, would be hard to refute, rendering them excellent instruments for young beginners. Because of this ease of response they are often unwittingly chosen by classical clarinet players who feel the need to be 'saxophone familiar', without recognising that all saxophones require considerable skill and familiarity on the part of the player in order to fashion a high personal standard of tone and delivery. That a Yamaha saxophone is capable of satisfying the highest musical demands is evident in the playing of the likes of Rousseau, members of the Northern Saxophone Quartet, and many others.

Since World War II, the American musical instrument industry has undergone considerable change, as a result of Conn's financial troubles and other makers' avoidance of the same fate through amalgamations. This has resulted in 'corporation' models rather than the specialist saxophone typified by the Conn Underslung, though seekers of tubes with a darker and more mellow character may wish to explore this area. In the midst of much activity in the cheaper lines from French, Italian, Czech and German centres (their saxophones often carried importer-designated names – for example, East German manufacturer Weltklang would supply instruments carrying a name specified by quite small



Fig. 2.8 Toneholes being raised from a saxophone tube at the Yanagisawa factory in Japan

importers), the Selmer company in Paris developed the legendary Mark VI. The Mark VI's richness, brightness and sheer weight of sound, combined with a precision of action, ensured its place in both professional and semi-professional circles alike; the baritone offered the now universal concert low C and a crisp delivery throughout the range. The Conn baritone continued without this facility until very late, but it remains a firm favourite with jazz soloists because of its rounded lyrical qualities. After some twenty-one years of Mark VI production the less-loved Mark VII Selmer lasted only five years, before the S80 – a much more refined and flexible instrument reminiscent of the post-war Super Action – became the latest epitome of saxophones for many of the world's top exponents in both classical music and jazz. The Selmer company has developed its concurrent Series III models in order to offer an alternative tonal option.

As we enter the twenty-first century, world markets have been inundated with cheap Far Eastern saxophones, some of which defy description, though there are now signs of improved technological input with factories such as KHS and Greenhill producing better models. At the same time there are small but diligent companies, notably Keilworth of Germany, who, having now considerable experience of making



Fig. 2.9 Testing for the integrity of pad seating on a Yamaha saxophone

saxophones under contract, are offering quality products under their own name for the discerning player, as part of the Boosey & Hawkes organisation. The demand for saxophones is greater than ever, and the inevitable result of this interest will be better saxophones, better players and more improvement in the availability and quality of teaching.