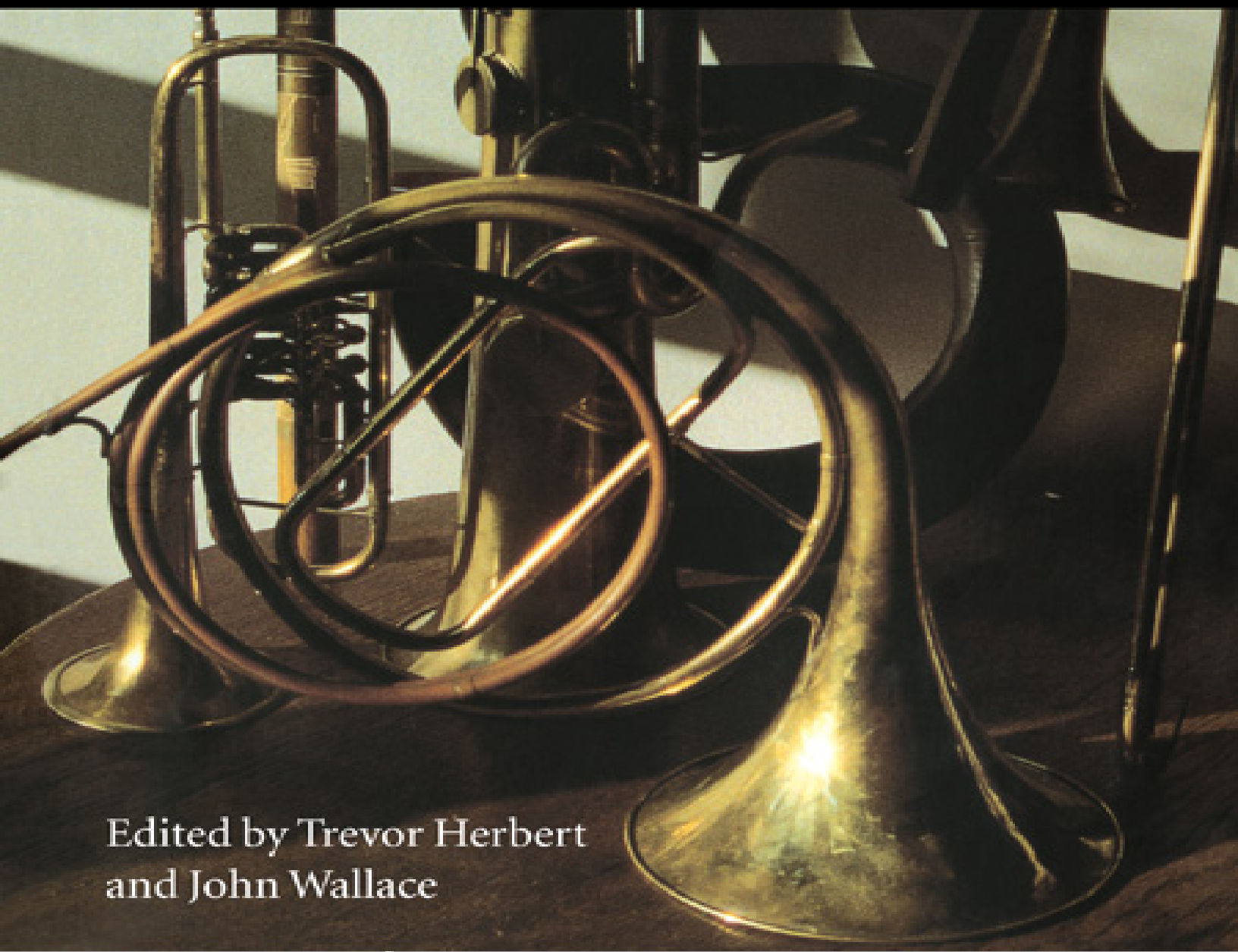




The Cambridge

Companion to

Brass Instruments



Edited by Trevor Herbert
and John Wallace

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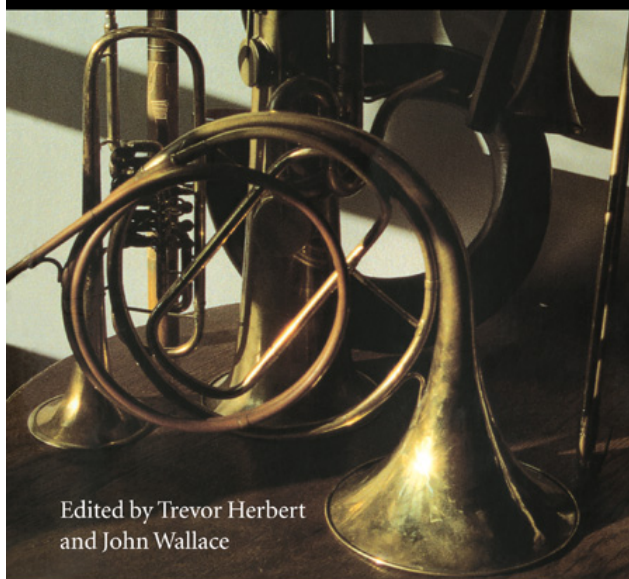
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This *Companion* is the first book to cover so many diverse aspects of brass instruments and in such detail. It provides an overview of the history of brass instruments, and their technical and musical development. Although the greatest part of the volume is devoted to the western art music tradition, with chapters covering topics from the medieval to the contemporary periods, there are important contributions on the ancient world, non-western music, vernacular and popular traditions and the rise of jazz.

Within this book are detailed descriptions of the development of individual instruments and the way that composers have written for them. Issues relating to performance practice recur as key considerations throughout this volume. Despite the breadth of its narrative, the *Companion* is rich in detail, with an extensive glossary and bibliography.

The editors are two of the most respected names in the world of brass performance and scholarship, and the list of contributors includes the names of many of the world's most prestigious scholars and performers on brass instruments.

The Cambridge Companion to Brass Instruments

The Cambridge Companion to
BRASS INSTRUMENTS

Edited by Trevor Herbert and John Wallace



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Notes on the contributors

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Arnold Myers has been Honorary Curator of the Edinburgh University Collection of Historic Musical Instruments since 1980, and is editor of a Catalogue of the Collection which has been published since 1990. He is currently undertaking research into acoustically based techniques for taxonomic classification of brass instruments. He is contributing several articles to *The New Grove Dictionary of Music and Musicians* and *The New Dictionary of National Biography*.

Keith Polk has contributed numerous articles on Renaissance instrumental music to a variety of international journals, and his book, *German Instrumental Music of the Late Middle Ages*, was published by Cambridge University Press in 1992. He is also a performer of both the modern and the natural horn, and has played with orchestras in Europe and the United States. He is currently Professor of Music at the University of New Hampshire.

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Simon Wills read music at Bristol University. After graduating, he joined the orchestra of the opera house at Palermo. He freelanced in London for some time, then spent five years playing second trombone in the London Symphony Orchestra. He is now principal trombone of the Chamber Orchestra of Europe, and is internationally known as a performer on Classical instruments, particularly the alto trombone. He has been a professor at the Guildhall School of Music and Drama in London since 1986, and has a growing reputation as a composer and conductor, with several works for brass to his credit.

Preface

In the process of assembling this book we have been the recipients of a great deal of advice and help. Our principal debt is to our contributors, all of whom have accepted the prescription we designed for the book and acquiesced to our requests for changes and amendments. We are particularly grateful to Arnold Myers who helped us in many ways by giving us the benefit of his advice on technical matters – particularly concerning the descriptions of instruments contained in the glossary – upon which he is an acknowledged expert. Similarly, we are grateful to Dr Clifford Bevan and Dr Edward H. Tarr for help in preparing the Glossary. We are also grateful to John Humphries, and especially to John Miller, who provided important advice on post-classical repertory.

The two institutions with which we are associated – The Open University and the Royal Academy of Music – have kindly availed us of several facilities. We are particularly grateful to the staff of the Academic Computing Service and the Jennie Lee Library of The Open University, who have provided us with help without which we could not have progressed the preparation of this book so quickly or smoothly.

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Dr Helen Barlow, Assistant Staff Tutor for the Faculty of Arts at The Open University in Wales, was largely responsible for the administration connected with the preparation of this book. She was also responsible for much of the copy-editing and for picture searches. All of the contributors

have benefited from her help, and we as editors have particular reason to be grateful for her expert and diligent contribution.

Notwithstanding the fact that we have been the willing and grateful recipients of so much advice and guidance, we hold ourselves entirely responsible for any shortcomings that remain. We hope that our efforts do justice to all who have contributed in any way to this volume.

TREVOR HERBERT and JOHN WALLACE

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James Wood: [Ex. 23](#)

nomenclatures

Note pitches

Throughout this book we have used the American Standard system to describe note pitches. In this system middle C is called C_4 and $A_4 = 440$ Hz. The octave C_0 to B_0 includes the lowest pitches that are audible to humans and C_9 to B_9 the highest notes ever written in western music.



Instrument names

Problems of nomenclature always prevail when one writes about brass instruments. Simpler definitions are easy to deal with – the cornett (sometimes expressed ‘cornetto’ – plural cornettos or cornetti) is a wooden lip-vibrated instrument which was used primarily in the sixteenth and seventeenth centuries – [Chapter 5](#) is devoted to this instrument. The *cornet* (originally called the cornopean in England) is a valve instrument that did not come into being until the nineteenth century. The modern orchestral horn is sometimes called the French (or french) horn: in this book, where the word horn appears without qualification, we are referring to this instrument or its ‘natural’ precursors. Where these words are used, we have taken care to ensure that the context of the use removes ambiguity.

A problem to which we cannot supply an easy solution concerns instruments invented in the nineteenth century, for which different nomenclatures are used simultaneously in different parts of the world. An example of this is the word ‘baritone’, which in Britain is always used to denote a saxhorn-type instrument with the same pitch but a narrower bore than the euphonium. Baritones are most commonly found in the British

version of the brass band. In the USA the word baritone is used more loosely, so, for example, an American might describe as a baritone what the British refer to as a euphonium. In Germany a yet different meaning could be gained from the word. Again we hope that the context in which these words are used will help remove ambiguity. The explanations contained in the glossary will also assist in this respect.

Introduction

Trevor Herbert and John Wallace

This book provides a broad overview of the story of brass instruments in western, and, to a lesser extent, non-western, music. Neither the book as a whole, nor any of the individual chapters contained in it, lays claim to being a comprehensive survey of its subject. Indeed, this is the first volume in the *Cambridge Companion* series to be devoted to a family of instruments rather than a single instrument type. Though it was a close-run decision, we felt that it was most helpful to look at the family of brass as a whole, because, though individual brass instruments have their own special histories, the merits of considering the family – particularly with respect to the way that brass instruments relate to each other – outweigh the benefits of dealing with just individual members of it.

There is probably no other family of instruments which has been more affected by the progress of history, with its attendant social changes, technical inventions and musical fashions. These changes have resulted in each instrument having not one, but several idioms. Such diversities are exemplified by the dilemma of modern performers who, on any day of any week, may be required to imitate the style of the seventeenth century, the nineteenth century, 1920s Broadway, modern jazz, the Second Viennese school, or play the music of their own time within current parameters of taste and style.

The history of brass instruments is complex and intriguing but there are key points in this story which are easily discernible. Trumpets and horns have been used in western and non-western music for millennia. In western music there are countless references to them, dating from the Dark Ages onwards. In the fifteenth century, trumpets fitted with a slide to enable their players to play more than one harmonic series were used, and within the same century the trombone and cornett were developed and acquired an important place in art music. In the seventeenth century, the trumpet

developed from being simply the medium for declamatory fanfares and became an art-music instrument. A little later the horn underwent a similar change by departing from its sole association with the hunt. While the cornett declined in popularity in the eighteenth century – as, in many places, did the trombone, at least temporarily – the trumpet and horn established a place in the embryonic symphony orchestra. From the last quarter of the eighteenth century, mechanical devices were applied to trumpets to facilitate the playing of chromatic passages. In the nineteenth century the major breakthrough came with the invention of valve systems. New instruments were invented and new players emerged, for these events occurred in the context of wider social changes. Many of the new virtuosi who were prominent in the world of brass playing were amateurs. Yet further ways of playing and writing for brass instruments developed, and in the USA they were an important vehicle for early pioneers of jazz. In the twentieth century, brass instruments have been prominent in both art and popular music. They have been used conservatively, radically, symbolically and, at times, trivially. They are taught in schools throughout the world, and, in both western and non-western countries, they have become embedded in vernacular forms of musical expression.

When commissioning chapters we were anxious to touch on all of these nuances but we also tried to strike a balance between dealing with precisely focused topics and more general themes. It was clear to us that the evolution of the instruments themselves has been one of the key features of this story, so three chapters explain some of the main technical developments. Whereas it is proper and helpful to look at the use of instruments in the Middle Ages in a single chapter, the development of the cornetto (which, even though it is not made of brass, is a member of the brass instrument family), trombone, horn and trumpet up to the nineteenth century needed more discrete treatment. Post-classical developments in brass instruments are extremely varied and, though we considered a number of options, we came down in favour of a series of chapters that examined and described the areas of brass playing and repertory in which our readers are most likely to be interested.

We have been anxious to avoid portraying brass instruments as merely a phenomenon of western high-art culture. Three chapters address some of the issues outside that domain: [Chapter 1](#) looks at brass instruments in non-western music, [Chapter 13](#) at the relationship between vernacular cultures

and brass instruments, and [Chapter 16](#) at brass instruments in the development of jazz. If the book has any major shortfall, it is that it has not been possible to devote more space and attention to brass playing in non-western countries in modern times. This has been the subject of a great deal of important recent scholarship by ethnomusicologists, anthropologists and musicians.

In order to gain a sense of coherence across this range of diverse topics – almost all the chapters were written independently of each other – we invited contributors to consider six themes and to try, where it was possible and sensible, to aim some of their writing at addressing these themes. The first three concern patterns of change – what the main developments were, what the repertory for brass instruments is, and what important issues of performance practice are associated with brass. We have encouraged contributors to outline controversies where they exist because the growth of interest in performance practice on brass instruments has, understandably, produced a range of different, sometimes conflicting, views. The other three themes concern the implications for brass instruments of specific technological developments, the significance of individuals, and the way that brass instruments have developed in the wider context of social and music history. These themes do indeed emerge throughout the book and provide as much of a unifying structure as we could expect (or want) in a multi-authored volume. While we have done our best to avoid overlap between the chapters, we have stopped short of making any editorial decisions which interfere with the contexts that individual authors may have established for their chapters.

A glossary of technical words and terms is given at the end of the book, as is a bibliography of relevant writings. Neither of these is intended to be comprehensive. Many reliable dictionaries and encyclopaedias of music – most notably, in the English language, *The New Grove Dictionary*¹ and its companion publications – provide wide-ranging information on issues relevant to this book. Literature and scholarship concerning brass instruments before the twentieth century have been given a new and accurate focus since 1989 by the work of The Historic Brass Society² under its visionary president Jeffrey Nussbaum. The Society's remit is broad, and its journal complements the many long-established musicological journals and organology publications such as those of The Galpin Society and The American Musical Instrument Society. *Brass Bulletin*, a less academic but

still invaluable quarterly publication, is the main international focus for contemporary brass players. It has, in recent years, included an excellent series which describes some of the manufacturing techniques used by present-day makers. To these can be added a number of journals and newsletters from societies and groups with more restricted spheres of interest, such as the International Trumpet Guild, the International Trombone Association, the International Horn Society and the Tubists Universal Brotherhood Association. *The British Bandsman* is just one example of a periodical publication that serves the interests of the band community.

It has always been our intention to do no more than offer a contribution to the understanding of brass instruments, and of their idiom and practices. We have assumed a modicum of technical knowledge of music on the part of our readers, but we have aimed our writing at all who have an intelligent interest in the subject. Our greatest hope is that the information contained in these pages will lead our readers to further study of those parts of our subject that interest them.

Lip-vibrated instruments of the ancient and non-western world¹

Margaret Sarkissian

Definitions and problems

When we hear the term ‘brass instruments’, most of us think first of standard western instruments such as the trumpet or trombone, polished precision instruments with valves or slides. These can be found all over the world today, not least in vernacular brass bands or popular music ensembles, where they exist alongside other markers of musical modernity – trap sets, keyboard synthesisers and electric guitars. This, however, is but the tip of an enormous iceberg. In looking beyond the western world, we must broaden our definition of ‘brass instruments’. In their 1914 ‘Classification of Musical Instruments’, Erich von Hornbostel and Curt Sachs applied the term ‘trumpet’ to any instrument in which ‘the airstream passes through the player’s vibrating lips, so gaining intermittent access to the air column which is to be made to vibrate’.² They divided this basic category into two subgroups – natural trumpets (‘without extra devices to alter pitch’) and chromatic trumpets (‘with extra devices to modify the pitch’). Further subdivisions were made on the basis of shape (conch shell or tubular in the case of natural trumpets, conical or cylindrical tubing in the case of chromatic trumpets) and means of playing (side-blown or end-blown).

While the Hornbostel-Sachs system attempts to encompass lip-vibrated instruments of all shapes and sizes, it has serious shortcomings when dealing with the non-western world. The major problem is one of lopsidedness: since the only ‘chromatic trumpets’ are western, the rest of the world has to be subsumed under the category ‘natural trumpets’. If we

exclude conch-shell trumpets, a relatively small and distinctive subgroup, it leaves a bewildering variety of instruments under the catch-all heading ‘tubular trumpets’. For practical purposes, then, a recent modification of the system by Geneviève Dournon, with subdivisions based on structure, shape and material, is better proportioned and allows more sophisticated distinctions among non-western instruments (see [Table 1](#)).³

Ready to embark upon world-wide exploration, equipped with an all-embracing definition of our subject and a system for classifying its parts, we are immediately confronted with two major problems. First, while both tools help us sort a large number of disparate objects into appropriate boxes (or museum cases), neither directly helps us address broader questions. For example, we could list all the end-blown conical metal trumpets in the world (or any other type that strikes our fancy), but what does that tell us about the different ways lip-vibrated instruments fit into the cultures of which they are a part? In many ancient and non-western cultures they seem to have important functions that are symbolic or practical as well as – or instead of – simply musical. Are any of these functions universal? Can we make any general observations about the geographic distribution of instruments or their functions, the different ways they are constructed or played, or the uses to which they are put? These questions and others like them – primary concerns for those of us interested in ethnomusicology, the study of music as culture – are some of the issues we shall consider in this chapter.

Table 1. Dournon’s classification scheme for lip-vibrated wind instruments

Class. no.	Description	Examples
413	trumpets and horns: the column of air is intermittently set in motion by lip vibration against a mouth hole situated at the end or at the side of the instrument	
413.1	end-blown trumpets: subdivided according to structure (plain/composite); shape of pipe/ horn material	
413.11	cylindrical bore (bone, bamboo, wood)	skangang (Tibet); saxxoo (Jamaican); didjeridu (Australia)
413.111	with finger holes	soes (Madhya Pradesh, India)
413.112	with extra bell	pato-pato (Maguella, Chile); pawa-pawa (Poland)
413.113	with kazoos (membrane covering one end of pipe)	ayemawingo (India)
413.12	conical bore	
413.121	straight shape with flared end (wood, metal)	evason (Romania); alphorn; bushb (Nigeria)
413.121.1	with telescopic parts	dingyichen (Tibet)
413.122	curved shapes: 25+ types various coded; go (horn, ivory, wood, earthenware, metal, seashell); conch shell	shylo (Lacandon of Peru); morapipi (Nepal); sawak (India); punga-punga (Maori, New Zealand)
413.122.1	with playing holes	oomett, serpent (western); ope (Finland)
413.122.2	other device for modifying pitch (mouthpiece, valve, piston, sliding ribes)	higle, french horn, trombone, etc. (western)
413.2	side-blown trumpets: some subdivided as end-blown trumpets	
413.21	cylindrical bore (wood, bamboo, metal)	ukukuyu (Bwanda)
413.211	with added bell	gusuma (Bolivia)
413.212	with kazoos (membrane covering one end of pipe)	
413.22	conical bore (horn, ivory, wood, metal, earthenware, gourd, shell)	
413.221	straight shapes	
413.222	curved and various coded shapes; conch shell	apere (Uganda); ope (Madhya Pradesh); shaw (Togo)

Unless we have unlimited time and money to travel the world, our second problem is one of source material. Any comprehensive attempt to survey the world – even a work as recent as *The New Grove Dictionary of Musical Instruments* (henceforth *Instrument Grove*) – has to rely on the published work of others. Although much of this work is now old and outdated, we still refer to it because in some cases the ground has never been revisited while in others the instruments described therein have become obsolete and/or the contexts in which they were performed have long disappeared. What we overlook, however, is the fact that these early studies vary wildly in their access to firsthand data. For example, two works first published in 1934 and still regularly quoted are Karl Izikowitz's study of South American Indian instruments and Percival Kirby's work on the instruments of South Africa. The former was based entirely on second-hand material and museum collections, while the latter was based on the author's own fieldwork.

Geographic distribution and construction principles

With these caveats in mind, we are ready to tackle some of the questions asked above. First, geographic distribution. At the broadest level, lip-vibrated instruments are found all over the world, but not in all cultures equally. Trumpets of all shapes and sizes are extremely common in Africa and Europe, fairly common in South Asia, less common in the Americas,

and few and far between in East and South-east Asia.⁴ In some places, a great variety of a single type of instrument is found: for example, conch-shell trumpets in Oceania and *didjeridu*-type wooden trumpets in Australia. In other places, like Japan, where traditional lip-vibrated instruments of any kind are rare, they are only used in a single imported context, Buddhist ritual.



Figure 1 Procession of the Imperial Military Band (Mehter). Illustration from the *Surname-i Vehbi*, Turkey, c.1720. (Istanbul, Topkapı Palace Museum, A.3593, fol. 172a.)

If we consider geographic distribution by material type, interesting patterns emerge. In some cases, patterns are a matter of common sense: it is hardly surprising that the majority of trumpets made from gourd or ivory are found in Africa. Exceptions, when they occur, are instructive. For example, the medieval *oliphant*, a short, thick end-blown trumpet finely carved from an elephant tusk, apparently ‘travelled westward from Byzantium in the tenth century and was in use for about two hundred years’.⁵ Many scholars (including Anthony Baines in his seminal study, *Brass Instruments*) have cited this as an example of Moorish influence on European trumpets during the Crusades. Instruments made from perishable materials like tree bark depend upon suitable climate and flora. In Scandinavia and Eastern Europe, spiral bark shavings are bound firmly into conical tubes, which can range in length from the Yugoslavian *borija*, made from willow or ash bark (about 50 cm.), to the Latvian *tāšu taure* (obsolete since the 1920s), made from birch bark (up to 150 cm.).⁶ In the hotter, more humid climate of the Amazonian rain forest, giant bark trumpets – up to four metres in length – are constructed. Made from tightly coiled bark, ‘which sticks together like glue when dry’, most are attached to supporting sticks that run along one or both sides of the instrument to prevent it from sagging.⁷ In the case of bamboo, on the other hand, plentiful supply does not guarantee the existence of lip-vibrated instruments. While isolated examples can be found in Africa and South America, there are virtually none in the bamboo-rich areas of East and South-east Asia. In this instance, cultural ambivalence towards lip-vibrated instruments in general overrides the regional abundance of raw material. An unusual exception is the bamboo ‘brass band’ tradition of Sulawesi, Indonesia. Introduced to European brass bands by nineteenth-century Dutch missionaries but lacking the materials to reproduce the instruments, local craftsmen began to make bamboo copies during the mid 1920s. Although they soon graduated to zinc replicas, there are some pockets (notably the Sangir Islands, north of Minahassa) where bamboo ‘brass’ instruments can still be found.⁸



Figure 2 Trumpet players with drummer in a religious street procession, Madras, India.

In other cases, distribution is so widespread that patterns are less easy to discern. For example, trumpets made from animal horn follow the general

distribution pattern for lip-vibrated instruments: most common in Africa, fairly common in Eastern Europe and Scandinavia, less common in South America, and rarely found in the Middle East (with the exception of the Jewish ram's horn, *shofar*), Asia, or Oceania. Sometimes there are ready explanations for such patterns: in Hindu areas of South Asia, for example, cow-horn instruments are rare because the cow is sacred. In Africa, where animal-horn trumpets are more often side-blown than end-blown, the rarity of a particular type of horn increases its value. For example, in Uganda, cow horns are only used when game horns or ivory tusks are not available or affordable; among the Swazi of South Africa, royal side-blown *imphalamphala* are made from sable antelope horns.⁹ Wherever they occur, construction is generally simple: once a suitable horn is selected, it is boiled or otherwise softened so that the interior can be scraped out. Depending on playing style, an aperture is created by sawing off the tip of the horn or by cutting a mouth hole near the tip, usually at the point where the tip of the horn ends and the bore of the tube begins. Many African side-blown animal-horn trumpets also have a small finger hole in the tip, which doubles the range of the instrument from one to two pitches.



Figure 3 Ritual animal-horn (*kudu* horn) trumpet of the Maasai people of Kenya.

Occasionally distribution patterns are surprising. One might expect lip-vibrated instruments made of wood to be particularly widespread, but if our rough survey of *Instrument Grove* is any measure, they occur predominantly in Africa, Europe and Australia. Often long, they range from straight cylindrical tubes, like the Scandinavian *lur* or the Australian *didjeridu*, to conical tubes with an upturned bell, like the European alphorn. Some wooden trumpets are simply branches hollowed out – by burning (e.g., Angolan *ndumbu*) or even by termites (*didjeridu*). Others involve cutting the branch or tree trunk in half lengthwise before hollowing it out and rejoining both halves with whatever comes to hand – tar and osier bands for the *lur*, putty and linen yarn for the Lithuanian *daudytė*, animal hide for the Ugandan *arupepe*, and bark or gut for the alphorn.¹⁰

The geographical distribution of two other material types, conch shell and metal, are both fascinating from a historical perspective. Naturally formed, the most common types of shell used for trumpets are the *triton* ('trumpet shell'), *cassis* ('helmet shell') and *strombus* ('true conch'). The spiral interior functions as tubing, making the instrument acoustically somewhat like a horn (rare conches with abnormal spirals are highly valued and are regarded as especially sacred in India and Tibet). A mouth hole is created either by breaking off the point of the shell (for end-blown conches) or by boring a small hole in the body (for side-blown conches). Wooden, bamboo, or even metal mouthpieces may be inserted into the end of the shell.¹¹ As might be expected from an instrument that has been around since neolithic times, conch-shell trumpets are found almost everywhere, including inland areas like Tibet and Central Europe, where they prove the existence of early trade routes. Particularly common throughout Oceania, both end- and side-blown conch-shell trumpets were formerly associated with religious, ceremonial, military and signalling functions. The victims of changing times, however, they are often blown today to announce everyday public events. The Tongan *kele'a*, for example, is played at cricket matches (in ensembles of from two to nine shells), either before the game begins or 'during the match to sustain general excitement'.¹² As sacred ritual instruments, end-blown conch-shell trumpets have fared better in Asia. First mentioned in the *Artharvaveda* (c. 1000 BC), *śankh* are still blown by brahmins in Hindu temples all over the Indian subcontinent.¹³ Known as

dung in Tibet, *faluo* in China, *horagai* in Japan, the conch-shell trumpet travelled through Asia with the spread of Buddhism. The *horagai*, for example, was first mentioned in historical records during the Heian period (794–1185) but may well have reached Japan much earlier. Still used in esoteric Shugendo Buddhist sects, it is the only traditional lip-vibrated instrument found in Japan.



Figure 4 End-blown trumpets (*fuf*) being played in Punda village, West Sepik Province, Papua New Guinea.

The historical development of trumpets made from metal, specifically brass, has been the subject of much research, speculation and controversy on the part of western scholars (see [Chapter 4](#)). As a result, we know that there were several types of ancient metal trumpets, ranging ‘from the Egyptian *sh-n-b*, Israelite *htzsrth*, Celtic *carnyx*, and Greek *salpinx* to the Etrusco-Roman *cornu*, *lituus*, *tuba* and *bucina*’.¹⁴ We also know that long metal trumpets employed by Saracen armies made a great impact on European soldiers at the time of the Crusades. According to one prevailing (but disputed) theory, the Roman *tuba* having fallen by the wayside, straight metal trumpets were reintroduced to the western world as a direct result of

contact with the Saracens.¹⁵ Whether the Saracen horn was ultimately derived from the Roman *tuba* or not, closer examination of the geographical distribution of long, straight metal trumpets in the non-western world does nevertheless suggest a strong connection with the world of Islam. In Africa, for example, end-blown metal trumpets are found only in Islamic areas such as Nigeria, Chad and central Cameroon. Known as *kakaki* (among the Hausa) or *gashi* (in Chad), these trumpets are extremely long narrow cylindrical tubes, sometimes over two metres in length, with flared metal bells. Constructed in two detachable sections for portability and often played on horseback, *kakaki* and *gashi* are used for praising the ruler or signalling important Islamic festivals.¹⁶ At the opposite end of the Islamic world, the silver *nafiri* is one of only two lip-vibrated instruments found in Malaysia. Slightly less than one metre long, a single *nafiri* is present in each of the royal *nobat* ensembles maintained by local sultans.¹⁷ As in Africa, these ensembles play for royal ceremonial occasions and on Islamic holidays. Not all non-western metal trumpets are long, straight, or associated with Islam, however. South Asia has a great variety of metal trumpets of different shapes and sizes, ranging from the ‘S’-shaped *narsing ā* of southern Bihar, and the double ‘U’-shaped Rajasthani *bānkiāy* to the extremely long, conical, telescopic Tibetan *dung-chen*.¹⁸

Regalia: power and status

The preceding discussion of metal trumpets has introduced one of the most widespread and important functions of lip-vibrated instruments: the marking of status. The association of trumpets and drums with rulers is just as powerful in twentieth-century Nigeria as it was for thirteenth-century crusaders.¹⁹ Sometimes even the right to kingship itself was vested in the instruments, as demonstrated by an 1831 incident from northern Nigeria, in which ‘power changed hands when the next in line to the succession was deprived of *kakaki* and *tambari* [kettledrums] by means of a trick’.²⁰ The association between long metal *kakaki* trumpets and Islamic rulers in West Africa is clear, but using trumpets to generate power and mark status is not limited to metal instruments nor to the Islamic world. Throughout Oceania, conch-shell trumpets were just as significant markers of chiefly status, rank and power. In Rarotonga, for example, ‘the very term for conch was applied

to chiefs, rulers and priests’.²¹ In East African kingdoms – unconnected with the Islamic world – royal ensembles mix ‘royal drums’ with hocketing gourd, ivory, or animal-horn trumpets. This combination is worth examining for it poses a curious paradox: how can interlocking parts (more commonly associated with egalitarian communities) feature in the music of a community dominated by a hierarchic principle that lays great stress on individuality? To answer this question and simultaneously demonstrate the ways in which musical ensembles can both reflect and construct deep cultural values, we shall look in detail at a single example.

Prior to a restructuring of Ugandan society by Milton Obote in 1967, Bunyoro was one of the leading traditional kingdoms. At the state level, the kingdom was headed by a *mukama* or king. Beneath him was an expanding network of chiefs: territorial chiefs, subcounty chiefs, parish chiefs and village headmen. As in a feudal system, a chief at each level owed allegiance to the one above and all were dependent upon the king for validation of their power. This hierarchic political structure, however, coexisted with a highly corporate community organisation. Although by no means egalitarian, villages maintained a strong sense of solidarity – fearing outsiders, observing neighbourly rights and obligations, and affirming their corporate identity in frequent bouts of communal beer drinking.²²

One of the ceremonies performed on the occasion of a coronation or its anniversary was a dance called *empango* accompanied by the royal band of drums and trumpets. The drums – nine small kettledrums, *engaijo*, and one ‘royal drum’, *empango* – were part of the king’s regalia. When they were not in use, they were kept at the palace of the royal regalia keeper. The side-blown trumpets, called *makondere* or *amakondere*, were made from gourd or a combination of gourd and horn and had one finger hole in the tip, giving each instrument a range of two notes. They were owned by particular clans and kept at the residences of clan heads. Seven *makondere* were used in the *empango* dance ensemble, although there were only five different parts (two parts, probably the lowest two, were doubled). The three upper parts used both pitches but the lower two each used only one pitch. In performance, the trumpets were played in hocket fashion.²³

The structure of the ensemble, then, tells us important things about Bunyoro society. The drums are an index of political hierarchy: as part of the royal regalia, they are looked after appropriately. Like subsidiary chiefs, the nine small *engaijo* drums play repeating patterns; like the king, the

single ‘royal drum’ controls them all with improvised variations. The trumpets, on the other hand, represent the people: they are kept in the village and can, in fact, play *empango* music (without the drum rhythms) for special clan events. As an index of the communally organised people, they play closely interlocking parts and all five parts are needed to complete the piece. But as in real life, though the trumpets work together to form a homogeneous whole, relations of superordination and subordination still exist: some trumpets play two pitches while others play only one. In effect, the ensemble is both a model of and a model for the way Bunyoro society works. It encompasses both hierarchical and egalitarian elements inherent in Bunyoro life and, in the process, resolves our paradox.

Gender distinctions

A second equally widespread and powerful function of lip-vibrated instruments is the marking of gender difference. Though not universal, there is a strong tendency in most parts of the world – including, until recently, the West – for trumpets to be the domain of men.²⁴ Curt Sachs, and many others before (and since), have attributed it all to sex:

The player's sex and the form of his or her instrument, or at least its interpretation, depend on one another. As the magic task of more or less all primitive instruments is life, procreation, fertility, it is evident that the life-giving roles of either sex are seen or reproduced in their shape or playing motion. A man's instrument assumes the form of a man's organ, a woman's of a woman's organ. And in the latter case the addition of a fertilizing object is not far off ... Tubular wind instruments, straight and elongated like a man's organ, belong to a man ... Sound, also, is a factor as well as form in these connotations. Most of the instruments reserved for men have a harsh, aggressive, indeed ugly tone; most instruments preferred by women have a muffled timbre.²⁵

Today this kind of argument would be considered simplistic and flawed, for it confuses sex with gender. The former is a (relatively) straightforward biological distinction. The latter is far more complex, combining a principle of social organisation with a set of ideas which, while appearing to be natural, based on common sense and biological difference, is in fact culturally constructed and variable. Viewed in this light, Sachs's homology is by no means clear. If we consider sound, his ground becomes shaky. It is true that in many parts of the world, trumpets are loud instruments reserved for outdoor use, but equally widespread is the separation between public and domestic spheres, the former being generally male-dominated and open

to outsiders, the latter often female-oriented and closed. From a practical standpoint, then, we could argue that trumpets are played by men because they are played outside, rather than that trumpets are played outside because they are played by men. Furthermore, can a musical sound be ‘aggressive’? Or is it the context in which sound is made and the way a listener chooses to interpret it?²⁶ If we look at the functions usually associated with lip-vibrated instruments, the connection between function and context is further emphasised. As we have already seen, trumpets are frequently associated with regalia, signalling and ritual, all of which mediate with the outside world in one form or another and thus fall into the public domain controlled, in most cultures, by men.

Gender inequality operates even in communities otherwise described as ‘egalitarian’. In such cases, women are often not allowed to hear – let alone see – the men’s long trumpets. Both the wooden *ndumbu* of southeastern Angola and the giant bark *buburé* of the Amazonian rain forest are hidden under water to keep them away from prying female eyes.²⁷ In the case of the BaMbuti of Zaire, a trumpet called *molimo* is hidden in the forest until the village is afflicted by disaster and the world needs to be set to rights by means of a *molimo* ceremony. A short extract from Colin Turnbull’s classic ethnography, *The Forest People*, encapsulates these highly gendered situations.

Every day, around midday, a couple of youths would go around the camp, just as they had done this day, collecting offerings of food and firewood from hut to hut, for the *molimo* concerns everyone, and everyone must contribute. And each evening the women and children shut themselves up in their huts after the evening meal, for the *molimo* is mainly the concern of the men. And when the women have retired the men sit around the *kumamolimo* – the hearth of the *molimo* – and gaze into the *molimo* fire. Nearby a basket hangs, full of the offerings of food that will be eaten later. But first the men must sing, for this is the real work of the *molimo*, as they say; to eat and to sing, to eat and to sing. Yet behind these apparently simple outer trappings of the festival there was an atmosphere of almost overwhelming expectancy ... As the men sang in the camp, the voice of the *molimo* echoed their song, moving about continually so that it seemed to be everywhere at once. During a lull in the singing it started giving animal growls, and the men looked around to make sure that all the women were safely in their huts ... The *molimo* was often referred to as ‘the animal of the forest’, and the women were supposed to believe that it really was an animal, and that to see it would bring death. That of course is why they were all bundled off to bed with the children before the trumpet was ever brought into the camp. And even when it was brought in it was often shielded by a number of youths so that if any woman should happen to look, she would see nothing.²⁸

At first sight, it would appear that the *molimo* trumpet provides a means of exerting control over the women of the village. Women cannot hear its

sound; they must be contained safely in the domestic domain, their homes. The task of setting the world to rights – of dealing with harmful outside forces – belongs to the men. But in the BaMbuti world, as in many similar communities, the women know full well what is going on, and with that knowledge subvert containment. Thus, as Gourlay discovered in Papua New Guinea, community *status quo* is maintained through a complex series of mutual deceptions:

The women know the men's secrets but pretend not to know in order not to damage the men's self-esteem. The men not only know that the women know and are pretending but themselves pretend that the women do not know but actually believe the stories which they themselves admit are pretence.²⁹

Mediating between worlds: signalling and rituals

One last widespread and highly practical function of lip-vibrated instruments – communication – has already been touched upon several times during the course of this chapter. There are myriad ways in which trumpets are used to communicate. European herdsman use alphorns to call each other across the mountains; young Latvian men play goat-horn *āžrags* on summer evenings to announce that they intend to marry in the autumn; Bugandan hunters from Uganda sound their *eng'ombe* (side-blown animal-horn trumpets) to co-ordinate the practical and ritual steps essential for ensuring a successful hunt; fishermen from Aoba, Vanuatu, blow their conch-shell trumpets, *tapáe*, to summon assistance for bringing in their nets – the variety is endless.³⁰ Not all communication is so pastoral: from the Roman legion to the US Cavalry, trumpets have been an essential part of military life, sounding advances, retreats, the start of a day, the end of a life. Communication can even exceed the boundaries of the everyday world. Whether the BaMbuti Pygmies sound their *molimo* trumpet to wake up the spirit of the forest, Japanese Shugendo Buddhists imitate a lion's roar on their *horagai* to drive out evil spirits, or Fijian islanders use their *davui* conch-shell trumpets to invoke the presence of a god, the sound of lip-vibrated instruments can bridge the gap between temporal and spiritual worlds.³¹

In each case, a short loud sound, series of sounds, or rhythmic pattern functions as a signal, a means of carrying a message or an instruction from one person or persons to others often a great distance away. If the receiver

understands the conventional pattern, the message will be communicated – the god will descend, the commoner will bow before the king, the army will retreat, or the shepherd will come home for dinner. In the final analysis, then, it is all a question of mediation: between women and men, between us and the world outside, between ordinary folks and their rulers, and between earth and heaven.

How brass instruments work

Arnold Myers

All brass instruments consist of a tube, at one end of which is a mouthpiece shaped so that the player can make an airtight seal when the lips are placed against it. The acoustical properties of brass instruments depend on the interactions of the player (in particular the oral cavities and lips), the air column inside the instrument, and the ambient air at the other end of the instrument. The column of air inside the tube is set into vibration when it is excited by the player buzzing his/her lips placed against the mouthpiece. A sustained sound on a brass instrument requires ‘standing waves’, i.e. soundwaves travelling from one end to the other and reflected from each end like water waves in a bath. Although the player opens his/her lips by blowing air through them, because he/she is buzzing his/her lips they are effectively closed for enough of the time to reflect most of the sound waves travelling towards them through the instrument. Whether the other end of the instrument terminates abruptly (as in a bugle) or terminates in a flaring bell (as in a trumpet), sound waves are reflected by the bell mouth or by the flare. The sound inside an instrument is much more intense than the sound produced by the instrument in the surrounding air. The bell of an instrument has to be carefully designed so that it reflects enough sound to allow standing waves to build up, yet allows enough sound to escape to be audible at an appropriate intensity to be useful in music. For this reason, brass instrument bells are of a limited range of patterns – one shaped like a gramophone horn, for example, would not work.

The standing waves lose some of their energy to the ambient air as audible sound, some in friction with the walls of the instrument, and also a small part to the player’s lips, which are coerced to vibrate at a frequency to some extent dictated by the instrument. At the same time, a player adds

energy to the vibrating air column at just the right frequency by blowing through the buzzing lips to replace the sound energy being dissipated.

The air inside a brass instrument, which is effectively closed at one end by the lips and open at the other, can sustain standing waves at certain quite well-defined frequencies, known as the frequencies of the 'modes of vibration' of the air column. If the frequency of the wave is very slightly higher or slightly lower than one of these frequencies, standing waves are still possible, but will be weaker. These mode frequencies form a series which is more extensive for a narrow tube such as in a french horn or a natural trumpet than for a wide tube such as in a bugle or an ophicleide. For a perfectly conical tube, the frequencies would correspond numerically to a harmonic series, which is defined as a series of numbers (here, frequencies) which are exact integer multiples of the lowest member (the fundamental). For a perfectly cylindrical tube, the frequencies would correspond to the odd-numbered members of a harmonic series. Real brass instruments are neither perfectly cylindrical nor perfectly conical, and the modes of vibration depend on the internal shape of the instrument. Tubes are musically most useful if several of the frequencies of several of the modes of vibration approximate to members of a harmonic series. In the case of instruments with large cylindrical portions of tubing such as trumpets and trombones, the mouthpiece and bell need to be carefully designed to make this possible. Even so, the lowest one or two members of the series of modes of vibration of trumpets and trombones diverge considerably from the harmonic series. The art of the brass instrument maker is to give the modes the most advantageous frequencies, strengths and tolerances.

When a sustained sound is produced on a brass instrument, the air inside the instrument vibrates not only at the frequency of vibration of the player's lips, but also at exact integer multiples of this frequency. These are the spectral components of the sound, sometimes called 'overtones'; the lowest component (whose frequency is that of the lip vibration) is the fundamental. The frequencies of the spectral components of the sound when a sustained single note is being played without vibrato form a harmonic series. The sound which escapes from the bell of the instrument also contains these spectral components, and it is the relative strengths of these components that determine the timbre of a sustained sound on the instrument. However, different notes played on the same instrument will have different spectra: a high note may have a significant amount of acoustic energy in only two or

three components whereas a low note may have a rich spectrum with significant amounts of energy at fifteen or more frequencies. It is always easier to distinguish two brass instruments by comparing low notes than high. Loud notes not only have energy at each spectral component, but also a more extensive spectrum. Because of this, a recording of a loud note can be recognised as such even if reproduced at low volume.

The series of fundamental frequencies of the notes which can be sounded by a player form only an approximation to a harmonic series, though they are sometimes loosely called ‘the harmonics’. If the frequencies of the modes of vibration of the air column formed a harmonic series, then the ‘note centre frequencies’ available to the player would also form a harmonic series ([Ex. 2](#)). However, this is an ideal case and the behaviour of real instruments is more complicated. In order for the instrument to ‘speak’ and produce a ‘well-focused’ sound, several of the harmonics of the note being played need to resonate with modes of vibration of the tube. In most cases, the fundamental of the note is very close to one of the mode frequencies; in addition, to produce the tone quality expected of brass instruments, its spectral components (harmonics) also resonate with higher modes of vibration of the air column inside the tube. The interaction of the harmonic components of the sound with the air column, termed a ‘co-operative regime’, is a strong effect. On the one hand, a co-operative regime can allow a sustained sound even if the fundamental does not match a mode of vibration of the air column – this is how a trombonist can sound a pedal note or a tuba player can sound ‘factitious’ notes not in the usual series (see [Table 2](#)). On the other hand, if the modes of vibration have a poor match with the harmonics of a note a player is sounding, the note will be ‘stuffy’ in quality, difficult to produce, and possibly out of tune. Since the air column can sustain standing waves at frequencies very slightly higher or lower than the mode frequencies, the player has some latitude to ‘lip’ a note up or down in pitch and to use pitch vibrato.

Ex. 2 Harmonic series on C: the pitches of the first 24 modes of vibration of air at 25° C in an ideal cone of length 2.65 metres (approximately 8ft). The mode frequencies departing most from the equally-tempered scale are indicated in black. A well-in-tune instrument pitched in 8ft C will allow a portion of this series of notes to be played without extending a slide, operating valves or opening tone-holes, depending on the bore proportions

and the ability of the player. An ophicleide, for example, would normally use members 1 to 6, a natural trumpet members 3 to 20.



In the case of wide-bore signalling instruments such as bugles, there are only a small number of modes of vibration of the air column which are of sufficient strength to contribute to the generation of sustained sound; therefore the ‘co-operative regimes’ are less extensive than those which allow in-tune production of the lower notes of narrow-bore instruments such as the french horn and the trombone; as a result many instruments of the bugle family are not well in tune. In the case of instruments with tone-holes such as cornetts and serpents, the situation is complex: the series of notes which can be produced with a given fingering are not generally a close approximation to a harmonic series. On these instruments, for example, a note and a note an octave higher usually have different fingerings.

Table 2. Example of mode frequencies and spectral components

Mode number	Frequency (Hz)	C ₂	C ₃	G ₃	C ₄	E ₄	G ₄	C ₅	D ₅	E ₅	G ₅
1	42.2	66.4									
2	124	133	133								
3	198	199		199							
4	265	265	265		265						
5	332	332				332					
6	395	398	396	398			398				
7	461	465									
8	529	529	529		529			529			
9	599	597		597					597		
10	663	664	664			664				664	
11	732	730									
12	801	796	796	796	796		796				796
13	872	863									

The second column shows the frequencies of the modes of vibration of a bass trumpet in 8ft C by Alexander (Model 19) with a Bach 7C mouthpiece, the tuning-slides fully closed and with no valves operated, measured at 18° C. The other columns show the spectral components (harmonics) of the notes playable on this instrument with no valves operated (Ex. 2). The pedal note, C₂, which is rarely used on the bass trumpet receives no support for its fundamental, and can be sounded only because of the support of modes 3–13 for its harmonics 3–13. The second mode (124 Hz) is a semitone flatter than the fundamental of the note C₃ (133 Hz), which note can therefore be sounded only because of the support of modes 4, 6, 8, 10 and 12 for its harmonics 2–6. On this instrument, modes above the 13th are not strong enough to help a player 'centre' on a desired note. In fact, the compass of the bass trumpet is not usually regarded as extending above G₅. The playable notes are a little sharp compared with the pitch standard A₄ = 440 Hz (middle C = 265 Hz is equivalent to A₄ = 446 Hz), and will be sharper still when the instrument is warmed up; however, the instrument is normally used with the tuning-slide drawn.

So far, we have discussed only sustained sounds. In order to sound a note, the brass player has to set his/her lips in vibration, sending a pulse of sound towards the bell. By the time the initial sound is reflected back and can interact with the lips to establish a stable sustained sound, the lips will have gone through at least one cycle (many cycles for high notes). A large part of the skill of the brass player consists of the ability to buzz the lips at the right initial frequency; it is to acquire this ability that many teachers recommend practice on the mouthpiece alone. The length of unsupported time is longer for a given note on, say, a natural trumpet in 7ft D than a piccolo trumpet in 2¼ft B_♭. With a longer tube length, the nearest playable notes above and below the desired note are closer in pitch than with a short tube length. These are the reasons why the trend in instrument design since the invention of the valve has been to make shorter instruments.

The sound characteristics of instruments depend to a large extent on their behaviour in the initial build-up of a note. If tape recordings have these 'starting transients' cut out, it is almost impossible to identify the instrument being played, sometimes even to tell if it is wind or string. Another characteristic of an instrument can be the presence of formants. These are regions of the spectrum where the components are consistently

strong regardless of the exact fundamental frequency of the note being sounded. Formants are the mechanism whereby vowels can be recognised in speech and song; they make an important contribution to woodwind character, and are less important for brass but still significant.

Opinions differ as to the importance of the material of a brass instrument. The vibration of the walls has little effect on the sound spectrum produced by a brass instrument, and the character of what the listener hears is principally determined by the shape of the bore profile of the instrument and of the oral cavities of the player. Factors such as material and wall thickness may in some cases have effects that can be sensed by the player, who is in physical contact with the instrument and who perhaps hears sound radiated from the body of the instrument. The bore profile, however, is the principal determinant of the character of the instrument – for example, whether it is a french horn, a flugelhorn or a saxhorn.

Design, technology and manufacture before 1800

Robert Barclay

Early technical developments

The emergence of the brass family as instruments to be used in art music is directly related to their ability to produce sufficient notes in the diatonic scale for melodic accompaniment. This is effected in two ways: either by changing tube length during playing by means of slides so as to fill in the gaps in the lower register, or by increasing tube length to a point where the higher harmonics are available to the player and close enough together that diatonic melodies may be played. Until the higher harmonics could be produced reliably, or the lower harmonics tuned to order, brass instruments were relegated to ceremonial and non-musical roles.

The simplest way of varying tube length is by application of a single slide attached to the mouthpiece. The mouthpiece is held in a set position against the lips while the whole instrument is moved up and down. Several authors cite extensive iconographical and musical evidence for the existence of such an instrument from the fourteenth and fifteenth centuries, and hypothesise on its general dimensions and musical function.¹ Modern reconstructions show that the instrument is at least mechanically and musically feasible. An argument against the existence of an instrument with a single slide has been made, but from the point of view of manufacturing technique it seems more logical that a workable but cumbersome single slide was developed first, and later gave way to an improved double slide as manufacturing techniques improved.² Making smooth concentric tubing which would telescope easily enough to allow the use of a single slide was difficult enough in the fourteenth century, without the extra technical

demands of making two such tubes work well alongside each other in a double slide.

The higher harmonics, which lie increasingly close to each other as the series is extended, became accessible as mouthpiece design and function became better understood in the sixteenth century. Lengthening the tube gives access to this wider range of harmonics, but it produces a very cumbersome instrument. The logical answer was to find some way of folding the tubes upon themselves, thus giving a more compact and easily handled design. It has been suggested that the folded form of the trumpet may have been developed by the brass instrument makers of Burgundy, France or the Low Countries in the fourteenth century.³ Nevertheless, a distinction must be made between development and application. Iconographical evidence points to the increasing popularity of a folded, 'S'-shaped trumpet during the fourteenth and fifteenth centuries, but this simply suggests the application of the technique, not its invention. Arguments have been made that trumpets of the twice-folded (or once-looped) variety had an unbroken lineage from Classical times.⁴

The trombone appears as a distinct instrument in the mid fifteenth century. The transition from the slide trumpet (on the strong assumption of its existence) to the trombone greatly enhances versatility. The 'U'-shaped slide, moving independently of the body of the instrument, makes playing much more convenient; holding at arm's length and sliding back and forth even the thinnest and lightest trumpet is tiring compared with the ease of moving a slide counterbalanced by the body of the instrument. Also, because the slide doubles back upon itself, the distance the slide must be moved between positions is halved, and the number of available positions within reach of the arm is consequently doubled.

The application of the double slide immediately separated the trombone taxonomically from the trumpet. It became essential to place stays between the components, especially to maintain an even distance between the slide tubes, and thus a more rigid and mechanically distinct form arose. Initially, the stays between the slides were removable and were held in place by latches, with a thin leather packing inserted. Later, as perhaps a better understanding of slide tolerances accumulated, a tubular stay was developed, fixing the inner slides at a set distance, while the outer stay telescoped sideways very slightly. The inner slides at this stage had no 'stocking' and were therefore of the same diameter for their whole length.

This meant that as the slide was progressively closed friction increased, giving a very unequal response. The stocking, on the other hand, presents the same surface area to the inside of the tubes, no matter what the position. Both tubular stays and stockings are found as improvements on earlier instruments that were not originally equipped with them. Bell flare increased in the same manner as in the trumpet, although neglect of the trombone in the eighteenth century arrested development.

The idea of a slide for the trumpet appears never to have been truly abandoned, but to have been applied sporadically at various times and places. The ‘flatt trumpet’ described by Talbot⁵ suggests use of a slide at the close of the seventeenth century in England; and later experiments in that country culminated in the highly successful slide trumpet of the nineteenth century. The existence of a single-slide instrument of 1651 by Veit of Naumburg shows a seventeenth-century German application, as does another with a double slide.⁶ Bach’s directions for *tromba di tirarsi* indicate a continuance of this practice into the following century.

The natural trumpet is assembled from around fourteen separate components: one bell/bellpipe, two yards, two bows, two saddles, five garnishes, one bell garland and one ball. Although regional variations in decoration and constructional details are found, this general form is remarkably consistent throughout continental Europe from the sixteenth century to the close of the eighteenth. It contains approximately eight feet of tubing. Illustrations of the first folded forms of the trumpet from the fifteenth century show the parts arranged in a flattened ‘S’, and frequently without supporting stays between the tubes. Later, the first yard was laid alongside the bellpipe and bound with cord, sometimes with a wooden spacing block. The reason for this change of configuration could lie in the development of thinner sheet metal, which provided a lighter and more responsive instrument, but one which could no longer be self-supporting.

The bell forms of the early trumpet and trombone are essentially the same – a shallow, gradual flare with no sharp increase at the termination – the only difference being in size. As an example, the 1551 tenor trombone of Erasmus Schnitzer apparently has a trumpet bell which indicates that the distinction between the two instruments, at least musically, was not as clear as it later became.⁷ Between the middle of the seventeenth century and the beginning of the eighteenth the shape of the trumpet bell became more flared,⁸ and the average diameter of the tubing decreased slightly. These

developments parallel the increasingly idiomatic and intricate music being written for the instrument.

Anomalous trumpets include those with their tubing coiled in fantastic ways, box trumpets with their entire length enclosed in a metal container, and others made in curved shapes, perhaps to permit hand-stopping. Coiled instruments are known from at least the sixteenth century and there has been much discussion over the exact function of extant examples. A portrait by Haussmann of the Leipzig trumpeter Gottfried Reiche holding a coiled instrument (see [Fig. 15](#)) lends weight to the hypothesis that this was a common form of the orchestral instrument at that time and place.⁹

While the trumpet developed from the ceremonial court instrument, the horn arose from instruments used in the hunt. Early horns are encountered in a wide variety of shapes from short, scarcely curved examples to semicircular models. These led eventually to the true musical instrument, the large-belled and multi-coiled horn with approximately sixteen feet of tubing. The problem of handling an unwieldy stretch of thin tubing was solved in this case by bending the whole length into gentle curves. The progressive increase in the size of the horn bell in comparison to those of other brass instruments caused adaptations of techniques and certain compromises. A triangular gusset, which can usually be traced by the presence of diverging soldered seams, is often inserted in the bell. Because of the technical challenge of making sound seams in thin sheet metal, as opposed to working a full sheet with only one seam, it is clear that the insertion of a gusset was driven by something other than expediency in shaping. It is probable that it represents a compromise forced upon the maker by a lack of wide sheet metal of suitable quality. With the mechanical hammering process then in use there was a distinct limit to the width of a strip that could be made to a consistent thickness.

The inside surfaces of horn bells are characteristically painted, and sometimes very elaborately decorated and lacquered. Black paint on the inner surface was traditional, and the more ornate work developed from this. It has been stated by several authors that the interior was blacked so that horses would not be startled by reflections of sunlight from the polished metal.¹⁰ However, a simple ray diagram will show that any light reflected from the convex surface of the interior will not be brought to a focus, but will diverge. The sun's image will therefore be tiny and remote. It is far more likely, from a craftsmanly perspective, that the paint in the

interior masked the absence of a very fine finish over such a large surface area. The smoothness of the metal depends upon the smoothness of the mandrel upon which it is formed, and to make and finish mandrels of the size required for horn bells required enormous labour and skill. From the eighteenth century onwards, when mechanical methods allowed mandrels (and bells, too) to be finished to a finer standard, decoration of the interior was retained as a continuing tradition.

Later developments

Towards the end of the eighteenth century vent holes were applied to brass instruments of the trumpet family. There were two reasons for this: the correction of out-of-tune harmonics, and the addition of missing notes in the lower register. William Shaw's so-called harmonic trumpet of 1787 is an example of the former application,¹¹ and the later keyed trumpets made by such makers as Johann Jakob Frank represent a further stage of experimentation.¹² The interest in vented instruments in the late eighteenth century is often cited as evidence for a long-lasting dissatisfaction with the intonation of the natural trumpet, and this is then used as a pretext for justifying the use of vented instruments in performances of earlier music. In fact, the reasons for the development of vented and keyed brass instruments are rooted in the exigencies of the period in which the experimentation was done. The first factor was the increasing use of equal temperament, causing the eleventh and thirteenth harmonics of the natural instrument to be further out of tune, and even less amenable to lipping.¹³ The second source of stimulation was the search, seen throughout the entire orchestra, for instruments that could play equally well in all keys. The last decades of the eighteenth century were times of enormous technical invention and it would be surprising if the trumpet had been alone in *not* being the subject of experiment.

The metals

Brass is an alloy of copper and zinc, although this modern interpretation would not have been understood before the middle of the eighteenth century. Brass-making before the modern era was done by combining copper with an earth called calamine, a common ore of zinc. Zinc has the interesting property that, when smelted from its ore, it does not exist as a liquid, but rather appears as a vapour. Thus, it was unknown as a metal throughout the medieval period, and when encountered later was regarded as a bastard or semi-metal.¹⁴ Brass production was not therefore regarded as a mixing of two metals, but rather as a transformation of a metal into something akin but superior. In effect, finely granulated copper was mixed with calamine in a sealed crucible and subjected to enough heat to release the zinc from its ore. The zinc vapour then diffused into the heated, but still solid, copper until the process was judged to have reached completion. The whole crucible was then heated to liquefaction, the seals were broken open, and the mass was stirred to ensure homogeneity.¹⁵ Zinc content of brass made in this way is usually between 20 and 30 per cent, giving a yellow colour, although English makers used a low-zinc brass which gives a characteristic reddish colour to their instruments.

Liquid brass was usually poured into ingots or thick plates, which were subsequently cut up for further working. Sheet brass began as thin cast plates poured between smooth stones. Once cooled, the cast plate was sawn into suitably sized pieces and hammered to the thickness required. Scraping was then carried out to ensure that the surface of the sheet was smooth, but this also helped to identify any defects. Slightly defective pieces were probably not discarded but used where their inconsistencies were not critical. Because of the thinness of the sheet metal used in brass instruments, and the amount of manipulation necessary in the forming processes, virtually flawless material was essential. Ductile metals like brass could also be drawn out into wires and rods of various profiles.

Silver was used for the manufacture of ceremonial and presentation instruments, chiefly trumpets. An instrument, or any other work of art, would be ordered and paid for according to the total weight of silver used in its construction. Silver was alloyed with copper to make it more durable in the manufacture of utensils, so control of quality was rigidly enforced. An addition of between 5 and 10 per cent of copper gave an alloy that was workable and durable, and still of high value. Until the discovery and exploitation of rich silver deposits in the New World, the silver used in

Europe was derived from the smelting of other metals, particularly lead and copper, in which silver occurs in trace quantities. Silver dissolves in lead and it is necessary to oxidise the lead away by blasting the molten alloy with air in a cupel.¹⁶ Silver was prepared in the form of sheets and other shapes in the same way as for brass.

Although metal instrument production before the Industrial Revolution was predominantly done by hand, it is a mistake to think that the industry surrounding the craftsmen was also man-powered. Since at least the thirteenth century a vast infrastructure of mechanical operations had supported the mining, smelting and refining of the metals, and the production of working stock.¹⁷ Water provided the motive power for ore-crushing plants, blast furnace bellows and hammer mills, while in the workshops mechanical lathes, drills and wire-drawing machines were commonplace.

Metal industries

Trade in brass and the goods made from it was of great importance to the merchants of the Hanseatic League. The majority of brass during the later medieval period came from foundries in the Low Countries. Calamine came principally from Stolberg and Altenberg in the Meuse region of what is now the border of eastern Belgium with Germany. Because of the large bulk of calamine required in the brass-making process, refined copper from smelters, predominantly in Sweden, was transported to the region of the calamine deposits. The cities of Aachen, Dinant and Liège produced brassware in copious quantities. The town of Dinant was particularly well sited and was noted throughout the period for the production of brass artefacts of all kinds.¹⁸ It is no coincidence that such developments as the slide and the folded form of the trumpet are often identified with the North.

With the disintegration of the Hanseatic League owing to internal dissent, trade patterns throughout Europe became realigned. The city of Nuremberg was situated on a key north-south trade route between the Mediterranean and Northern Europe, and aggressive mercantile interests soon established the city as a centre of commerce and manufacture. The Fugger family of Augsburg, a dynasty of merchants, bankers and financiers, were largely

responsible for the new Central European axis of trade in copper.¹⁹ The metal came from mines in the Tyrol, and from Neusohl in Slovakia over which Jakob Fugger had acquired a controlling interest in 1495. Further to the Fugger interests in copper, an agreement between Nuremberg and Mansfeld was signed in 1502 assuring an outlet for and stimulus to the copper producers of the Harz Mountains. This also ensured a continuing supply of copper after Anton Fugger, son of Jakob, relinquished his hold on the market in 1547. Nuremberg was also supplied with copper from mines in the Erzgebirge. By the sixteenth century Nuremberg's brass instruments were sought throughout Europe, and in the following century the city's craftsmen had captured the lion's share of the market.

Instrument makers

Discussion of the brass instrument makers begins with Nuremberg because of the longevity of its industry and its huge output. It is known that trumpets were being made in Nuremberg in the late fifteenth century,²⁰ and in the early sixteenth century the brass instrument makers there inaugurated their own guild of specialists.²¹ Brass instrument making was always limited to a few families; in the four-hundred-year span of the Nuremberg industry there are only about twenty-five names, and the most productive families number only eight or nine. Nevertheless, these few makers occupy a central position in the history and development of brass instruments.

Neuschel is the earliest Nuremberg brass instrument family known by name. Hans and his brother Lienhard were working at the end of the fifteenth century and it is likely that their father, Hans the Elder, was also an instrument maker. The second famous sixteenth-century family was founded by Albrecht Schnitzer who came from Augsburg at the close of the fifteenth century. His sons, Erasmus and Hans the Elder, both of whom died in 1566, became makers of some reputation. A trombone by Erasmus dated 1551 is the earliest known Nuremberg brass instrument.²²

Two later Nuremberg brass instrument making families stand out for their longevity, the quality of their work and the number of instruments they produced. The Ehe family were brass instrument makers from shortly after 1600 until almost the end of the eighteenth century, and the Haas family

spanned four generations in the seventeenth and eighteenth centuries. Between them they account for a huge proportion of the instruments now extant. By the eighteenth century, factory methods, in the modern understanding of the term, were employed in the brass instrument industry. Large numbers of instruments were produced on a piecework basis by skilled and highly specialised workers, but individual instruments of high quality were still produced as well. It is clear from extant examples of the later work of the Haas factory that their instruments fall mostly into the former category, although their trumpets were praised by Altenburg.²³

Two early trumpets from opposite sides of Europe are evidence of other centres of activity in the Renaissance, and indicate a wide diffusion of brass instrument making. A late fourteenth-century trumpet recovered from the Thames at Billingsgate in London is perhaps evidence of an English tradition,²⁴ and the recent discovery in a shipwreck off the Dutch coast of a trumpet by Lissandro Milanese of Genoa, dated 1589, opens a new chapter on a little-suspected Italian tradition.²⁵ Features of both instruments are evidence of common techniques of construction, and both show competent control of fine metal working.

While the bulk of seventeenth-century production in continental Europe fell to Nuremberg, in England a particularly active industry, almost entirely represented by trumpets, centred around such makers as William Bull, Augustine Dudley and Simon Beale. This tradition continued into the eighteenth century in the hands of such makers as John Harris. The English products have a style uniquely different from even the most divergent of other European makers, perhaps owing to their insularity and lack of early contact with continental craft traditions. The eighteenth century saw an upswing of continental production from such centres as Vienna where, led by the Leichamschneiders and the Kerners, makers produced trombones, trumpets and excellent horns. Somewhat less productive centres, such as those in Prague and Pfaffendorf, are worthy of mention, and of particular interest is an instrument by Heinrich Pfeiffer of Leipzig in coiled form, dated 1697.²⁶ In late seventeenth-century France the Crétien family were largely responsible for founding a lasting industry famous for its horns.

Early metal techniques

Brass is the craftsman's delight: it cuts readily and cleanly; it can be softened by heating and then cooling, and hardened again by working; it is easily joined by soldering; it can be formed by cold working; and it takes a very high finish. The vast majority of instruments of the brass family are, indeed, made of brass. The kit of handtools required for making a brass instrument is quite small, but added to this are the necessary mandrels, templates and other forms, and such mechanical contrivances as lathe, drill and bellows-blown furnace. The principal illustrated sources of the brass instrument makers' tools are detailed elsewhere.²⁷

Almost all parts of brass instruments made before eighteenth-century industrialisation began as flat sheet. Sheet metal was available in a variety of thicknesses, and instrument makers could choose the thickness to suit the application.²⁸ Altenburg comments upon the effect on trumpets of the choice of metal and its thickness.²⁹ Some small parts are made of wires of various profiles, and small castings were also employed. The sheet is marked out for cutting by scribing around a template, a flat sheet of metal which acts as the master pattern. The parts are cut out with tin-snips, a larger and more powerful variation of scissors.

In order to form the parts the metal must be annealed to make it soft and easy to work. Both brass and silver can be made soft at room temperature by heating and then cooling quickly. Iron mandrels were used by the instrument maker for shaping and forming the components. Each component of the finished instrument had its specific mandrel; long, parallel or tapered ones for forming the tubes, shorter, wider ones for the ferrules, and a large specially shaped one for the bell. Long tapered tubes are made by wrapping the sheet metal by hand tightly around a rod of exactly the internal diameter required. The edges of the metal are rubbed down with a burnisher so as to be exactly aligned. The width of the metal sheet must be very accurately calculated so that the edges just touch each other when wrapped around the mandrel.

Non-ferrous metals like brass and silver are usually joined by soldering. Solders are alloys of two or more metals which together have a lower melting-point than the metals to be joined. Two basic types of solder were used: a hard solder of high melting-point for making the seams of all the components, and a soft solder of low melting-point for joining some

components together.³⁰ The solder is mixed with a flux, to help it flow when molten, and applied to the seam. The component is then heated over a bed of charcoal until the solder flows into the seam. The cleanness of the edges, the closeness of the fit, and the degree and distribution of heat are all critical factors in making a satisfactory solder join. Perhaps the finest example of the solderer's art on a musical instrument can be seen on the flawless toothed bell seam of a trombone by Georg Ehe, of 1619.³¹ After the soldering is done the tube is rammed back onto the mandrel and smoothed out by burnishing and filing. During the eighteenth century a mechanical method was devised for drawing the tubes by means of a winch through a die of the correct outside diameter.

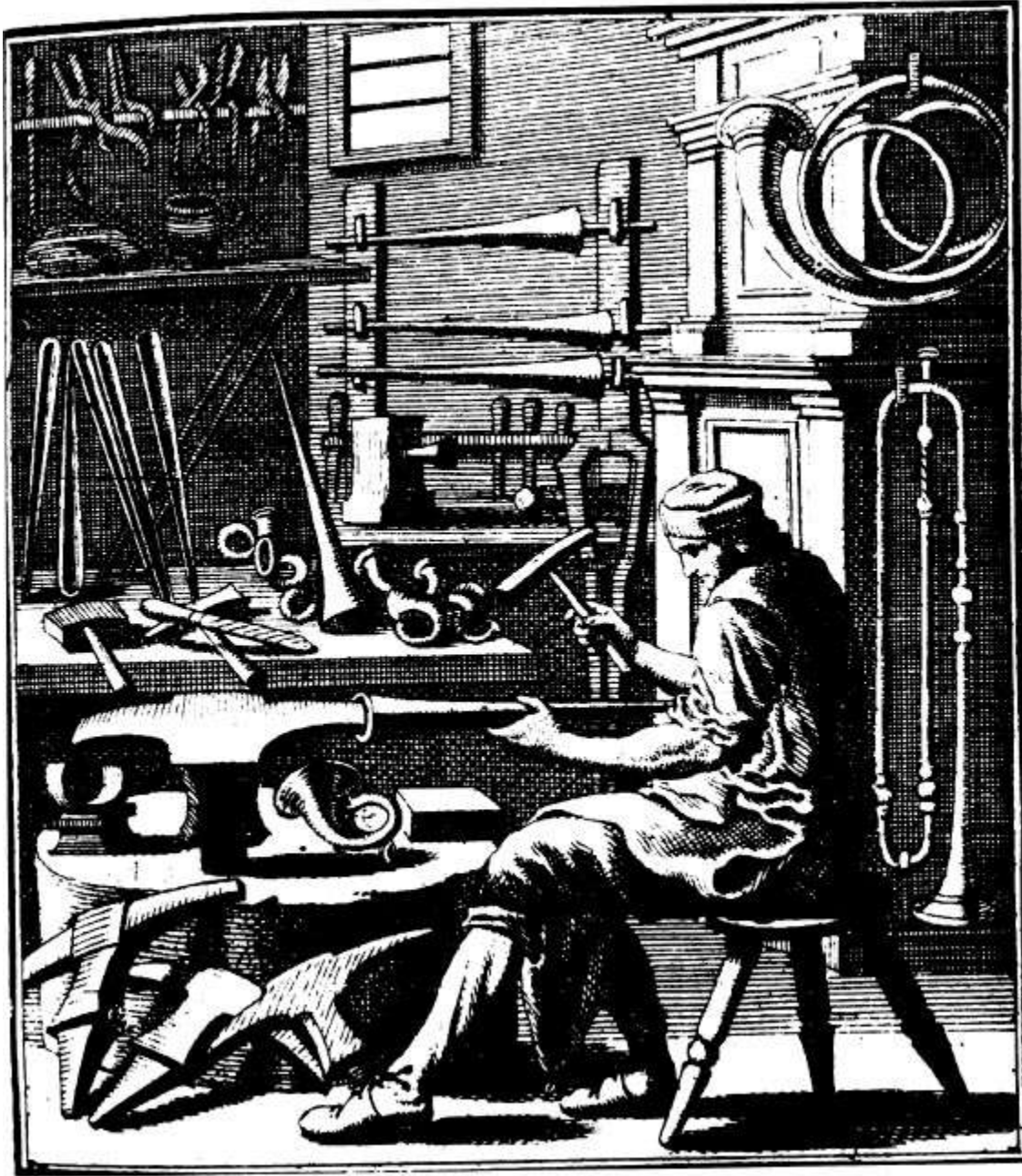


Figure 5 The trumpet-maker's workshop illustrated by Christoph Weigel (1654–1725) in *Abbildung der gemein nützlichen Hauptstände* (Regensburg, 1698). This illustration appears frequently in discussions of tools and techniques, but it is rightly criticised for its lack of reliability. If the trumpet and horn hanging on the wall behind the craftsman are so unlike contemporary instruments, it follows that the tools and techniques illustrated must also be treated cautiously. The artists who rendered such illustrations were rarely specialists in their subject-matter, so it is not feasible to reconstruct the minutiae of early technique from such sources alone.

Some instruments require at least two bows, each of which turns the tubes through 180°, and others require long, continuous curves of shallower

radius. In addition, a wide range of coiled crooks and tuning pieces completes an instrument's kit of parts. The only way to bend a thin-walled tube without collapse is to fill it with a resistant but relatively flexible substance, so it bends as if it were a solid rod. Pitch or lead were traditionally employed for this. In either case the filling material is melted in a container over a fire and poured into the tube, ensuring that no air bubbles are present. Once cool, the tube is bent by hand around a suitable form, ensuring that the seam lies on the side so that it is neither compressed, nor stretched. The occasional wrinkles that form on the inner side of the bend are tapped down with a small hammer and then burnished, although they are very often visible on finished instruments of even the highest quality. The filling material is melted out once the bow is finished.

The bell of a brass instrument is a compound shape; it cannot be formed simply by wrapping a flat sheet. This will form only a cone, so the metal must be further worked into shape by hammering, burnishing, or spinning. For this reason the seam cannot be a simple butt join like those of the parallel tubes; energetic working of the shape would cause the seam to burst open. Bell seams are therefore always tabbed. The sheet metal is cut in such a way that a toothed overlap is formed, giving a secure join that can stand mechanical stress. The shape of the sheet metal pattern is dictated by the final shape of the bell and the amount of working necessary to get it there.

Once the bell seam has been soldered the resultant distorted cone is ready for forming. Hammering on an anvil was traditionally employed for spreading the metal into the shape of a flared bell, but in the eighteenth century spinning came to be applied, where the bell is formed by pressing hard upon it while it is rotating. In both cases a mandrel of the exact inside shape of the bell is required. Mandrels were turned on a lathe from soft iron, and then case-hardened to give a resistant surface. Once the shape of the bell is roughly established by hammering, it is forced over the mandrel and burnished by rubbing with a heavy steel rod. This has the effect of pressing the metal closely in contact with the mandrel and thus establishing its shape very accurately. In this way very reproducible results are assured. During the process of hammering and burnishing the metal at the end of the bell becomes thinned. The resultant thickness depends upon the original shape of the template: a more economical template means that more thinning of the bell is required to bring it to the correct size. The role of metal thickness in tone formation and timbre of early brass instruments has

been the subject of some debate, but no systematic study has yet been undertaken.

As the edge of the bell is very thin it is supported by a garland, a conical or flared structure of sheet metal which is fitted tightly over it. The garland has no intended acoustic function – it is purely protective – although it does, of course, almost double the thickness of the end of the bell. It provides a wide surface for engraved decorations, and the maker's name and location, and also carries cast or embossed motifs as the occasion demands. A bezel of half-round wire with punched designs usually strengthens the outer edge. In later eighteenth-century instruments the edge of the garland is wrapped over a concealed round wire. On almost all trumpets, but rarely on trombones, a hollow ball made of two joined hemispheres or a casting decorates the bell about half-way up. It is purely decorative but is perhaps sciamorphic; it may once have been a handhold, or a thickened section supporting a joint. The latter is certainly the case on Tibetan instruments where the balls mark telescoping sections, and on Moroccan ones where more rudimentary balls mark the sections which dismantle. On English instruments the ball is often very large and elaborate, with the mouthpipe sometimes passing through a hole in it.

The components of brass instruments were traditionally held together by friction, probably to allow for substitution of parts during repair. Joints are usually formed by flaring one component outwards and pinching the other inwards so that an overlap joint results. Most joints of this kind have a taper of roughly the same gradient as a mouthpiece receiver so that friction alone will hold them together, but others show smooth-fitting parallel joints which may have been coated with wax or resin to assure rigidity. The outer portion of these overlapped joints is strengthened by an added sleeve, variously called a garnish or a ferrule, which doubles the thickness at this place of weakness and lends itself to a variety of decoration. Various strategies have been employed to hold thin, friction-fitted metal components together firmly, including cord bindings, loose-fitting stays with tight packings, twisted wires and later soldered joints. The main thrust seems always to have been the provision of adequate support without the need for complicated dismantling when required. This is probably related to the comparative technical difficulty before the nineteenth century of reversing soldered joints for convenient cleaning, repair and alteration of individual components.

Metals were traditionally finished by hand-polishing using progressively finer grades of a variety of abrasives until a shine resulted.³² The use of a steel burnisher in forming the pieces prior to polishing results in a very characteristic longitudinal appearance to hand-finished components, although some pieces were rotated in a lathe for more efficient and even finishing. It was not until well into the nineteenth century that rotary mechanical polishers giving a bland and non-directional finish were employed.

Wooden instrument construction

For completeness this section deals briefly with the cornett and serpent, both of which are vented instruments of wood. These two instruments are curved, and it is therefore not possible to produce them on the lathe with tapered reamers as is traditional with the instruments of the woodwind family. (The straight cornett is an exception). It is necessary to carve the bore of the instrument in two halves which are then joined together. Curved bores have been produced in ivory without the necessity of splitting, but this is highly laborious and time-consuming.³³ For wooden instruments dense, fine-grained hardwoods which carve well are chosen, and fruit woods like pear and apple seem to be particularly favoured. For the cornett, the projected bore of the instrument is drawn mirror-imaged on two pieces of wood with very flat, smooth surfaces. The half bores are then rough carved to a little under the required dimensions, and then gradually opened out while repeatedly checking them against semicircular templates. Once the two halves are satisfactorily worked, the positions of the finger holes are marked on one half and drilled through. Again, this is done undersize and slowly worked out to the correct diameter. Some undercutting of the holes can be done from the inside at this stage. The two halves are then joined with glue, and the outer surface is afterwards carved to shape, often octagonal in form. As earlier organic adhesives were susceptible to failure, especially in damp conditions, additional precautions were taken; on some instruments grooves were cut into the outside at each end and in the middle, and string or wire was wrapped around. The instrument was then covered with leather as an added protection for the joint. On others, small metal caps

were fitted over the ends, and these were often decorated by engraving and other designs.³⁴

Although the bore of the serpent is similar to that of the cornett, its width and the comparative thinness of its walls dictate different construction methods. The entire length of the bore is composed of carved sections of wood glued together in such a way as to overlap each other from side to side rather in the manner of brickwork.³⁵ Once the shape is established and the vent holes are drilled, an additional strengthening with wire or string is followed by a covering of thin leather glued in place. The finger holes of some serpents have turned bushings of ivory which rise slightly above the surrounding surface, making the very large holes easier to cover efficiently. Metal keywork was added to later serpents along the same pattern as that used on woodwinds.

Brass instruments in art music in the Middle Ages

Keith Polk

The role of brass instruments in the Middle Ages, especially in the earlier Middle Ages, remains murky. No music survives and the scant remnants of instruments allow only the most fragmentary notions of what the actual structure and shapes of trumpets and horns of the time might have been. Literary and theoretical sources seldom mention brass instruments, and few pictures illustrate them. Only towards the end of the medieval era do the sources, especially pay records and iconography, provide more ample evidence.

What is clear, however, is that, throughout the time span, brass instruments maintained their associations with ritual and function. High ceremonies demanded the blare of trumpets, and armies, too, evidently continued the Roman tradition of communication and signalling by means of horns and trumpets of various types. These ritualistic legacies evidently laid the base for new directions which became evident in the fifteenth century, as various types of brass instruments became clearly associated with art music for the first time. It is the transition to participation in art music which marks a clear differentiation between the instrumental practice of the ancient world and that of the early modern era. This transition will provide the underlying theme to what follows.

Earlier Middle Ages

From the time of the break-up of the Roman Empire to the early fourteenth century the most telling transformations among brass instruments were

those concerning trumpets. Horns of diverse kinds continued in use, although the details of their developments are very obscure and the use of early horns in any case seems to have had lesser impact on later medieval traditions.

As the face of Europe changed in the centuries following the waning of Roman influence, trumpets seem to have almost (but not quite) vanished from view. They were infrequently mentioned or pictured, at any rate, in surviving documents, especially those from the ninth, tenth and eleventh centuries. This evident decline in their use was undoubtedly tied to changes in society. Large-scale centralised authority had passed from the scene, and with it must have disappeared many of the ritual functions which called for performers. Armies also changed, and while it is quite clear that Roman military tactics incorporated trumpets as an essential element, the place of such instruments in later military units is less clear.



Figure 6 Two shawms with slide trumpet (Brussels, Bibliothèque royale, MS 14967, c.1420–30).

From just before 1100, however, trumpets begin to appear again – and with increasing frequency, especially after the time of the first Crusade (1096–99). The possible link between these events has led to one of two apparently contradictory views of the history of the trumpet. One view of trumpet history emphasises the influence of Muslim culture, and the other, in reaction, argues for the primacy of residual European traditions.

The notion of the primacy of Muslim culture can claim a venerable tradition which reaches back to the early years of the twentieth century. H. G. Farmer, Francis Galpin and Curt Sachs were among the early historians who called our attention to eastern influences.¹ Edmond Bowles and Edward Tarr have subsequently added further refinements to the argument.² This view holds that the sudden and dramatic increase in references to trumpets which began simultaneously with the Crusades was stimulated by contacts with the East. Certainly, Europeans who witnessed the events wrote of the use of instruments in the Muslim armies as something novel. The manner of the detailed description leaves no doubt as to the deep impressions made, as, for example, the well-known instance of the horses of Christian knights that were so terrified by the awesome sounds of the enemy's musicians that the animals had to have their ears and eyes covered to keep them under control. Moreover, the debt to the East is specifically acknowledged in terminology, as with instances of instruments referred to '*cors sarrazinois*'.

Don L. Smithers has recently attacked this view. He has argued that Roman traditions, as carried on in early medieval Europe, never died out.³ Moreover, according to Smithers, the Muslims themselves may well have been influenced by Roman and post-Roman traditions. His discussion is, in fact, especially extensive in its treatment of brass instruments in ancient civilisations, and concerning the possible influence of Roman practices in the Near East in the earlier Middle Ages. Concerning the crucial period, between about 1000 and 1150, however, Smithers offers little new evidence, and in fact makes no attempt to refute the accounts of eyewitnesses which make it clear that those on the scene were certainly deeply impressed by what they heard from the Muslim side. A more conciliatory argument has been offered by Anthony Baines. Citing the fragmentary evidence from the tenth and eleventh centuries, Baines observes that what

had probably occurred was a genuine resurrection of the Roman *tuba* by the proud and prosperous free cities of North Italy ... Meanwhile the Arabs ... had almost certainly found their way to trumpets during the same period ... But the fully-evolved Moslem trumpet was not a simple copy of anything within the Western sphere, nor of an earlier Sassanian trumpet ... but a product of subsequent Persian brass technology.⁴

There may, in fact, be no basic contradiction in the two views. The evidence, though meagre, would indicate that European players were still playing some kinds of trumpets in the tenth and eleventh centuries. Contact

with the East, especially stimulated by the Crusades, however, appears to have introduced a new kind of instrument by about 1100, a long, cylindrical trumpet with a small, flaring bell. This trumpet 'set the style for the western trumpet for the remainder of the Middle Ages'.⁵

1100–1350

From about 1100 onward the trumpet assumed an unquestionable central role in ritual music in Europe, becoming on the one hand a virtual aural trademark of high station, and on the other an essential component of any large-scale military operation. This is not to say that brass instruments were yet incorporated into art music. Indeed, it would appear that the world of the trumpeter and that of the singer (to take an example) rarely came in direct contact. Still, brass instruments and performance practices evolved in ways which ultimately allowed them to become more flexible in their musical capacities.

One kind of trumpet dominated (the long, straight instrument, made in two or three sections with a small, flaring bell). Among the ways in which the instrument could appear, three usages may be distinguished.

Firstly, trumpets could be played, most characteristically, in pairs, without the companionship of other instruments. Iconographical sources show trumpets used in this way particularly to emphasise the stature of a monarch or similar noble figure. This would often be at such state occasions as banquets. Archival sources are quite inconsistently preserved from this period, but those available show that a pair of trumpeters were regularly included in the households of the highest aristocracy probably by about 1200, and certainly by 1300. Monarchs evidently made some attempt to restrict the privilege of maintaining trumpets to their own élite circles, but with little success. Italian city states, at any rate, were quick to imitate the fashion. Bologna, for example, regularly maintained at least two trumpeters from 1250 onwards.⁶

A second way the trumpet could appear was in the company of small kettledrums, the so-called 'nakers'. This usage clearly followed Muslim models.⁷ Two (or more) trumpets combined with nakers were evidently more geared to outdoor events such as tournaments and processions, and, of

course, to warfare. As we shall see, these relatively small combinations were the foundation of the much expanded trumpet/kettledrum ensembles of the Renaissance and Baroque eras.

Thirdly, the trumpet could appear within small groups which incorporated shawms. Details of this combination in the twelfth and thirteenth centuries are obscure, although here, too, there is a suggestion of a link with the Near East.⁸ This mixed ensemble is rarely shown in iconographical sources, and archival documents are often ambiguous as to its make-up. The musical forces of the city of Pisa in 1324, for example, comprised a shawm, a player of *nakers*, and two pairs of trumpets.⁹ Baines has suggested that the performances of these thirteenth- and early fourteenth-century combinations sounded much like those found in the Near East, in which the shawms' elaborate, figural melodies are accompanied by monotone punctuations from the trumpets in a kind of crude heterophony.¹⁰ This combination of trumpets with woodwinds appears to have lost favour soon after 1300, though an analogous combination, this time involving a brass instrument with a slide, reappeared about a century later.

The long trumpet was not the only trumpet-like instrument of this era. There was a shorter trumpet also in use, and certainly by the thirteenth century players were performing on two distinct instruments, one designated by such terms as *buisine* or *cor sarrazinois* which referred to trumpets (i.e. probably the long instruments), the other a *clairon* (or *clarioune* or something similar, probably the short variety). Terminology, however, is ambiguous and provides little foundation for firm conclusions. One thing which can be said is that the shorter instruments were often of less elaborate, and less expensive, construction, and were the ones most likely to be placed, for example, in the hands of civic watchmen on the towers of medieval cities. Horn-type instruments continued to be illustrated and, even if infrequent, the concept of very short, sharply conical instruments prevailed. As with the earlier Middle Ages, however, these instruments continued to have little contact with art music.

1350–1500

From the mid fourteenth century onward the situation concerning brass instruments changes dramatically. Archival documents survive in far greater numbers, with thousands of payroll records, for example, detailing the presence of performers. Iconographical sources, too, become more numerous, and appear to be quite realistic in the instruments and instrumental combinations they depict. Theorists also begin to be much more specific and knowledgeable in their comments on instruments. Much of this more ample material, to be sure, is weakened by a critical lack of direct evidence (almost no instruments survive, and because professional musicians never performed from written music, surviving music is extremely scanty). Still, by patching together surviving material, we can be more sure of instrumental practices than was the case for previous eras. Another dramatic change concerned the nature of instrumental music itself, with the participation of brass instruments in art music accelerating at a breathtaking pace. The role of players on brass instruments limited them almost exclusively to ritual and ceremony as late as the closing decades of the fourteenth century, yet by 1500 these musicians took part in the highest art music, performing in the company of the finest singers and composers, before kings, emperors and popes.

Late medieval developments followed two main tracks, both of which carried on previous traditions. The first concerned the evolution of the trumpet ensemble, the second the incorporation of brass instruments into the professional wind ensemble.

The trumpet 'ensemble' of about 1350 was, apparently, fundamentally a pair of long, straight trumpets. Two seemed to have been the desirable minimum, at any rate, at courts of higher nobles, such as the Holy Roman Emperor and the Duke of Burgundy. Of course one trumpet was sufficient in some circumstances to establish royal presence, and on appropriate occasions more instruments could come together to reinforce the effect. And the 'effect' moves to centre stage more and more visibly from the late fourteenth century onward, as the establishment of image became a preoccupation of those of the highest stature – or those who aspired to such stature. We should keep in mind in this regard how unstable were the power relationships of the higher nobility. The Duchy of Burgundy rose from obscurity to a position of immense influence in the last two decades of the fourteenth century, and its independent power and eminence vanished at a stroke with the death of Charles the Bold in 1477. The Habsburgs emerged

from one more or less equal family among a snarling pack of German houses in the early decades of the fifteenth century, to domination of the world scene by 1520. In such a precarious world, symbols of stability, dignity and power were highly desirable.

A technological advance occurred at precisely this time, with metal workers perfecting their skills at bending brass tubing, thus making trumpets more stable and sturdy. Iconography shows that instruments were available fabricated in 'S' shapes by the late fourteenth century, and in the standard 'folded' form by shortly after 1400.¹¹ Once the bent forms were developed they soon took over. Straight instruments continued to be made, but for most purposes players preferred the portability and control afforded by the newer shapes.

Ensembles of trumpets expanded in size. By about 1420 five or six trumpets could be included under noble patronage, and the augmentation continued throughout the century – to as many as ten or twelve regularly maintained players.¹² Even more could be assembled for high state ceremonies, but, at the same time, under certain conditions one or two trumpeters could function to reinforce regal image.

Musically, in the longer term, the most important advance was that within the large ensembles some players began to specialise in the upper register. Musical sources from the early fifteenth century show the imitation of trumpet calls, with quotations of signals which are fully triadic. These show that by about 1430 some trumpet players were playing up to the eighth harmonic. An observer who heard the trumpet players of the Duke of Saxony in 1474 was astonished that they could play 'higher than one could imagine possible'.¹³ This wording suggests that these players were playing even higher than the eighth harmonic, probably at least to the twelfth partial. That is, the foundation for the *clarino* playing of the Baroque was laid in the mid to late fifteenth century. No sources of actual trumpet music survive, but terms seem to have been introduced (or, more accurately, transformed) precisely to account for new distinctions within ensembles. The term 'field trumpet', probably for the lower instruments, appears for the first time, and such terms as *claretten stimmen* seem to be attempting to characterise the more elaborate high parts.

Contemporary observers left varied records of the beginning of the entry of trumpets into more purely musical repertoires. On exceptional occasions, trumpets were admitted into some church ceremonies, but their role was

apparently restricted to providing festive fanfares. Archival and iconographical records, at any rate, show that wind players (including those on trumpets, trombones and shawms) did not perform with singers until late in the fifteenth century. A group of mass movements from early in the fifteenth century do quote trumpet calls. Theorists, however, discuss the mimicking by singers of non-vocal sounds such as those of trumpets.¹⁴ In short, the evidence now available would indicate that the ‘trumpet’ parts in these sacred pieces were probably sung, and that the regular participation of players of brass instruments in the liturgy came only several decades later. The pieces are none the less significant, for they convey some echoes of the advanced capabilities of early fifteenth-century trumpeters. Concerning secular repertory, however, evidence is more solid. Members of the court of Burgundy danced to ‘chansons’ played by trumpets in Ypres in 1393, and the ‘high register’ trumpet players referred to in 1474 were also performing for dancing.¹⁵ In 1454 a trumpeter in Stuttgart played ‘chansons a sa trompette’ before the visiting party from the court of Burgundy, and some hint of the repertory comes from the report of the tower trumpets of the city of Frankfurt in 1478, who performed the tune ‘In Gottes Namen fahren wir’.¹⁶ Indications of increasing musical sophistication are seen in such records as those in Basle which state that the city council expected the watchmen on the towers of St Martin’s church to perform ‘in two-part harmony’ in 1497.¹⁷ Regardless of such intimations, however, most trumpeters on most occasions were probably preoccupied with ceremonial, not musical, effects. About 1460, the theorist Paulus Paulirinus of Prague suggested that singers could imitate the trumpet with a raucous voice ‘like *tubae gallicanae* though without making discords and cacophony’ – hardly a flattering allusion to the musical qualities of the instrument.¹⁸

The second major line of development for brass instruments in the closing years of the Middle Ages concerned their incorporation into the shawm ensemble. Double-reed shawms themselves appear to have set off in a new direction about 1350. The group moved away from ceremonial to more musical duties, which included providing ‘chansons’ for banquets and dancing. By the second half of the fourteenth century, shawms appear to have been playing in at least two parts consistently, for a new instrument, the bombard, was developed to play the lower tenor part. That the phenomenon was indeed new (and thus a departure from any previous tradition) was underlined by contemporary terminology, which emphasised

the arrival of instruments in 'the new mode'. The fashion made rapid headway, demanding that musicians quickly assimilate new playing techniques. In about 1360 Tielmann Ehn von Wolfhagen observed:

The manner of shawm playing, which was previously not so good, has been changed and improved. Thus, one who was considered a good player in this area just five or six years ago is considered worthless now.¹⁹

During the mid fourteenth-century phase, shawms appear to have dropped their association with trumpets. Most references to the ensemble at this time mention only shawms (or shawms and bombards), and allusions to the presence of a brass instrument are rare. In fact, as the next important change occurred (between about 1375 and 1400), with the addition of an instrument to play a third part, the contratenor, the first choice seems to have been a bagpipe, rather than anything trumpet-like. This was apparently because the demand was for an instrument which could match the musical capabilities of shawms. At this time, the trumpet was played exclusively in its lowest register and was capable of only two or three notes, and was judged inadequate. Still, the bagpipe in its turn was evidently not satisfactory, probably because of its inability to match the articulation of shawms. Consequently, the need became pressing for an instrument which could serve effectively as the contratenor in the wind ensemble. This need appears to have stimulated musicians, instrument makers and metal workers to seek improvements to brass instruments. By the early fifteenth century, these efforts led to the development of the slide mechanism. Concurrently, an instrument equipped with a slide was incorporated into the shawm ensemble, resulting in a kind of standard three-part grouping of shawm, bombard and an early form of the trombone.

While these general outlines are widely accepted, scholars have engaged in a good deal of contentious debate about detail. A commonly accepted view is that the earliest instruments involved a single section of sliding tubing, which was placed immediately after the mouthpiece. This was apparently added first to instruments of an 'S' shape, then subsequently to instruments in the 'folded' shape of the modern trumpet. (Both of these forms have been described as 'slide trumpets'.) According to this line of thought, the doubled slide mechanism (that of the modern trombone) developed later, some time in the second half of the fifteenth century. Peter Downey offered an alternative view, suggesting that the single slide was not used in this era, and that the earliest slides involved the doubled type from

the very beginning.²⁰ Much of Downey's thesis was based on practical considerations, which were countered by Ross Duffin and Herbert Myers, both of whom argue that the 'slide trumpet' was indeed capable of meeting the demands that apparently stimulated its creation.²¹ Furthermore, hundreds of illustrations from contemporary iconographical sources show instruments which must have been equipped with slides and which were shown performing with shawms, instruments which could only have been slide trumpets. The weight of the evidence at this time would favour the single slide argument.

Another subject of controversy is the possible date of inception of the slide instrument. The engagement of Evrard Janson as a player of the 'trompette des menestrels' in 1422 (apparently a slide trumpet, as he was distinctly set apart from the players of 'trompettes de guerre') has long been emphasised as one of the earliest explicit accounts available. Some scholars have dated it earlier than 1422, even as early as about 1380.²² Such dating has met with scepticism, but it does now appear that a slide mechanism was probably developed between about 1400 and 1410, and that it was finding reasonably wide acceptance between 1410 and 1420.

One further dispute concerns the possible place of origin of the slide. The instrument, once developed, seems to have been adopted quickly, especially within ensembles in courtly circles in the orbit of Burgundy and France. As early as 1411 the court of Burgundy seems to have engaged a player designated as a 'trompette et menestrel' who was associated with the shawms, thus probably a player of slide trumpet. Soon thereafter similar players appear in other courts, including those of the Count of Hainaut (1417), the Count of Savoy and the kings of Aragon and France (all in 1418). Slightly earlier there are strong hints that some kind of slide instrument may have been in use in the Hanseatic regions centred around Cologne, extending perhaps to the cities of Flanders. Several references beginning about 1390 in Deventer suggest that a slide trumpet may have been performing with civic shawm players. The civic ensemble in that city was termed an ensemble of 'pipers' in 1402; in 1404 this same group, as an ensemble, consisted of two shawms and a 'trumper' (*sic*), suggesting (though the terminology is hardly conclusive) that this may have been a combination of shawms with slide trumpet. The ensemble of the Bishop of Utrecht visited Deventer in 1409, and consisted apparently of three shawms and a 'trumpet', also presumably a slide instrument.²³ Abraham Maillet was

engaged in Lille in 1408 as a civic ‘minstrel’ (*menestrel*) without any designation as to his instrument, although in subsequent documents he was clearly a player of ‘trompette’ who performed with the civic shawm players.²⁴ In short, after about 1400 similar indications become increasingly frequent in the Cologne-Flanders area in such localities as Deventer, Lille, Tournai, Ypres, Zutphen and Zwolle. Evidence allows only tentative conclusions, but the slide instrument seems mostly likely to have been developed in this region.

Once the ensemble added a slide instrument, subsequent progress was evidently quite rapid, and the group became the leading professional ensemble for much ceremonial art music of the fifteenth century. By about 1450, the group was often expanded to four members with the addition of a second shawm, and by c.1475, another slide instrument (a second one in the contratenor range) was frequently added. Ensembles of larger courts and cities included six parts by 1500, with the addition of another tenor reed instrument. Further expansion followed, but until well into the sixteenth century the favoured instrument for the lower parts continued to be the trombone (by then consistently in its more modern form with a double slide).

As the mixed wind ensemble made its mark in art music, the demands on the slide trumpet player/trombonist were evidently considerable. This player was often paid more, at any rate, and was the one most likely to be distinguished by such special terms as ‘master’. By special techniques of ‘lipping’, the slide trumpeters could command a complete diatonic range from perhaps as low as A, and also the most important chromatic inflections required for alterations such as those needed at cadence points. (Absolute ranges are difficult to establish, and it does appear that wind players frequently, if not traditionally, played at higher than written pitches.) With the development of the double slide, of course, the complete chromatic range became available. True bass trombones, however, were not put into use until much later, well into the sixteenth century.

Verification of the musical capabilities of fifteenth-century players is provided by the manuscript collection of the Italian player Zorzi Trombetta. Early in his career Zorzi was a trumpet and slide trumpet player serving on one of the Venetian galleys that journeyed regularly to England and Flanders. In the mid 1440s, while on his journeys north, he jotted down some of the pieces he had heard there, and added some attempts at

counterpoint to go with some of the melodic tenor lines.²⁵ This collection is a precious document, for Zorzi's jottings reveal not only that he was musically literate, but that he had learned the basic rules of counterpoint. Furthermore, we can probably assume that he was setting down the contratenors for his own use – that is, to be played by himself on a slide instrument. Thus these parts reveal that the instrument was, in fact, capable of a full diatonic scale. Zorzi's additions were intended as contratenors, verifying the later comments by Tinctoris that the trombone played the contratenor and low contratenor parts within the wind ensembles.²⁶

The next manuscript that can be linked to contemporary brass players is the Casanatense manuscript, which Lewis Lockwood has dated about 1480, from the court of Ferrara.²⁷ As Lockwood points out, the repertory of the manuscript appears to represent that of the fine shawm ensemble there, which included, among others, Michel Schubinger of Augsburg. The collection demonstrates that professional wind players by 1480 were fully conversant with contemporary styles as established by the leading composers of the time (including Ockeghem, Busnois, Agricola, Martini, and even Obrecht and Josquin, who were just arriving on the scene). At about this time Michel's brother, Augustein Schubinger, also spent some time in Ferrara, but soon moved on to the position of trombonist in the civic ensemble of Florence.²⁸ A contemporary Florentine collection (held in the Biblioteca Nazionale Centrale, Florence) contains a repertory which is conspicuous in its parallels to the Casanatense manuscript. This set (Banco Rari 229, known as 'Florence 229') in turn includes three pieces which appear in the earlier Glogauer Liederbuch and which seem to insinuate some connection to a more local instrumental practice.²⁹ Thus their inclusion in Florence 229 may reflect the presence of German instrumentalists. This is not to say that the Florence manuscript was assembled by wind players, but it does seem to be the case that the outstanding shawm and trombone performers in Italy were participating in performances of the premier secular repertory of the time, and interacting in the most refined of musical circles. Moreover, in the Low Countries at this same time, wind players were evidently also participating in the sacred repertory. Contracts for civic bands from the region specified performance of both sacred and secular pieces, and by about 1500 trombonists there were noted as taking part with singers in performances of liturgical music. Indeed, when the choir of Philip the Fair, which included such outstanding

composers as Pierre de la Rue and Alexander Agricola, was heard, it was the playing of Augustein Schubinger (who had moved north after the death of Lorenzo the Magnificent) which was singled out for praise.³⁰

So far, this discussion has emphasised two instruments, the trumpet and the slide instrument (whether slide trumpet or trombone). Towards the end of the fifteenth century, however, wind bands began to expand their performance options. One 'brass' instrument that rose quickly to a leading role was the cornett – indeed, this was the instrument that Augustein Schubinger seems to have preferred after about 1500. It was on this instrument that he attracted lavish comments in performances with the singers of Philip the Fair. The cornett, however, reached its peak later in the sixteenth century, and will be covered elsewhere in this volume.

In summary, early in the fifteenth century, the wind band provided music for ceremonial and festive occasions, especially for dancing, for processions, and for banquets. Wind players were still distinctly set apart as loud minstrels, and they rarely appeared at the same time as performers of soft instruments – and never with singers. The repertory consisted of dance tunes, items of a more local character, and many pieces from the international secular repertory. By shortly after 1450 we have increasing evidence that trombone and shawm players were widening their interactions with art music. By about 1475 the leading professional instrumentalists were familiar with the dominant current styles, and were performing the best pieces by the finest composers. At the same time trombone and shawm players were more consistently including sacred items in their repertory, and within a decade or two were more routinely appearing with singers.

Performance techniques reflected a similar pattern of increasing sophistication. In the first decade of the fifteenth century players were being identified by function, as performers of soprano (shawm), tenor (bombard), or contratenor (slide trumpet, then trombone). Musical and theoretical sources suggest that their techniques were still rather primitive, largely improvisatory and often based on borrowed melodies which were usually placed in the tenor and surrounded by matching counterpoint. By 1450 the counterpoint had become more complex, especially for the performer of the contratenor. Indeed, sources show that shortly after the middle of the century trombone and shawm players were capable of performing in a variety of contrapuntal styles, and that demands on their memory capacity was considerable. That is, their 'unwritten' performances were probably a

mixture of improvisations based on secular and sacred borrowed tenors and melodies, and of repertories of composed pieces, sacred and secular, in the most demanding styles of the day. The transformation of wind players, and especially of trombonists, is verified by the career of Tielman Susato in Flanders. This pre-eminent publisher, editor and composer began his career as the trombonist in the civic ensemble of Antwerp. Once restricted to the marginal role of ritual, these musicians were now assuming a central role in the art music of their time.

The cornett

Bruce Dickey

The name ‘cornett’ refers to a family of lip-vibrated finger-hole horns in widespread use from the late fifteenth century to the early nineteenth. Cornetts were made in many forms: they could be either curved or straight, wooden or ivory, covered with leather or left plain, and of either round or octagonal cross-section. However, the dominant form by far, at least from the mid sixteenth century on, was curved, wooden and leather-covered.

The cornett enjoyed a development that was unparalleled both in its rapid ascent and in its subsequent profound decline. No western musical instrument of comparable importance has ever emerged so rapidly from obscurity or plunged into such total eclipse. Though many details of this development remain obscure, the broad sweep of the curve is becoming clear as the modern revival of the cornett, begun in the early 1950s, again focuses interest and scholarship on this instrument, once regarded as, ‘the most excellent of all the wind instruments’.

Early history: ‘Trumpys, taborns and cornettys crye’¹

The curved form of the cornett, as well as the Latin-derived forms of its name (Latin: *cornu*; Italian: *cornetto*; French: *cornet à bouquin*; English: cornett),² clearly link this instrument to an ancestry among the lip-vibrated animal horns widely used since ancient times for signalling. Two important developments were necessary, however, to turn animal horns prepared for blowing, capable of only one or two notes, into musical instruments useful

in cultivated music: finger holes had to be added and the bore of the instrument needed to be narrow enough to permit overblowing. These developments appear to have occurred gradually between the eleventh and fifteenth centuries and undoubtedly culminated in a period of experimentation during which the delicate balance of dimensions was sought which would bring into being a fully functioning cornett. The archival and iconographic record leaves little doubt that this balance was achieved in the middle of the fifteenth century, and from that time onward the instrument experienced an astonishing growth in popularity.

The first depictions of animal horns with finger holes appear in the eleventh century.³ Most of these are psalter illustrations depicting King David flanked by four musicians. The imagery goes back to a commentary on the psalms from the fourth century⁴ and is frequently encountered in medieval iconography. Here King David is surrounded by his four subordinate Levite musicians. One of them (usually Ethan when names are provided) is often portrayed playing an animal horn in illustrations prior to the year 1000, and a horn with finger holes in later ones. Presumably, such a marked change in an established iconography was stimulated by a change in the instruments with which the artists were familiar. Although we can only guess at what music such instruments might have played, evidence for their existence beginning in the eleventh century is persuasive. By the twelfth century some illustrations clearly show the characteristic six- or eight-sided form of the later instrument and a narrow bore profile suggesting that they were constructed of wood or ivory.⁵

Virtually simultaneous with the emergence in medieval iconography of animal horns with finger holes is the appearance of straight, lip-vibrated finger-hole instruments.⁶ The latter appear in a series of miniatures, mostly from the Rhineland, southern Germany and Austria, and share a distinctive morphology: they are relatively short, clearly conical, straight, wooden instruments, almost invariably exhibiting a carved animal's head at the bell end. The origin of these instruments is obscure, though the presence of animal heads has led some to hypothesise a Celtic influence.⁷ Whatever their origin they are almost certainly the precursors of the straight cornetts found with relative frequency in fifteenth- and early sixteenth-century illustrations, particularly in Germany.

The fifteenth century: ‘bon à oyr avoecq les chantres’⁸

In the course of the fifteenth century the cornett made a decisive move from the musical periphery to become, by the first decades of the sixteenth century, a serious rival to the soprano shawm as the most favoured soprano wind instrument. This move occurred first within the fifteenth-century wind band, the so-called *alta cappella*, an ensemble typically composed of two shawms and a slide trumpet or trombone. The exact moment at which cornetts entered this group is difficult to determine because of ambiguities both in the iconographical evidence and the terminology relating to wind players. The normal term for wind players was a form of the word ‘piper’ (*piffaro* in Italy, *Pfeifer* in Germany), and referred to whatever instrument the ‘pipers’ played – thus to both shawm and cornett.

Some time after 1450, however, shawm players (or trombonists) began doubling on the cornett, and eventually some of them came to be singled out for their cornett playing – they became the first virtuosi of the new instrument. This development is aptly reflected in the career of one of the seminal figures of the period, Augustein Schubinger, a player who has been called ‘the first international virtuoso of the Zinck’.⁹ When Augustein’s name first appears in the 1470s he is described simply as a ‘Pfeifer’, later as a trombonist, and finally, on a series of occasions from 1501 to 1506, as a cornett player. He was apparently a cornett player of astonishing capabilities, for he is mentioned time and again by contemporary observers and travelled as far as the Low Countries and Spain while in the service of the Imperial court. The extraordinary thing about the reports of his playing, however, is that they show the cornett being used, not in the loud wind ensemble, but, pointedly foreshadowing the instrument’s future function, as a solo instrument with singers in a liturgical setting.

Augustein was not the only cornett player mentioned in connection with such performances, but he was the most celebrated player of his age and undoubtedly at the forefront of the changes taking place in the wind ensemble. The rigid medieval division of loud and soft instruments was rapidly breaking down as the century drew to a close. This increased flexibility of instrumentation coincided with a period of extraordinary creativity in instrumental music, nourished, we may imagine, by a lively

exchange between south German players, much in demand in Italy, and north Italian instrument builders. One of the most significant results of this process was the explosive emergence of the cornett.

In the sixteenth century, Venetian cornett makers were widely considered to be the best and it has been speculated that it was in Venice, for centuries a centre of cultural mediation, that the primitive finger-hole horn finally developed into a true, curved wooden cornett.¹⁰ Perhaps German players like Augustein, who seem from iconographical evidence to have favoured straight instruments, by bringing their superior playing techniques and unusual instruments to Italy, stimulated the Venetians to perfect their curved cornetts.

The sixteenth century: ‘quel lascivissimo cornetto’¹¹

In the first half of the sixteenth century the cornett experienced an astonishing surge of popularity, emerging as the most important of all wind instruments. It virtually supplanted the shawm in the Italian civic ensembles, became a regular adjunct to the organ in churches and chapels, developed into a family of instruments with distinct sizes and functions, and fostered the development of virtuosi whose fame was unprecedented among wind players.

At the end of the fifteenth century the cornett had two distinct forms of diverse provenance: one straight and uncovered, the other curved and leather-covered. There is reason to suspect that the straight version still dominated after the turn of the century, at least among German players. A number of German woodcuts¹² between 1500 and 1520 show players, including Augustein Schubinger himself, with straight cornetts, and the first descriptions of the cornett in theoretical sources,¹³ both of them German, also show straight instruments with separate mouthpieces. A contemporary Italian source, Sylvestro Ganassi’s famous recorder method *Opera intitulata la Fontegara* of 1535, displays two curved¹⁴ cornetts lying significantly on the frame of the title page, suggesting that this was already

the form favoured by Italian players, a hypothesis supported by a portrait of a cornettist from around 1530 by Pontormo.¹⁵

The cornett family

In the sixteenth century the cornetts expanded into a family of diverse shapes and sizes. Unlike other Renaissance wind instruments, however, they were seldom played together, the true cornett consort being effected through its ‘marriage’ to the trombone. The two instruments were an ideal match: the trombones generally lacked the agility necessary for ornamental upper parts, while the cornetts lacked fully satisfactory tenor and bass models. Nevertheless, by the second half of the century, cornetts were seen in an abundance of sizes and shapes and in three basic types: curved, straight and mute.

The standard curved cornett was made from a single block of wood, cut into a curve and split lengthwise. A conical bore was carved out of each half, the two pieces glued back together, the corners planed to an eight-sided profile, and the longitudinal joint secured by a series of bindings and a covering of black leather or parchment. Six finger holes were drilled into the top of the instrument and a thumb hole underneath. The player attached a small cup mouthpiece of wood, horn, or ivory. Although said to be pitched in A, it was actually in G without the bottom note. In the hands of a skilful player, however, it could descend to G₃ (by lipping) and ascend to D₆. Though Michael Praetorius, in his *Syntagma musicum* (1618), claims that good players could play as low as F₃ and as high as G₆, the highest note found in its repertoire is E₆.

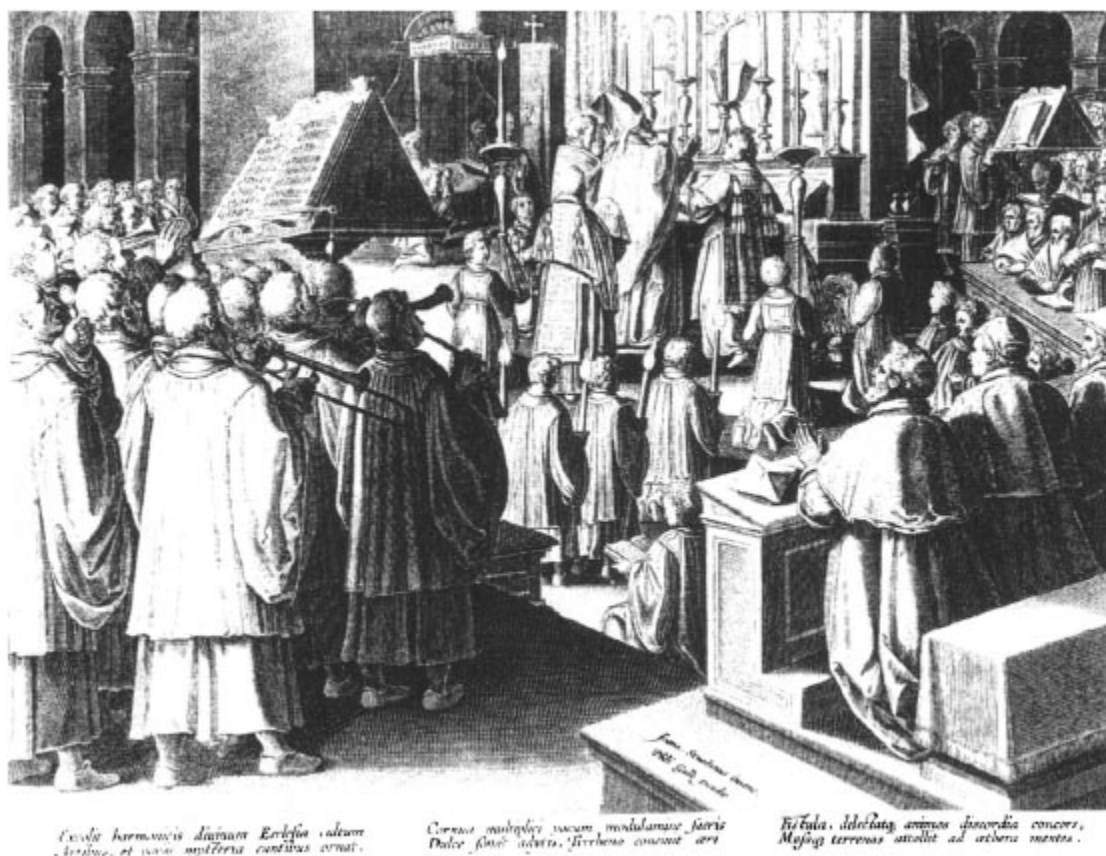


Figure 7 Cornetts and trombones being used in a polychoral performance, engraving by Philippe Galle after Johannes Stradanus, 1523–1605.

Large cornetts, normally called simply ‘cornetti grandi’ or ‘corni torti’ (owing to their serpentine shape) and pitched in D, a fifth lower than the standard cornett (though often with a key to cover an additional finger hole), comprised the tenor members of the family. More than thirty-five tenors, many finely made, survive in museum collections, and they were widely used, even when not specified, judging from the large number of cornett parts written in tenor clef or descending below the range of the standard cornett.

Although Mersenne in his *Harmonie universelle* of 1636 mentions an ‘haute contre des cornets’ pitched in G (a step below his *dessus*), the existence of alto cornetts outside France remains conjectural. They are described by no other source, but *contralto di cornetto* appears as one of the regular positions in Bologna’s Concerto Palatino alongside the *soprano di cornetto*.⁶ Indeed the alto parts of much of the canzona and motet repertoire of such groups would be unplayable on the standard cornett in A.

Mersenne also describes a bass cornett in G an octave below the *dessus*. Bass cornetts are mentioned in a number of sixteenth-century German inventories, and a few examples exist in museum collections, but they seem to have been most widely used in France. The bass cornett should not be confused with the serpent, which is pitched a fourth or fifth lower, and is not strictly a member of the cornett family, having a more conical bore, thinner walls and no thumb hole.

Despite its Italian name, the *cornettino*, a small cornett in D or in E, was used mostly in the second half of the seventeenth century in Austria, northern Germany and Poland. Many cornettino parts are playable on the standard cornetto; the preference for the smaller instrument was presumably often one of timbre.

There existed two distinct types of straight cornetts. The first was made of turned, uncovered wood, and had a detachable mouthpiece and a sound similar to the curved cornett. It appears to have been used mostly in Germany, where it was called the *gerader Zink*. Of some three hundred extant cornetts in museum collections only thirteen of this type exist, all of them in German-speaking lands (except for two in the United States).¹⁷ A few eighteenth-century examples, made in two sections with ornate turnings, were clearly inspired by transverse flutes.

The second type, the mute cornett (German: *stiller Zink*; Italian: *cornetto muto*, or occasionally *cornetto bianco*), was similar in appearance but had a mouthpiece turned directly into the end of the instrument. The resulting wide back bore and usually deeper cup gave it a characteristically sweet, ‘muted’ quality. It was widespread in the sixteenth century and, north of the Alps, in the seventeenth as well. It could be pitched in A or in G, but it normally ascended only to A₅.

Patterns of use: towns, courts and churches

By the mid sixteenth century cornetts appeared in a rich variety of ensembles and settings from cathedrals to princely chambers, from public piazzas to court chapels. Moreover, their popularity spread to every part of Europe, undoubtedly fostered by the performances of virtuosi travelling in the retinues of emperors and princes.

By the 1530s *concerti di cornetti e tromboni* were beginning to flourish in cities like Bologna, Genoa, Brescia, Perugia, Lucca, Udine, Florence, Rome and Naples. In Bologna, the transformation from shawm to cornett was complete by 1538, with four cornetts and four trombones established as the standard instrumental grouping.¹⁸ A Genoese document from 1590 stipulates that ‘the musicians shall be seven or eight in number, with parts for trombones and parts for cornetts, that is, first and second trombone, first and second cornett, and the other three parts in the middle shall be given to trombones or to cornetts according to what is required’.¹⁹ Their duties were precisely spelled out: daily ‘performances’ in the public square, accompanying the entrances and exits of prominent officials as well as providing entertainment for their meals, playing for processions and at public celebrations, etc. The German *Stadt Pfeifer* and the town waits in Britain had similar duties, though neither were as specialised as the Italian ensembles, continuing to double on a large number of wind instruments throughout the sixteenth century. A manuscript in Regensburg²⁰ containing 120 madrigals, chansons and motets with instrumentations clearly represents the repertoire of a *Stadt Pfeifer* band. Though some of the works specifying cornett pair it only with trombones, most include shawms as well.

Outside the civic ensembles, cornettists were increasingly sought out by the courts. At the court of Elector Friedrich the Wise in Saxony, a cornettist is first mentioned in 1501; in 1565 there were four.²¹ At the Bavarian court, the instrumental chapel had one cornettist in 1530, and usually at least three from 1550.²² At Innsbruck, one of the great centres of cornett playing, forty-two cornettists are cited in the court archives between 1483, when ‘Jeronimus, Zinkenplaser von Bayern’ was paid 1 fl. for his services, and the death in 1716 of the last court cornettist, Andreas Rastpichler.²³

From the middle of the century, court inventories from Italy, Germany, Austria, England, Spain and Flanders list cornetts in numbers which are sometimes overwhelming: sixteen in the possession of Henry VIII in 1547, fifty-nine at the court of Marie of Hungary in Flanders in 1555, seventy-four in Innsbruck in 1596 (including fourteen tenors and five basses), and fifty at Kassel in 1613 (including twenty-four mute cornetts, twenty-one curved cornetts and five ‘Basszincken’). While these numbers partially reflect the need to accommodate different pitch levels, they surely reflect as well the importance given to the instrument at court.

Except on rare occasions, the cornett was not a participant in the most intimate chamber music at court, the so-called *musica secreta*. It was in large-scale public festivities meant to reflect the magnificence of court life that it was indispensable: triumphal, funeral and carnival processions, tournaments, weddings, banquets, receptions and the *intermedi* that were a part of court theatre presentations. It was for such events that large (and at times truly enormous) instrumental and vocal forces, sometimes known as the *concerto grande*, were called upon.

The *concerto grande* at Ferrara, including the cornett virtuoso Luigi Zenobi, the highest-paid musician at court, included as many as fifty or sixty musicians, though the Florentine ambassador considered this a trifling thing compared to the hundred employed in such performances at Florence. A description of the Florentine *concerto grande* includes two cornetts and three trombones, together with twelve harpsichords, an organ, thirty viols, a violin, a *piffaro*, a double-bass and twelve lutes.²⁴ For the entrance of Grand Duke Ferdinand de' Medici into the city of Pisa in 1588, a twenty-voice concerto was heard with sixty-four singers, two harpsichords, four cornetts, four trombones, an organ, two *viola da gamba* and four lutes.²⁵ But, as a Ferrarese cookbook of the Este family makes clear,²⁶ single cornetts, both curved and mute, often played with a large variety of other instruments as well, including viols, 'dolzaine', crumhorns, tenor recorders and organ.

No less impressive were the instrumental forces of German courts, particularly the Bavarian court chapel under Orlando di Lasso. Troiano's celebrated description of the festivities for a court wedding in 1568 presents a panorama of instrumentations which undoubtedly reflect in principle (even if they exceed in extravagance) practices at smaller German courts. In addition to ensembles of cornetts and trombones, many mixed instrumental groupings with cornetts were featured, including one with harpsichord, trombone, recorder, lute, 'cornamusa', mute cornett, *viola da gamba* and transverse flute.²⁷ A heterogeneous wind consort with both mute and curved cornetts was a feature of the Bavarian court chapel and is depicted in a famous book illustration by Hans Mielich. In it the singers are joined by six *viola da braccio*, a lute, a spinet and seven wind instruments: a wind-capped double-reed instrument, bass recorder, transverse flute, trombone, mute cornett, rackett and curved cornett.

Outside the courts and civic ensembles, the principal employers of cornett players were large churches capable of supporting permanent

musical chapels. Most churches, however, hired outside *piffari* for major feasts and maintained only small chapels for their regular services. San Antonio in Padua was unusual in having a cornettist in regular employment already in 1554, but he was replaced by a trombonist in 1557, and only in 1582 did an ensemble of a cornett and three trombones become a permanent fixture.²⁸ At San Marco the first regular cornettist was Dalla Casa, hired in 1568, together with his two brothers who played trombones. When larger numbers of players were required, the doge's *piffari* could be hired, or any one of six independent *piffaro* groups in the city. In Rome, from the 1580s onward it was common to perform polychoral music on certain patronal feast days at each of the city's institutions.²⁹ These performances would almost always have required outside musicians and singers, and archival references show that one cornettist, and sometimes two, were nearly always among them. In the early seventeenth century these extravaganzas sometimes took on enormous proportions (in one case involving twelve choirs representing the twelve apostles) and on at least two occasions required the services of four or five extra cornettists.

In all these domains of cornett playing virtuosi flourished. In Italy it was not uncommon to find celebrated composers among the ranks of town, court and church cornettists: Ascanio Trombetti of Bologna, Nicolo Rubini of Modena, Giovanni Bassano of Venice, Giovanni Martino Cesare of Udine, and Alessandro Orologio of the Veneto (the last two active in German-speaking countries). Virtuosi were even found behind the cloistered walls of convents; the nuns of San Vito in Ferrara were particularly praised for their skills on cornetts and trombones. North of the Alps, contemporary sources show that Italian names were increasingly found beside those of local players after the middle of the century (Antonio Scandelli in Dresden; Fileno Cornazzano, Francesco Mosto and G. M. Cesare in Munich; Orologio in Prague). Among the later northern virtuosi, Gabriel Schütz (1633–1710), town musician at Nuremberg, described by Mattheson as 'one of the greatest masters of his time in the Holy Roman Empire', and Balthazar Richard, active at Brussels 1620–60, were probably the most celebrated.

The seventeenth century: ‘per violino overo cornetto’

The cornett entered the seventeenth century as the most favoured of instruments – the leader of the civic wind band, the ‘most excellent instrument’ for imitating the human voice, the preferred companion of both the trombone and the organ, an instrument of virtuosi. It left the century as an old-fashioned and often badly played relic. To understand this profound change is to understand both the nature of the cornett and its relationship to the changing fashions of seventeenth-century music.

The turn of the century witnessed one of the great upheavals in the history of music. The relationship between text and music was being redefined in an attempt to bring new expressive power to vocal music, and instrumental techniques were being investigated in order to create a new and more idiomatic instrumental music. As this process began, the cornett was at its height and was thus a protagonist in much of this music, playing obbligato parts in the new concerted church music, solo and ensemble sonatas and canzonas together or in alternation with violins, and even occasional obbligato parts in operas and oratorios. But in a very real sense the cornett was as much a victim of these changes as it was a participant in them. Developments in both vocal and instrumental music would lead further and further from the kind of vocality which the cornett excelled at imitating and from the kind of ornamentation which defined its virtuosity. There would arise a new virtuosity based on the very different capabilities of a new instrument – the violin. It was above all the changing relationship with this new rival which would determine the course the cornett would follow in the seventeenth century – a course leading slowly but inexorably towards obsolescence.



Figure 8 Engraved portrait of *Stadtpfeifer* Gabriel Schütz by J. F. Leonart after Georg Strauch, 1656.

Before 1650, Italian printed music for cornett frequently carries the indication ‘per violino o cornetto’. Indeed these two instruments, one representing the new wave of fashion and the other a noble but declining tradition, shared for some fifty years the leading soprano role in both instrumental and concerted sacred music. After this date, cornetts were seldom specified in prints for two reasons, reflecting both a commercial and a musical reality. First, the ever-diminishing number of cornettists made such indications unprofitable. Second, violin writing was becoming increasingly idiomatic and thus unsuitable to the cornett, presenting problems of range or tessitura, giving the player no opportunity to breathe,

or exploiting impossible technical devices such as double stops. The fact that some good players were still active as late as the 1690s is demonstrated by the existence of difficult cornett parts in a number of manuscripts, which, being free of the commercial constraints of printed music, better reflect the reality of performance practices. It is reasonable to assume that the cornettists who played these parts would have sought their repertoire in printed violin music, regardless of printers' opinions. (In northern countries this process of decline lagged some twenty or thirty years behind Italy, but by 1700 no more printed music for cornett issued from these presses either).³⁰

On both sides of the Alps, despite sporadic appearances in opera and regular employment for civic functions, the cornett was first and foremost a church instrument. In the vast and resonant spaces of cathedrals the cornetto's special talent for imitating and supporting the human voice found its ideal home. Here its bright and penetrating sound was, as Mersenne says, 'like a ray of sunlight in the shadows when we hear it among the voices in cathedral churches or in the chapels'. In England cornetts and trombones doubled the voices of the choir in the Chapel Royal, in the cathedrals at such places as Canterbury, York and Durham, and in provincial and collegiate churches until at least the time of the Commonwealth. In France and Spain (and in Latin America) the cornett was widely used to double voices in cathedrals until well into the eighteenth century. In Italy, though ripieno parts for cornetts cease to be published around 1650, manuscript copies of later works make it clear that the practice survived much longer. In Germany, reinforcement of voices with cornetts and trombones was virtually universal into the eighteenth century both in concerted music and in the *stile antico*. A manuscript of a Palestrina Mass partly in the hand of J. S. Bach, in which the vocal parts are doubled by two cornetts and four trombones, is only a reminder that such performances were still the norm in early eighteenth-century Germany, a practice Bach also follows in a dozen of his cantatas.

When the cornett did not double voices it played obbligato parts, often together with or in place of the violin, or with an ensemble of trombones. Giovanni Gabrieli was a pioneer and master in this sort of instrumental writing, but his example was followed more in Germany than in Italy, where a newer style of concerted music for smaller forces had come into fashion even before his death. Later Italian composers, including

Monteverdi in his 1610 Vespers, seldom wrote elaborate florid instrumental parts within a large-scale concerted texture, but instead favour ritornelli employing only a few instruments, limiting the interplay with the voices.

Gabrieli's devoted student, Heinrich Schütz, was the Venetian's true heir as a composer of obbligato cornett music. Schütz was a master of large-scale polychoral writing, but his first book of *Symphoniae sacrae* contains unsurpassed masterpieces in the more modern and intimate style, employing the cornett with three singers and in numerous combinations of wind instruments. His powerfully expressive setting of *Anima mea liquefacta est*, employing two cornetts (almost certainly mute cornetts) along with two tenors, is one of the great works of the cornett repertoire.

In Italy after about 1670, cornett writing converges in function and style with that of the trumpet, for which the cornett now often serves as a partner or replacement. In the works of Giacomo Perti, Alessandro Stradella, and, above all, Francesco Passarini, cornett and *clarino* writing are hardly distinguishable. The cornett is no longer employed for its virtuosity or its vocal quality, but merely as an alternative timbre.

In northern sacred music after 1650, the cornett most often appeared in an ensemble with trombones which served as one instrumental choir in large-scale polychoral works. At the Imperial Court in Vienna cornetts and cornettini were a constant feature in sacred music (and often in opera as well) until the end of the century, either doubling voices or playing obbligato parts (of sometimes awe-inspiring difficulty in their exploitation of the high register) by such composers as Antonio Bertali, Heinrich Ignaz von Biber, Georg Muffat, Johann Schmelzer. In Germany, cornetts are also frequently called for in pieces clearly intended for *Stadtpfeifer*, who were required to double on many instruments. Such pieces involved alternating pairs of instruments (usually violins, cornetts, trombones and recorders) playing sinfonias and obbligatos which are all intended for a single pair of musicians.

Instruction and performance practice

At every stage of its development the cornett was an instrument of professional musicians. The difficult art of playing it was taught through a

system of apprenticeship which left few instructional materials of the sort associated with instruments for amateurs. What little we know of the cornett's technique must be gleaned from the relatively few general writings on musical theory and practice which deal at least tangentially with the instrument.

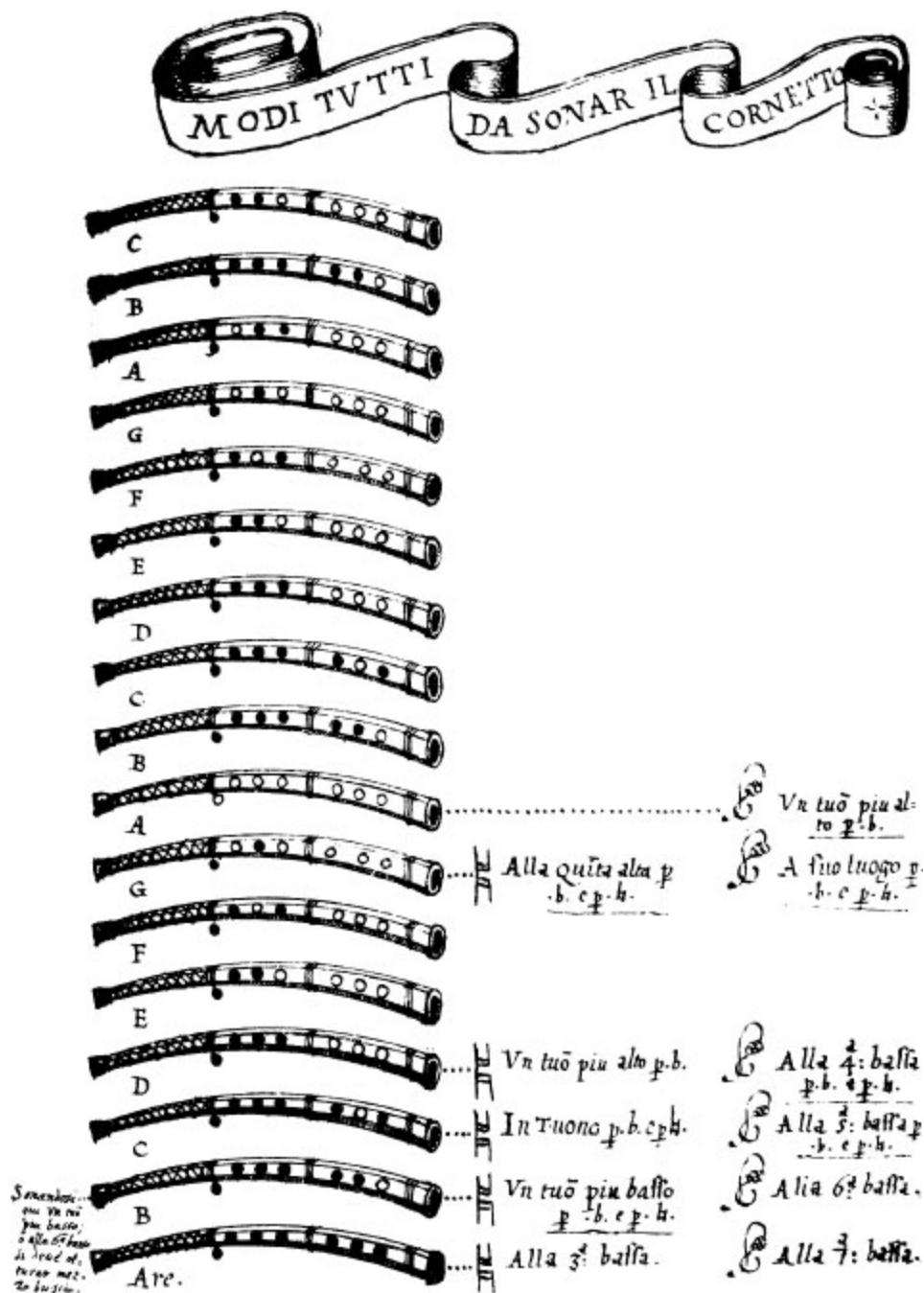


Figure 9 'Cornetto' fingerings and transpositions from Aurelio Virgiliano's *Il dolcimelo*, c.1590.

Sixteenth-century theorists seldom go beyond a description of the range of the instrument, but discussions of tuning and temperament reflect the skill of the best cornett players. Cornetts were said to belong to the 'flexible-stable' instruments, which, though their notes were fixed by the placement of finger holes, could nevertheless adapt to the temperament of other instruments. Thus they would adopt meantone temperament when playing with keyboard instruments, but could play in pure intervals with singers or fully flexible instruments such as trombones and violins.



Figure 10 The *Preludio per cornetto* of Bartolomeo Bismantova.

In an incomplete manuscript treatise entitled *Il dolcimelo* written around 1590 by Aurelio Virgiliano, we find the cornett's first detailed fingering

chart, and, even more interestingly, evidence that cornett players transposed so freely that they used, in effect, different sets of fingerings for playing ‘in concerto’ (together with singers) and alone with instruments.

Cornettists were famous above all for their mastery of the art of improvisation, which was, in the sixteenth century, the principal outlet for virtuoso display. Instrumentalists were expected to improvise elaborate divisions in imitation of vocal *passaggi*, and cornettists, owing to the agility of their instrument and its similarity to the voice, were the most accomplished at this art. Two Venetian cornettists have left us examples of their divisions, frozen improvisations, as it were, and they cannot but leave us in awe of the sixteenth-century virtuosos who improvised them. In particular, those of Girolamo Dalla Casa are dazzling in their intermingling of groups of four, six and eight notes. In the preface to his division manual, *Il vero modo di diminuir*, published in 1584, Dalla Casa also provides us with some rudimentary advice on playing technique and discusses at length the tonguing syllables used in division playing. Except on fairly slow notes, pairs of syllables were invariably used, as in modern ‘double tonguing’, the difference being that more liquid syllables (*tere tere* or *lere lere*), which better imitated the sound of vocal *passaggi*, were preferred to the sharper and more regular *teke teke* of modern brass players.

One of the last important cornettists in Italy was Bartolomeo Bismantova, musician at the cathedral and cornettist at the Accademia dello Spirito Santo in Ferrara. To judge from his solo *preludio* for cornett, Bismantova was himself a fine player, and was quite possibly the virtuoso for whom Giovanni Battista Bassani intended the difficult cornett part in his oratorio of 1685, *La morte delusa*, one of the last major Italian works involving the instrument. Bismantova’s manuscript treatise, *Compendio musicale* of 1677, is the last Italian instruction book for the cornett and contains, in addition to fingerings, the only real advice on playing technique which we possess. His recommended position for the mouthpiece, at the corner of the mouth, is the one most often found in depictions of the cornett, though his German contemporary Daniel Speer comments that the placement depends upon the teeth, and that some players even play in the centre of the mouth.

The decline: ‘un’ assai dispiacevole dissonanza’

Ultimately, the reasons for the decline of the cornett lie with questions of musical fashion and style, but though fashion may change quickly in some areas of musical life, elsewhere traditions hold on stubbornly. The seventeenth-century fascination with string instruments took some parts of Europe by storm, revolutionising instrumental music and sweeping aside the cornetts and trombones *en masse*. That this was so at the English Chapel Royal, we learn from John Evelyn's diary:



Figure 11 An angel cornettist in an altar painting by Lodovico Caracci in the Chiesa di S. Paolo, Bologna.

The 21st [December 1662], one of his Majesty's chaplains preached, after which instead of the ancient, grave and solemn wind music accompanying the organ, there was introduced a consort of twenty-four violins, after the fantastical light way of the French – better suiting a tavern or playhouse than a church. This was the first time of the change, and now we heard

no more the cornett, which gave life to the organ, for that instrument, in which the English were so skilful, was quite left off.

In the provinces, however, change was more gradual, and there the cornett was not entirely abandoned much before 1700. The last provincial cathedral in which the cornetts continued to double voices was probably Durham, where the last two cornettists died in 1696 and 1697.³¹

In other places the cornett was still more deeply rooted, the virtuosi more plentiful, and the traditions more tenacious. In Bologna, the civic ensemble was finally silenced in 1779 in order to put an end to 'a very disagreeable dissonance'.³² In Rome a similar decision was made in 1798 at the time of the French occupation.

The cornett survived longer in northern countries than in the south. Increasingly, though, after 1700 the instrument was no longer the domain of professional virtuosi, but of humble town musicians. Where cornetts were heard, they were described as loud, rather rough instruments, played with tremendous effort: 'The "hard" cornett ... is extremely difficult, indeed the most difficult of all the wind instruments, and sounds, from far away, like a raw, unpolished human voice.'³³

Still further to the north, in Norway, the cornett enjoyed a later flowering. In 1744, the German-immigrant *Stadtpeifer* and organist Johan Daniel Berlin published, in Trondheim, a treatise on the instruments in which he speaks of the cornett, even providing a fingering chart.³⁴ Though he claims that 'one will find only a few who can manage to play the cornett well', apparently he knew at least one such player, for his *sinfonia* for cornett and strings, in a manuscript in Trondheim, is extremely demanding, ascending to the very top of the instrument's range and requiring difficult leaps in a thoroughly Rococo manner.

The cornett was still heard in Norway half a century later. Lorents Nicolaj Berg published the last known tutor with instructions for the cornett in 1782 in Christiansand.³⁵ As an instrument of the *Stadtpeifer*, played ever more poorly, the cornett lasted until at least 1840, when the French composer and musicologist Jean Georges Kastner heard one play a chorale each day together with three trombones from a balcony in Stuttgart.³⁶ Kastner, being well acquainted with earlier descriptions of the cornett, was at a loss to understand the instrument's former glory. The 'most excellent of wind instruments' had clearly fallen on hard times.

‘Sackbut’: the early trombone¹

Trevor Herbert

On 20 November 1906, Francis Galpin, the Anglican cleric and pioneering organologist, delivered a paper to members of The Musical Association in London. His paper, ‘The Sackbut: Its Evolution and History’, was one of the great contributions to musicology. In it Galpin explained the story of the exotic-sounding ‘sackbut.’² His narrative was clear, straightforward and based on the systematic evaluation of diverse primary-source evidence. Before that evening, it was believed by some, even perhaps by some members of his distinguished audience, that the sackbut was an instrument of deep antiquity, and that its citation in the Book of Daniel (‘That at what time you hear the sound of the cornet, flute, harp, sackbut...’)³ was no less than a literal testimony of musical practice at the time when the Old Testament was written. The unarguable truth that Galpin placed before them was that ‘sackbut’ was no more than a word by which one of the most familiar musical instruments – the trombone – was once known. Furthermore, he showed that it could be dated no earlier than the fifteenth century, and that a comparison of an early example (Galpin owned an instrument made in Nuremberg in the sixteenth century) with a modern trombone revealed, on the face of it, more similarities than differences.

In the twentieth century, research has improved our knowledge of the early trombone and the way in which its idiom and repertory changed over the years. We know more now than Galpin knew at that time. It is not just that we have more information about instruments, their players, their music and the cultural contexts into which music fitted and to which it conformed. We now also have evidence drawn from sophisticated musical experiments by performers on period instruments. Even in the middle of the twentieth century, musicologists could speculate only in abstract terms on what the true idiom of the early trombone was: how it really sounded, and what its

articulations and sound colours were like. Their practical source of reference was the sound of modern trombones and the performance values of their players, most of which were formulated to deal with the post-classical orchestral repertoire. Since the 1970s the best period-instrument players have travelled deep into the sound world of the Renaissance and Baroque. Their example has shown how different the idiom of the early trombone was, compared to that of its modern equivalent.

Nomenclatures

'Sackbut' was but one of the names by which the trombone was known in its early life. Indeed, the rendering 'sackbut' was only used in England and it was never universal – 'sagbutt', 'sacbut' and 'shagbut' were equally popular. The Italians always used *trombone* and the Germans *Posaun(e)*, both of which are derived from other words (*tromba* and *buzine*) which mean trumpet. On the other hand, 'sackbut' comes from a different and more interesting etymological strain. The word (but not the instrument) almost certainly originated in south-western Europe – France, Spain or Portugal – where the first element, *sac-*, is derived from words meaning to draw, in the sense of pulling, and the second, *bu-*, probably has its origin in a Teutonic root meaning to push. The French ended up calling the trombone *saquebute*, the Spanish *sacabuche* and the English rendered it 'sackbutt', 'sagbut', 'shagbosh' or whatever seemed reasonable to long-suffering scribes recording payments to yet another foreigner for blowing a new musical gadget.

The relevance of the etymology of the sackbut-type words is that, from the time that they were first applied to a musical instrument, they did not simply denote their subject – they probably also described it. This line of nomenclature has almost certainly always been applied to a slide instrument, whereas this could not be assumed of early citations of words like *trombone* and *Posaune*, which need to be qualified in their context because they might easily have meant 'big trumpet'.

There were other words that also meant trombone in the Renaissance. Documents originating in Scotland in the early sixteenth century record payments for players of the 'draucht trumpet'. The most frequently cited

player of this instrument was a man called Julian Drummond. Until recently it was assumed that Drummond was a Scot who had briefly emigrated to Italy and then returned to Scotland. It now seems certain that he was an Italian who settled in Scotland.⁴ He assumed a common local surname, perhaps to disguise a Jewish identity; there are other instances of sixteenth-century immigrant musicians doing this. The existence of a source that describes the ‘weir trumpattis’ (‘war’ trumpet) and the ‘draught trumpattis’ in the same sentence suggests that the latter was different to the former and that it had a slide.⁵ It is, of course, possible that draught trumpet is another term for the Renaissance single-slide trumpet, but this seems unlikely: the single-slide trumpet must have been entirely anachronistic by such a late date.

‘Draught trumpet’ was not used outside Scotland and is not found in any sources after the 1530s, but yet another relevant term, *tuba ductilis*, can be found in several sources in the sixteenth and seventeenth centuries. Many sixteenth-century writers took it to be the Latin expression for trombone. Praetorius and Mersenne understood the phrase in this sense, and ‘The Custom Book of St Omer’, a document originating in 1609, which refers to musical practices at the Jesuit school at St Omer, France, systematically gives proper and common names for instruments, describing the trombone as ‘Tuba ductilis (vulgo Sacbottum)’.⁶

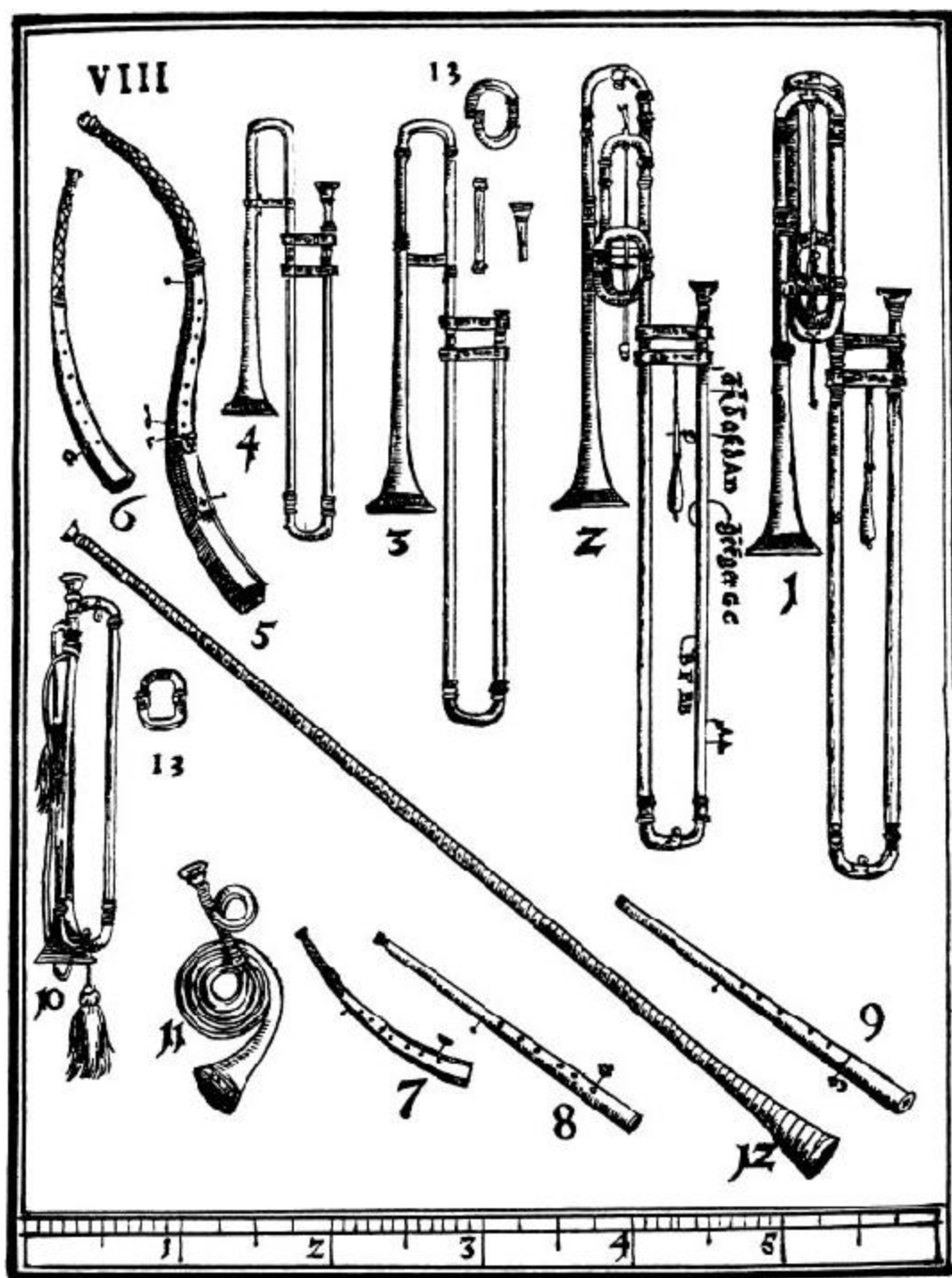
By whatever name it was known, it is certain that in the second half of the fifteenth century the trombone was widely used in the courts of mainland Europe, where it was one of the standard instruments in *alta cappella* groups. Professional trombone players were employed in Italy, the German-speaking countries, the Low Countries, France, Spain and, at the very end of the century, in England. We do not know exactly when and where the trombone was invented but it is likely to have been in the north. In the late fifteenth century, players and makers of slide instruments from northern Europe – particularly Germany⁷ – were influential in southern countries such as Italy. It is likely too that it was players from Germany or the Low Countries who were the first to arrive in England, where the first trombonists to be named in payment records are Hans Nagle and Hans Broen.

By the sixteenth century and for most of the seventeenth century the trombone was one of the most important professional instruments. Towards the end of the seventeenth century its popularity declined in all but a few

centres, though where it did survive – most notably Austria – it continued to be deployed to great effect. In the second half of the eighteenth century, leading composers started writing once more for the trombone, and by the closing decades of the eighteenth century the trombone was again a familiar instrument in all places in Europe that had a thriving musical life. It is from this time that the modern idiom of the instrument can be traced.

The instrument

The majority of trombones which survive from the sixteenth and early seventeenth centuries were made in Nuremberg, the major centre for their manufacture. When, in 1545, the King of England purchased trombones for Italian players in his court band, it was the Nuremberg firm of Neuschel that supplied them. Neuschel's business letter confirms the order of five 'grosse busonen' (big trombones) and a 'Myttel busone' (medium trombone).⁸ This almost certainly means bass and tenor instruments respectively, because the alto instrument (which must surely have been described as *kleine* in this terminology) was used less widely in the sixteenth century than subsequently. Indeed, despite the English need for five 'grosse busonen', the fact that by the seventeenth century the tenor instrument was referred to as *gemeine Posaune* (common or usual trombone) suggests that this instrument had the widest utility.



1. 2. Quart-Posaunen. 3. Rechte gemeine Posaune. 4. Alte Posaune. 5. Corno, Großs Tenor-Cornet. 6. Rechte Chor-Zinck. 7. Klein Discant-Zinck, so ein Quint höher. 8. Gerader Zinck mit ein Mundstück. 9. Still Zinck. 10. Trommet. 11. Jäger Trommet. 12. Hölzern Trommet. 13. Krummbügel auf ein ganz Ton.

Figure 12 Illustrations of brass instruments from Michael Praetorius, *Syntagma musicum*.

Information about how different sizes of trombones were distributed becomes clearer in the seventeenth century, when Praetorius provides

details of the trombones in most common use. He describes four types of instrument: the alto (*Alto oder Discant Posaun*) pitched in D or E; the tenor (*Gemeine rechte Posaun*) pitched in A; the bass (*Quart Posaun* or *Quint Posaun*) in E and D; and the double bass (*Octav Posaun*) pitched an octave below the tenor with a range from E_1 to A_3 . Praetorius believed the alto to have a less satisfactory tone-colour than the tenor, and says that the double bass trombone was rarely used.⁹

There was also a soprano trombone, but this too was rarely used and was probably played by trumpeters. It is easy to understand why the soprano trombone never really caught on. It was introduced at about the same time that the trumpet had acquired its own clearly defined idiom and repertory, and in any case the cornett was a perfectly suitable and established treble partner for the trombone.

Another slide instrument was being used in England at the end of the seventeenth century. This, the 'flatt trumpet', is one of a number of brass instruments which have had a negligible impact on music history, but it has nevertheless engendered hot, if largely inconclusive, debate among brass instrument historians. Few pieces were written for this, the seventeenth-century manifestation of the slide trumpet (not to be confused with the fifteenth-century or the nineteenth-century versions, which were both different), but the most famous work in which it is cited is Purcell's *Funeral Music for Queen Mary* (1695). It is tempting to think of the flatt trumpet as merely a trombone – perhaps the English version of the soprano trombone – but the existence of a manuscript prepared by James Talbot,¹⁰ a contemporary observer, providing a clear description of two separate instruments, the one called sackbut, the other flatt trumpet, seems to make this theory unlikely. No flatt trumpets survive, but modern makers have produced perfectly credible 'copies' of them on the basis of extrapolations from documentary sources.

The morphology of surviving early trombones is more or less consistent. None, of course, had thumb valves to change the pitch of the instrument, but otherwise they lacked only three mechanical features that almost all modern instruments have: a tuning-slide placed on the final bow of the instrument (though crooks and shanks were commonly used, and some Nuremberg bass instruments seem to have had a tuning device on the final bend of the bell section), touch springs (small springs fitted in the housings of slides to finely adjust tuning in the first, or closed, slide position) and a

water key to release the condensed moisture of the player's breath. The tubing was narrower than is the case on modern instruments – diameters of tubing vary, but H. G. Fischer's survey of measurements shows most of them to be about 10 mm. The bells were smaller with a much less extravagant terminal flare – seldom more than 10.5 cm. wide – and the metal of which the instruments were made was much thinner.¹¹

Since the 1960s a number of period reproduction instruments have been available. Some such instruments do little more than capture the cosmetics of early instruments, and equally often the sound they make is indistinguishable from that of a modern medium- to narrow-bore trombone. However, there are some excellent reproduction instruments which closely follow the proportions and other material features of extant period specimens.

Few authenticated trombone mouthpieces survive from before the seventeenth century. The most important of these is a tenor trombone mouthpiece, inscribed with the mark of the Schnitzer family, and accompanying a tenor instrument bearing the same mark, dated 1581. It is impossible to determine whether this mouthpiece was typical of others of the period. Evidence gathered from drawings in treatises such as Mersenne's *Harmonie universelle*¹² suggests that, in general, early mouthpieces had flat rims, shallow cups and narrow, sharply defined apertures. There must have been hundreds of mouthpieces in use in the sixteenth and seventeenth centuries, so one can only speculate about their design in very general terms – there is no reason to believe that they all conformed to an identical pattern.

On early instruments – certainly those made in the sixteenth and seventeenth centuries – it was probably not possible to obtain a true harmonic series with the slide fully closed for every note; consequently the 'first position' was not with the slide closed but with it slightly extended, so that players could sharpen and flatten notes as necessary. The earliest diagrammatic representation of trombone positions is contained in Aurelio Virgiliano's *Il dolcimeolo*.¹³ Virgiliano, like every authoritative writer up to the end of the eighteenth century, shows not seven positions but four. Modern players are taught to use seven positions which are a semitone apart: they learn the trombone as essentially a chromatic instrument. The thinking of early players was not chromatic but diatonic. Half tones were conceived as adjustments between the basic diatonic notes.

Idioms and styles

The physical characteristics of sixteenth- and seventeenth-century instruments mean that trombones had two types of sound: they could be played loud with a brassy timbre similar to what one would expect from a field trumpet of the time, but primarily they were instruments of medium to quiet dynamics, suitable for intimate and delicate ensemble playing. The best copies of early trombones give modern players a valuable insight into the music culture of early players. It is easy to play these instruments quietly and with a clear and precisely focused sound, and one can readily understand why trombones were used so often to accompany vocal music. It is not hard to accept Henry George Fischer's contention that Praetorius's use of the phrase 'einer stillen Posaun' in describing the inclusion of a single quiet trombone in broken consorts in England reflected the characteristic expected of trombones rather than a special effect.¹⁴

This type of musical identity was the most important feature of the trombone in the sixteenth and seventeenth centuries. Early trombones had a wide dynamic range, but virtually every piece that specifies their use, particularly those that also name other instruments on different parts, seems to assume these subtle and restrained qualities. However, on the other hand, when copies of early instruments are blown really hard, the sound characteristic is entirely different. The timbre 'breaks up' and the sonority changes markedly, becoming brassy. Mersenne warned against this type of playing which, he said, 'is deemed vicious and unsuited for concerts';¹⁵ but presumably he had heard trombones played that way, and there are abundant sources, particularly from the sixteenth century, which indicate that trombones played with trumpets and shawms for declamatory fanfares outdoors.

In the sixteenth century, trombone players and, to a lesser extent, cornettists had facilities on their instruments that most others did not: they could adjust to more widely varied pitch standards, they had a broad dynamic range, they could be used as effectively out of doors as indoors, and a variety of articulations could be produced to blend with other instruments or voices. This meant that they were versatile instruments well suited to a wide variety of functions. In consort music in the sixteenth and seventeenth centuries, single trombones were used with other instruments. Praetorius suggested that the trombone was a suitable bass instrument, but it

was not restricted to bass lines. The favour that the trombone found in groups accompanying sacred vocal music is the most consistent feature of its story before the late seventeenth century, though it was used in secular vocal music too, both to double and to substitute vocal lines. Madrigals sent to the Accademia Filarmonica in Verona in 1552 included one ‘with low voices arranged for the trombones’.¹⁶

Trombone players decorated and embellished phrases in a manner similar to other instrumentalists. Mersenne noted that ‘those who use ... [the trombone] well perform diminutions of sixteen notes to the measure’.¹⁷ Similarly, Praetorius lists trombones among ‘ornamenting melodic instruments’.¹⁸ Many trombonists doubled on other instruments, so their knowledge of other instrumental idioms and their sense of ensemble must have been keen. The best early trombonists were virtuosi; Praetorius noted the merits of the ‘famed master, Phileno of Munich’ and Erhardus Borussus who had apparently moved from Dresden to Poland.¹⁹ Of the Italian Lorenzo da Lucca it was said that he had ‘in his playing a certain grace and lightness with a manner so pleasing’ as to render his listeners ‘dumbstruck’.²⁰

The idiom of the trombone in the latter half of the sixteenth century can to a large extent be deduced from what composers specified and wrote for the instrument in the early seventeenth century. At this time the balance of authority between composers and performers in European music culture was changing, decisions about performance devolving less to the players. In the earlier phases of this process the written and labelled parts almost certainly give evidence of current or long-established practices, rather than radical new experimentation by composers. The repertory that Venetian trombone players encountered in the first decades of the seventeenth century provides a good illustration of this phenomenon. The Gabriellis’ choral and polyphonic writing for trombones has a poise and maturity which suggests that they were continuing and refining, rather than inventing, an idiom for the instrument. Also, it is easy to see the florid trombone writing in the ‘Sonata sopra Sancta Maria’ from Monteverdi’s Marian Vespers (1610) in terms of the embellishment formulae contained in the late sixteenth-century diminution manuals ([Ex. 3](#)).

Homogeneous trombone ensembles were used in the sixteenth century and more widely employed in the seventeenth century. But the three-trombone format that became the basis of the modern orchestral trombone

section – alto, tenor and bass as constituents of a single block of sonority – does not really take root until the late Classical period. When Romantic symphonists – most notably Brahms – call up this timbre evocatively, their musical reference is unlikely to have been stimulated by a sense of history that went further back than the second half of the eighteenth century.

Ex. 3 Claudio Monteverdi, *Vespro della Beata Vergine*, trombone parts from ‘Sonata sopra Sancta Maria’ (bars 89–95), 1610



Centres and practices

There were few centres of musical activity in the sixteenth and seventeenth centuries where trombones were employed which did not also employ cornetts. It is unnecessary for me to repeat here what is said in [Chapter 5](#) of this book, except perhaps to emphasise that what Bruce Dickey refers to as the ‘marriage’ of cornett to trombone is one of the fundamental features of the history of the trombone before 1700. However, the perception that trombones and cornetts were each other’s sole partners can be exaggerated. In the two centuries following 1500, cornetts and trombones formed the core of many types of ensemble – particularly those that served liturgical functions – but there is ample evidence to show that trombones were used among more diverse collections of instruments too.

In the sixteenth and seventeenth centuries, professional trombone players were employed by several different types of musical foundation and institution. There is also a tantalisingly small body of evidence which hints

that some amateurs played too. Trombonists were a standard feature of civic bands such as *Stadtpfeifer* in Germany, *piffari* in Italy and, from the mid 1520s, the waits in England and Scotland. Throughout Europe these bands had similar functions. They marked both the important and the commonplace rituals of their towns. These rituals were often routine and regular: they may have been daily – the sounding of fanfares and other declamatory pieces – or seasonal – perhaps marking annual civic progresses or anniversaries. Most major towns in the German and Italian states had such bands, and in England they existed in those places that had the status of being a city (by virtue of having a cathedral). Civic bands were essentially secular, but there is no doubt their trombonists, along with other players, were hired for religious services too.



Figure 13 Seventeenth-century town waits, wash drawing attributed to Marcellus Laroon (c.1649–1702).

Players also found employment in royal or religious centres of power. Records of payments to players have, to a greater or lesser extent, survived for many such centres. What does not survive – and it is likely that it never existed – is a corpus of musical sources from the sixteenth century which have labelled trombone parts. But the extent to which trombone players were in receipt of regular payments from the major musical centres usually makes deduction of what type of music they were playing easy. They played both secular and liturgical music. Even players attached to ecclesiastical foundations would have performed secular ceremonial music as well as accompanying liturgical settings.

Trombonists were paid well and seem to have had a high status. As early as 1497, a musician called Piero Trombone was the highest-paid instrumentalist at Ferrara. He was not one of the court ‘trombetti’; neither was he termed ‘piffaro’.²¹ Such was his celebrity that foreign monarchs courted his services. Other Italian trombone virtuosi of the sixteenth century included ‘Bartolomeo’ (perhaps Tromboncino), Zaccheria da Bologna and Lorenzo da Lucca.²² In England, by the 1530s payments to trombone players took up the greatest proportion of expenditure on instrumentalists’ wages. Most of the recipients of these payments were members of the Bassano family, one of the most influential dynasties of the sixteenth century.²³ They were almost certainly Venetian Jews who arrived in England as distinguished players. Many representations of music making in Germany – at the Bavarian court, for example, where Orlando di Lasso was *maestro di cappella* – show trombone players prominently.

In Spain, trombones were used in 1478 at the baptism of Prince Juan, the son of Ferdinand and Isabella, when ‘The prince was brought to the church in a great procession ... with infinite musical instruments of various types – trumpets, shawms and trombones.’²⁴ It appears to have been in 1526, however, that Seville Cathedral took trombone players into regular employment, when the cathedral chapter decided that

it would be very honourable in this holy church and in the praise of the divine worship to have on salary, for their own use, some loud minstrels, trombones and shawms, to use in various of the most important feasts and the processions that the church makes.²⁵

Almost all sixteenth-century trombone players were specialist professionals but morsels of evidence suggest that there were some amateurs too, because these sources refer to women – the named professionals who are mentioned in payment records are always men. Nuns

in a Ferrara convent appear to have played trombones in accompaniment of the liturgy. A German embroidered table-cloth from the 1570s shows an aristocratic woman playing the trombone – the representation is clearly not allegorical. A further source advocates the view that a rounded education for boys should contain music instruction, and lists among the suitable instruments for that purpose sackbuts and cornetts.²⁶

Music in the sixteenth and seventeenth centuries was not merely an entertainment. It was a tool of diplomacy and a potent signal of status. The musical life at a court had to have a high standard, but it also had to reflect the character, preferences and tastes of its principal patron. Though there is abundant evidence that trombone players performed in ceremonial music, in court entertainments and in worship, it would be wrong to assume that practices and flavours were identical throughout Europe. For example, at the famous meeting of Henry VIII and Francis I at the Field of the Cloth of Gold in 1520, the differences in musical practices were brought into sharp relief when the French king's *cors de sabutttes* (*sic*) accompanied a sung mass, while the English singers sang *a cappella* even though the players from the London court were present. This almost certainly signifies that in England, unlike other parts of Europe, instrumentalists did not accompany the liturgy.²⁷

Most of the music for which trombones are specified (or for which their specific use is easily deduced) in the sixteenth century originated in Italy. This includes the pieces played at the extravagant Medici wedding celebrations of 1539 and 1589, containing the so-called 'Florentine Intermedi'. By the beginning of the seventeenth century the picture of what exactly trombone players played is less ambiguous, because the practice of labelling parts was more common. The earliest surviving English pieces to be labelled with trombone parts are John Adson's *Courtly Masquing Ayres ... framed only for instruments* (1611), which have three pieces with sackbut parts. The next and only work of any substance to be so labelled in Britain is also the last – but equally the best – Matthew Locke's *Music for His Majesty's Sagbutts and Cornetts*, a suite of pieces apparently performed at the Restoration coronation of Charles II in 1661.²⁸ The Adson and Locke pieces are, interestingly enough, among what is only a tiny handful of works found in a British source which specify trombones and cornetts alone. The few other pieces with labelled parts also include other instruments.

Venice, and the music establishment at St Mark's in particular, was the pre-eminent centre of excellence in the early seventeenth century. It was not just the size of the instrumental ensemble at St Mark's that was so important, but also the quality of the music that was written to be performed there. The intrepid English traveller Thomas Croyat's barely contained enthusiasm for the sound of 'Sometimes sixteen [instrumentalists] playing together on their instruments, ten sagbuts, foure Cornets, and two Violdegambaes of an extraordinary greatnesse', which he encountered at the Scuola Grande di San Rocco in Venice in August 1608, was a response to the music of Giovanni Gabrieli, one of the first composers whose writing for the trombone was truly idiomatic. Venice was an important microcosm for the high Renaissance and early Baroque periods, and the inclusion of the instrument in operas as early as Monteverdi's *L'Orfeo* (1607; first performed in Venice, 1609) suggests a recognition of the potential of its sound as a dramatic device. It is difficult to determine exactly where and when the symbolic association of trombones with darker facets of the emotional and spiritual spectrum originates, but by this time such meanings were widely understood. For example, at the first performance of Beaumont and Fletcher's masque *The Mad Lover* in 1616, a stage direction called for 'A dead march within, of Drums and Sagbuts'.²⁹ The influence of Venice spread north too. Scheidt, Schein, Praetorius and particularly Gabrieli's protégé, Heinrich Schütz, also wrote idiomatically for the instrument. The latter's *Fili mi, Absalon* is a fine example of this facet of seventeenth-century style.

Before the end of the seventeenth century, most places in Europe witnessed a sharp decline in the instrument's popularity. The fall of the trombone from fashion is often attributed to the new preference for balanced sonorities of homogeneous instrumental groups, particularly of strings, after the French style. In fact it is unlikely that such explanations tell the whole story. In places where the trombone died, it usually died completely. In England, for example, the decline of the use of trombones in the royal music establishment was matched by a similar decline in cathedrals and civic waits in London and the provinces, perhaps reflecting the strong influence of London as the cultural centre of the country.

The trombone only survived in places where its traditional function as a supporter of vocal lines in sacred music was sustained. This was the case in the Habsburg empire, where, even in 1790, Albrechtsberger was

complaining that ‘Many usages sanctioned by long custom can hardly be justified ... trombones written in unison with alto, tenor, or bass voice’.³⁰ There were excellent trombonists in Vienna throughout the eighteenth century. Stewart Carter has determined a continuous line of players at the Habsburg court from 1679 to 1771. The Imperial opera had five trombonists in 1747 (Christian, Loog, Stainprugger, Tepsser and Leopold Ferdinand Christian). In 1790 Albrechtsberger names twelve yet different players who had ‘handled this difficult instrument skilfully’. Among them are Braun and Fröhlich, both of whom wrote methods for the instrument. A number of works containing trombone obbligati were written by composers working in Austria in the eighteenth century and there is also a small but important solo repertoire.³¹

It was not just in Vienna that the trombone lasted. The instrument also survived in Germany, and, for a time in Rome, where, at the start of the century, a wind band in Castel Sant Angelo (*musici del concerto di Campidago*) was described as ‘concerto de tromboni e cornetti del Senato et inclito Popolo Romano’.³² In Germany J. S. Bach used trombones in fifteen of his cantatas, all but one dating from his time at Leipzig. Again the link with vocal music is clear. C. Stanford Terry has made the point that in every case where Bach used the trombone, it is used with a chorale of the older motet form, and – with only three exceptions – it doubles a vocal line without sounding independently.³³



POSAUNE

*Ich suche fast den Ruhm an allen Ort und Enden.
 So wohl den Alterthum als auch der Würkung nach.
 man sehe was ich kan in beiden Testamenten.
 ich warff die Mauren ein als man mich recht besprach
 kein Opfer oder Feind wird recht ohn mich vollführet
 und heut zu Tag bin ich nur grosse Chör bezieret.*

Figure 14 'The Trombone', Johann Christoph Weigel (1661–1726), copper engraving from *Musicalishes Theatrum*.

Another pocket of culture where the trombone survived in the eighteenth century was in the eastern edge of North America, where immigrant Moravians continued to use trombones for chorales and to accompany voices. The Moravians are unlikely to have been the first to take trombones to the New World. Spanish colonisation of South America in the sixteenth century caused one of the first major engagements of Catholicism with a non-European country. Music was embedded so deeply into Catholic religious practices that it is likely that instruments were introduced at an early stage; they were certainly used in Mexico in the late Renaissance.

The modern era for the trombone begins with the operas composed for Vienna in the third quarter of the eighteenth century. These include Gluck's *Orfeo ed Euridice* (1762), but it was the dramatic use of trombones in Mozart's operas, particularly *Don Giovanni* (1787) and *Die Zauberflöte* (1791), that must have had the greatest influence on other composers. The scoring for trombones by Mozart is poised and idiomatic, and similarly in sacred vocal works, particularly the C Minor Mass (1782/3) and the *Requiem* (1791), his writing takes the use of trombones to a new level of sophistication.

In England there was not a single native-born trombone player throughout the eighteenth century. Genuine confusion surrounded the requirement for what Burney called a 'Trombone or Double Sackbut' for the Handel celebrations at Westminster Abbey and the Pantheon in 1784. German trombonists were eventually found (Zink, M[ü]ller and Niebhuer) who had recently arrived in the country as part of Ely's band. But a mystery surrounds the identity of the trombone players who took part in the first British performances of Handel's oratorios *Saul* and *Israel in Egypt* in 1739. Both these works have idiomatic independent trombone parts, but no local players could have been available to play them. Otherwise, apart from a single instance in 1741 when trombones took part in a concert for the benefit of the trumpeter Valentine Snow, there is not one source that shows that trombones were used in England between the late seventeenth century and 1784. The most likely answer is that German players came to London to play the parts. When they left, the instruments were again quickly forgotten. A member of the audience in 1784 found them so novel that he described them in a marginal annotation to his programme as 'something like a brass bassoon with an ear trumpet'.³⁴ In England in the late eighteenth century it was as if the trombone had just been invented. But in

effect the idiom of the trombone was being redefined across Europe. Opera orchestras, and later symphony orchestras, incorporated trombones as part of their establishment. In Paris the first of a long line of trombone professors was appointed at the Conservatoire, and soon a new brand of players emerged whose values and techniques were appropriate for the age of Romanticism.

The trumpet before 1800

Edward H. Tarr

The late Renaissance (1500–1600)

Trumpeters seem to have enjoyed Imperial protection in the Habsburg empire by the fifteenth century.¹ In 1548, the Imperial Diet of Augsburg decreed that trumpeters and others were allowed to form guilds. The decree was confirmed in 1577, leading to the founding of the Imperial Trumpeters' and Kettledrummers' Guild in 1623.²

Three surviving manuscript collections allow an insight into the court trumpeters' military and ceremonial repertoire of the late Renaissance: the notebooks of two German trumpeters at the Danish court, Magnus Thomsen (1596–1609) and Hendrich Lübeck (1598), and a trumpet method, *Tutta l'arte della trombetta*, compiled in the 1580s and written down in 1614 by the Munich chief court trumpeter, Cesare Bendinelli (c.1542–1617). All contain exercises, military signals and ensemble pieces.³

Monophonic military music to c.1600

The oldest surviving trumpet signals, codified in Italy during the sixteenth century, were executed in the low register of the trumpet, from the second to the fifth or sixth partial of the harmonic series (C₃ to E₄ or G₄). They were preceded by an introductory 'toccata'; later a concluding third part was added. Bendinelli remarked that the style of execution should be free, 'with little regard for the beat'.

Other kinds of monophonic trumpet signals were played at special events such as announcements of university promotions or jury verdicts, or to summon the gentry to table. They were also included in theatre pieces,

including many of Shakespeare's plays, where they were called 'tuckets' (a word with an obvious etymological connection with 'toccata').

Trumpet ensemble music to c.1600

During the late Renaissance, Italian trumpeters also refined the art of ensemble playing by improvising over given themes. Their ceremonial pieces, which were usually performed by a five- or ten-part ensemble (split into one or two choirs) with optional kettledrums, were called 'sonatas'. Each musician was assigned a register, called (from highest to lowest part): 1. *clarino* or *soprano* (from C₅ to A₅, exceptionally C₆); 2. *sonata*, *quinta*, or *principale* (the main melody, C₄–C₅); 3. *alto e basso* (G₃–E₄, following the *sonata* part but lower); 4. *vulgano* ('the follower', on G₃); and 5. *basso* (on C₃). The true melody, located in the second part from the top, was sometimes a paraphrase of a well-known tune; over this the player of the highest part improvised embellishments, some of which were transmitted as exercises by Bendinelli, who also showed in three telling examples how such a *clarino* part was improvised over the second part.

More than three hundred sonatas survive from Bendinelli's time, and each follows a similar form: an introductory and closing *intrada*, the sonata itself (consisting of many eight-bar sections called posts, which grew in rhythmic complexity during the course of the piece), and a *rotta* (during which the *clarino* player rested).⁴

Other short trumpet ensemble pieces known as toccatas were sounded, usually thrice in succession, to announce the raising of the curtain on a theatre piece, such as at the inauguration of Palladio's Teatro Olimpico in Vicenza in 1587 and before the Prologue of Claudio Monteverdi's (1567–1643) opera *L'Orfeo* in Mantua in 1607.

Yet another kind of trumpet ensemble piece, the processional fanfare (*Aufzug*), seems to have originated around 1570.⁵ Here the melody is in the top part. It continued to be a trumpet genre well into the nineteenth century.

In ensemble pieces, trumpeters must have acquired a high degree of proficiency at an early date. By 1474, Saxon trumpeters performing for dancing after a wedding in the Upper Palatinate created a stir because they played 'higher than one could imagine'.⁶ And on the earliest surviving acoustical document of the trumpeters' art, a wind-up reed organ from

1582, in the shape of a tower 33.4 cm. high, populated by a black timpanist and two choirs of five bearded trumpeters each playing a processional fanfare, C₆ is reached in one of the sections (Ex. 4).⁷

Integration of the trumpet ensemble with voices and/or instruments

It may have been Bendinelli who first integrated the trumpet ensemble with singers, preparing the way for the acceptance of the trumpet into art music. He was commissioned in 1587 by Duke Wilhelm to set for trumpet ensemble ‘the piece ... sung in church on Christmas after Vespers ... called *Fi[t] porta Christi*’, from the *Hymnarium* (1580–1) of Orlando di Lasso.⁸ It was probably performed in alternation with the choir.⁹ At the Munich court it seems to have been heard every Christmas until at least 1614. Settings by Lübeck and Thomsen also survive.¹⁰

Ex. 4 *Aufzüge* of the Augsburg *Trompeter Automat* (bars 7–12), 1582



The Baroque period (1. The seventeenth century)

Military music

Our main sources of knowledge for trumpet playing in the seventeenth century are *Modo per imparare e sonare di tromba* (Florence, 1638)¹¹ by Girolamo Fantini (1600–c.1675), Marin Mersenne’s treatise *Harmonie universelle* (Paris, 1636–7), and volume III of Michael Praetorius’s *Syntagma musicum* (Wolfenbüttel, 1619). Fantini notated military signals much more precisely than his predecessors, setting the style for the codifications which were to come.

Among the various types of signals is an ascending arpeggiated motif (from G₃ to G₄, the final G₄ being reiterated) emerging shortly before 1600

and known first as a *chiamata*, later as a ‘call’ (*Ruf*), serving an introductory or structural function in various signals.¹² In its final form on C₄, it found its way not only into many military signals of the nineteenth century, but also into countless musical compositions from Biber to Bach, the best known of whose numerous quotations of this motif is from the aria for bass and trumpet, No. 8, ‘Great Lord, o mighty King’, from the *Christmas Oratorio* (Ex. 5).¹³

The founding of the Imperial Trumpeters’ and Kettledrummers’ Guild

On 27 February 1623, Emperor Ferdinand II confirmed the twelve articles of an Imperial Privilege given to the Imperial Trumpeters’ and Kettledrummers’ Guild. (The articles were confirmed by every emperor through to Joseph II in 1767, Ferdinand III expanding the Privilege to contain twenty-three articles in 1653, and Franz I reducing them once again to twelve in 1747.)¹⁴ The main purposes of the Privilege were to keep the number of trumpeters small and the level of their art high by strict regulation of their instruction, and also to ensure the trumpet’s exclusive status by restricting its use.

Although the Privilege was valid only for the Habsburg empire, in fact the trumpet occupied a similarly exclusive position in many other countries as well.

Ex. 5 Traditional trumpet signal (*chiamata*, *Ruf*) as found in H. I. F. von Biber’s *Trombet undt musicalischer Taffeldienst (Intrada)* and in J. S. Bach’s *Christmas Oratorio* (No. 8), 1734–5

Violin



Solo tpt in D



The acceptance of the trumpet into art music in the seventeenth century

The trumpet was emancipated from its military and ceremonial functions and accepted into 'art music', in the company of voices and other instruments, in various centres at different times.

This process began with the trumpet choir simply being taken over into various settings. Bendinelli's pioneering achievement of 1587 and Monteverdi's famous *Orfeo* toccata (Mantua, 1607) have been mentioned. In various collections after 1614, Michael Praetorius (1571–1621) composed several vocal works into which he integrated the trumpet choir. Among them is a 1618 setting of the well-known Christmas tune *In dulci jubilo*, with voices, instruments and a six-part trumpet choir. (He referred to the parts as two *Clarien*, *Prinzipal*, *Alter Bass*, *Volgan* and *Grob*.) That the trumpeters' art at this time was most suitable for the battlefield may be deduced from Praetorius's remark a year later that, so as not to drown out the other instruments, the trumpet choir should be deployed 'in a special place near by the church'.¹⁵ In setting the same piece in 1620 for choir and trumpets, Samuel Scheidt (1587–1654) retained only the upper two *Clarien* parts and gave them rich passagework.

Vienna, seat of the Habsburg emperors, is the key to the trumpet's acceptance into art music during the early seventeenth century. Because trumpets symbolised both the *ecclesia militans* and Imperial pomp,¹⁶ it was there or in its associated centres that many of the earliest attempts were made to integrate the trumpet ensemble into vocal compositions (Masses and Vesper psalms).

The earliest such works (written perhaps around 1610 and certainly before 1616) are a *Messa con le trombe a 16* and a *Magnificat con le trombe* by the Graz court composer Reimundo Ballestra,¹⁷ and a *Magnificat* and a *Jubilate Deo* by the Vienna court composer Giovanni Valentini (1582/3–1649), printed in Vienna in 1621.¹⁸ The Mass *Veni sponsa Christi* by Vienna-based Christoph Strauß (printed posthumously in 1631) features solos for both the *principale* and *clarino* parts in the Credo, and for the *clarino* (a brilliant flourish ascending to C6) in an introductory Symphonia.¹⁹

In the ensuing period, Antonio Bertali (1605–69) composed three *Messe con trombe*, Johann Heinrich Schmelzer (1623–80) eight, and more were to come from court composers such as H. I. F. von Biber (1644–1704, in Salzburg), Johann Joseph Fux (1660–1741) and Antonio Caldara (1670–1736).²⁰ In these works, trumpeters played introductory *intradass* as well as various other appropriate sections.

Also in Vienna, in place of the Sequence of the Mass, a tradition of ‘solemn sonatas’ with and without trumpets, as opposed to ‘ordinary sonatas’ and ‘pastoral sonatas’ without them, dates from the late sixteenth century, and began to include trumpets in the time of Bertali (*Sonata di Natale*, for two trumpets, two cornetts, four trombones, strings and continuo; Epiphany sonata for four trumpets, two cornetts, three trombones, strings and continuo; two sonatas for St Leopold) and Schmelzer (*Sonata Natalis* for five trumpets, strings and continuo). In addition, solemn sonatas with trumpets and timpani were performed in the place of the Gradual at coronations and similar celebrations of the greatest pomp.²¹

In Kremsier, a Habsburg residence in Moravia, a significant flourishing of the musical art took place during Karl Lichtenstein-Kastellkorn’s reign as Prince-Bishop of Olmutz (1664–95). H. I. F. von Biber, a violinist who worked there before moving to Salzburg in 1670, wrote many important trumpet works, including two sonatas for six and eight trumpets respectively, with timpani and continuo. Court *Kapellmeister* Pavel Josef Vejvanovsky (1639/40–93), himself a trumpeter, wrote many significant pieces for one to five trumpets, strings and continuo; and other composers active in Vienna, including Bertali and Schmelzer, sent the Prince-Bishop manuscripts of their works, many of which featured the trumpet.

Here in Vienna and the Habsburg lands, then, is the true origin of the church sonata with trumpet(s), a genre which came to enjoy much popularity in Bologna. Several dozen trumpet sonatas were written for the basilica of St Petronius, commencing with Maurizio Cazzati’s (c.1620–77) Op. 35 of 1665 (which included three sonatas with solo trumpet, strings and continuo) and continuing with well-known works by Giuseppe Torelli (1658–1709), Petronio Franceschini (1650–80), Domenico Gabrielli (1651–90) and others.²² The Bolognese trumpet sonatas were often preludes to the Mass or Vespers, performed on the name day of the church’s patron.²³ The combined repertoire of Kremsier and Bologna contains more pieces written for solo trumpet than anywhere else.

In Italy, it had been the Tuscan court trumpeter Fantini who introduced his instrument into art music, his method of 1638 containing eight sonatas for trumpet and organ and numerous dance movements for trumpet and continuo. Fantini apparently mastered the art of 'lipping', so that he could produce pitches between the available notes of the harmonic series. French trumpeters witnessing a 1634 performance of Fantini, together with Frescobaldi, organist of St Peter's in Rome, were less than complimentary, calling his execution of such pitches 'spurious' and 'unordered', but we should not place much stock in such accounts, since the trumpet's place in French music at that time was still exclusively associated with the military sphere.²⁴

The trumpet was introduced into Italian opera by the Venetian composer Antonio Sartorio (1630–80) in the Sinfonia to *L'Adelaide* (1672, two trumpets); and Venetian operas of the following years by Sartorio, M. A. Ziani (c.1653–1715), Giovanni Legrenzi (1626–90), Domenico Freschi (c.1630–1710) and others often contain one or more arias and sinfonias with solo trumpet, an example which was followed by Alessandro Scarlatti (1660–1725) in Rome and Naples. The arias (usually for soprano) exemplify the heroic feelings common to the operas of that period, reflect on the typically Baroque conflict between love and war, or accompany the goddess Fame, whose traditional attribute was one or two trumpets and who often came flying through the air above the stage, transported by a machine.

In France, the trumpet symbolised Louis XIV as *le roi soleil*. There were several corps of trumpeters under his personal jurisdiction: twelve military trumpeters divided into four *trompettes ordinaires ou de la chambre* and eight *trompettes non servants* who performed in groups of three or six; and twenty-four in the Royal Life Guards, from which were recruited the four élite trumpeters *des plaisirs du roi*.

It seems to have been Jean-Baptiste Lully (1632–87) who introduced the trumpet into French art music (church music and opera) in the 1680s. He and his successors – including Marc-Antoine Charpentier (1634–1704), André Campra (1660–1744) and Jean-Philippe Rameau (1683–1764) – often wrote in a three-part texture consisting of two upper melodic parts and a bass part doubled by kettledrums. Often, all parts were played by several trumpeters in unison.

The trumpet was introduced still later into art music in England, where the court trumpeters were organised into four groups of four each in Life

Guards regiments. After an early example by Matthew Locke from 1675 (albeit for 'warlike music') which has not survived, and two others by Nicola Matteis from 1685 and 1687 which survive only in fragmentary form, it seems to have been Henry Purcell (1659–95) who, in 1687, was the first to discover the non-warlike capabilities of the instrument, with the birthday ode, *Sound the Trumpet, Beat the Drum*. He was inspired by Sergeant Trumpeter Matthias Shore (c. 1640–1700) and his sons and successors William (?-1707) and John (1662–1753). John could play 'with all the softness imaginable'²⁵ and was even called 'ye best Master in ye world'.²⁶

Purcell's three dramatic works of 1690 – *Arise, my Muse; Dioclesian; Of Old when Heroes thought it Base* – and many compositions of the following years, including *King Arthur* (1691), *The Fairy Queen* and *Ode for St Cecilia's Day* (1692), *Te Deum and Jubilate* (1694), and *The Indian Queen* (1695), contain some of the most stirring trumpet parts in the repertory, both in C and D.

Purcell's forward-looking example encouraged other composers, including his brother Daniel (c.1663–1717), John Barrett (c.1674–1735), John Blow (1649–1708), Jeremiah Clarke (1673/4–1707), William Corbett (c.1680–1748) and others, to write overtures, sinfonias and sonatas featuring one, two or (rarely) four trumpets, as well as numerous airs and trumpet tunes in their dramatic works between c.1695 and c.1715. These parts seldom go above the thirteenth partial.²⁷

The 'flatt trumpet', an English innovation, was a chromatic trumpet with a double slide placed in the bend near the player's chin. On St Cecilia's Day 1691 some trumpeters under John Shore 'plaid ... some flat tunes [i. e. in the minor mode] made by Mr Finger with a general applause, it being a thing formerly thought impossible upon an instrument designed for a sharp [i. e. major] key'.²⁸ Purcell then composed a short movement in the minor mode for four of them in *The Libertine* (1692), later adapting it as the first of three movements composed for the funeral of Queen Mary II (who died on 28 December 1694); shortly after, this music was sounded at his own funeral. The flatt trumpet then seems to have become temporarily extinct, becoming reinvented at the end of the eighteenth century.

The Baroque period (2. The eighteenth century)

The Habsburg domain

In Vienna, the arts reached their apogee during the reign of Karl VI (1711–40); historians speak of a *Reichsstil*, a unified style of art, architecture and music dedicated to the glorification of the Habsburg empire. In no other royal house were protocol and ceremony delineated to such an elaborate degree as in Vienna. Immediately upon his succession, Karl VI increased the number of court trumpeters from seven to fourteen. There were two groups, which overlapped – the Musikalische Trompeter and the Hof- und Feld-Trompeter, each with its timpanist(s).²⁹

The sacred and secular feast days at court were divided into three groups in descending order of importance.³⁰ Participation of one or two choirs of four trumpeters each was obligatory in the two highest categories, two choirs (eight trumpeters and two timpanists in all), however, being reserved for the ‘gala days’ (birthdays and name days of the Emperor and Empress).³¹

In their operas and oratorios, the court composers Fux, Caldara (who wrote thirty-three dramatic works with trumpet parts), Luca Antonio Predieri (1688–1767) and Georg von Reutter II (1708–72) wrote spectacular high trumpet parts surpassing all others anywhere in terms of range and technical difficulty. Ascending regularly to E₆, the twentieth partial, and occasionally even to G₆, with long sequences, trills on nearly every sustained note, and treacherous arpeggiated figures, often for two trumpeters in echo, they were written for three court trumpeters: Franz Kuffel (*Ober-Trompeter* between 1711 and 1754), Franz Josef Holland (1687–1747) and Johann Heinisch (*fl.* 1727–50). In 1732, Fux called Heinisch ‘a very special virtuoso’ who was able to play certain (presumably very high) notes ‘that the composers had previously wished for, but no trumpeter had been able to execute’, recommending that his pay be doubled!³² Already in the pre-Heinisch era Caldara had written duets in which both trumpeters were expected to ascend to E₆, with trills and unprepared entries at this height; but in the opera *Adriano in Siria* (1732) the first trumpet reaches an F₆ three times in bars 46–7 of the Introduzione,

and several of Reutter's works, including a trumpet concerto in C major, require the 'world record' height of G₆, which is even reiterated (see [Ex. 6](#)).³³

Not only was the Dresden trumpet corps one of the most important in the empire, with eight to fifteen members between 1548 and 1795, but the court orchestra was also one of the best-trained and most virtuosic anywhere. The *Concerto a VII Clarini con Tymp.*, included as an appendix to J. E. Altenburg's *Versuch einer Anleitung zur heroisch-musikalischen Trompeter- und Pauker-Kunst* (which was published by J. C. Hendel of Halle in 1795), may well have been composed, not by him, but by a Dresden chief court trumpeter around 1760.³⁴ Altenburg's treatise is the most comprehensive source on the Baroque trumpeters' understanding of their art.

Ex. 6 Georg von Reutter II, Trumpet Concerto No. 1 in C Major, 1st movement (bars 37–42)



Leipzig and environs: J. S. Bach

When J. S. Bach (1685–1750) took on his new position as cantor of St Thomas's church in May of 1723, he had at his disposal four 'city pipers' (*Stadtpfeifer*), three fiddlers, one apprentice from the town, students from the university and fifty to sixty pupils of St Thomas's school, split into four choirs. One of these choirs, of sixteen to twenty singers, was directed by Bach himself. He found a long-standing local tradition of good trumpet playing. His predecessors, Sebastian Knüpfer (1633–76), Thomas Schelle (1648–1701) and Johann Kuhnau (1660–1722), had all written trumpet music. A feature of their writing, owing to the particular instruments used by the *Stadtpfeifer*, was the occasional use of slide trumpets. These were equipped with a long single slide inside the mouthpipe, so that the entire instrument had to be moved back and forth; they were used mainly for playing chorales.

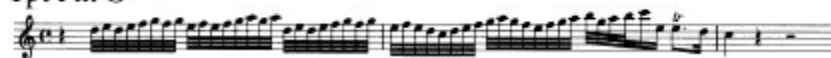
During his Leipzig tenure, Bach wrote at least three cycles of cantatas. A third of these (about a hundred cantatas) have been lost. More than half of those that survive contain trumpet parts. Of these, roughly half are in D and half in C. Only two cantatas feature two trumpets (BWV 59 and 175), and two are for four (BWV 63 and 119). The rest are for one or three trumpets, the latter generally being reserved for festive occasions. His Cantata No. 172, first performed in Weimar on 20 May 1714, is a telling example of pre-Leipzig trumpet virtuosity ([Ex. 7](#)).

The only significant difference in Bach's trumpet writing in Leipzig, as opposed to the pieces composed at his previous places of appointment, was his use of the *tromba da tirarsi*, as the slide trumpet was called. In six cantatas he explicitly asked for this instrument or its counterpart, the slide horn: Nos. 46 (from 1 August 1723, *tromba a corno da tirarsi*), 77 (22 August 1723), 162 (10 October 1723, *corno da tirarsi* added to a work first performed without brass in Weimar on 25 October 1716), 67 (16 April 1724, *corno da tirarsi*), 20 (11 June 1724) and 5 (15 October 1724). In many other movements, starting in May 1723, its use is mandatory although not stated in writing.

Ex. 7

J. S. Bach, Cantata No. 172, Aria 3 (bars 8–10), 1714

Tpt I in C



The player who performed Bach's Leipzig brass parts (first trumpet, horn, cornett and probably descant trombone) until his death was Gottfried Reiche (1667–1734). He had trained as a city piper in his native city of Weißenfels, the court of which produced several eminent trumpeters including J. E. Altenburg and his father J. Caspar Altenburg (1689–1761), as well as Bach's future father-in-law Johann Caspar Wülcken (?-before 1732). Reiche came to Leipzig in 1688 and worked his way up through the *Stadttpfeifer* hierarchy, becoming Senior in 1719.

However, to say that Reiche influenced Bach's trumpet writing, as has been done in recent years,³⁵ goes too far. Reiche's successor, Ulrich Heinrich Ruhe (?–1787), performed for Bach for sixteen years to the former's eleven, including many repeat performances of works originally

written for Reiche, who had required an assistant in the last years of his life.³⁶

In his writing for first trumpet, Bach required a range from the third to the eighteenth partial, from G_3 to D_6 ; the second trumpet ascended to the sixteenth or C_6 , and the third to the twelfth or thirteenth, G_5 or A_5 . Only once did he write E_6 , in the obbligato to the final chorale of Cantata No. 31 (originally in E_b in *tief Kammerton*, performed first in Weimar on 21 April 1715 and later in Leipzig on various occasions, in C in normal *Kammerton* at $A_4 = 415$). Bach's trumpet parts sometimes display the 'lipped' notes B_4 and less often $C_{\#5}$, while the out-of-tune eleventh and thirteenth partials (F_5 and A_5) are treated on an equal basis with all the others. Endurance is sometimes a problem, as in No. 64 of the *Christmas Oratorio* or, most notably, the opening chorus of Cantata No. 41, *Jesu, nun sei gepreiset*, written for New Year's Day 1725, the first trumpet part of which displays only 7 bars of rest in its first 103 bars, and only $1\frac{1}{2}$ bars' rest between bar 175 and the end at bar 213.

Italy

Torelli returned to Bologna in 1701 after a six-year absence in Ansbach and, significantly, Vienna, bringing a new instrument, the oboe, with him, and continuing to write instrumental music utilising two trumpets and two oboes with strings and continuo. The vocal music (Masses and Vesper psalms) of his predecessors, much of it with prominent parts for one or two trumpets, continued to be performed well into the twentieth century, and Padre G. B. Martini (1706–84) wrote a number of sinfonias and sonatas featuring four trumpets.



Figure 15 Gottfried Reiche (1667–1734), portrait (1727?) by Elias Gottlieb Haussmann.

Alessandro Scarlatti was active in Naples and Rome, influencing the young Handel during his long study trip to Italy from 1706 to 1710, and making considerable use of the trumpet in his operas and oratorios. In the learned circle of the Roman *accademia*, frequented by the wealthy and

powerful (he, Pasquini and Corelli were admitted to the Accademia dell'Arcadia in 1706), he wrote seven arias for soprano, D trumpet and continuo, as well as a famous and highly virtuosic cantata (for the above with two violins), *Su le sponde del Tebro*.³⁷

It was in Italy that the 'new style' was developed, lighter, with a new prominence to the upper line at the expense of the bass, and less pompous, to the detriment of the trumpet. Nevertheless, it was Baldassare Galuppi (1706–85), a representative of the newer style, who at an unspecified date wrote a most interesting aria in the operatic Fame tradition for soprano, C trumpet, strings and continuo, 'Alla tromba della Fama'.³⁸

London: G. F. Handel

When George Frideric Handel (1685–1759) settled permanently in London in the autumn of 1712, he found a thriving trumpet tradition. The King's Sergeant Trumpeter, for whom he wrote most of his parts, was Valentine Snow (c.1700–70). Handel had already written for trumpet in his early operas *Almira* (Hamburg, 1704) and *Agrippina* (Venice, 1708).

The first opera he wrote for London, *Rinaldo*, first performed on 24 February 1711 at the Theatre in the Haymarket, caused a sensation because of its dramatic writing for four trumpets (a rare occurrence), and because of its lavish use of stage machinery, with fire-spewing dragons and live sparrows released into the opera house.³⁹

Handel wrote for trumpet(s) in twenty-two of his forty operas (1704–41) and eighteen of his oratorios (1720–51). The majority of these works employ two trumpets, but a few are for one and the most pompous ones for three. One of his most virtuosic arias is 'Desterò dall'empia dite' from *Amadigi* (1715) for soprano, trumpet, oboe, strings and continuo. Virtuosity for its own sake, however, was not for him. The effectiveness of Handel's trumpet parts (mostly in D) lies more in the sheer majesty they convey; although he generally did not write as high as Bach, his parts are often strenuous because of their length. Cases in point are *Messiah* (1742, with its famous bass aria with obbligato trumpet conjuring up the Last Judgement, 'The Trumpet Shall Sound'), the Dettingen Te Deum (1743, celebrating a military victory), three of his four Coronation Anthems (1727, for the coronation of George II), and the *Royal Fireworks Music* (1749), all but the first of these being written for two *clarini* and *principale* plus kettledrums.

The English slide trumpet, which had a brief existence in the late seventeenth century as the ‘flatt’ trumpet, was reinvented towards the end of the eighteenth century. Its invention was attributed to John Hyde and the first instruments were apparently built by one Woodham, who died in 1795 or 1797. It seems, however, that already in 1790–1, in Vauxhall Gardens, another trumpeter named Sarjant performed certain pieces by Handel which would be unplayable on the natural trumpet but lie well on a slide instrument. However that may be, the English slide trumpet’s short double slide is pulled towards the player and permits a lowering of harmonic series notes by a full step. It was used extensively in the following century by the Thomas Harpers, father (1786–1853) and son (1816–98).⁴⁰

Baroque performance style – the basic features

Compared with the modern orchestral tradition, Baroque performance style – not only for the trumpet – displays several marked differences.

(1) Intonation. The various systems of unequal temperament current between c.1550 and c.1815 have one element in common: their preference for the pure, i.e. beatless, major third (with a vibrating ratio of 5:4). All were well suited to the natural trumpet, the pure third of which (5:4) was placed in the harmonic series by nature. Modern keyboard instruments tuned to equal temperament are therefore theoretically out of tune.

(2) Strong and weak beats. There was a greater difference between strong and weak beats than there is in the modern linear, symphonic tradition, corresponding to a particular vocal ornament arising at the beginning of the Baroque period and described by both Giulio Caccini in *Le nuove musiche* (1600) and Fantini in his trumpet method (1638): the ‘messa di voce’, or a crescendo and diminuendo on long notes. That this manner of playing was current throughout the entire period in question is shown by a remark in Leopold Mozart’s violin tutor of 1756, concerning the speed of the bow on individual notes: slow at the beginning, fast in the middle, and dying out at the end.

(3) Articulation. Articulation was described in various sources between 1535 and 1795, not only in the familiar trumpet methods, notably on pp. 10–11 of Fantini’s tutor (see [Fig. 16](#)), but in still greater detail in recorder,

cornetto and flute treatises. From these it is easy to develop a general rule to use unequal articulations (alternating syllables beginning with strong consonants such as *t* or *d* with those beginning with weaker ones such as *r* or *l*) on intervals of a second, with equal ones reserved for notes on the same pitch or in arpeggiated figures.⁴¹

(4) Improvisation. Early wind methods assigned a significant part of their text to improvisation. This feature comes through only weakly in the trumpet methods by Bendinelli, Fantini and Altenburg, showing the importance of oral instruction.

Modo di battere la lingua puntata in diuersi modi.

le ra le ra li ru li ta te ta ta ti ta ta

ti ri ti ri ti ri di la le ra la la la la

teghe teghe teghe di la de ra de ra de ra

ta se ta se ta se ta le ra le ra la ta se ta se ta

la ra le ra la ra la se ghe se ghe da se re se re da

II

tia tia da la la le ra la la la le ra le ra la

dia dia da ta ra te re da ta ra se re te re da

leralera la ti ri ti ri da teghe teghe teghe da

la la le ra le ra le ra teghe teghe teghe teghe ti ri ti ri ti ri ti

se re se re se re se re le ra lera lera lera teghe teghe teghe di

Figure 16 ‘Various Ways of Tonguing’, from Girolamo Fantini’s *Modo per imparare a sonare di tromba* (Frankfurt, 1638 (sic, but probably published in Florence)), pp. 10–11.

(5) Pyramid. In addition, the Baroque trumpet produces a gentler tone than today’s piccolo trumpet, owing to its greater tube length (224 cm. vs. 65 cm.) and its much larger mouthpiece (with a bore of 4–6 mm. vs. 3.6–3.8 mm.). One could compare playing in a Baroque trumpet ensemble with organ intonation: the tenor part of a Bach fugue is easily discernible on a

Baroque organ (but not on a Romantic one). The sound of Baroque organs, and of ensembles of Baroque trumpets, should resemble a pyramid, with the loudest notes (*principale* part) at the bottom and the gentlest (*clarino* part) at the top. This is in marked contrast with jazz, for in a big band the lead trumpeter is heard above all other parts. The greatest Baroque trumpeters, from Fantini and Shore to Heinisch, were praised not for their sheer power, but for their ability to play softly.

(6) Conclusion. In the Renaissance and Baroque periods, the basic precept for any instrumentalist was to imitate the human voice. The basically vocal nature of nearly all Baroque trumpet music has stylistic consequences in accordance with the five points raised above. It is not by accident that Baroque orchestras composed of 'authentic' instruments have come into existence in recent years: they represent a reaction against large symphony orchestras with their entrenched later repertoire and performing style. Holding a Baroque trumpet in one's hands, however, is not a guarantee of performing in Baroque style.

The Classical period

1750–1815: a period of crisis

For the trumpet, the period following Bach's death was one of crisis. On the one hand, the art of *clarino* playing advanced to unheard-of heights; but on the other, the new style of composition was rendering virtuoso trumpeters obsolete.

Playing in the highest register of the trumpet reached its apogee between 1730 and 1770 in Germany and Austria. The most important trumpet works, divided into three groups by range, are indented below.⁴²

To the first group, in which the trumpet is expected to ascend to the sixteenth or eighteenth partial, belong works by J. S. Bach, W. F. Bach (1710–84), C. P. E. Bach (1714–88), J. F. Fasch (1688–1758), G. P. Telemann (1681–1767), J. M. Molter (c.1695–1765), L. Mozart (1719–87), J. W. Hertel (1727–89) and J. M. Sperger (1750–1812). To these may be added a difficult triple concerto in E by C. F. C. Fasch (1736–1800) and

certain works by Telemann, J. S. Endler (? – 1762), J. S. Bach and others, featuring a *clarino piccolo* in F.

A second group, concerti ascending still higher (to E₆ and F₆ on an instrument in D) and making corresponding demands on endurance, is represented by F. X. Richter (1709–89), J. Riepel (1709–82), J. Stamitz (1717–57), Endler and J. A. Groß (Gros) (1701–83/4).⁴³

Finally, there are the works of the highest virtuosity (ascending to G₆) by the Austrian composers M. Haydn (1737–1806), Reutter and others, for Heinisch, his pupil Caspar Köstler, and perhaps also J. B. Resenberger, the two latter both Salzburg court trumpeters.

The new style of composition was foreshadowed in the works of Reutter. In a single work, such as his *Servizio di tavola* Nos. 1 or 2, a single *clarino* could be dedicated a solo movement containing a beautiful cantilena ascending to F₆, or a pair of high trumpets could chase each other up to E₆, with free entries and trills on this pitch, sequential arpeggios, and sixteenth-note triplet runs, while in the other movements Classically oriented trumpets and timpani provide rhythmic reinforcement of tonic and dominant in a moderate range.

Classical music with trumpets

Composers of the so-called Classical period, notably Joseph Haydn (1736–1809), Wolfgang Amadeus Mozart (1756–91) and Ludwig van Beethoven (1770–1827), created music in which trumpets had an entirely new function, rhythmically rather than melodically oriented. Strings and woodwind instruments, even horns (which were generally written for in pairs, sometimes in two different pitches), were more capable than the heroic trumpet of expressing the wide range of emotions which the new style demanded. Trumpets were deployed mainly as a pair, and were generally used to accentuate the home tonality of a given movement or work. The range of first trumpet parts generally did not extend above G₅. Second trumpet parts often contained wide, treacherous skips and had an average range of G₃–E₅. An occasional trumpet fanfare concluding a fast movement betrays the instrument's once heroic function. Since their parts no longer fulfilled an easily discernible melodic function, trumpeters had to

employ considerable insight and keep their ears open in order to bring their instruments into proper balance with the rest of the orchestra.

In some of his sacred music, Mozart followed the old Austrian tradition of writing for four trumpets, two high and two low (K. 66 and 66b). Although, according to an old anecdote involving a family friend, the Salzburg court trumpeter J. A. Schachtner (1731–95), Mozart had an inborn antipathy to the trumpet, he nevertheless wrote a trumpet concerto (now lost) in his early years and used the instrument tellingly in his scores.

Up to 1775, Haydn used trumpets in pairs and pitched only in C; he then gradually added the pitches of D (1775), B \flat (1778–9) and E \flat (in England, 1793).⁴⁴ The *Nelson Mass* (1798) uses three in C.

Beethoven also adhered to the standard Classical trumpet range, writing for pairs of trumpets in B \flat , C, D, E \flat and F, but made new demands on endurance.

Short trumpets

During this period, Nuremberg lost its hegemony as the leading centre of brass instrument making. New shapes were also devised. A set of four in F with two double bends, now in the Leipzig collection, was made for a church in Schweidnitz, Silesia, by J. L. Ehe III (c.1735) and by Heinrich Nicolaus John of Breslau (1735), each of whom produced one pair of the instruments.⁴⁵ Numerous short trumpets made in the area between Vienna, Prague and Budapest were built in a high basic pitch such as F or G and crooked down to lower ones, in response to the new tonalities demanded by Classical scores. The first fold of tubing of these instruments is shorter than the main one and results in a short mouthpipe.⁴⁶

It is also possible that they were built in this way so that they could be played chromatically by hand-stopping, a technique supposedly introduced in the 1770s by the Karlsruhe trumpeter Michael Wöggel,⁴⁷ for whom J. A. Schmittbaur (1718–1809) wrote seven concerti in 1773–4, now lost. Wöggel's trumpet, which is said to have been made by J. A. Stein of Augsburg, but is also lost, was curved slightly so that he could more easily reach the bell; trumpets with this shape were later called 'trompettes demi-lunes' in France.⁴⁸

Keyed trumpets

Most surviving keyed trumpets were also made in the short shape.⁴⁹ Although about fifty such instruments are known to survive and several trumpeters experimented with key mechanisms, the one whose name is specifically linked with this particular type of instrument is Anton Weidinger (1766–1852), a Viennese court and theatre trumpeter.⁵⁰ He commissioned a number of solo works, notably Joseph Haydn's immortal concerto in E \flat , written in 1796 but not performed by Weidinger until 28 March 1800. Others include pieces in E \flat by L. Kozeluch (1798) and J. Weigl (1799), a trio by Johann Nepomuk Hummel (1802), and the concerto in E by Hummel (written in December 1803 and first performed on New Year's Day 1804, presumably on a new instrument). For all of these composers, the use of a keyed instrument was a unique experiment, since they otherwise wrote exclusively for the natural trumpet.

Trumpets with vent holes

Two trumpets with vent holes survive from the late eighteenth century. William Shaw's so-called 'harmonic trumpet' of 1787 is a silver instrument from the vaults of St James's Palace, London, built in E \flat , with crooks to D, C and B \flat , and a set of vent holes mounted on sleeves. Opening a hole eliminates the neighbouring partials and functions as a quick-change device between tonic and dominant.⁵¹ The other such trumpet, in the Frankfurt Historisches Museum, was made in 1790 by G. Haltenhof of Hanau and has one vent hole. These instruments could only have been used in a 'Classical' context, to aid accuracy in hitting isolated pitches, and hardly for melodic playing in the Baroque sense.

The vent-hole system had a future: rediscovered around 1960 by Otto Steinkopf, it was applied to Baroque trumpets built by Helmut Finke (Herford) and first played successfully by Walter Holy of the Cappella Coloniensis, the pioneering Baroque orchestra of the West German Radio in Cologne. Thanks to this brilliantly simple invention, which eliminates every other partial by the alternative opening and closing of two tiny vent holes, modern trumpeters are able to perform with a fair degree of security in the upper register of eight-foot instruments.

Steinkopf devised a third, so-called ‘transposing hole’, to shift the tonality of a C trumpet to F, or of a D trumpet to G. He found his inspiration in certain mid-nineteenth century German posthorns displaying one transposing hole. On these instruments it is possible to play melodies in the third or ‘fanfare’ octave of the harmonic series: the hole is so positioned that a player by opening it can easily produce F_4 between the fifth and sixth partials, and A_4 between the sixth and seventh. Steinkopf placed this hole, however, at an acoustical point rendering these two notes perfectly in tune an octave higher, in the clarino register. He thus presented an instant solution to the natural trumpet’s deficient eleventh and thirteenth partials. The too sharp F_5 and too flat A_5 on a C instrument thus become the in-tune prime and third of an instrument in F – thus the designation ‘transposing hole’. A later, equally brilliant invention of Michael Laird’s furnished trumpets with even four holes. Rightfully, instruments provided with such aids should not be referred to as ‘natural trumpets’. Following Robert Barclay’s suggestion, I think ‘Baroque trumpet’ is the best term. Although purists clamour loudly for ‘no compromises’, they owe a great debt to Steinkopf and Holy for first showing this possibility.

Baroque style, Classical style, modern style

With the emphasis shifted from melodic playing to rhythmic punctuation and emphasising of principal tonalities, Classical trumpeters changed their style of articulation. Baroque ti-ri articulation apparently went out of fashion, soon to be replaced during the Romantic period by the ‘two slurred, two tongued’ articulation still taught today. With their instruments built in ever-higher keys and crooked down to various lower ones, trumpeters also lost a degree of sensitivity. Although certain players through the end of the eighteenth century and well into the nineteenth were able to play very high notes, these were no longer demanded in scores. All these elements led to a somewhat heavier style of trumpet playing from which the modern performing style developed.

For those interested in playing Baroque music in the proper style, as far as it is possible to make any pronouncements at all at such a historical

distance, let it be pointed out that modern indentening habits are not easily discarded. The idea of the pyramid, for example, simply does not apply in the modern big band, as mentioned above. Modern piccolo trumpets, too, universally employed for performances of Baroque music on modern instruments, make it possible for players to negate the pyramid; for with these a 'high C' can be played just as loud as any note in the middle register. ('High C' is in the middle register of such short instruments)! Such aural influences are ubiquitous and hard to ignore. The result is that in rendering Baroque music, many players today perform in all registers with equal (loud) volume.

In rendering Baroque music on any trumpet, then, modern or reconstructed, performers should remember the differentiation made in those days between the soft, singing *clarino* style and the more robust, militaristic *principale* style. It is the latter which led to the Classical performing style and to our modern one as well. Even though it will probably prove impossible to change our styindentenic awareness and our indentening habits completely, it is devoutly to be wished that in the future, sensitive trumpet soloists will derive pleasure from producing high notes 'as softly as a flute', thus joining the ranks of their eminent predecessors Shore and Heinisch.

The horn in the Baroque and Classical periods

Thomas Hiebert

Throughout the ages the horn has been inextricably linked with hunting, an extra-musical association that coloured its use in music during the Baroque and Classical periods. Early on, the horn was employed in fanfares for hunting scenes in stage works such as Michelangelo Rossi's *Erminia sul Giordano* (Rome, 1633), Francesco Cavalli's *Le nozze di Teti e di Peleo* (Venice, 1639) and Jean-Baptiste Lully's *La Princesse d'Elide* (Versailles, 1664).¹ Though it is not known if the horns used in these works were of the tightly wound helical or the more modern single-coil variety, they had essentially the same range and harmonic-series pitchgamut as the trumpet.² This is illustrated in the *Sonata da caccia con un Cornu*, c.1670, written by an anonymous Bohemian composer for strings and horn in C *alto* – at the same pitch as the trumpet in C.

A crucial step in the evolution of the horn was its further differentiation from the trumpet (a differentiation that continued throughout the eighteenth century) as its tube length became longer, with a larger hoop and wider bell, resulting in a lower compass and a deeper, more sonorous tone. It was only after this maturation that composers requested the horn regularly in art music. The larger *cor de chasse*, associated with the mounted Parforce hunt, is generally thought to have appeared in France by 1680 during the reign of Louis XIV, first as a single-coiled horn in C *alto*, then a double-coiled horn at lower pitches.³ Count Franz Anton Sporck (1662–1738) of Bohemia is credited with introducing the large-hooped *cor de chasse* to German-speaking areas, where it was often called the *Parforcehorn*. After having seen it in Paris c.1680, Sporck sent two of his retainers, Wenzel Sweda (c.1638–1710) and Peter Röllig (c.1650–1723), to learn this novel

instrument. Sporck was not the only person to have been impressed with the *cor de chasse*, for it is clear that the ‘french horn’ was known in England at the same time.⁴ However, Sporck’s initiative was pivotal, because the school of players that developed in Bohemia produced many of the best horn players of the eighteenth century. Though the French *cor de chasse* and the Parforce hunt were widely imitated, relatively little serious music for horn was written in France before the instrument had been introduced into the orchestra in German-speaking areas, Italy and England at the beginning of the eighteenth century.

Introduction of the horn into the orchestra: 1700–1740

The earliest references to horns built with crooks (called *Krumbögen* – most likely terminal crooks) date from 1703, and appear in a bill from the Viennese horn builder Michael Leichnamschneider.⁵ This important development, indicating that horns were being built not only for the hunt but for musical performance in several keys, is confirmed ten years later by Johann Mattheson in his ‘Waldhörner’ article in *Das neu-eröffnete Orchestre* (1713).⁶ Mattheson states that the horn had become very popular in ‘church, theatre, and chamber music’ precisely because it represented a different aesthetic from the trumpet: it was not as coarse in tone, it could be played with more facility, and with the most useful key, F (a fifth beneath the trumpet in C), it was more effective in filling out the texture. Mattheson’s ideas are echoed repeatedly later in the century, often virtually verbatim, showing a widespread Austro-German preference for this aesthetic.⁷ Though numerous makers built large-hooped horns, the ideal for a full-bodied horn tone was probably best realised in the Leichnamschneider horns, which appear to have been particularly sought after;⁸ the Leichnamschneiders’ influence was felt as far away as England where ‘Two French Hunting Horns made per Johannem Leichnam Schneider in Wienn 1711’ are recorded in the ‘Catalogue of Instruments’ belonging to the Duke of Chandos in 1720.⁹ Mattheson’s assertion that the horn was coming into vogue is borne out by the extent to which

professional hornists were finding employment in court orchestras at this time. Among these were Johann Theodorus Zeddelmayer (Weissenfels, 1706), Johann Adalbert Fischer and Franz Adam Samm (Dresden, 1710), Georg Laurentz Reichel (Wolfenbüttel, 1710), Pangratz and Hoffmann (Düsseldorf, 1711), and Wenzel Rossi and Friedrich Otto (Vienna, 1712).¹⁰

Carlo Agostino Badia's (1672–1738) opera *Diana rappacificata* (Vienna, 1700) contains the earliest known use of the horn as an integral member of the orchestra.¹¹ Badia's treatment is characteristic of much horn writing of the early eighteenth century. The work opens with a pair of horns in F echoing hunting signal figures in the triadic register, then continues with more melodic passages in the first horn, utilising the *clarino* register. Among early well-known pieces that display these characteristics are Johann Sebastian Bach's first work with horn, the secular cantata *Was mir behagt* (1713), and his Brandenburg Concerto No. 1 (by 1721), and two of Jan Dismas Zelenka's challenging capriccios, one in D major (c.1717, ZWV 182), another in F major (c.1718, ZWV 184). The two writing styles show the juxtaposition of two traditions: one a true horn idiom with clear hunt associations using triadic signal motifs and horn fifths in relatively long rhythmic values, often in triple metre, the other mimicking the characteristics of trumpet-writing: stepwise passages in parallel motion, shorter rhythmic values, the *clarino* register, and the concertante style. The general acceptance of the horn in art music was quickly accomplished because the technique, and, to an extent, the idiom, of the trumpet was transferred to the horn, yet the instrument was more sonorous and had an additional cachet for the aristocracy because of its hunting associations.

Though composers in Vienna other than Badia wrote for horn, some of the most important developments are found elsewhere. For example, in Hamburg, Reinhard Keiser (1674–1739), a composer with a propensity for colourful instrumentations, included the horn in a series of operas starting in 1705 with *Octavia*. At Darmstadt, Cristoph Graupner (1683–1760) started writing for horn in sacred and secular cantatas in 1712, and by 1728 began writing for combinations of horns, and horns and trumpets, crooked in two and eventually three different keys to increase the open-note possibilities between them, a forward-looking technique in brass orchestration that did not take hold until the later eighteenth century.¹² Alessandro Scarlatti was the first of many Italians to use the horn in opera in his *Tigrane* (1715). Antonio Vivaldi also included the horn in operas, as

well as in concerti for two horns and other concerti grossi. In England, horn developments paralleled those in German-speaking areas, though the writing made fewer demands on the players. George Frideric Handel's *Water Music* (c.1717) is the earliest extant work from England with horn and orchestra, and *Radamisto*, from 1720, is his first indoor use, after which he included horn in many operas and oratorios. Particularly significant is *Giulio Cesare* (1724), containing both an important solo horn obbligato in F, 'Va tacito', as well as Handel's only employment of pairs of horns crooked in two separate keys, which antedates Graupner's similar treatment by four years.

Works written in the early decades of the eighteenth century show that Mattheson was correct in stating that a favourite key for horn was F, but longer horns in D *basso* also became popular. This is apparent in Georg Philipp Telemann's serenata of 1716, *Deutschland grünt und blüht im Friede* (TVWV 12:1c), remarkable for its early combination of horns and trumpets at the octave in the two keys F and D respectively. Using low horns in D, as well as combining horns and trumpets, allowed Telemann to add depth to his brass sonority, a procedure that became standard practice in eighteenth-century festive works with large orchestra. There is even reason to believe that on occasion horn and trumpet players may have played off each other's parts and doubled at the octave in an ad lib manner.¹³ That brass performing practices were at times flexible is seen in occasional 'Tromba o Corno' designations on parts and scores, indicating that if trumpets were not available horns could fill in.

J. S. Bach's horn players in Leipzig were not specialists but doubled on a number of instruments, like the trumpet player Gottfried Reiche. This may explain some of the confusion surrounding Bach's horn writing, for while the musical significance and beauty of Bach's works is clear, brass performance practices relating to them is anything but. To put it, perhaps, simplistically, Bach's horn parts have traditionally been divided into 'normal' transposed parts (those based on the harmonic series) and more chromatic parts written at concert pitch. The more chromatic parts often double the soprano voice in chorales and may well have been played on the fabled *corno da tirarsi*, an instrument specified by Bach, but for which no extant examples exist. Even with the 'normal' horn parts Bach shows a clear interest in expanding the note vocabulary for horn, since on occasion he uses notes that fall outside the harmonic series. Bach wrote 'normal'

parts for horn in numerous cantatas, both sacred and secular, during the period 1713 to c.1749, and the lion's share of these are for pairs of horns in the keys of F and G. When crooked in certain keys, B \flat , and D, but especially C, it is uncertain what is the correct octave for performance. All these problems are compounded by the fact that Bach, like many of his contemporaries, used a variety of names for the horn; for example, *corne*, *corno*, *corno da caccia*, and *corne de chasse*. However, it does not appear that these names refer to specific types of horns, at least in 'normal' horn parts.¹⁴

A large body of orchestral, vocal and chamber music from the opulent Dresden court, containing parts for specialist horn players, shows a treatment of the instrument which is exceptional in the eighteenth century. From 1717 onward, the works of Antonio Lotti, Johann David Heinichen and others demonstrate that the horn players Fischer and Samm were masters of their instruments, for it is not uncommon for the soloistic parts written for them to ascend to the eighteenth harmonic in F and the twenty-first harmonic in D, with occasional non-series tones as well. Most of the non-series tones lie close to a harmonic, often as neighbour tones, so players may have used either a lipping technique or an elementary form of hand-stopping. Before c.1740 very little in the way of documentation or demands in the music indicates that any developed form of hand-stopping was used. Iconographical sources before the second half of the eighteenth century show the horn held up or to the side in a manner that would not allow hand-stopping. However, some hornists may have found they could colour the pitch with their hand to bring it in tune, a technique eminently possible on the more tightly wrapped horns that were becoming increasingly common. Nevertheless, any posited form of hand-stopping in the early eighteenth century would have been a skill reserved for specialists, for it is clear that the overwhelming majority of orchestral horn players did not use the technique during this period.

Though the hunting-horn style would condition the idiom of the instrument throughout the late Baroque and Classical periods, and though the concertante style borrowed from the trumpet continued, by the 1730s and 40s the horn was finding new expression in a virtuosic and acrobatic violin idiom, traversing wide leaps, as well as in a lyric vocal idiom in slow movements. The new styles are found in solo and ensemble concerti and overtures by Telemann and Johann Friedrich Fasch, where the horn is often

treated soloistically or *colla parte* with other melody instruments.¹⁵ These tendencies are also found in brilliant solo obbligatos, such as in Johann Adolph Hasse's Dresden opera *Cleofide* of 1731. Hasse's treatment of the horn may have inspired Bach to write the 'Quoniam' horn obbligato in the Missa portion of the B minor Mass dedicated to Dresden in 1733, since Bach is thought to have heard *Cleofide*.¹⁶ Hasse's non-soloistic parts in *Cleofide* illustrate growing tendencies towards the middle of the century to use the horn in a harmonic-rhythmic function, a development that allotted the instrument a more permanent position in the orchestra.

Mid-century developments: 1740–1770

By 1740 the horn had gained a foothold in orchestras across Europe, and players who specialised on the horn were becoming more numerous, though many still doubled on other instruments. These developments had ramifications for composers. One such ramification was that the distinction between soloistic parts written for horn specialists and the more simplistic everyday parts for the numerous non-specialist orchestral players was becoming more pronounced. In operas, orchestral works and *Harmoniemusik* the horn was fast becoming an essential component, and this brought a concomitant increase in the number of keys in which it was required to play. This increase is illustrated when one compares the keys (D and F) required in Hasse's *Cleofide* (1731) to the five (C, D, E \flat , F and G) in another Hasse opera performed in Dresden, *Artemisia* (1754). Important solos in the mid to late eighteenth century were usually written in D, E \flat , E, F and sometimes G. Those in A, B \flat and C were reserved mainly for simpler orchestral writing. The appearance of *The Compleat Tutor for the French Horn* (London, c.1746) marks the first attempt at a method solely for horn. It is aimed at the novice player, a fact that illustrates how this speciality instrument was now becoming increasingly common. The tutor is thought to have been written by a Mr Winch, who, along with the Messing brothers, was probably a Saxon or Bohemian hornist active in London shortly after 1740.¹⁷

While the horn was finding wider expression in music in general in the 1740s and 50s, another Bohemian hornist at Dresden, Anton Joseph

Hampel (c.1710–71), was involved with some of the most significant developments for future horn playing. Hampel's arrival at the second horn position in Dresden in 1737 ushered in a new era with clear distinction between the registers and styles of first and second horn. A virtuosic, high-register, first horn style continued in many works for some time, but a complementary low-register, idiomatic, second horn style appeared, characterised by wide leaps plummeting as low as the second harmonic, and factitious notes (written as E₂, F₂ and F_{#2}) 'lipped' down from the third harmonic. The new style is found in the works of numerous composers for the Dresden court horn players, but the earliest dated example, and a very advanced form of it, comes from 1740 in the hand of Johann Georg Pisendel, the Dresden concertmaster, in some dated horn additions to a violin concerto by Franz Benda.¹⁸ As time went on, the specialisation by horn players in either high or low registers continued, so much so that both high and low solo concerti appeared, sometimes referred to as first and second horn concerti. To facilitate playing in these distinct registers, specialised mouthpieces would probably have been used – those for the low horn having a wider diameter than those for the high instrument. These are illustrated in horn tutors in the later eighteenth century.¹⁹

Hampel also worked with the Dresden instrument maker Johann Werner to develop the *Inventionshorn*, c. 1753, an instrument configured so that crooks could be inserted into the central section instead of terminal crooks placed at the mouthpipe, a basic design that was later copied and modified by many other makers. This development allowed for easier tuning and crook-changing between and even within movements, an increasingly common event. Of particular importance are Hampel's experiments with non-transposing mutes which, according to Heinrich Domnich in his *Méthode* of 1807, led to the 'discovery' of hand-stopping. If Domnich is correct, it is likely that Hampel's 'discovery' was aimed at utilising open, partially stopped and fully stopped notes for more chromatic effects and a fuller scale, not merely colouring notes slightly with the hand to bring them into tune. It seems, however, that composers needed to be convinced by able players to write in a style that required a developed hand technique, for early on it is seen only in special compositions for or by horn virtuosi.

The dissemination of these advancements was doubtless brought about by the many students of Hampel and his colleague at Dresden, Carl Haudeck (1721–1802), Giovanni Punto being prominent among them.

Among Hampel's own works, the 'Lecture pro cornui' (manuscript, c.1762, now lost), as well as a set of horn trios from the same period, are passages that would have required hand-stopping.²⁰ Furthermore, an undated manuscript collection that can be traced to Dresden from the first half of the eighteenth century contains numerous concerti for first horn by such composers as Johann Joachim Quantz, Christoph Förster, Graun, and at least one work by Johann Georg Knechtel, first horn at Dresden from 1734 to 1756; but there are also a few pieces for second horn, including an anonymous concerto thought to be by Hampel. Hampel's work requires a developed form of hand-stopping in a two-octave scale from the twelfth harmonic down to the third (from G₅ to G₃). This would not be possible by lippling or partial hand-stopping.²¹

Others were involved with experiments similar to those at Dresden. In 1792 Ernst Ludwig Gerber mentions that Bachmann, second hornist at Sondershausen, was using a fluent right-hand technique by 1750,²² and a concerto for second horn by Franz Xavier Pokorny dated 1754 contains a passage remarkably similar to that referred to above, written by Hampel.²³ Pokorny's and Leopold Mozart's concerti for two horns from the 1750s, possibly written for horn players at Regensburg and Wallerstein, were among the first in the genre of the true double concerto in the more Classical style. They also show similarities to the writing characteristics used in Dresden, with well-defined first and second horn techniques including factitious tones.

While some horn players specialised in either high or low registers, others were comfortable in both. One such performer was Joseph Haydn's horn and baryton player, Carl Franz (1738–1802), who was highly esteemed for his hand technique which he applied over a four-octave range.²⁴ The *Divertimento a tre* (1767) for strings and horn in E_b, ranging from the second harmonic to the twenty-first (written C₂ to F₆), was probably written for Franz, as, no doubt, were some of the demanding parts in Haydn's symphonies, such as the Symphony No. 51 (c.1771–3), which ascends as high as the *Divertimento*, but includes novel, low-register, factitious tones, 'lipped' down as far as a tritone from for horn contains occasional non-series tones, some of them striking low-register factitious tones, their placement indicates a minimal amount of hand-stopping. An example of this is found in the concerto in D major of 1762, Hob. VII d:3. With Haydn

as with Bach, the correct octave for performance of horn parts in C and B \flat , is a subject of debate, though *basso* realisations are more likely the later one gets.²⁵

Developments in France in the middle of the century show the horn being used in increasingly progressive ways. For example, though Jean-Philippe Rameau wrote simple horn parts in his first opera from 1733, by 1760 he was producing more sophisticated writing, including parts for horns crooked in five keys;²⁶ and by 1765, or possibly earlier, the Strasbourg-born composer and horn player Jean-Joseph Rodolphe (1730–1812) was performing hand-stopped notes.²⁷ Furthermore, ten years after the Pokorny concerto for second horn mentioned above, hand-stopped notes, low-register factitious tones and distinct registers for high and low horn, eventually called *cor alto* and *cor basse* respectively, are first illustrated in Valentin Roeser's *Essai d'instruction* (Paris, 1764).

While hand-stopping was gaining ground in soloistic contexts, to optimise their open-pitch possibilities in orchestral sonorities, composers were becoming more interested in combining pairs of horns crooked in two different keys. Used in this way, one horn pair could echo another in a different key, or their pitches could be combined to create novel sonorities. Among early examples of this important trend, which eventually led to the standardisation of four horns in the orchestra, are L. Mozart's *Sinfonia da caccia* from 1756, and Haydn's Symphony No. 31, the 'Hornsignal' of 1765.

Solo and orchestral horn in the late eighteenth and early nineteenth centuries: 1770–1820

By 1770 travelling horn virtuosi were spreading the knowledge of hand-stopping. An indication of the increasing popularity of solo horn players and the growing interest in public concerts is that, between November 1761 and January 1763, Joseph Leutgeb (c.1745–1811) gave fourteen concerto performances at the Burgtheater in Vienna. In 1770 his cantabile playing at the famous Parisian concert series, the *Concert spirituel*, was highly praised.²⁸ Wolfgang Amadeus Mozart's earliest use of stopped notes dates

from 1769 in the Serenade in D major, K. 100, where a solo horn and solo oboe are combined. Though Leutgeb would have been the logical choice for K. 100, others must have been proficient in hand-stopping, for just three years later, Mozart, in an experimental mood, required all four horn parts in his Divertimento in D major, K. 131, to use it. Many of Mozart's later solo works for horn from the 1780s and early 90s were indeed written for Leutgeb, most prominently the horn concerti and the Quintet for Horn and Strings, K. 407/386c. Though Mozart's horn concerti contain many stopped notes for the soloist, it is notable that few, if any, are required for the orchestral horn players, an indication of the reluctance of composers to use these tones in an orchestral context.

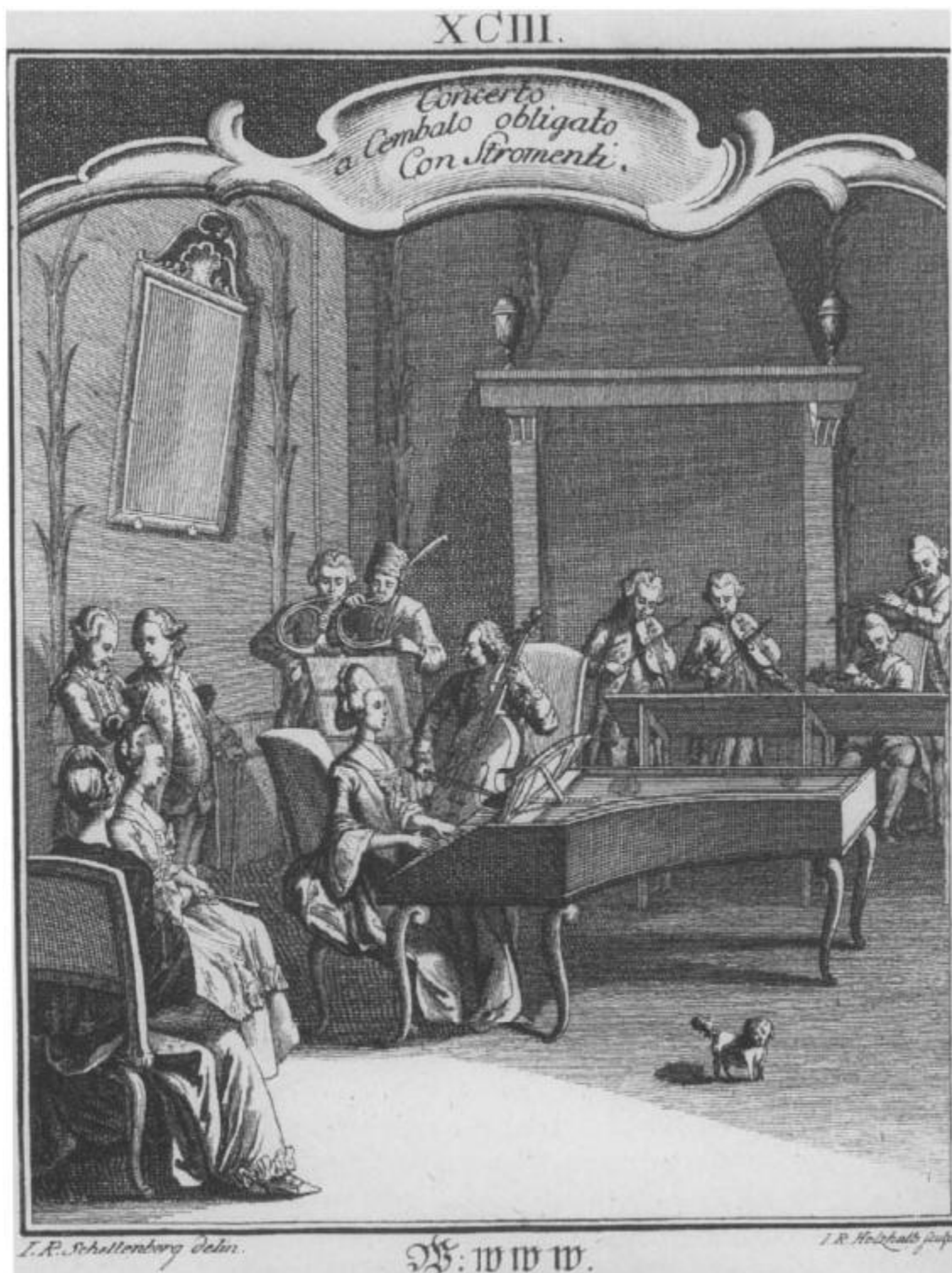


Figure 17 Harpsichord concerto performance at a Zurich subscription concert in 1777: copperplate engraving by Johann Rudolf Holzhab (1723–1806).

Many of the early exponents of hand-stopping, such as Rodolphe, Franz and Leutgeb, were known as soloists, while others had reputations primarily as duettists. Horn-playing brothers often formed duos, among them Joseph, Wenzel and Jacob Ziwiny in Mannheim, Ignaz and Anton Boeck in Vienna, and a whole family of Nisles from Wallerstein, some of whom appear to have been child prodigies.²⁹ Concerti written for the duettists epitomised the registral specialisations: the *cor alto*'s high-range pyrotechnics were complemented by the *cor basse*'s nimble arpeggios and lyrical style employing non-series tones in the mid- and lower register. Anton Rosetti (1750–92), who resided at the court at Wallerstein from 1773 to 1789, wrote at least twenty-one horn concerti, six of them for two horns. A number of Rosetti's double concerti are dedicated to Josef Nagel (c.1750–1802) and Franz Zwierzina (1750–1825), first and second hornists at Wallerstein starting in 1780. Other concerti for low horn are dedicated to Carl Thürschmidt (1753–97).³⁰ Thürschmidt teamed up with the specialist in playing the high horn Johann Palsa (1752–92) to create one of the most celebrated and well travelled of the horn duo teams. Thürschmidt was also the inventor of a chromatic non-transposing mute, and with his assistance a horn model designed for soloists was built in Paris by Lucien-Joseph Raoux, c.1781. The new model, dubbed *cor solo*, was constructed for performance in those keys preferred by soloists – D, E \flat , E, F and G – because they were the most practical for hand-stopping, but also because they produced an ideal horn tone-quality. Silver *cor solos* were made for Thürschmidt, Palsa, and probably the most famous virtuoso of them all, the Bohemian Jan Václav Stich (1748–1803), better known as Giovanni Punto.³¹

Punto studied with many of Europe's most renowned horn players, among them Hampel and Haudeck in Dresden, before launching a stellar career of his own. In 1803, Charles Burney wrote, 'Spandau, from Holland, was the first that was able to make the artificial notes [on the horn] agreeable, about 1772, and soon after, Ponto [*sic*] did wonders on this instrument'.³² But not all were convinced by Punto's hand-stopping. The difference in tone-quality between stopped and open tones was criticised in *New Instructions for the French Horn*, published anonymously in London in the 1770s. Nevertheless, Punto won high praise from most of his contemporaries, in particular Mozart, who wrote in 1778, 'Punto bläst magnifique.'³³ Ludwig van Beethoven was also impressed with Punto's

playing and wrote the Horn Sonata, Op. 17, for him in short order in 1800. Beethoven's sonata and numerous concerti composed by Punto himself show that the Bohemian possessed a very flexible lip technique and an advanced hand technique, but his methods – the *Seule et vraie méthode* (1794–8), originally by Hampel but revised by Punto, and the *Etude ou exercice journalier* (c.1796) – are strangely silent on the topic of hand-stopping.

Hand-stopping had traditionally been the domain of *cor basse* players like Punto, but by the 1790s non-series tones were showing up regularly in *cor alto* parts as well. This is manifest in Beethoven's wind chamber music from the last decade of the eighteenth century, for example in the Rondino, WoO 25 (c.1793), and the Sextet with Strings, Op. 81b (c.1795), both works that maintain clear-cut *cor alto* and *cor basse* registral distinctions. Similarly, in orchestral music Beethoven and his contemporaries often employed the second horn in solos with hand-stopped notes in the lyrical mid-register, but chromatic passages appear with increasing frequency in parts for all horns in the first decade of the nineteenth century, a striking example of which is the demanding horn trio in 'Komm Hoffnung' from *Fidelio* (1805/6). The much-discussed solo with numerous non-series tones for fourth horn in the Adagio of the Ninth Symphony (1822–4) was probably played on hand-horn, as it is consistent with Beethoven's other chromatic horn writing and contemporary horn players' technique, even though the theory that Eduard-Constantin Lewy may have played it on an early two-valved horn appears expeditious from a technical point of view.³⁴

By the first decade of the nineteenth century, hand-stopping had reached a very sophisticated level in solo works, as represented in the quick chromatic passages in Luigi Cherubini's Sonata No. 2 for horn and string orchestra (1804), and Carl Maria von Weber's Concertino for horn and orchestra (1806/rev. 1815). Furthermore, the general acceptance of hand-stopping as a viable technique for most horn players is reflected in the methods that were published in Paris at this time, principally Frédéric-Nicolas Duvernoy's (1765–1838) *Méthode* of 1802 and Domnich's (1767–1844) *Méthode* of 1807. These methods finally explain features of hand-stopping that had been known to many hornists for decades. Both Duvernoy's and Domnich's methods advocate equality in tone between stopped and open notes. But Duvernoy specialised in the horn's middle register, called *cor mixte*, which avoids the extreme high and low registers,

and he had a predilection for playing on the F crook regardless of what key the piece was in.³⁵ Domnich advocated the traditional separation into *cor alto* and *cor basse* specialities, as did Louis-François Dauprat (1781–1868) in his comprehensive *Méthode* of 1824. Though the first horn style in the high register did not disappear, in general the extremes of register between *cor alto* and *cor basse* were moderated as the effects of the *cor mixte* approach were felt and the era of the duetting virtuosi came to a close.

In orchestral writing, combinations of horns crooked in two or more keys became the preferred technique for increasing pitch possibilities in the early nineteenth century, even as stopped notes were becoming more common. The hunting choruses in Haydn's *Die Jahreszeiten* (1799–1801) and Weber's *Der Freischütz* (1821) illustrate that the hunt was never far from the horn's aesthetic. However, Beethoven's fourth horn solo in his Symphony No. 9, and the horn quartets in the overtures to *Freischütz* and Gioachino Rossini's *Semiramide* (1823) demonstrate that a chromatic horn style had evolved that was not necessarily predicated upon the existence of the valved horn even though it may have been anticipated in these works. While the appearance of the valved horn in the early nineteenth century allowed for new effects, a thoroughly Romantic style had been established with valveless horns in solo and orchestral music that would persist as a model into the nineteenth century.

Design, technology and manufacture since 1800

Arnold Myers

In the nineteenth century, three processes took place simultaneously: the development of new types of brass instrument, further mechanisation in manufacture and increased mass production of instruments, and an enormous increase in the use of brasswind, particularly in bands. Keyed and valved brass and the remodelling of the slide trombone provided a varied palette of timbres: an instrumentarium of extensive chromatic compass in voices ranging from contrabass to soprano. The surge in brass playing in bands (described in [Chapter 13](#)) went hand in hand with the mass production of instruments at affordable prices. To an increasing extent, musical instruments became a trade commodity, made for export rather than local use.

The quality and variety of raw materials available to the brass instrument maker in Europe increased greatly in the period around the close of the eighteenth century and the beginning of the nineteenth. The direct extraction of zinc from its ore, pioneered in the eighteenth century, led to brasses with a more controlled zinc content and a wider range of ratios of copper and zinc. The calamine process for producing brass, described in [Chapter 3](#), was gradually supplanted by the direct alloying of copper and zinc. Refinements in the production of steel, most notably the Bessemer process, resulted in finer, tougher and more durable springs – essential components of efficient, smoothly operating valve mechanisms. More efficient and improved refining processes for other metals led to their use in specialised applications. Nickel, for example, came to be used for sliding components where its hardness and resistance to wear were advantageous. Parallel with this development came improvements in the machined

tolerance of components, and a newer understanding of the lubricants that kept them in smooth operating condition.

Metal produced by the foundries was more reliable in quality and constituents, and thus standard mechanical processes became more reproducible and predictable. Larger numbers of parts could be processed more quickly with less waste. The application of steam power to foundries made mass production more cost-effective and allowed industries to be sited more conveniently, not necessarily where sources of water power were available, thus lowering the cost of raw materials. The balance between the price paid for labour and the cost of raw materials began to tip, although it was not until the twentieth century that a full reversal of the figures was evident.

An extremely important development was the industrial application of electroplating. This led to the controlled deposition on metal parts of layers of dissimilar metals. Such applications as plating of finished work with precious or more durable metals, and the selective plating of moving parts, transformed both the appearance and the working qualities of an increasingly wide range of brass instruments.

The development of more easily controlled soldering techniques resulted in changes to methods of assembly. Hitherto, components of an instrument were generally held together by friction or by bindings, making disassembly relatively easy. But once gas flames had been adapted for the soldering of metals (as opposed to the earlier use of charcoal and blowpipe) it quickly became feasible to join components firmly with low-melting-point alloys. Tubes tended to be butted end to end, instead of inserted one into another by tapered sockets. This development, coupled with the emerging use of machine-made tubing and other components, had an influence upon sound production and tone quality.

The New World lagged behind Europe in the establishment of the complex infrastructure of mine, refinery and foundry, so the import of finished instruments was more economic until well into the nineteenth century. Nevertheless, production of some instruments earlier in the century indicates an increase in local sources of raw materials, or their import.

The development in factory production was most pronounced in France, Britain and the United States, where factories developed which employed large numbers of workers who made finished instruments from raw materials such as sheet and tube brass. Production was concentrated in the

largest cities – notably Paris and London – and towns where instrument manufacture became the local industry such as Graslitz, Bohemia, and Elkhart, USA. The large factories generally produced instruments in a range of qualities, from the highest standard for professional players and well-funded amateur bands down to cheap ‘pacotille’ instruments which were mediocre to begin with and quickly disintegrated in use. In German-speaking countries, however, brass instruments continued to be made mostly by smaller firms, with many of the parts supplied by outworkers or subcontractors. Many of these firms were situated in the Vogtland area of Saxony, around Markneukirchen; in 1860, 50 per cent of the production of brass instruments of the Vogtland was exported to the United States. Sales were handled in some cases by the firms which assembled the instruments and in other cases by dealers who bought instruments from a number of makers but who often added their own mark.

Large factories such as those listed in [Table 3](#) and wholesale dealers such as Zimmermann pursued export markets and produced illustrated catalogues describing their ranges of models. In several instances firms which have made a wide range of brass instruments have become renowned for one particular product, e.g. Kruspe and Alexander for french horns, Besson for cornets and trumpets, Boosey & Hawkes for euphoniums and basses, Conn and King for trombones, Hirsbrunner for tubas, Vincent Bach for mouthpieces. In other cases, firms have specialised in one instrument, e.g. Baudouin in serpents, Schreiber in cornets and Raoux and Paxman in french horns.

The market has changed to some extent in the twentieth century, firstly with the fall in demand during the depression (when many small firms went out of business) with a decline in the number of bands, and latterly with an increase in the demand for instruments for school bands and orchestras. At the same time, the pay and conditions of workers in the industry have improved enormously, as they have in other industries.

In the industrial era, new techniques appropriate for mass production were introduced, steam power and electric and hydraulic power transmission were employed. Although brass continued as the most common material, other alloys were tried, in particular german silver (white bronze, *Neusilber* or *maillechort*). In the nineteenth century this was sometimes used for whole instruments; because it is harder to work, these

were expensive models. Now it is more usually used for garnishings such as ferrules, mouthpipe sheaths and bow guards on instruments of brass.

Many of the hand techniques described in [Chapter 3](#) continued as new methods became economic only in the larger factories, or only for certain parts of some instruments. Today, gently expanding sections can be produced by 'swaging': placing the seamed tubing over a mandrel and forcibly drawing it through a lead plate, starting at the narrow end. Some tubing is now prepared for bending by filling with water (actually a weak soap solution) and freezing. Low-melting-point alloys and resin are alternatives to filling with lead or pitch. The advent of factory production has led to further mechanisation of manufacture. In some factories since the mid twentieth century, sections of standard tube or deep-drawn pieces have been placed between external steel dies and expanded by hydraulic pressure to the required size and shape. Small sections of tubing are formed from sheet metal by 'deep drawing' in presses: the brass sheet is placed between two steel dies and forced under pressure into the shape of a saucer; subsequent pairs of dies press the brass via a cup shape into a section of tube of the desired shape which is then cut to length at both ends. As with hand methods, the brass has to be annealed after each step.

Table 3. Large manufacturers of brass instruments

Milichner	Frankfurt am Main, Germany	1868–c. 1935	Circa 1885 claimed to be largest manufacturer of musical instruments in Germany
Boosey	London and Paris	1857–c. 1990	In 1881 employed workforce of 62 in Paris; in 1894 employed 151 workmen in London and 140 in Paris; produced 5,200 brass instruments per annum in London; London branch taken over by Boosey & Hawkes in 1918; introduced 'Prototype' system of moulds in 1926
Reinhold & Fuchs	Gerditz, Bohemia	1800–1940	In 1925 employed workforce of 500; largest manufacturer of brass instruments in Austria-Hungary, first in Austria-Hungary to use steam power
Boosey	London	1868–1930	In 1894 employed 150 mechanics to make bells and woodwinds; merged with Hawkes in 1930 to form Boosey & Hawkes
Coleman	Königs-Güt, Bohemia	1812–1946	In 1859 employed workforce of 80; in 1880 employed workforce of over 100 and produced 3,000 brass instruments per annum; in 1891 employed workforce of 120
Conn	Elkhart, Indiana	1879–	In 1890/94 employed workforce of 110; in 1893–1910 employed 1,000; in 1910 employed 2,000 and produced 30,000 brass instruments per annum; in 1928 introduced assembly-line production
Couesnon	Paris	1582–	In 1878 employed workforce of 200; in 1911 employed workforce of 1,000 in eight factories and was largest manufacturer of musical instruments in the world; in 1914 one factory produced 50,000 brass instruments per annum, another produced 10,000 brass instruments per annum
Distin	London	1845–68	In 1862 employed workforce of 30; in 1868 taken over by Boosey who had not previously made brasswinds
Goussier	Paris	1843–83	In 1845 employed workforce of more than 200; in 1847 produced 42 per cent of all brasswinds made in Paris; in 1855 employed workforce of 300 and produced 20,000 brass instruments per annum; in 1860 exported 70 per cent of production; in 1865 employed workforce of 700; taken over by Couesnon
Graves	Winchester, New Hampshire, and Boston, Massachusetts	1824–69	First large-scale manufacturer of wind instruments in the United States
Gobillard, Hawkes	Paris, London	1817–45, 1876–1930	In 1844 employed workforce of 210 and used assembly-line methods; taken over by Gobillard. Added brasswind production in 1876; opened factory at Lidgegate in 1924; in 1927 employed workforce of 300–350; merged with Boosey in 1930 to form Boosey & Hawkes
Higginson, Krat	Manchester, England, London	1842–1929, before 1800–c. 1960	In 1891 employed workforce of more than 90 In 1890 employed workforce of 50 and was largest manufacturer of brass instruments in Britain; sold to trade rather than under own name

Klein	Philadelphia, Pennsylvania, and Markneukirchen, Germany	before 1870-c.1885	Large-scale exporter from Germany to United States
Mailloux	Brussels	1816-1935	In 1890 largest manufacturer of wind instruments in Belgium
Motitz	Berlin	1875-c.1950	Between 1882 and 1897 produced c.1,200 brass instruments per annum
Pilloux	Lyon and Paris	c.1875-1931	From 1890 employed a workforce of 100 in Lyon making brasswind
Pelitti	Milan, Italy	1826-1903	Probably largest maker of brasswind in Italy
Pepper	Philadelphia, Pennsylvania	1876-c.1919	At peak produced 3,000 brass instruments per annum
Rampone	Quarna and Milan, Italy	1847-1912	From 1860 employed workforce of 80 to make wind instruments; from 1912 became Rampone & Cuccia in 1920s employed workforce of 109
Salvations Publishing and Supplies	London and St Albans, England	1859-1972	Employed workforce of 90 to make instruments for Salvation Army brass bands
See	Paris	1842-c.1928	In 1847 employed workforce of 570; in 1855 claimed to employ a workforce of 200; between 1853 and 1870 produced c.1,500 wind instruments per annum
Stewart	Grasshite	1833-c.1948	In 1903 employed workforce of 79 to make brasswind
Talbotville-Lamy	Paris	1857-c.1938	In 1870s employed workforce of 80 to make brasswind; in 1888 and 1928 employed workforce of 1,000 to make all kinds of instruments
Uhlmann	Vienna	1824-c.1904	Probably largest maker of brasswind in Austria
Yamaha	Hamamatsu, Japan	1865-	Has recently taken sizeable share of market

Bell flares are now usually spun: a roughly formed bell is placed on a mandrel and turned in a lathe. While being spun it is worked to a uniform thickness and burnished, and the rim turned over its wire reinforcement which is fixed by soft solder. Rather than being gusseted and seamed, some bells are now spun from flat sheet and brazed ('cross-seam welded') onto the bell stem. The bell sections of small instruments are often made by drawing and then cross-seam welded to the bell stem.

Before an instrument is assembled, the parts are cleaned. Small pressed parts are de-burred manually or in a vibrating bath. The instrument is assembled starting from the bell or the next largest section and working towards the mouthpipe. Straight sections ('branches'), U-bends ('bows') and other sections are joined by soldering; each joint is covered by a sleeve or 'ferrule'. All except the cheapest instruments are now given some kind of surface protection after polishing. Silver-plating by electrolysis has been offered as a standard option by many makers since the 1870s and gives a brilliant, easily cleaned surface. Other instruments are now sprayed with clear or tinted lacquer.

Mechanised processes are expensive to tool up, but they allow large numbers of instruments of the same pattern to be produced very economically. Given good design, the quality can be uniformly high. Handcraft techniques are still used by smaller firms, who maintain that hand beating permits finer control over wall thickness. In the late nineteenth century, a typical major firm would allow a craftsman up to a hundred hours to make a complete instrument, fewer for small or cheaper models. Today, a professional-quality instrument such as a french horn can take up to fifty hours, whereas a cheap mass-produced instrument can be produced on assembly lines with less than six man-hours of work.

The most important innovation for brass instruments in this period was the invention and adoption of the valve. The trumpet and the horn were used in orchestras and bands in the late eighteenth and early nineteenth centuries, their musical capabilities being extended by hand-stopping (standard practice with the horn, but also used with some trumpets), and on the trumpet by using instruments with slides or keys. These techniques increased the number of notes available to players, but they were used in conjunction with crooks which were selected according to the key of the music being played. The orchestral horn player needed eight or nine crooks; the horn soloist, the bandsman horn player and the trumpeter fewer. If the music changed key, time had to be allowed for the musicians to change crook. Parts written for the horn and trumpet were closely related to the series of notes available on the natural instruments, unlike trombone parts.

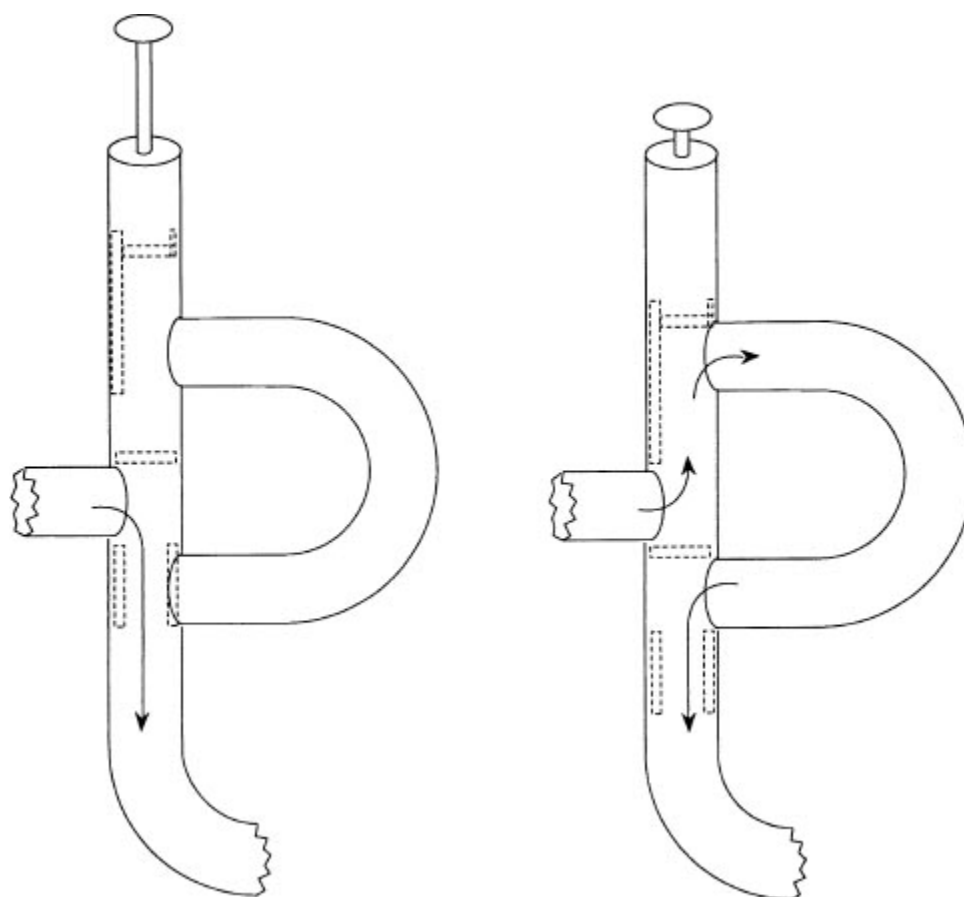


Figure 18 The Stölzel valve. The piston moves in the windway. The inevitable step at the bottom of the piston together with the abrupt right-angle bends in the windway result in large discrepancies in bore diameter. The springs have of necessity to be at the top. The partitions inside the piston can be

of metal, but in some instruments were formed from wax. This pattern of valve was rarely used for instruments with large bore diameter such as euphoniums or tubas.

These limitations occasioned the development of keyed brass (described in [Chapters 10 and 11](#)) and of the valve, a mechanical device having the effect of an instantaneous crook change. One of the first inventions was that of Charles Claggett, an Irish musician and inventor resident in London, in 1788. No examples of his valve survive, and the accounts in contemporary writings do not fully explain how it worked. The first valve to be widely adopted was introduced in 1814 by the musician Heinrich Stölzel in Prussia. This pattern ([Fig. 18](#)) was used for the following 100 years, though after 1850 only for cheaper instruments.

Other designs followed which achieved a similar effect by different mechanisms. The double-piston valve is thought to have been introduced by Christian Friedrich Sattler in 1821. A version (the Vienna valve, [Fig. 19](#)), patented by the instrument maker Leopold Uhlmann in 1830, was widely used in the Austrian empire along with other valve designs in the middle of the nineteenth century. It has survived to this day as the valve system employed in the Vienna horn. A variant, the *système belge*, was used in Belgium until the middle of the twentieth century.

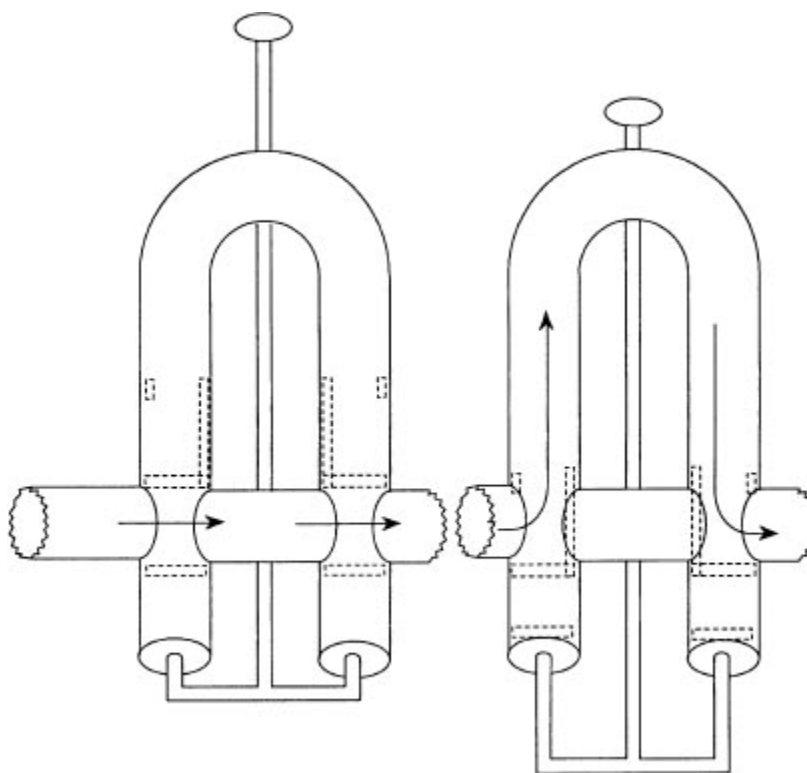


Figure 19 The Vienna valve. Here there are two short pistons for each valve, both moving in the windway when the valve is operated; however, the passage through the valves is both straight and of constant diameter when the valve is not operated. The springs are external, usually clocksprings in drums to which the touchpieces are attached, and there is generally a long connecting rod. A variant, the *système belge*, has the springs in cylinders parallel to the pistons and short connecting rods.

The Berlin valve ([Fig. 20](#)) was introduced by the Prussian bandmaster and innovator Wilhelm Wieprecht for his military band instruments in 1833, and was used for a few decades by many German instrument makers (also by Adolphe Sax in Paris). The most successful piston valve, however, has been the Périnet valve ([Fig. 21](#)). Curiously, the Parisian instrument maker François Perinet, who patented the valve design known by his name in 1839, is represented in museum and players' collections mainly by the valveless *trompe de chasse*. His valve design avoids both the sharp bends in the windway of the Stölzel valve and the large surface area of the piston in the Berlin valve. It has been used for most French and British instruments and for many instruments made in the United States and elsewhere; it is now universally used for the majority of trumpets, cornets and flugelhorns, and for a high proportion of tubas and other intermediate-bore instruments.

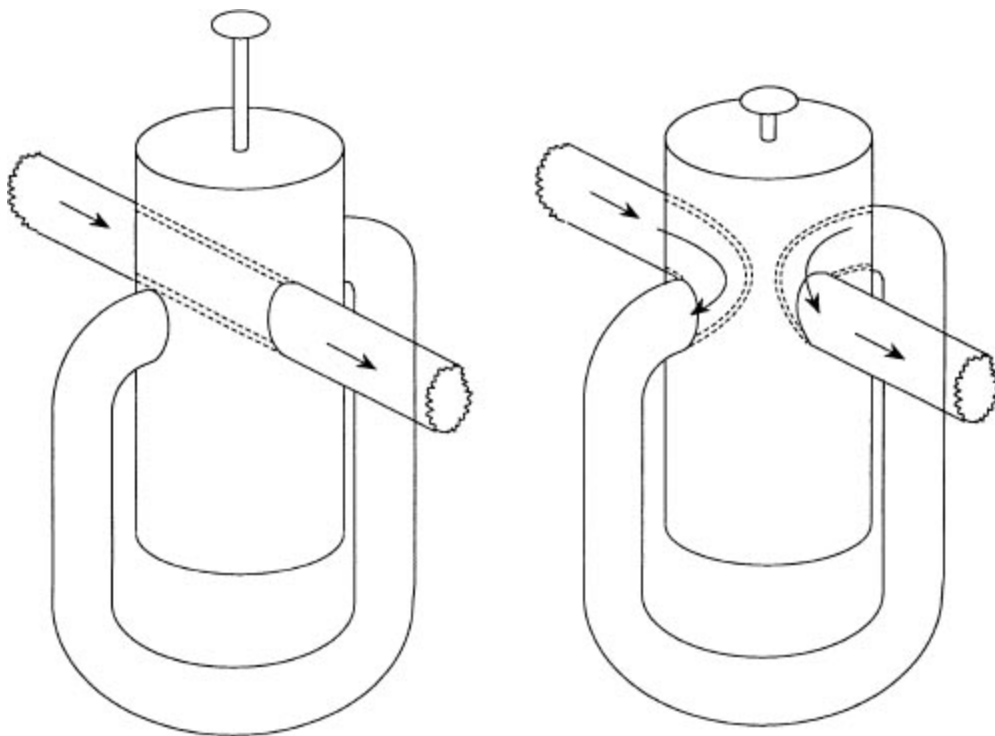


Figure 20 Berlin valve. The piston diameter has to be at least twice the bore diameter. The windway when the valve is not operated can be straight through, or for short valve loops the main windway

can turn through 90° in the piston so that the valve loop ports can be adjacent. The spring is a compression spring at the bottom of the piston.

The rotary valve appears to have been introduced by Friedrich Blühmel, his last version of 1828 being in a form with three passages in the rotor. Its modern form with two passages ([Fig. 22](#)) was patented by the instrument maker Josef Riedl in Vienna in 1835. Its design has not changed significantly since then. The rotary valve came to be used for the majority of instruments made east of the Rhine, and is now universally used for french horns and the thumb valves on trombones, also for a proportion of tubas and other instruments.

Many other designs have been developed, many have been patented, but the above have been the most widely used. Other designs have involved square cross-section pistons (Blühmel and Stölzel), moving vanes inside the windway (Adams, Meifred&Deshayes, Coeffet, Low), rotating disks (Halary, Shaw, Köhler), and pistons enclosed in the windway (Pace, Sampson). The recent Thayer valve, developed for the thumb valve on trombones, is a rotary valve with the straight-through passage parallel to the axis of rotation. The basic designs have had countless modifications, such as those of Allen and Rudall Carte which have elliptical bore cross-sections in the valve ports and passages in order to reduce the travel of (respectively) rotary and Perinet valves.

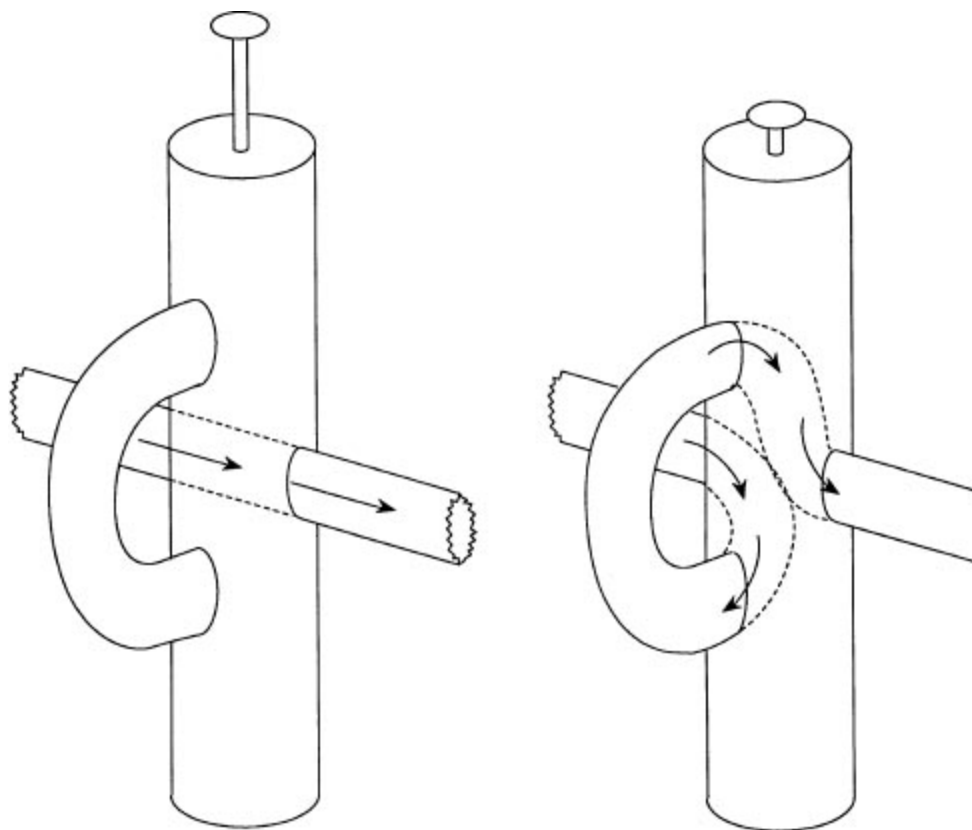


Figure 21 The Perinet valve. The passages inside the piston (or *coquilles*) are bent both parallel to the piston axis and in the plane normal to the axis. The diameter of the piston is wider than that of the Stolzel valve, but narrower than that of the Berlin valve. The model shown here has a straight windway when the valve is not operated; in some models the ports are spaced out around the valve, giving a gentle bend in the windway when the valve is operated. The springs can be either at the top of the piston or at the bottom.

After the period of experimentation with different basic designs, subsequent developments in valve making have concentrated on minimising the fluctuations in diameter and sharpness of bends in the bore, and in improving the action. The action has been made easier by the use of lighter pistons and rotors, the selection of lower-friction materials for moving surfaces, and the appropriate choice of return spring. There is now little difference in performance between piston and rotary valves, and the use of one rather than the other is largely a matter of tradition. With a piston valve, the length of travel has to be at least one bore diameter. Because with rotary valves there is of necessity some system of levers to transform the linear motion of the touchpiece into a rotation of the rotor, the connectors can be designed so that the length of travel of the touchpiece is arbitrarily small. In practice, however, the travel of the player's finger and the restoring force of

the spring are not greatly different for rotary and piston valves. The biggest distinction is that when a rotor is half-way between its two positions the windway is almost blocked, whereas when a piston is half depressed, air can pass through both the direct passage and the valve loop, albeit with some constriction. With sufficient lip control, a player can ‘half-valve’ a piston instrument to produce a glissando between notes. In Germany, where rotary-valved trumpets are preferred for most purposes, Perinet valved trumpets are made as ‘Jazz Trompeten’. There is also a measurable difference in legato playing: acoustic tests have demonstrated that the Vienna horn is capable of a smoother legato than the rotary valve.

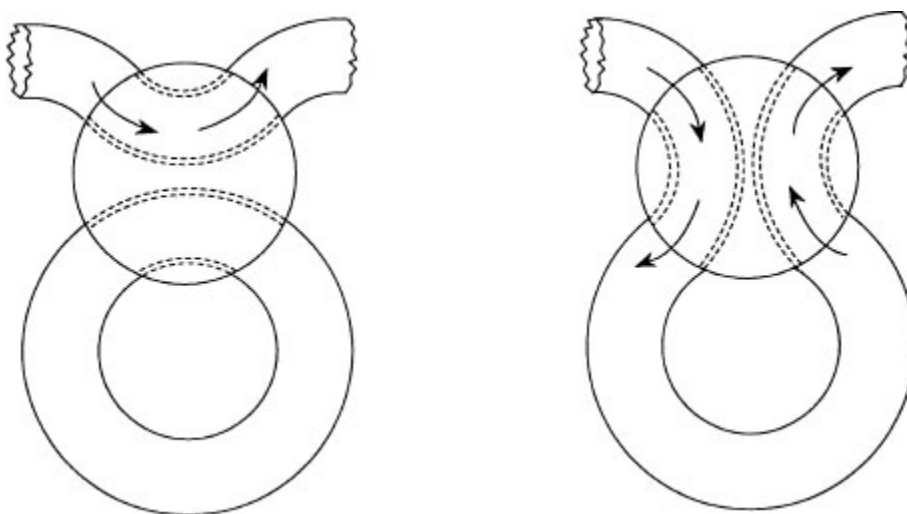


Figure 22 The Rotary valve. The diameter of the rotor has to be at least twice the bore diameter. The springs are external, either clocksprings in drums to which the touchpieces are attached or helical springs mounted on the touchpiece spindle. This type of valve is used on instruments of all sizes.

The most common purpose of the valve is to extend the tube length, lowering each of the series of notes available to the player by a semitone, two semitones, or by a larger interval, depending on the relationship between the air-column lengths with and without the valve operated. By far the most widely used arrangement is for the valve operated by the first finger to give a pitch lowering of two semitones, the second finger to lower by one semitone, and the third finger to give three semitones. The right hand is used for these three valves except with the french horn, where the right hand has maintained its position in the bell for hand-stopping and the left hand operates the valves. There have been, however, a significant number of instruments in Germany which have the role of the first and

second fingers reversed, and a significant number of French instruments where the third finger gives a pitch lowering of four semitones. It is equally easy to arrange the valve passages so that operating the valve cuts out the extra tubing of the valve loop rather than adding it. This *ascending valve* was for many years used on french horns in France for the third valve: operating the ascending third valve raised the pitch by two semitones. These alternative configurations required different fingering techniques. Four-valve french horns generally have the fourth valve ascending from 12ft F to 9ft B₁, or from 9ft B₁ to 6ft F and arranged to be operated by the left thumb. Instruments such as tubas which commonly have four or more valves most usually have the fourth valve lowering by five semitones; the finger used for the fourth valve is the first finger of the left hand or the fourth of the right.

It was soon realised that valves, when mechanically capable of being operated rapidly, could be used not merely to change crook simply and rapidly, but to play tunes and ensemble parts with facility: more evenly than by hand-stopping a french horn and more easily than by moving the slide on a trumpet or trombone. From the 1820s, valved horns and valved trumpets benefited from more efficient valve mechanisms and became popular in bands and orchestras. Although there was continued resistance from musicians who placed greater value on the sound quality of the natural instrument than on the facility of the valved, by the early years of the twentieth century valved instruments were universally used not only for the modern repertoire for which they were necessary but also for the old hand-horn and natural trumpet repertoires.

The advent of the valve not only transformed french horn and trumpet techniques, but also enabled the development of new kinds of brass instrument. The slide of a trombone or slide trumpet requires a bore profile with a high proportion of cylindrical tubing; the use of finger holes or key-covered holes on the cornett, serpent, keyed bugle or ophicleide gives the best results with a conical bore profile. A valved instrument, however, can have any bore profile that will result in playable notes with pitches approximating to a harmonic series, experienced by the player as the instrument 'being in tune with itself'. Thus in France in the mid 1820s valves were added to the posthorn, an instrument which in its natural form was of limited musical use, to create the cornet, a new instrument which very rapidly became enormously popular. Valves were added at least

experimentally to all existing instruments. The valved bugle, or flugelhorn, has found a lasting, if minor, place in the palette of instrumental colours; the valve trombone has been found to be useful in certain circumstances, but its sound quality and response to the player have never equalled those of the slide trombone; valved ophicleides were made for a time. Within a few years of the invention of the Stölzel valve, instruments of various shapes and sizes were produced which had no valveless antecedents, particularly in Germany, where they were given names such as *bass Trompete* or *chromatisches Basshorn*. In France, the néocor and the clavicor were developed in the 1830s as alto and tenor instruments to form a ‘family’ with the cornet. The most important completely new instrument resulting from the valve’s emancipation of bore profiles was the Bass Tuba, the name first used by Wieprecht in 1835 for a wide-bore model valved bass in 12ft F.

The advent of the valve did not mean that crooks were done away with immediately. Instruments, especially those for orchestral use, employed crooks together with valves into the first half of the twentieth century. Music parts for bands rarely required more than one transposition for any instrument, nevertheless cornets in France and Britain were made with detachable shanks until the middle of the twentieth century. Where only two transpositions were envisaged, instruments were sometimes fitted with a ‘quick-change’ valve, an additional valve without any spring return which had to be set in advance of playing a particular passage. Many early twentieth-century cornets and trumpets for orchestral use were pitched in B₁, with a quick-change to A.

A further avenue opened up by the valve has never been seriously exploited: the duplex instrument. Here an extra valve is placed in the windway (after the usual three or four playing valves) which can divert the windway to a completely different bell. Duplex instruments of all sizes have been made, but the only two to have been extensively used have been the double-bell euphonium, in which the alternative bell has the proportions of a trombone bell, and the echo cornet, where the alternative bell gives a muted effect.

Many early valved instruments had only two valves. Two valves giving one and two semitones separately give three semitones in combination. With the longer tube length of the trumpet of the time (typically 6ft F or 7ft D in the nineteenth century), two valves were entirely adequate to execute the repertoire. With the french horn, players used valves in combination

with hand-stopping, and two valves were enough to give a complete chromatic compass; two-valved horns were made in France until the end of the nineteenth century. Even with the early cornet, a third valve was not always considered to be worth the extra expense. However, as the facility of valve technique led to greater demands from composers and arrangers, and the idioms of brass writing became more chromatic, three valves became normal for cornets, trumpets and band instruments; french horns for orchestral use increased to four valves ('double horns') in the first half of the twentieth century. Orchestral tubas, in order to have a chromatic compass down to the lowest notes players can effectively produce, have at least four, and in some models five or six, valves.

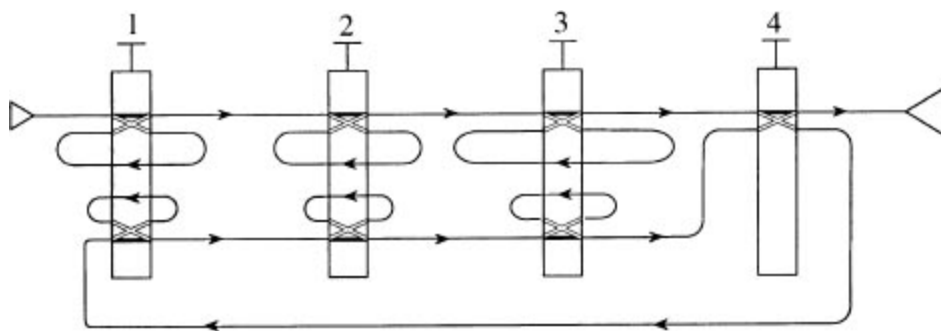
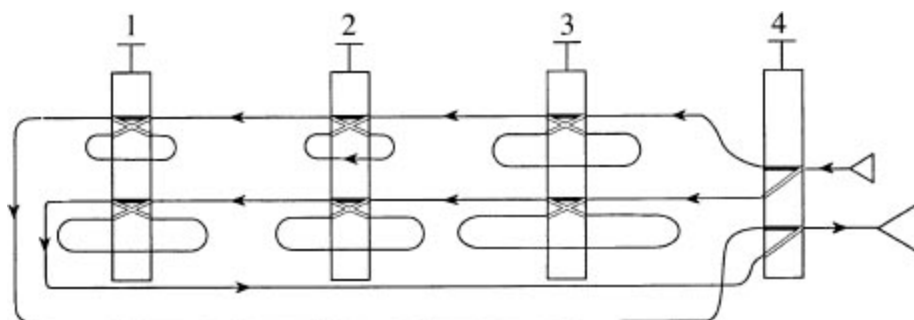


Figure 23 Systems to improve intonation

a. Compensating valves

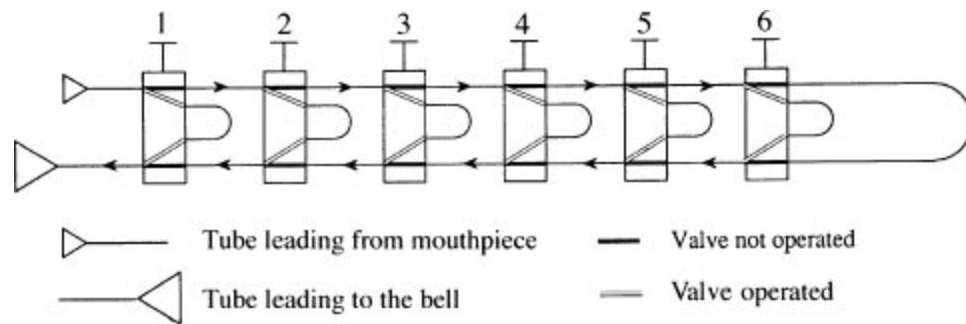
With 'compensating' instruments, the valve loop of the valve giving the greatest lowering (usually 5 semitones) is led through the other valves so that supplementary valve loops can be brought into the windway when this valve is used with any of the others. Piston compensating valves are more common except for french horns, where compensating valves are rotary.



b. 'Full double' valves

The principle of the 'full double' horn is to have the five-semitone valve again controlling two paths through the other valves, but as alternatives, rather than having one supplement the other. Rotary

valves are more common than the pistons shown here for clarity.



c. Independent valves

With independent pistons the windway goes twice through each of six valves. The first valve can either turn back the windway at the length needed for the basic pitch of the instrument or can let it pass to the second valve; this in turn can turn back the windway at the length needed for a semitone lowering or can let it pass to the third valve, and so on.

This brings us to the problem of using valves in combination: if a valve adds the correct amount of tubing to lower the instrument by x semitones, it will not add enough tubing to lower the instrument by x semitones if another valve is in use at the same time. The calculations are more complex than the simple proportions often presented in the literature, since valves increase the amount of cylindrical tubing in the windway and affect the bore profile as well as the air-column length.

Typically, a three-semitone third valve used in combination with a five-semitone fourth valve will give a lowering of nearer eight rather than nine semitones. Various ways of overcoming this problem have been devised, some of amazing mechanical complexity. With small instruments, it is often enough to tune the third valve to lower the pitch by slightly more than three semitones and then to avoid using it on its own – the player can then ‘lip’ any wayward notes up or down sufficiently for reasonably good intonation. Fitting the third valve tuning-slide (sometimes the first as well) with a finger-ring or sprung lever so that it can be moved by the player at least in slow-moving passages is common with trumpets and cornets. Even some tubas are designed so that a tuning-slide can be manipulated in performance. Some models of large instruments such as euphoniums and tubas have large numbers of valves (five or six) allowing the player some flexibility of fingering – there might for instance be two valves nominally giving a semitone but with one adding more tubing than the other so that

the player can ‘pick and mix’. The ‘compensating’ valve system (Fig. 23a) is used on some french horns and many euphoniums and tubas; the ‘full double’ principle (Fig. 23b) makes for a heavy instrument, since three valves have two full-length valve loops; as a result it has rarely been used on tubas, but it is the preferred valve pattern for french horns. The most radical alternative valve design to have been extensively used was the *independent pistons* system of Adolphe Sax (Fig. 23c): the need (and indeed the ability) to use valves in combination disappears. Intonation can be excellent, but the fingering is totally different from the conventional; it is more akin to a trombonist’s slide positions. This may account for the fact that this system was only ever regularly adopted for trombones although Sax intended it for all brass instruments.

Piston and rotary valve cases are turned on a lathe and machined to size, then the ports are drilled. Small pieces of tubing which connect two valves, or each valve with the rest of the instrument (the ‘knuckles’), are inserted in the holes, and the whole assembly (‘valve cluster’) of three or four valve cases with connectors and knuckles is wired together and soldered at the same time. Valve pistons are made of hollow construction for lightness: the body is often produced by deep drawing, the ports are then drilled to take the internal passages (*coquilles*) which are inserted through the drilled holes and silver-soldered into place. Protruding tubing is then removed and the piston is fitted by a process of reaming the inside of the case, grinding the piston and lapping. To prevent a piston from rotating, a lug (the ‘key’) projects from the piston body and runs in a vertical channel (the ‘keyway’) cut into the case interior. Valve rotors are made by a similar process, though on cheaper instruments they can be cut from solid brass or bronze.

Since the beginning of the nineteenth century most brass instruments have been equipped with a tuning-slide, slide trombones being the last to receive this feature. In addition to the main tuning-slide, each valve loop has its own tuning-slide; in many cases the outer slides are soldered directly to the knuckles.

Keyed brass

Ralph T. Dudgeon

The late eighteenth and early nineteenth centuries provided warm ground for the seeds of experimentation in brass instrument technology. Serpents and their latter-day relatives, the bass horns and *basson russe*, were proof that vented brasses were viable musical instruments. The need for fully chromatic brass increased as performers, instrument makers and audiences felt the need to find instruments that would suit the new music. A distinctly different sort of brass musician produced that music. For example, the training of Anton Weidinger as a guild apprentice serves in sharp contrast to the democratic self-instruction exemplified by the careers of the keyed bugle and ophicleide players that followed him.

Early keyed horns and trumpets

Ferdinand Kölbel and his son-in-law, Hensel, were the earliest documented experimenters with keyed horns, which they called the *Amor-Schall*. In 1756, they demonstrated two of their instruments for Tsarina Katharina II in St Petersburg.¹ Kölbel's instrument had keys on the bell and on a cross tube. The instrument featured a unique bell in the form of a half sphere. A second half of the sphere with perforations to let the sound out could be attached to this section, and it was the special sound that made the name *Amor-Schall* appropriate. The instrument had a sound that was, according to one account, 'a very agreeable blend, from the normal hunting horn, English horn, and the oboe'.² The instrument employed a new technique, produced a sound that varied from the mainstream, was difficult to

manufacture and attracted few disciples. Horn players preferred the hand-stopping techniques that were already established and widely accepted.

The first keyed trumpets are mentioned in Christian Friedrich Daniel Schubart's *Idéen zu einer Ästhetik der Tonkunst*, dated 1783–5 and published posthumously in 1806 by his son, Ludwig.³ Schubart described the sound of the keyed trumpet as a hybrid between a trumpet and an oboe. Modern players who have performed the concertos of Haydn and Hummel on keyed trumpets have commented on the difficulty of the instrument, but have realised acceptable musical performances despite the obstacles. Michael Wöggel, a court trumpeter in Karlsruhe, in collaboration with instrument maker Johann Andreas Stein, bent the trumpet in a half-moon shape so that the instrument could be hand-stopped. This hand-stopped instrument is most often referred to as an *Inventionstrompete*, a term which has led to confusion because, later, Christoph Friedrich Nessmann called his instrument by this name and Weidinger's keyed trumpet was called an *Inventions-Trompete*. The term *organisierte Trompete* was also used to describe Anton Weidinger's keyed trumpet, especially when he played it in Vienna.



Figure 24 A grouping of keyed brass instruments. Left to right: seven-keyed bugle in $B\flat$, anon., English, c.1820; ten-keyed bugle in $E\flat$, Graves & Co., Boston, c.1840; nine-keyed ophicleide in C, anon., Paris, c.1830; five-keyed trumpet, G crooked to $E\flat$, modern replica, Meinel & Lauber, c.1968.

Johann Ernst Altenburg mentioned a keyed trumpet played by Schwanitz of the Weimar court (after 1769). Schwanitz's trumpet had one hole and a leather slider, which he may have used (from Altenburg's citing of it in

1780–5) to around 1793, when it is mentioned again by Nessmann, a Hamburg trumpeter. Nessmann devised a system that concealed three keys under the trumpet's cordage. He was able to produce a chromatic scale from C₄ to C₅ for Ernst Ludwig Gerber.⁴ Ernst Kellner experimented with finger holes on trumpets in the period from 1780 to 1785. He is reported to have performed in Holland and perhaps for a short time in London using a trumpet with holes.

In his method book for the keyed trumpet, Andreas Nemetz says that his teacher, Johann Leopold Kunerth, was the first inventor of the keyed trumpet and that Josef Riedl made improvements to it.⁵ A four-keyed trumpet made by Riedl is pictured in the method. Carl August Müller also produced keyed trumpets for Schott in Mainz. Eventually the prototype experiments gave way to a standardised form. The keyed trumpet has two double bends and stands about 40 cm. long. With a few exceptions, the keys on German and Austrian models are manipulated by the left hand, while Italian models are played with the right hand. Early keyed trumpets were pitched in D or E_b, with three keys. Generally, only one key can be opened at a time. After 1815 more keys were added and the instruments were built in G, A, or A_b, and furnished with crooks to provide access to lower keys. Crooking required a different combination of the keys and complicated the technique considerably. Mouthpieces for the keyed trumpet are semihemispherical and similar to those that had been used on the natural trumpets that preceded them.

Anton Weidinger (1766–1852), a friend of Joseph Haydn and Johann Nepomuk Hummel, was the first trumpeter who was able to employ the keyed trumpet with sufficient artistry to silence the critics and to influence two major composers of the era to write concertos that remain master-works in the trumpet repertoire.⁶ Weidinger served an apprenticeship with a noted *Oberhoftrumpeter*, Peter Neuhold. He was an excellent student and matriculated early from his studies with a glowing letter of release. His first job was as a field trumpeter in the service of Prince Adam Czartorisky's cuirassier regiment. In 1787 he joined the dragoon regiment of Archduke Joseph. Resigning his military service in 1792, he joined the Royal Imperial Theatre Orchestra in Vienna. The transition from the fanfare work of the field to the artistic demands of orchestral playing was difficult, but, because of Weidinger's strong musical skills, he was able to change with far less trauma than the average trumpeter. He soon established himself in the

Viennese musical community, and married on 6 February 1797, with Joseph Haydn serving as one of his witnesses. Haydn wrote his concerto for Weidinger in 1796, so he certainly had a successful prototype by that date. Such an instrument would have had at least three keys to raise the natural partials a semitone, a tone and a tone and a half. In 1798 Weidinger performed Leopold Kozeluch's *Symphonie Concertante* in E \flat major for mandolin, keyed trumpet in E \flat , double bass, pianoforte and orchestra. In 1799 a chamber concerto by Joseph Weigl was performed. Weigl's concerto can be played mostly on the natural trumpet in E \flat , but there are passages that clearly could only be performed on the keyed trumpet. Newspaper accounts of Weidinger's playing, notably in *Allgemeine musikalische Zeitung*, spread the news of the keyed trumpet and Weidinger's skill.⁷ In 1803, Weidinger launched a successful tour of Germany, England and France in which he played repertoire such as Haydn's concerto, several unidentified *arie obbligati*, and a sextet by Ferdinand Kauer. A lost trio by Hummel for piano, violin and keyed trumpet dates from this period. Hummel's *Concerto a tromba principale* was first performed on New Year's Day 1804 at Esterházy castle. Since this concerto is pitched in E rather than in E \flat and does not rely as much on the *clarino* register, many scholars feel that Weidinger had a new trumpet made for this occasion. Evidence is difficult to gather on this issue because Weidinger did not permit people to examine his instruments, but the music itself indicates that he would have needed an additional fourth key to perform the music properly. At any rate, the greater complexity and modulation scheme of the Hummel concerto are testimony to a mature performer with excellent technical powers, good endurance and a fine instrument.

Sigismund Neukomm's *Requiem* of 1815 provided Weidinger with another important work to display his *Inventions-Trompete*. The piece contains interludes for a brass choir of keyed trumpet, four horns and three trombones. Vienna had other keyed trumpeters after 1815, notably Joseph Werner and Anton Khayll. The instrument was used in military music in Vienna until 1840. The famous Gambati brothers performed on keyed trumpets in Paris and London. By the time that Alessandro Gambati emigrated to New York, valved cornets were the norm.

The research of Austrian musicologist Friedrich Anzenberger has shed light on the method books for the keyed trumpet and its use outside of Vienna. Books by Araldi, Asioli, Nemetz, Roy and Muller, and Roy show

four- and five-keyed instruments and detail their fingerings in various crook settings. The range of nationalities of the authors shows the regional dissemination of the instrument, and documents its use in military music and opera. An American publication by Prentiss, not listed by Anzenberger, should also be added to the list.⁸

The keyed bugle

Keyed bugles are conical, wide-bore, soprano brass instruments with side holes which are controlled by keys similar to those used on woodwind instruments. They are important for the role that they played in the development of the brass band movement on both sides of the Atlantic.⁹ The first keyed bugles had only five keys, but keyed bugles with up to twelve keys are found. The key closest to the bell stands open when the instrument is at rest. Some later instruments have a whole-tone valve instead of the E and F keys. Early keyed bugles were pitched in C with a crook to B \flat . Later, other keyed bugles came in a variety of keys, the most common being high E \flat . The keyed bugle is sometimes confused with the keyed trumpet. When the two are compared side by side, however, many differences can be seen. The keyed trumpet is double-wound and primarily cylindrical, while the keyed bugle is single-wound and primarily conical. On keyed trumpets only one key opens at a time, while keyed bugles can employ alternate fingerings using several keys at a time. Mouthpieces for the keyed trumpet are semihemispherical, while keyed bugle mouthpieces have deep, conical cups.

Keyed bugles were generally made of copper, with brass or german silver keys and fittings. However, instruments made of solid silver, gold and even tortoiseshell exist. The fingering systems are extensions of the original instrument's design, a notable exception being instruments made by the firm of Kersten, which were an attempt to divide the arrangement of six keys between two hands. The original design of the more common variety of keyed bugle gave the right hand most of the work, with the left hand only being responsible for the E and F in the first octave of the instrument. The mouthpieces were made of brass or ivory, and were sometimes silver-plated. The rims tend to be flatter and sharper than those that modern

players are accustomed to. As a result of the instrument's conical bore and the use of a deep conical mouthpiece, a very mellow and woolly sound is produced, similar, but far from identical, to the sound of the modern flugelhorn. Sonic phenomena associated with venting also contribute to the instrument's unique timbre.

In Dublin in 1810, the bandmaster of the Cavan Militia, Joseph Haliday, added five keys to the common military bugle. Haliday's patent is dated 5 May 1810, and is British patent No. 3334. Some writers have stated that the Duke of Kent heard Haliday perform on the instrument and encouraged its use in the British military, but it is more likely that a rival of Haliday, John Bernard Logier, pirated the patent, wrote his own method book and dedicated it to the Duke of Kent to ensure that he would be able to make more sales to the military. It was about this time that more keys were added. By 1823, models with up to nine keys were available.

One of the most famous English keyed bugle players was John Distin, whose playing inspired keyed bugle obbligato parts in some English operas of the period (Bishop's *The Miller and his Men* is an example). Professional English trumpeters began to double on the keyed bugle. Payroll lists from orchestras show that some of the best trumpeters were able to double their money by playing both the keyed bugle and the slide trumpet. John Hyde, first trumpet in the King's Theatre Orchestra in London, was a fine keyed bugle player and wrote a method book for it. Another important performer, and author of a method for the next generation of English players, was Thomas Harper Sr. His method is important for the beautiful illustrations of instruments and for his advice to players, which provides valuable information regarding aspects of nineteenth-century trumpet, keyed bugle and cornet performance practice. Joseph Küffner's *Polonaise for the Keyed Bugle* is typical of the style of English keyed bugle music in the early 1820s. The English firms of Pace, Percival and Köhler made fine instruments in London. Keyed bugles were common in British bands by the time of the allied occupation of Paris in 1815. At the request of Grand Duke Constantine of Russia, made after he had heard Distin perform with the Grenadier Guards Band, the Parisian instrument maker Halary was asked to duplicate the English instruments. Halary extended the idea of the keyed bugle to a whole consort of keyed instruments which he called ophicleides. The French put the *cor à clef* to work in the opera orchestra. Rossini's *Semiramide* (1823) and Kreutzer's *Ipsiboé* (1824) have keyed bugle parts.

Parts for *trompettes à clef* were included in the Paris score of Rossini's *Guillaume Tell* and in Meyerbeer's *Robert le diable*. While the keyed bugle was used in military bands in France, it was often given an inner voice rather than a soprano or solo line. The French design, inspired by Halary, enlarged the body of the instrument, eliminated the crook, and featured some innovative key designs that made the instruments easier to play and hold. The revolutionary concept of a workable, completely chromatic, soprano brass instrument, and the invention of valves in 1818, motivated a surge of brass instrument making in London, the major musical centres on the Continent and the United States.

In Germany, catalogues mention *Klappenhorn*, or *Klappenflügelhorn*, frequently among listings of military and wind music. There are pieces which have prominent parts for the *Klappenhorn* and even music for choirs of *Klappenhörner* pitched in different keys, but it does not appear that the keyed bugle was considered as seriously as an orchestral or solo voice as it was in England. However, the keyed bugle met with great success as a soloist's instrument in America.

An English maker who emigrated to the United States and began working for the firm of Graves and Company in Winchester, New Hampshire, was James Keat. His name on the bell of a Graves keyed bugle was a symbol of a high standard of craftsmanship that would become a trademark of the New England makers. The Boston firm of E. G. Wright was also noted for its finely ornamented E_b , 'presentation instruments'. American keyed bugle making was a refinement of earlier English construction. The flat English key style was rounded and streamlined, the earlier box mounts were replaced by posts on footplates, and the number of keys increased from nine to twelve. The public's enthusiasm for keyed bugle soloists and the interest in the instruments themselves as symbols of status and virtuosity extended the instrument's use in the United States.

Perhaps the first professional-level keyed bugle soloist in America was Richard Willis, a student of Logier, who arrived in New York in 1816. By June of 1817, he had become the first director of the United States Military Academy Band at West Point and was arranging for the purchase of Kent bugles to instruct young band members. General E. A. Hitchcock recalled his playing in his diary of 1824: 'Willis was a perfect master of that instrument. While he could send tones over the river and into the mountains, bringing back marvellous echoes, he could bring it into such

moderation as to accompany a lady at her piano, even in a very small room as I have often heard him.’¹⁰ This reference confirms other citations of Willis’s musicianship, and documents the use of the keyed bugle as a chamber music or ‘parlour’ instrument. Willis gave programmes in the East Coast centres and he was a model for what became the expected image of the nineteenth-century band director. Willis died in 1830. Unfortunately, a fire in 1838 destroyed many of his personal papers and manuscript music that were housed at West Point. Some of his published music survives in piano editions and a few of his most popular marches such as *Grand Canal March* and *West Point March* are still performed.

Apparently, Willis’s influence as a teacher extended beyond West Point. Upon his death, a rising keyed bugle virtuoso, Francis Johnson, was moved to compose music to J. Tranor’s poem, ‘The Death of Willis’. On the title page, Johnson paid tribute to Willis for the ‘knowledge of that fine martial instrument, the Kent Bugle, when first introduced in this country’.¹¹ After the American War of 1812, Johnson emerged as a strong force in American popular music. Many of his compositions were published as piano reductions. Some of these piano pieces have cues for the various band instruments, including the keyed bugle, and provide an idea of the instrumentation and texture of Johnson’s ensembles, which often included flute, clarinet, bassoons, horns, serpent and percussion. When the group played indoors, some of his musicians switched to strings. Johnson may have been one of the first Americans to play solos on the high E₁ keyed bugle. His popularity is evident from the type of engagements that his band played. He provided music for a ball which celebrated General Lafayette’s arrival in America. In 1837 his ensemble toured England and France. Some writers have reported that he performed for Queen Victoria and that she awarded him a silver bugle as a token of her admiration. He died in 1844.

By the 1830s, bands featuring keyed buglers were popular. Even small towns had ensembles that played for dances, concerts or political events. Keyed bugle solos were heard in theatres before the curtain and between acts. Many keyed bugle performers made a good living dividing their time between such performances and summer employment in the American circus. New England was a centre for band music, but keyed bugles were played as far west as Minnesota and as far south as New Orleans. The band tradition is well documented and there is growing iconographic and

published musical evidence that keyed bugles were used in small social orchestras such Hall's Quadrille and Concert Band.

The instrumentation of ensembles using keyed bugle ranged from amateur boys' bands to professional ensembles with set instrumentations, healthy budgets and impressive uniforms. The American Brass Band of Providence Rhode Island in 1838 could be considered typical of this latter category. The leader of the band was Joseph C. Greene. Other American soloists during the height of the keyed bugle's popularity (1840–60s) included Rhodolph and D. C. Hall who were active in the Boston area, and Ebban Flag, an important member of the Boston Brass Band. The Salem Brigade Band (later the Salem Brass Band) was known for its fine keyed bugle performers including the ensemble's first leaders, Francis W. Morse and Jerome H. Smith. The most famous American keyed bugle soloist was Edward 'Ned' Kendall, the founder of the Boston Brass Band and the unquestioned virtuoso of the instrument for three decades. Kendall's death in 1861 marks the end of the keyed bugle era in America, although a few band leaders and soloists such as Thomas G. Canham continued the tradition to 1873.

American keyed bugle music appears in a number of formats. A good idea of the style of literature can be gained from nearly sixty method books which typically have a brief section on the instrument's technique, a fingering chart and basic exercises followed by popular and operatic tunes in solo and duet form. Methods by Burditt, Dodworth, Goodale and Prentiss are representative examples. Some music was issued in subscription. Published band editions with important parts for the keyed bugle include Eaton's *12 Pieces of Harmony for Military Bands* and Howe's *The Musician's Companion*. The majority of music for the keyed bugle was in manuscript, consisting of arrangements that the bandmasters or talented members of the ensemble would customise for their particular group. Surviving manuscript band books include the *Manchester Band Books* of 1849, and several pieces in the Scala Collection in the Library of Congress. The most important European manuscript collection which contains virtuosic keyed bugle parts is the Cyfarthfa Band manuscripts from Merthyr Tydfil, Wales. In the 1840s Ralph Livesey, a keyed bugle virtuoso, was the conductor of this ensemble. He was succeeded in this post by his son, George, who was also a keyed bugle player. A sampling of this music has been recorded on period instruments by the Wallace Collection for Nimbus

records.¹² Keyed bugle obbligati to vocal selections were popular in programmes of the period. T. Philipps's *The Last Bugle* (Philadelphia, 1823) is an example.

The largest work for keyed bugle and orchestra is Anton Philipp Heinrich's *Concerto for the Kent Bugle or Klappenflügel* (1834). The manuscript score is in the Library of Congress. Owing to a set of unusual circumstances, the piece was never performed in the nineteenth century. In 1987 it was first performed by this writer and the Sudetendeutsche Musiktage Orkester under the direction of Widmar Hader, in Regensburg, Germany. The work is for a forty-two part orchestra in the grand Romantic tradition including scoring for serpent, ophicleide, bombardon and even organ. Heinrich is claimed as a Sudeten as well as an American composer, having emigrated from Bohemia to America after the Napoleonic Wars.

The study of the literature for the keyed bugle has increased as various period bands and social orchestras aspire to perform this music again. The English composer Simon Proctor has composed a new concerto for the keyed bugle and orchestra which was premièred by the Richmond (Virginia) Philharmonic in 1994.

The ophicleide

Jean Hilaire Aste (who did business under his firm's name of Halary) submitted a family of new instruments to the Académie des Beaux-Arts, and later patented ophicleides on 24 March 1821, with an additional rider added on 16 August 1822.¹³ The word 'ophicleide' is derived from the Greek *ophis* (serpent) and *kleis* (that which serves for closing). The invention of the term also marked the first instance of a 'trade name' given to a musical instrument by its maker. Asté's patent, No. 1849, describes a Clavitube or *trompette à clef*, which is the keyed bugle discussed above, and the Quinticlave or *quinte à clef*, which was an alto keyed bugle in F or E_b, built in the shape of the bassoon. Finally, a bass and contrabass rounded out the family. The bass (also in the bassoon shape) was pitched in bass C or B_b and was called the ophicleide or *serpent à clef*. The *ophicléide contrebasse en fa* was a rare but highly effective instrument. Certainly there had been ample experimentation with the serpent, bass horn, *basson russe*

and other upright serpent forms.¹⁴ However, the occasion of Grand Duke Constantin's commission for duplicate keyed bugles led Halary to consider an entire consort or family of conical keyed brasses.

The alto ophicleide was a rarity, even in its own day. It was used in military and civic bands, but seldom in the orchestra. The conductor Rivière is reported to have played the alto ophicleide in a French band in his youth. Alto ophicleides found their way to American brass bands and some were manufactured by the New England makers. By the late 1830s, more reliable instruments with the new valve systems were gaining favour on both sides of the Atlantic.

History has proven the bass ophicleide to have been the most long-lived keyed brass instrument. Its original design needed only slight modifications and the addition of more keys (from the original nine to as many as twelve) to make the instrument more flexible, with an array of alternate fingerings. It could be heard in bands up to the beginning of this century and its enthusiastic revival, particularly in the UK, is a testament to its integrity as an instrument. The bass ophicleide's dimensions are outlined in [Chapter 11](#). The relatively small bell of the instrument defines the vocal timbre, sometimes described as a woolly euphonium. Although technically a bass instrument, its agility in the upper register and flexible, vocal tone gave composers the option of using it as a tenor or baritone voice. This idiom can be heard in the air and variation solos that featured ophicleide soloists in Europe and the United States. Perhaps the best-known examples of this genre are the arrangements of Handel's 'Oh, Ruddier Than the Cherry' from *Acts and Galatea* and Bottesini's *Fantasia (La sonnambula de Bellini)*.

Paris was the first major centre of activity for ophicleide players because of the well-funded opera activity. Spontini's *Olimpie* was the first opera to use the instrument. The part was played by M. Mongin on 22 December 1819, even before the instrument received its formal patent. Rossini, Donizetti, Berlioz and Meyerbeer also called for the ophicleide in several scores. Waldteufel's waltz *Espana* employs the instrument in a soloistic way.

Mendelssohn was the only German composer to employ the ophicleide, notably in *Ein Sommernachtstraum (A Midsummer Night's Dream)* (1826/42). Berlioz used a B \flat and a C ophicleide in *Symphonie fantastique* (1830) and *Grande messe des morts* (1837), assuming that the intonational

failings of one instrument would be compensated for by the strengths of the other. It was for this reason that he combined them in the unison statement of the *Dies Irae*. He was reported to have commented that the section sounded even more frightening than he had imagined when he composed it. Ophicleides were later combined with tubas (see [Chapter 11](#)). Jullien appears to have enjoyed the sound of the ophicleide and featured the great French virtuoso Prospère (Jean Prospère Guivier) in several of his Promenade Concerts, creating enough notoriety to warrant Prospère's portrait and biographical sketch appearing in the *Illustrated London News* of 24 June 1843.

The contrabass ophicleide, sometimes called the *monstre*, was pitched in F or E \flat and stood a healthy 150 cm. tall. From its first appearance at the Birmingham Festival of 1834, the monster was played by such notable ophicleidists as William Ponder, Robert Merrick, M. Lerey and finally by Prospère on Jullien's United States tour of 1853. Julian Tollot was reported to have made the last contrabass ophicleide in 1858. A modern reproduction of the contrabass ophicleide by California instrument maker Robb Stewart was demonstrated to be an effective instrument when it was played by its owner, Philip Palmer, at a keyed brass festival in 1989. Palmer also commissioned Stewart to make an alto ophicleide, which also proved to be a beautiful-sounding instrument.

Performers such as William Ponder, Hubbard, Prospère, Robert Merrick, Samuel Hughes,¹⁵ Freising, J. H. Guilmant, M. Mongin and A. J. Phasey devoted considerable energy and time to establishing the ophicleide as a serious instrument. Space does not permit the detailing of their individual careers, but they all shared the nineteenth-century ideal of virtuosity and a spirit of entrepreneurship that led to the 'freelance' musician of our era.

Like the keyed trumpet and the keyed bugle, the ophicleide had its major centres of activity during the nineteenth century. Paris was the early centre, but London was quick to follow with a circle of fine players who were important for spreading their technique by way of professorships at the Guildhall School of Music (Hughes and Guilmant) and the Military School of Music, Kneller Hall. Published tutors had an influence on the distribution of qualified players. The *Méthode complète d'ophicléide* by F. Berr and Caussin has been noted by several authorities as being the finest method. Other books were written by P. Clodomir, Cornette, Garnier, Héral, Kastner, Schiltz (later translated by Merrick) and Steiger.¹⁶ Wooden-bodied

ophicleides called serpentcleides were introduced, and in 1832 Guichard patented the first valved ophicleide, which is considered to be the first tuba. The keyed and valved brasses coexisted for a few decades, with the valved brasses eventually gaining total favour as the technology to produce a reliable valve became possible.

A revival of the ophicleide is fully under way. Clifford Bevan, Steve Wick and Tony George are among the leading players in the UK. Carey Blyton's music for the sound track of *The Revenge of the Cybermen* episode of the BBC television series *Doctor Who* used both the serpent and ophicleide. Roger Norrington's 1989 recording of *Symphonie fantastique* once again used ophicleides as in the original score. In the United States, the interest in Civil War period bands has created a need for ophicleide players. Robert Eliason, Robert Pallansch, Jay Krush and the Canadian Gary Nagels are among the leading professional ophicleidists in North America.

The low brass

Clifford Bevan

Medieval and early Renaissance ... instruments were normally played in consorts or choruses of their own kind, in various pitches, the bass often being supplied by an instrument of a different character because of difficulty in constructing an effective instrument of the group in a sufficiently low pitch.¹

This remained the situation with brass instruments in the late eighteenth century (and in some places even in the twentieth).² The trombone was the sole exception. Praetorius illustrated both bass and contrabass trombones in *Syntagma musicum* (1619). However, the latter instrument was seldom used.

Towards the end of the fifteenth century another lip-reed instrument which could play as low as the bass trombone, the bassoon and the cello had appeared. This was the serpent, invented by Edmé Guillaume of Auxerre to accompany plainchant.³ Its mouthpiece is inserted into a bent brass crook which in turn enters a wooden tube. In a length of some 210 cm. this tube expands from a diameter of 2 cm. to a bell of about 10 cm. Its range of two and a half octaves from C₂ was ample for plainchant, the slow tempo of which gave the player time to pitch each note beforehand. The pitch of the serpent tends to be unstable owing to its wide conicity and the position of the six finger holes along its 'S'-shaped tube which are placed conveniently for the three middle fingers of each hand, rather than in accordance with acoustic requirements. When military bands adopted the serpent in the late eighteenth century three keys were fitted, giving improved B_s, C_{#s} and F_{#s}. The *serpent militaire* was also more robustly constructed than the *serpent d'église*. At the same time, bassoon-shaped serpents appeared. The first, possibly by Régibo of Lille, was the *basson russe*. Another French serpentist, Alexandre Frichot, introduced his bass

horn, built of copper in a V-shape, to England in the 1790s. It achieved great popularity, becoming known as the English bass horn.

Handel is supposed to have exclaimed, 'Aye, but not the serpent that seduced Eve', when he first heard the serpent, on coming to England, and having included the serpent in his score for the *Fireworks Music* (1749) subsequently erased it from the first page in a very deliberate manner, yet in *Harmoniemusik* ensembles the serpent appeared with increasing regularity. Samuel Wesley included one in a march composed in 1777, and a serpent player remained with the North Gloucestershire Militia until 1860. It also established a place in many rural English amateur church bands. Its impact on composers of the Classical era was limited. Beethoven used it only in his Military March in D major of 1816, with two bassoons and double bassoon. In the late eighteenth-century marches commissioned for English wind bands, Haydn used a serpent to reinforce the bassoons in the bass part. Since he did not specify serpent elsewhere, it is clear that the bands actually included a serpent in their instrumentation.

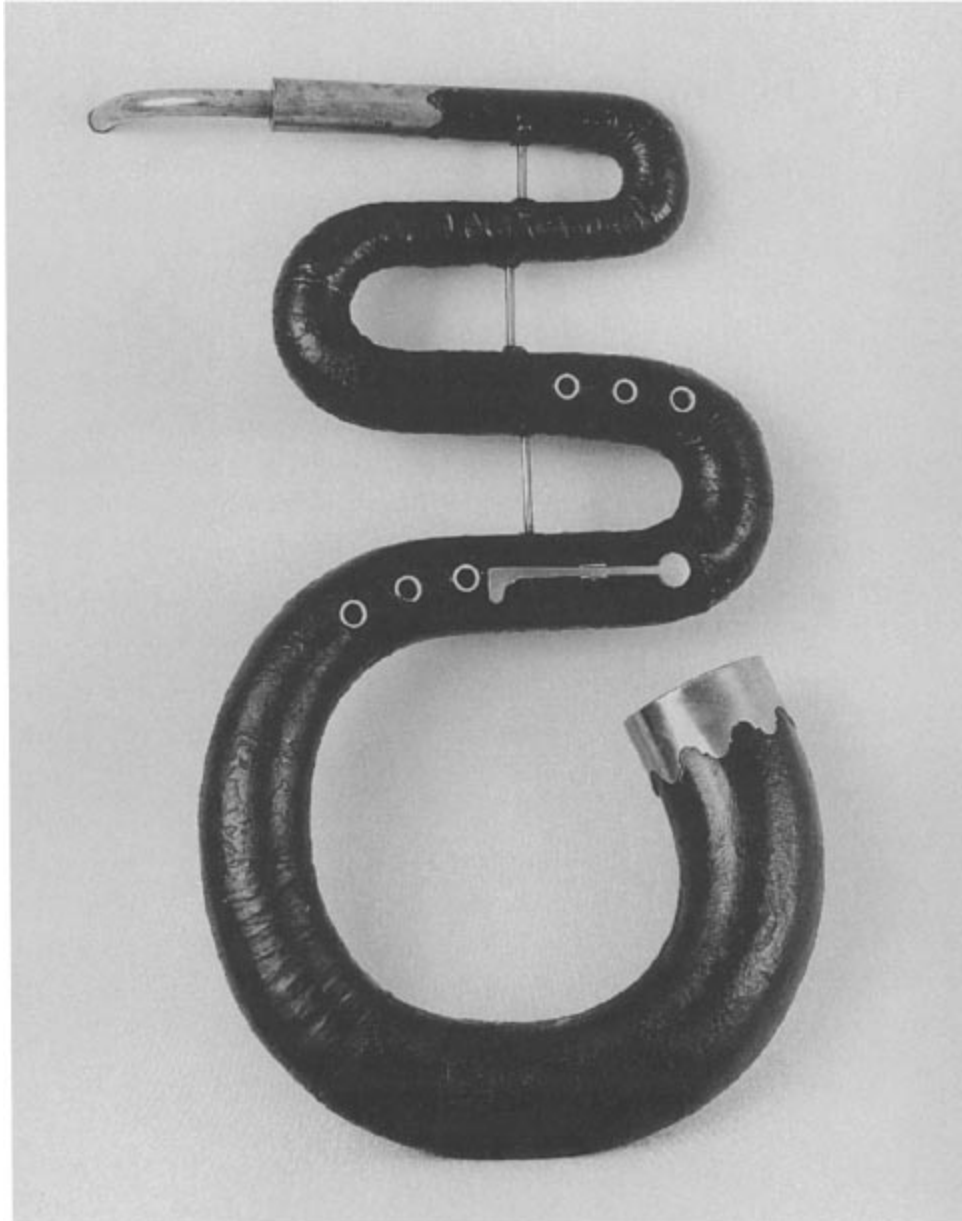


Figure 25 Three-keyed serpent by Haye, London, c.1825.

The serpent was also heard in the theatre. An upright model was seen in the pit of La Scala, Milan, in 1816 and 1825.⁴ The scores of Bellini (1801–35) and contemporary Italian opera composers included a part for serpent. The works of others, like Rossini (1792–1868), confirm Italian interest in the serpent while showing the emergence of national preferences for specific bass brass instruments.

The ophicleide was patented by Halary of Paris in 1821. Its compass was broadly the same as that of the serpent, but the timbre was recognisably

modern. The keywork conferred ample agility, while the instrument retained the characteristic attack of all lip-vibrated instruments with sideholes, sharing with the serpent a vocal quality that resulted in it usurping the earlier instrument as supporter of the choir in many French churches. It was used regularly by nineteenth-century French composers for the theatre, the concert-hall and places of light entertainment. Berlioz was a notable advocate. In several works (including the *Symphonie fantastique* (1830)) he stipulated two ophicleides, one in C and one in B \flat , in order that the less reliable notes of one might be strengthened by the better notes of the other. It soon became established in orchestras and bands in a number of countries, including Italy, Spain, England, Wales and America, although it found less favour with the military than it did with civilian bands, possibly because of its rather fragile construction. Ophicleide solos, usually transcriptions of songs or *airs variés*, became extremely popular. As a solo instrument, the ophicleide attracted some distinguished players.

Rossini, who specified *serpentone* in works like *Mosè in Egitto* (1818), composed for performance in Italy, requested ophicleide in operas composed for France, including *Moïse*, the revised version of this work produced in Paris in 1827. Donizetti (1797–1848) also stipulated ophicleide in French operas, but in the score of *Parisina* (produced in Florence, 1833) asked not for *serpentone* but for *cimbasso*. The word *cimbasso* applied not to a specific instrument but to an instrument fulfilling a particular function or part: the provision of the lowest notes of the brass section in an Italian opera orchestra. *Serpentone* and *cimbasso* were interchangeable terms. Later in the nineteenth century, the word *cimbasso*, while retaining its meaning, came to be used for other instruments, as I explain below.

The ophicleide is not found in the scores of conventional symphonies because during the greater part of the nineteenth century this genre was almost exclusively the domain of German and Austrian composers, most of whom were unaware of the ophicleide's existence. However, Mendelssohn scored for ophicleide in two major works: the music for *Ein Sommernachtstraum* (*A Midsummer Night's Dream*) (Overture 1826/Incidental Music 1842) and the oratorio *Elijah* (1845–6). He also specified serpent in the oratorio *St Paul* (1836) and the overture *Meeresstille und Glückliche Fahrt* (1832), with *corno basso* in the *Ouvertüre für Harmoniemusik* (pre-1830) and *corno di basso* in *Trauermarsch* (1836) – both upright serpents in music for wind band.



Figure 26 Sean O'Neill of the Welsh National Opera Company with *cimbasso* by Josef Meinl, the first of this type used by a British opera company.



Figure 27 The virtuoso tuba player John Fletcher (1941–87).

Mendelssohn clearly wished to strengthen his orchestra's lowest register, yet only one contrabass serpent (c.1840) and one contrabass ophicleide (c.1834) are known to have existed, both of them in England. The Prussian

bandmaster Wilhelm Wieprecht described the unsatisfactory situation in 1835: ‘For 10 years now I have been working with military bands, and have felt, I suppose, most sorely the need of a true contrabass wind instrument.’ He dismissed existing bass instruments:

None of the bass wind instruments such as: 1) the English bass horn, 2) the serpent (both with an effective compass of at the most $2\frac{1}{2}$ octaves, viz. from treble G [G₄] down to contrabass C [C₂]) and 3) the bass trombones (with a compass of 3 octaves from second octave C [C₅] to contrabass C [C₂]), could fill the place of the wanting contrabass which wind band music demanded.

Proof that this need was felt in all countries is offered by the invention of the ophicleide. Although the latter can only go one and half tones deeper than the English bass horn and the serpent, this instrument was still looked upon as a major advance in all countries ...

The quotation is from the prologue to his Prussian Patent (No. 9121, 12 September 1835) for the *Bass-Tuba*. He concludes:

... this would surely indicate how important and advantageous for music is the invention of the chromatic Bass-Tuba, which can descend one octave lower than the serpent and English bass horn, and six notes lower than the ophicleide, while yet retaining the high notes of these three said instruments.⁵

Along with the instrument maker Johann Moritz, Wieprecht constructed an instrument pitched in F and in C (like many modern bass tubas) with five valves (a common number even today, the additional valves controlling the tubing that provides the lower notes). There is an account of the experiments leading to its appearance in the patent document, but he does not refer to the *Berliner-Pumpe* valve, created earlier in 1835 by the same team, which, unlike its predecessors, allowed the use of the wide-bore tubing essential in brass instruments to produce low notes. (The further the vibrating air in a tube has to travel, the wider the bore needs to be in order to overcome the friction of the air against the tube’s walls.) However, the bore of Wieprecht’s *Bass-Tuba* was wider only relative to that of existing instruments. Shortly afterwards he designed a bombardon which was more indicative of the lines along which the wider-bored tuba was to develop from the middle of the nineteenth century.

Wieprecht’s choice of names was unfortunate. *Tuba* was the Latin for ‘trumpet’, to which his instrument was related only in the broadest sense of the term, being more conical in profile and playing in a much lower register. The *Bass-Tuba* was, in any case, a contrabass instrument, establishing a confusion in terminology which continues to afflict the low brass.

Bombardon (from the Italian *bombardone*: a large medieval stone-firing cannon) was first applied to the deep bass shawm, and then in the 1820s, by Riedl, to his ophicleide, before being used for bass valved instruments. In this case, therefore, Wieprecht adopted a term already in familiar use, which was destined always to have band, as opposed to orchestral, connotations.

Table 4. Dimensions (mm.) of *Bass-Tuba* in F and C (Moritz) c.1838–40, and ophicleides in B \flat c.1830 (Charles Sax) and c.1855–65 (Henri & Martin)

	Moritz	Sax	Henri & Martin
Overall length of tubing	3540	2745.5	2598
Length of main tube	—	1829	1628
Length of crook	—	916.5	970
Bore at tip of crook	14.8	2.5	12
Bore where crook is inserted	—	35.5	34
Width across bell	193	213.5	236.5

The most significant single dimension is the bell diameter, which is smallest in the bass tuba. That the bell of the later ophicleide is more than 25 per cent wider than the bass tuba's may indicate a rearguard action being fought by ophicleide makers against the tubas with their fuller sound. It also helps explain the widespread use of the term *ophiclède (à pistons)* for valved bass instruments in France during much of the nineteenth century.

Notwithstanding the relatively lightweight tone of the bass tuba, Berlioz was delighted when, in 1843, he heard twelve such instruments in a performance of his overture *Les francs-juges* (1826) by Prussian army bands totalling 600 players. Subsequently he amended many scores, substituting tuba for ophicleide, or (for example in *La damnation de Faust* (1845–6)) specifying ophicleide for the upper part with tuba below. In 1843 the Belgian Adolphe Sax who had established his workshop in Paris the previous year, took out the first patents for his family of saxhorns with matching proportions and hence matching tone-qualities. The prime market was French army bands and brass bands in the United Kingdom. His instruments were pitched alternately in E \flat and B \flat , establishing the convention of brass basses in those two keys in European bands. By the time of the International Patent Convention of 1883, instrument makers in many countries had made and marketed their own families, often differentiated only by minor differences in detail. The French saxhorn family is, to all intents and purposes, identical with the *flicorni* and *fiscornos* found respectively in Italian and Spanish bands, each with their own bass and contrabass instruments.

The invention of the tuba was perfectly timed for composers of the Romantic school, whose interest in orchestral tone-colour was one of their distinguishing characteristics. While the ophicleide had scarcely made any impression in central Europe, improving communications facilitated the dissemination of an awareness of the tuba. It was no coincidence that Mendelssohn had been the only German composer to use the ophicleide to any extent: he was a well-travelled musician. (*Elijah* was given its première in 1846 in Birmingham, England, a country with many fine ophicleidists.) The cosmopolitan Berlioz undertook a conducting tour of the German States during the crucial period of the tuba's early development, and was a member of the musical instrument section jury at the 1851 Great Exhibition in London.

Tubas of various pitches were well established in European and American bands by then. Those in B_1 are normally called euphoniums, and occasionally appear in orchestral scores as tenor tubas. Wagner's first specific request for orchestral bass tuba seems to have been in *Eine Faust-Ouvertüre*, completed in 1840. It is possible, however, that the tuba may have been introduced in later revisions, as the work was composed in Paris. This is significant in view of the dichotomy between French and German concepts of low brass. At the Paris Opéra, saxhorns were used in Meyerbeer's *Le prophète* of 1849, but only in stage bands. Wagner's first significant opera, *Rienzi* (1840), was written in the hopes of production there, and consequently scored for a single ophicleide in the orchestra and four more in the stage band. (He also included a part for serpent, treating it as a third bassoon.) In later works, Wagner wrote for F tuba, often playing an octave above the double basses, notably in *Die Meistersinger von Nürnberg* (1862–7), where the part climbs as high as E_4 in the overture, and incorporates a thrilling trill on the way down.

As it developed from the middle of the century onwards, the rapidly expanding bore of the tuba enhanced its power and nobility, but emphasised its difference in tone from the trombones alongside which it was positioned in the orchestra. This threatened to become even more of a problem with the development of the contrabass tuba, pitched in C or BB_1 , with still wider bore, and capable of playing even lower notes. (The Czech firm of Červený is generally credited with its invention in 1845, but it also appeared in France as the *saxhorn contrebasse en si bémol* during the late 1840s). From *Das Rheingold* (1853–4) onwards, Wagner normally specified contrabass

tuba as the lowest instrument – not of the trombone section, but of a group of four *Wagner Tuben*: two tenors in B \flat and two basses in F, with bores midway between the tuba and the horn, played by horn players using conical mouthpieces. The contrabass tuba forms the natural foundation of this mellow-toned group.

To provide the equivalent voice for the trombones, Wagner stipulated contrabass trombone. The prototype, pitched in B \flat , was made with a double slide by Carl Moritz, although from the middle of the twentieth century it became customary to use a large-bore instrument pitched in F with a normal slide and two valves. Contrabass trombones have been demanded by other composers during two specific periods: the early twentieth century (Schoenberg, Berg, Richard Strauss), and the late twentieth century- a phenomenon dealt with below.

Apart from *Jérusalem* (1847), which was destined for the Paris Opéra, consequently having an obligatory ‘oficleide’, the lowest brass part of Verdi’s opera scores is designated either *cimbasso* or *trombone basso*. These parts show clear differences from the way in which he writes for tuba (under the name *bombardone*) in his stage bands. Far from fulfilling the common tuba role of doubling the bass trombone an octave lower, the *cimbasso* often provides a fourth real part, may be used with bassoons or cellos and basses when the trombones are not playing, and in general is treated in a much more agile manner than the tuba. The musical problems encountered when a tuba is used to play these parts have only recently been overcome, and this victory has been achieved simply by following Verdi’s own instructions.

Like Wagner, he preferred a trombone section of four matching voices. He called his lowest instrument *trombone basso* because it was Italian practice to use a section of three tenor trombones (although the *trombone basso*, like the bass tuba, was really a contrabass instrument). In Italy, as in France, the ophicleide was commonly used to support the orchestral trombones, as confirmed in *Studi d’istrumentazione per banda* by Alessandro Vessella (1897):

In the scores of the Italian masters the *cimbasso* is still found as the foundation of the trombones, instead of the ophicleide. The *cimbasso*, no longer used, was made of wood, sometimes copper, in bassoon shape with six finger-holes and two keys, a metal bell and an S, to which was applied a mouthpiece somewhat larger than that of the trombone; the compass was C-g [C2–G4], non-transposing.⁶

Here Vessella identifies the prototype *cimbasso* as well as describing contemporary performing practice in Italian orchestras. (Tubas under various names had long been established in Italian bands.) In 1871 he dictated his requirements for the forthcoming première of *Aida* to his publisher, Ricordi:

That bombardon is not a possibility ... I cherish a *Trombone Basso* because it is of the same family as the others; but if it should be too tiring and too difficult to play, try again one of the usual ophicleides that reach low B [B1]. In fact anything you like, but not that *damned tuba* which does not blend with the others.⁷

However, a decade later, he commissioned a BB₁ contrabass trombone from Giuseppe Pelitti. In this case there was no problem with an unwieldy slide, as the trombone normally used in Italy was the valve trombone, which still maintains its popularity in Mediterranean countries. The *trombone Verdi*, or late nineteenth-century *cimbasso*, assumed a distinctive 'T'-shape, its mechanism and associated tubing positioned vertically and the bell facing forwards over the player's shoulder. Recently many European and American opera houses have invested in these instruments, thus correcting the balance of the brass section in Verdi (and Puccini) works, although at the time of writing the striking chorale for four trombones at the opening of the overture to *Nabucco* is not heard as Verdi conceived it at La Scala, Milan, where the tuba is still used.

Composers for symphony orchestra appear to have been more acquiescent in their acceptance of the tuba in the part lying beneath the trombones. There was, however, considerable variation between countries in the concept of the orchestral tuba. In France, the influence of the ophicleide was pervasive, although a tuba was used in some dance orchestras from the mid 1840s. This instrument was pitched in C, but the addition of a fourth valve enabled players to cover the ophicleide range. The tone was scarcely like the ophicleide's, and was nothing like that of the bass tuba known elsewhere. None the less, since Sax had named his euphonium, or tenor tuba equivalent, *saxhorn basse en si bémol*, this small C tuba assumed the function of the orchestral bass tuba, although pitched a tone higher than the euphonium. Lightweight and agile, it took its place alongside the three tenor trombones of the French orchestra and contributed to its sharply defined range of tone-colours. By 1892 a six-valved small C tuba in the Opéra pit enabled Wagner's contrabass tuba parts to be heard at last in Paris. It remained standard in French orchestras until the 1950s, and

its high tessitura continues to exercise the techniques of tuba players faced with parts written with this model in mind.

While the French small C tuba was not used in Britain, the ophicleide had become almost as firmly established there as in France. The Royal Artillery had four bombardons in the band by 1850 but retained an ophicleide in the orchestra until 1863. Hans Richter, the German conductor who directed a series of London concerts from 1879 onwards, commissioned a five-valve F tuba, threatening his ophicleide player Guilmartin with dismissal if he did not master it. Apart from the occasional use of the E_b tuba, the standard British orchestral instrument was relatively small and pitched in F. One reason for its popularity was that, until the 1960s, the majority of professional British tuba players tended to have been army euphonium players, and the F tuba was pitched only a fourth lower than the euphonium. Tubas were normally compensated on the 1874 Blaikley system, giving good intonation without the need for the adjustment of slides while playing, a system still used in the E_b tubas (i.e. instruments with four valves pitched in E_b) played by the majority of professional tuba players in the United Kingdom and the Commonwealth, except for Canada, where United States practice is followed.

The United States lay at the other extreme of the tuba scale from France. Here the favoured orchestral instrument was large, supplied by indigenous makers or branches of German companies or their agents (German immigrants were responsible for the establishment of the major American symphony orchestras), and pitched in either BB_b or C, an octave lower than the small French C tuba. Many professional tuba players in the US had also been military bandsmen, but had actually played the tuba rather than the euphonium. Furthermore, the use of large instruments and the development of their players' expertise have been encouraged by the number of American wind bands.

When the tuba appeared in Russian orchestras, where there was no symphonic tradition until midway through the nineteenth century, it was already well developed, and the larger, deeper, fuller approach was favoured both there and in neighbouring countries. As inspector of naval bands, Rimsky-Korsakov had been impressed by the technique of the players and was influential on later orchestral composers like Prokofiev and Shostakovich.

By and large there had been international standardisation of the low brass in bands well before the end of the nineteenth century. In the orchestra, the high tessitura beloved of French composers like Ravel and Poulenc, the agility demanded by the British, the depth and resonance favoured by the Americans and the distinctively solid approach of the Russian school reflected the types of instruments in common use in each nation. During the late 1950s and 60s, the rapid growth in recording following the introduction of the long-playing record and the appearance of the jet-setting conductor resulted in inevitable standardisation, assisted in continental Europe by a number of American tuba players who occupied influential positions as performers and teachers. French orchestral players now use the F or CC instruments long favoured by their German-speaking counterparts, and in the United Kingdom most orchestral players have a C or BB_♭ instrument to complement their EE_♭ in Wagner or Shostakovich performances.

The long tubing of the lower brass presented the instrument maker with both challenge and opportunity. In 1845, some ten years after Wieprecht's Bass-Tuba, the helicon appeared. Adding greatly to the comfort of the marching bandsman, the bell rests on the player's left shoulder and the main tubing passes beneath the right arm, thus allowing the body to take the greater part of the weight. The most familiar variety is the sousaphone, conceived by the American bandmaster John Philip Sousa in 1898. He designed his new instrument with the large bell facing upwards, 'so that the sound would diffuse over the entire band like the frostiness on a cake'. Ten years later the modern shape, in which the bell faces forwards above the player's head, was introduced to overcome difficulties experienced when playing in the rain. Adolphe Sax's saxtubas were built in the circular form of the Roman *buccina*, in order to bring greater unity of sound to the military band through all pitches facing in the same direction (see French Patent No. 4361, 20 August 1849/23 April 1852). Unfortunately their only appearance (other than at a parade-ground trial) was in Halévy's opera *Le juif errant* (1852), where they provided critics of this seriously misjudged production with yet another opportunity for ridicule.⁸ The saxotrombas had bores midway between tuba and horn, and even the deeper instruments had only three valves, as the relatively narrow bore inhibited the production of lower notes. The antoniophone, invented by Antoine Courtois, was coiled into the shape of a snail shell with three valves in the centre. The detachable bell could either face upwards or under the arm. In 1892 François Sudre

patented his sudrophones which included *baryton* and *contrebasse* pitches with four valves. A cylinder containing a membrane covered a slit in the side of the bell. This utilised the kazoo principle to imitate the sound of a stringed instrument.

A favourite with the avant-garde of every era, the tuba is periodically 'rediscovered' – for instance, by Mahler (who gave it a solo in his First Symphony), Webern, and composers as different as Berg, Britten and Birtwistle. Following the reappearance of the *cimbasso* contrabass trombone in the late twentieth century, some composers are now demanding it outside the opera house. In Patrick Doyle's score for the film *Mary Shelley's Frankenstein* (1994) it is the contrabass instrument for a brass section of four trumpets and three trombones.

The identifiable tuba player has existed only since the 1890s, when Harry Barlow (1871–1932) earned recognition in the Halle Orchestra (1894–1930), and later in the BBC Symphony Orchestra. He designed a distinctive model of F tuba, some examples of which are still in use. John Fletcher ('King of the South', 1941–87), tuba player with the London Symphony Orchestra and Philip Jones Brass Ensemble, is acknowledged as having influenced the approach to tuba playing world-wide, while Stuart Roebuck ('King of the North', 1935–94) was a later Halle tuba player and, perhaps more importantly, teacher at the Royal Northern College of Music of several generations of tuba players now working throughout Europe. In the United States, William Bell (1902–71), initially of the Sousa Band, influenced tuba design and teaching methods as well as following a distinguished orchestral career with the New York Philharmonic and NBC Symphony Orchestra. After many years with the Los Angeles Philharmonic, Roger Bobo (1938–) settled in Europe, following Melvin Culbertson (1946–) who virtually single-handedly revolutionised traditional French tuba playing.

Although the (tenor) euphonium established itself as a soloist from its first appearance in the 1840s, continuing the tradition established by the (bass) ophicleide, solos for contrabass instruments are normally rare. However, since the 1955 Tuba Concerto by Ralph Vaughan Williams, numerous others have been composed. The tuba's propensity to blend with other instruments is a problem not faced by the composer for unaccompanied tuba, and this repertory has also expanded rapidly since such works began to appear in the 1960s. Many of these make extreme

demands on technique. The tuba ensemble grew from modest quartets by English brass band composers Kenneth Cook and Eric Ball in the 1940s. Ensemble activity has reached high levels, particularly in the United States. Euphoniums are usually included, as well as bass and contrabass tubas. *The Tuba Source Book* (1996), a 654-page tome presenting 'a comprehensive picture of the tuba', lists 1,900 pieces for tuba with piano, over 100 for tuba with orchestra and more than 1,100 for multiple tubas. The majority of these were composed after 1950.

In jazz the tuba has fulfilled two different roles. It participated in the brass bands of New Orleans, making a mainly rhythmic contribution. Despite the sousaphone's visual attractions, it was superseded in the bands of the 1920s and 30s by the string bass, but reappeared during the Dixieland revival of the 1940s. Later, composers like Claude Thornhill and Gil Evans began to use tuba alongside horns and flugelhorns. The tuba has appeared in pop from time to time. During the mid 1990s several performers have used one in their backing groups, notably Tori Amos, whose singing and piano playing have been complemented by a quintet of tuba family instruments ranging from flugelhorn down to E♭ tuba.

The revival of instruments previously considered defunct has formed part of the move towards authentic performance. Roger Norrington's 1989 recording of Berlioz's *Symphonie fantastique*, using the instruments specified by the composer, vindicated Berlioz's use of two ophicleides. Ensembles involving ophicleide, usually playing nineteenth-century popular music, have appeared in the United States and the United Kingdom. Both ophicleide and serpent have been scored by composers working in theatre and film. There is growing interest in the serpent ensemble, not least because there is no original music for such a grouping, so players are free to explore the repertory of their choice. The serpent has been used appropriately in recent performances of liturgical music in the United States and France. In the late 1990s there appears to be only one avant-garde serpent player, the French tuba player Michel Godard.

Low brass players fulfil a mainly supportive role. When, as a tribute to the veteran American tuba player Arnold Jacobs (b.1915), the Mayor of Chicago declared 25 June 1995 'Arnold Jacobs Day in Chicago' and President Clinton sent his congratulations, players of the 'background brass' everywhere were proud to share in official recognition of their hitherto largely unremarked contributions.

Brass in the modern orchestra

Simon Wills

The thing that we commonly call the modern orchestra is not really modern at all. It existed more or less in its present form in the early nineteenth century – even its seating arrangements were fixed by 1860.¹ The repertoire it plays regularly was, for the most part, created between 1750 and the First World War: a sizeable number of regularly performed pieces were written in the first half of the twentieth century, but little of the orchestral music composed in the second half of the century has gained even a tenuous hold on the public's affections. The 'modern orchestra' is, if not exactly a fossil itself (as is sometimes alleged), then at least a collector of antiquities. This chapter describes evolving styles of writing for brass in the orchestral museum.

The brass section of a standard symphony orchestra will generally consist of four or five horns, three trumpets, three trombones and a tuba. This basic dozen will be enough for most of the music that is likely to be encountered, but is not an exact fit. Eighteenth-century brass sections were small – usually two horns and two trumpets. There was growth throughout the nineteenth century, culminating in Schoenberg's *Gurrelieder* (1912) which uses a brass section of twenty-five. Thereafter, composers continued to write for symphony orchestra but smaller forces have been common since about 1918. The shrinkage has not been even, however, and while a great many 'orchestral' works of the late twentieth century may only be scored for a couple of dozen players – the strength of an eighteenth-century court band – the brass instruments frequently assume a role the prominence of which would have surprised Haydn.

Throughout the eighteenth century there hardly existed a brass section worthy of the name. Horns and trumpets were frequently played in the concert room, with trombones being confined to church or to fleeting

appearances in the opera house. But each section was written for in quite different ways and, though they might coincide in a tutti, they did not for the most part work as a team. They could not: before 1815, and for some time after, lack of valves restricted the trumpets too much. They found themselves wedded to the timpani with a function that was often as much rhythmic as anything. By hand-stopping, horn players could play more or less all the notes of a scale and tackle complex passages, and a reticent tone (except when blown hard) enabled them to blend with the woodwind section. In many parts of Europe, the trombone was almost never used in concert music. In central Europe a few solo works were composed, including a serenade by Michael Haydn for alto trombone and horn, and a charming but slight concerto by Beethoven's teacher, Albrechtsberger. This is, at first sight, surprising. The trombone had been able from the outset to play chromatically over the whole of its compass and was a transparent-sounding instrument, well able to blend with a small orchestra. Unfortunately, it toiled under an association with the supernatural and with vocal music that was deeply enough ingrained to exclude the instrument from anything else. The eighteenth-century music that does use it shows that composers were well aware of the instrument's potential. Gluck, for example, wrote a splendidly jaunty obbligato for alto trombone in the third act of *Alceste* (1776).² But the old association persists despite the cheerful character of the music, for the aria is sung by a spirit from the underworld. Similarly, in *Don Giovanni* (1787), Mozart leaves trombones out of the score until the Commendatore's statue comes to life.

Figure 28 Trumpet section of the Philharmonia Orchestra recording William Walton's *Henry V* film music in 1946. Left to right: Roland Dyson, Herbert Barr, Horace Barker, David Mason, Ronald Wild, Harold Jackson.



It is possible to trace two distinct trends in the development of brass writing. With some composers, there is smooth evolution from eighteenth-century practices, absorbing technical developments slowly, while in others there is abrupt absorption of the sounds of the band into the orchestra. Berlioz was the first important composer to realise fully the potential of the advances in instrument design, and Wagner carried the process forward. The more circumspect trend, followed by Brahms and Schumann, begins with Schubert, who in a quieter way was as revolutionary as Berlioz.

The Romantic brass section was made possible by the invention of valves, the development of credible bass instruments and the secularisation of the trombone. The steps by which the first two of these were arrived at are described in other chapters. The third criterion was met during the first quarter of the nineteenth century. The finale of Beethoven's Fifth Symphony (1808) is a turning-point, for it owes much of its impact to the use of what amounts to a brass band in its opening bars: this is the first symphony to use trombones. Despite the boldness of the gesture, Beethoven retains old habits. The horn and trumpet writing is not modified by the

presence of trombones: the three departments are rhythmically independent for much of the time, with the trombones notably more pedestrian than their colleagues. In other works, too, Beethoven retains, at least in part, an eighteenth-century attitude to them. In the 'Pastoral' Symphony (1808), they are used in the storm, and in the Peasants' Thanksgiving they play a simple chordal part like two fingers on a church organ. The Ninth Symphony reserves them largely for choral episodes. In *Fidelio* (1805) they are confined to the dungeon scene and the overture.

Schubert is able to be more adventurous because he is more pragmatic in his attitude to the brass. In the incidental music to *Rosamunde* (1819) he accompanies a chorus of evil spirits with trombones, but uses them in the ballet music as well. Now the supernatural connotations are gone: it is hard to imagine the Commendatore's companions anticipating his appearance by joining in the dancing at Don Giovanni's party! His church music is extravagant in its use of trombones (the A \flat and E \flat Masses are proverbially taxing) but they are not tied exclusively to the voices. They act as extra horns, playing with the woodwind when the choir is silent. In the last two symphonies he transfers this manner of writing to the concert-hall, particularly in the Ninth Symphony in C, 'The Great' (1825). Admittedly, the trumpets are still written for as though the valve had not been invented, but trombones and horns are used as a distinct section, with virtuosic parts and substantial exposed passages – the work even opens with unaccompanied horns. The extent to which the trombones carry the melodic interest is without precedent: this is the first example of a symphonic composer using them on equal terms with the rest of the wind.

Brass styles that evolved from Schubert's approach are confined, for the most part, to the Germanic world: Mendelssohn, Schumann, Brahms and Weber are his obvious descendants. Band music enjoyed as much popularity in Germany as it did in France or Great Britain, but a discrete and conservative style of orchestral playing seems to have persisted in the German orchestra. Here more than elsewhere, the leaps forward in instrument manufacture achieved uneven acceptance. We have Berlioz's word for it that the natural trumpet died out quickly,³ but there was less pressure for change on the horn. The use of stopping technique meant that it was not inhibited in the same way as the trumpet was. There were, too, aesthetic considerations: shadings of colour produced by hand-stopping were felt to be part of the music, and serious players tended to integrate the

two approaches. In 1853, F. Gleich in his *Handbuch der modernen Instrumentierung* went so far as to call the abandonment of stopped notes in Beethoven and Weber ‘Vandalismus’! Brahms persisted in writing for the hand-horn late in the century, accommodating the instrument’s limitations by writing for pairs of players in different keys, which accounts for the frequency with which solos for third horn appear in his music. German trombones tended to be built larger than elsewhere, with very big bell-flares. This dulls the sound in quiet passages. More important, it makes greater physical demands of the player, since vibrating a wider column of air requires more effort. It may be partly for this reason that, for much of the Romantic period, the writing for them is less virtuosic than it is in Mozart or Schubert. The ophicleide caught on in Germany (though not as much as in England and France), and Mendelssohn used it memorably as a Rude Mechanical in his *Ein Sommernachtstraum*, Op. 61 (1826/42). It is used more as a grotesque extension of the woodwind than as a part of the brass family. The tuba displaced it but was not universally accepted: Brahms uses it in only two overtures, the Second Symphony and *Ein Deutsches Requiem* (1869), while Schumann limits its use to his *Julius Caesar* overture (1851) and a paltry twelve notes in the opera *Genoveva* (1850). The tuba makes its appearance in this last-named work at a moment of supernatural drama – a recitative for the shade of a murdered servant. The trombones are prominent in the passage, but have been widely used by this point in the work. Since they no longer have an unearthly association, that role is assumed, albeit briefly, by the tuba!

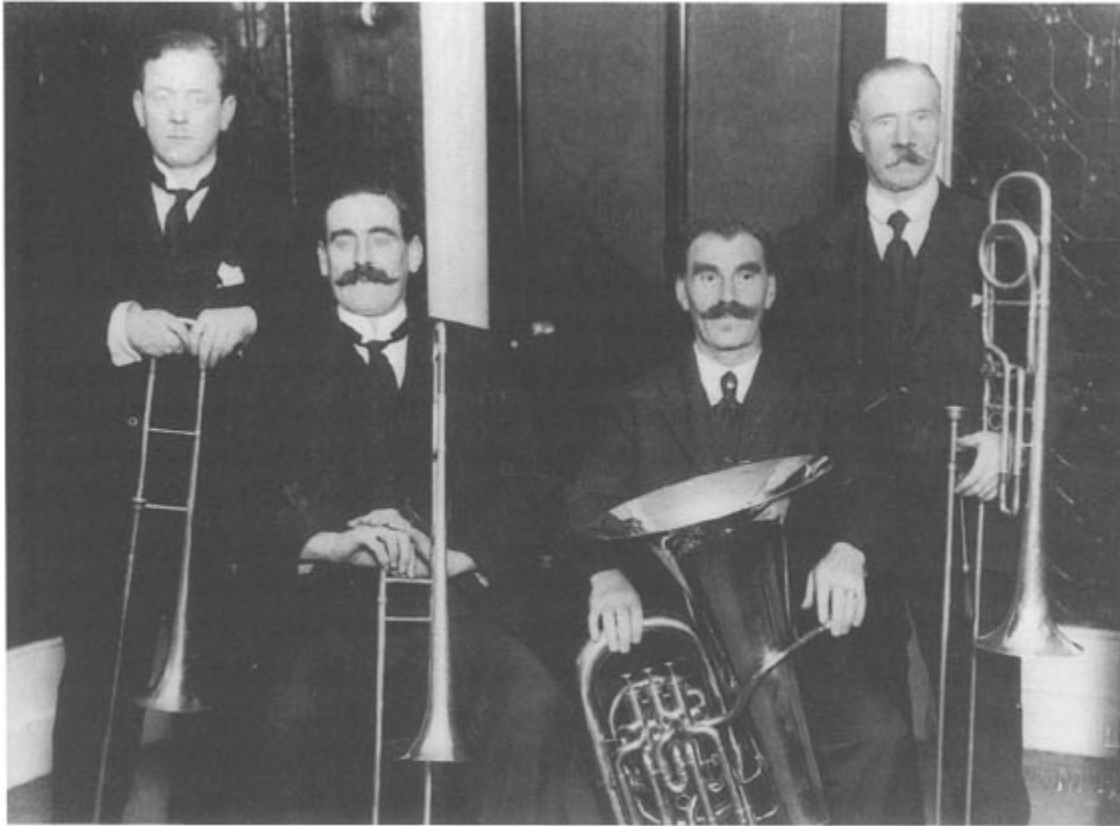


Figure 29 The trombones and tuba of the London Symphony Orchestra, at the Three Choirs Festival, Worcester, 1922.

Schumann and Brahms, though cautious in their use of the trumpet, both had the Schubertian habit of writing exposed passages for a choir of horns and trombones. Schumann's *Frühlingssymphonie* (1841) begins with unaccompanied trumpets and horns – surely a reference to Schubert's Ninth Symphony – and uses the trombones independently, giving them a solo chorale in the second movement and a busy transitional passage in the finale that also recalls the earlier work. In the Second Symphony (1846), he uses horns, trumpets and the first trombone as a unison choir to play the cyclic theme and in the Third ('Rhenish') Symphony (1851) turns them into a polyphonic choir in his evocation of Cologne cathedral. He specifies two *ventilhörner* and two *waldhörner* in the score of the 'Rhenish' – a procedure followed by Brahms in some works. In much of the tutti writing there is very little difference in the way the two pairs are written for. However, in the Cologne cathedral movement, valved and hand-horns echo each other in certain chromatic passages, and the shading of tone produced by the stopping technique produces a strikingly eerie effect. This

contributes a great deal to the potency of the movement, and it is a shame that the colour should be lost in most modern performances, which use valved horns for all four parts. For all the subtleties in his horn writing, Schumann seems at times to have lacked confidence in balancing the brass section as a whole with the orchestra. He wrote two versions of his First Symphony (first version 1841), and it is the second of these that we usually call his Fourth (*Frühlings* came second). Brahms called this later revision 'over-dressed'. The scoring is noticeably heavier. The trumpets and trombones, used sparingly in the original, play accompanying figures much of the time, and the ensuing thickness of texture has contributed to the notion that Schumann was a poor orchestrator. In contrast to this plodding caution, the late *Allegro and Introduction* in D minor for piano and orchestra (1853) makes bold use of a single tenor trombone. It is silent until the final section of the work, when its single contribution is a long and exposed melody in unison with the first trumpet.

Brahms's disapproving reaction is not surprising in view of his own use of brass. His trumpet and horn parts are substantial, but though the new instruments were in general use by the time he wrote his First Symphony he writes for them in a manner not significantly different from Schubert. Valves were for him a fast method of re-crooking! He is very sparing in his use of trombones, holding them in reserve to make a particular point, such as in the brief solo chorales in the First and Fourth Symphonies. By now, the characteristic enormous German trombone was well established. Brahms may have been wary of its ability to swamp an orchestral texture, but, if he was, he stayed his hand in his draconian revision of Schubert's symphonies and left the trombone parts intact.⁴

Except in a description of brass writing, it would be perverse to include Bruckner with the composers discussed above. He was firmly of the Wagner camp in his lifetime, receiving their praise and Hanslick's scorn in equal measure. Brahms disliked Bruckner's 'symphonic boa constrictors' and called them a swindle, but Wagner was so impressed with the trumpet solo at the start of the Third Symphony (1873–7) that whenever Bruckner's name was mentioned he was apt to exclaim: 'Bruckner! The trumpet!' In brass writing, however, Wagner's influence on Bruckner is not pervasive, beyond fostering a certain heroic quality in an already angular melodic style – as, for example, in the coda of the Eighth Symphony (1887). There are obvious references, such as the Wagner tubas in the second movement of

the Seventh Symphony (1883), the lonely horn solo at the start of the Fourth (1874) and the preponderance of heavy brass in all of them, but Bruckner's distinctive way of writing for brass was the product of his experience as a church composer, and was well established before he encountered Wagner's work for the first time in 1861. This is clear as early as the E Minor Mass, written at about the same time as the First Symphony. It provides an important insight into the relationship between Bruckner's church and concert music. The piece is scored for an orchestral brass and wind section, minus tuba. The brass underpin the choir for a limited amount of the time: the bulk of the musical argument is borne by the chorus with the brass commenting at intervals or providing transitional fanfares. In other words, the relationship between brass and voices closely resembles that between brass and strings in the symphonies. The composer's habit of repeating brass chords at climactic moments in symphonies has clear antecedents in declamatory sections of the Mass, where the chorus is doubled by the band. This basic approach to the brass does not modify significantly throughout the symphonic canon. Bruckner's Third Symphony, which was dedicated to Wagner and in its first version quoted from him, has no tuba part. Wagner's music undoubtedly liberated Bruckner from the formal constraints of academic composition, but as an orchestrator Bruckner's roots lie elsewhere.

The infusion of a more band-influenced style of brass music into the orchestra happened rapidly in the work of Berlioz. The growth in popularity experienced by brass instruments at the same time was dramatic. In 1792, the *Encyclopaedia Londoniensis* described the presence of trombones as 'a nuisance to all lovers of pure harmony and refined tones'.⁵ In 1829 a London-based trombone soloist called Schmidt was said to have 'excited more admiration than he gave pleasure',⁶ and when the Gambati brothers demonstrated their keyed trumpets at the King's Theatre in the same year a reviewer adjudged them 'a perpetual source of distraction and headache' who played on 'Brobdingnagian penny-trumpets'.⁷ Then things changed. The two-valve piston trumpet was of sufficient interest to the New York public for the impresario William Niblo to stage a contest between Alessandro Gambati and the prominent slide trumpeter John Norton in 1834. When scuffles broke out in the crowd of three to four thousand that had gathered to hear the verdict, its savage breast was charmed by the appearance of a certain Sig. Cioffi. He, 'the universal favourite, came down

with his trombone to the front, and commencing “Hail Columbia” marched forward through the center of the saloon, and most of the audience, finding that all was over, followed him out’.⁸ The enthusiasm for brass was not confined to America. The craze spread: playbills for the Wizard of the North’s concerts in 1846 make much of his saxhorns and cornopeans,⁹ and by 1860 it was worth a London dance-hall proprietor’s while to advertise, as the main attraction, the presence of saxhorns in his band.¹⁰ The cornet virtuoso J. B. Arban was not overstating his case when he observed that ‘It [the cornet] is no less indispensable, no less beloved by the public than the Flute, Clarinet or the Violin.’¹¹ Then there was military intervention: armies all over Europe were reorganising their musical establishments. Britain came first, when what had amounted to a sumptuary law limiting band size was repealed in 1820. Wieprecht reformed Prussian bands at about the same time, and the French military adopted the new saxhorns after a contest in April 1845 on the Champ de Mars in Paris.¹² Bands of all sorts formed the backbone of popular musical entertainment, and the new brass designs excited curiosity in their own right.

The franchise for listening to serious music widened as populations began to shift to the towns. It is generally the case that urban populations have free evenings and spare cash, and are concentrated enough to make concerts pay even if ticket prices are low. Theatres mushroomed: they needed musicians and the pay was good. In a low theatre a drummer made a pound a week, and a street ophicleide player could earn ‘25s a week the year through’¹³ – considerably more than many skilled tradesmen. Large numbers of people entered the musical trade, and numbers grew, in England (the country for which we have the most reliable figures) from two thousand in 1800 to seven thousand by 1840.¹⁴ In 1829, the orchestra of the Royal Italian Opera in the Haymarket had refused to sign a contract that restricted their outside work and cut their pay. Standards immediately fell and there was much resentment of incompetent players brought in from France.¹⁵ Thirty-two years later, in 1861, a foolish dispute between the Royal Italian Opera at Covent Garden and the Philharmonic Society led to the latter losing nearly all of its orchestra, but with very different results.¹⁶ A new one was assembled within days and the Society’s activities suffered no disruption – except that the Saturday rehearsal had to stop a little early to let the players fit in an engagement for August Manns at Crystal Palace.¹⁷

Britain was unusual in that music was almost entirely commercial. Things were different elsewhere: musicians at the Paris Opéra enjoyed secure jobs and pensions. In Germany, the small court establishments that had exercised an almost feudal control over their musicians disappeared early on (many musicians migrated to London),¹⁸ but local governments took over and every town of any size had its orchestra and *Hochschule*. By 1890, Frankfurt am Main, a town of some 200,000 souls, could boast two conservatoires, an opera house playing six nights a week, a Museum orchestra 120 strong and two choral societies.

In Britain and France there was already a taste for spectacle (in 1828 a performance of *Messiah* at York had used an orchestra of 237 and 290 singers), which was exploited by Philippe Musard and his protégé Louis Jullien. As composers these men are of no account – they devoted themselves to fatuous quadrilles – but they are important because they promoted the classical orchestral concert as popular entertainment and developed a mass audience for it. Musard fired pistols into the air as he conducted and Jullien set fire to the Jardin Turc in Paris during a performance of his *Huguenots* quadrille. Large numbers of players were engaged; the brass section of Jullien's selection from *I Puritani* was eighty strong. Trombonist Cioffi and the cornet soloist Koenig (whose *Posthorn Galop* remains one of the few nineteenth-century brass solos to have survived in the popular repertoire) became crowd-pullers in their own right. Prosperé's gigantic ophicleide could be made to 'coo like a dove' and ophicleide-fanciers were, it is said, legion (Mendelssohn wrote the part in *Elijah* for him). There was a great deal of outrageous nonsense in the concerts, such as a Chinese polka allegedly based on two notes composed by Confucius, yet for all his tomfoolery Jullien presents the curious figure of a serious musician masquerading as a charlatan. He was a good orchestral trainer who proselytised great music, introducing Haydn and Mozart into his concerts.¹⁹ His education policy worked, and in the first issue of *Household Words* Charles Dickens was able to observe that 'classical music has of late years been descending from the higher to the humbler classes'.²⁰ The implications of all this for playing standards were far-reaching. A growing market allows specialisation. Early in the century it was common for an English theatre²¹ to engage a single player on trumpet, trombone, bugle horn and keyed bugle, and one Johann Röst, who was at Covent Garden in 1819, spent the summer months as an itinerant piano-

tuner as well.²² Twenty-five years later most players could afford to be specialists. This, added to the esteem in which virtuosity was held, inevitably increased the scope of brass writing.

Seen against this background, Berlioz's taste for the grandiose seems natural. There is of course a showman's instinct in the four brass sections used in the *Grande messe des morts* (1837), the off-stage brass in the *Te Deum* (1849) and the 240-piece band that the *Grande symphonie funèbre et triomphale* (1840) was scored for. But unlike Musard and Jullien, with whom he worked on occasion, Berlioz made a serious study of instruments. In the *Treatise on Orchestration* he discusses the differences between natural horns and the valved variety, detecting no difference between the two in open notes but decrying the tendency of valved players to drop all stopped notes as a 'serious abuse'. He retains the natural trumpet, placing it alongside the new *cornet à pistons*, and he is scrupulous in writing differently for them. In the 'Marche au supplice' in the *Symphonie fantastique* (1830) he uses trumpets to open the main theme, dropping them in favour of cornets once the melody moves out of their reach. Berlioz was a close friend and fervent supporter of Adolphe Sax, championing his inventions in the newspaper columns he wrote and corresponding with him on the minutiae of writing for saxhorns. Berlioz's writing for trombones is adventurous in its quantity – the *Grande symphonie funèbre et triomphale* contains the most extended solo in the orchestral repertoire – but he requires no greater virtuosity than does Schubert. He was contemptuous of French players' neglect of the bass trombone ('evidently the Prussian lungs are stronger than ours')²³ but bewailed the Berlin Opera's habit of using a bass trombone to play ophicleide parts, which ruined the balance of the brass section. His sense of sonority was profound: there is a passage in *Grande messe des morts* in which eight trombones play pedal notes beneath high flute chords. In the *Treatise on Orchestration* he comments that the sounds are not heard separately, but combine to create a new colour. In other words, he beats Messiaen to the notion of chords of resonance by a clear hundred years!²⁴ The dominant influence on Berlioz was Beethoven: though specific stylistic references are few, the innovative and brassy *Les francs-juges* overture (1826) dates from the time of his first hearing of Beethoven's Fifth. The idea of realising a poetic vision in a symphony was one that appealed to him: *Symphonie fantastique* refers quite closely to the

spirit of the Beethoven work, not least in the fact that it introduces trombones (and ophicleides) in a march in the fourth movement.



Figure 30 The brass section of the Philharmonia Orchestra at the Royal Albert Hall, 1964. Top row, left to right: Ray Premru, Ray Brown, Arthur Wilson, Philip Jones, Roy Copestake; bottom row, left to right: Pat Strevens, Nick Busch, Ian Beers, Alan Civil, Andy McGavin.

Wagner was the most important Germanic innovator. Strauss was content to build on and expand the older man's revolution and Bruckner, for all his admiration of Wagner, was cautious. Wagner took a keen interest in new instruments and as early as *Rienzi* (1840) the influence of band sonorities is apparent. The warmth and weight of a modern brass section obscure the sheer strangeness of his early works. When he began his composing career small trombones were still in use; *Rienzi* was first given with a serpent in the orchestra and *Der fliegende Holländer* (1841) with an ophicleide. The few period-instrument performances of these works that have taken place reveal a bright, rickety quality in the sound which must have been shocking when it was first heard. The brass in Wagner's orchestra usually amount to no more than the standard dozen except in the *Ring*. Here, the orchestra is

much bigger: each instrumental group is numerous enough to play a complete chord. This may have been prompted by the advanced leitmotif structure of the four operas which make up the cycle: some themes become associated with particular timbres, which helps fix them in the audience's mind. Thus the curse on the ring is frequently hinted at by a clarinet quartet, Valhalla has a distinctive set of brass fanfares, the dragon Faffner generally has a tuba about his person and the aptly named Hunding is followed at heel by the bark of a quartet of Wagner tubas. With the *Ring*, the heavy brass of the army band are integrated into the orchestra and they carry much of the melodic burden. Wagner's apportioning of solos indicates that playing had by now reached a very high standard indeed. Solos are not confined to principal parts. Everyone has them, even the third trumpet, second trombone and bass tuba.

As a developer of the brass section Wagner has gravity: he extends in a downward direction. He writes for two tenor, one bass and a contrabass trombone, adds a bass trumpet to the three conventional ones, and, by adopting the Wagner tuba, ends up with a tuba quintet as well. The B_1 contrabass trombone, which extends to E_1 in exposed passages, was a giant of a thing twice the size of a normal trombone, with a four-legged slide. It is used on equal terms with the others in the section and adds density to unison writing – for example in the spear motif or Siegfried's fight with Faffner. The 'Wagner' tubas are modified band instruments and may well have been suggested to Wagner by Richter who was himself a horn player. Certainly the preliminary sketch for *Das Rheingold*, dated 1853, before Richter joined his staff, makes no mention of them. The most striking innovation to be found in the *Ring* brass is the bass trumpet. It was developed at Wagner's request from a cavalry instrument and it may be that the composer's intention was initially to give the trumpets a decent downward extension. It soon assumed a soloist's role: the late Reginald Goodall, one of the most eminent interpreters of Wagner's music, was apt to view it as a character in the drama. It continues to play when the rest of the brass are silent, most notably in the first act of *Die Walküre* (1856), which is very thinly scored for most of its length. For all its importance in a work which has engendered more debate and obsession than almost any other in music, the instrument failed to flourish elsewhere. Strauss uses it in *Elektra* (1909), Janáček gives it a few bars in *From the House of the Dead* (1928) and the *Sinfonietta* (1926), it has two fleeting solos in *Le sacre du*

printemps (1913) and a part in *Gurrelieder* – though it is not generally heard above the *mêlée*. It remains an inexplicably under-used instrument.²⁵

With the *Ring*, the notion of an expanded brass section became established. Mahler, Strauss and Schoenberg expanded further, sometimes to the point of absurdity – the bloated orchestras of *Elektra* and *Die Frau ohne Schatten* (1918) will barely fit into a pit. The seven trumpets in *Elektra*, the seven trombones (including an alto and contrabass) in *Gurrelieder* and the off-stage brass ensemble in the *Symphony of a Thousand* (1906) are visually spectacular and sound very fine, but the most important developments were not in quantity but in the way the instruments were used. In music written after Wagner, virtuosity is taken for granted and the brass are expected to play with as much agility and in as extrovert a manner as the woodwind. This demand is common to all categories of music, be they romantic, expressionist, impressionist or anything else. Mahler's habit of writing complex unisons for eight horns would hardly have persisted had the players not been able to manage them. He writes solos of extraordinary length, and by the Ninth Symphony (1909) they are as fluid as anything in his woodwind writing. In the Third Symphony (1896) he makes similar demands of an off-stage posthorn, and though the very large trombones by now in use cramped his style somewhat, there are protracted solos in the Second, Third and Eighth Symphonies. In France, cornets persisted alongside trumpets until very late, and the style is lighter but no less virtuosic: the cornet flurries in Debussy's 'Dialogue du vent et de la mer' from *La mer* (1905) show this well. A generally lighter style of playing was cultivated in France as late as Stravinsky's time, typified by the piccolo trumpet part in *Le sacre du printemps* and the very high trombone glissandos in King Kashtey's dance in *The Firebird* (1911). A similarly light style was popular in Britain, and was remarkably persistent. Small-bore trombones, known colloquially as 'pea-shooters', and a bass trombone in G, which was sometimes referred to as the 'English rose', remained in use until well after the Second World War.

Virtuosity is a self-nourishing phenomenon that can be musically disruptive if allowed to flourish unchecked. As the nineteenth century drew to a close it was given a twist by many composers. In Strauss, Ravel and Stravinsky there is a distinct sense that attrition of the player is part of the expressive vocabulary. In *Till Eulenspiegel* (1885) and *Don Juan* (1889) Strauss wrote hard parts, but in the expectation that eventually the players

would manage them cleanly. There are hints of chaos in *Don Quixote* (1897) and the battle in *Ein Heldenleben* (1898) has moments of gratuitous difficulty, but at the end of the century there is a marked difference in approach. *Salome* (1905), the first opera to explore the ‘Neroism in the air’²⁶ of that time, is of extreme dissonance and difficulty. It uses its *Ring-sized* brass section in a perverse way that matches its subject-matter; the extremes of register and sheer speed of execution required traduce the nature of the instruments. Even when he is watching the world end, Wagner has order in his orchestra: Strauss creates carefully calculated turmoil. The *Zeitgeist* amongst artists at the end of the century was apocalyptic; this was the era that spawned Wedekind’s *Erdgeist* (1895) and *Die Büchse der Pandora* (1904) which introduces the character Lulu. Strauss as an individual was described as ‘morbidly overexcited’ and some sensed a sickness beneath the strength of his tone poems.²⁷

Berg’s subject-matter in *Wozzeck* (1922) and *Lulu* (unfinished at the composer’s death in 1935, first produced in 1937) is no less tormented, and his orchestra shares the pain. The difficulty of the parts in *Wozzeck* extends even to the bombardon player in the on-stage band, and there is relatively little difference between the demands made on brass and those made on other departments. This is well illustrated by the trumpet duet at the start of Act II. It is in the nature of expressionist music to be highly polyphonic, and Berg’s writing shows considerable independence of line, a trait very apparent in most of Schoenberg’s orchestral works as well. When the moon rises over the scene of Marie’s murder it does so with the help of a push from a strained first trombone. This instrument is placed under similar pressure in the *Three Pieces for Orchestra* (1915). The top E_b s at the start of the second movement could easily be played on a trumpet, but if easily played they would hardly have the same nervously expressive effect. The logic of Berg’s melodic writing makes his parts much easier to play than they might appear on the page, but in later works he writes passages which appear perverse. In the trombone part of the *Kammerkonzert* (1925) for violin, piano and thirteen wind, he combines rapid turns only playable on valves with a series of impossible glissandos, and exposed, two-and-a-half-octave, solo slurs are to be found in the slow movement. This has led some to the conclusion that his brass writing is penned in hope and ignorance, but it is hardly likely that his orchestral technique would have regressed in the short time that separates the composition of *Wozzeck* and the

Kammerkonzert. The latter work, however, has a highly organised structure in which a form of cabalism dictates many of the musical parameters. It illustrates a point that will become important when we consider late twentieth-century music (see [Chapter 18](#)) – that the more involved the predetermined factors in a work become, the less a composer is able or inclined to write sympathetically for his instruments, and this in turn influences his expressive vocabulary.

Ravel, too, is unkind. His effects are carefully calculated and he was well known for consulting players as to the practical limits of their instruments.²⁸ The horn and trumpet parts of the Piano Concerto in G major (1931) and *Bolero* (1928) are notorious examples, as are the high tuba in 'Bydlo' and the exasperated whine of Schmuyle's trumpet in his orchestration of *Pictures at an Exhibition* (1922). The most extreme example of his method appears in the dance competition in the full version of *Daphnis et Chloé* (1909–12). Here, a flute and string melody is accompanied by first horn and first trombone slurring across the natural harmonics of their entire compass. Janáček, like Berg, has a melodic style that naturally exercises instruments, and he too draws little distinction between orchestral families in his style of writing. The frantic horn parts in the play-within-an-opera in *From the House of the Dead* and the third movement of the *Sinfonietta* are extreme examples of this. Though there is something of Strauss in his use of brass – the two tubas in the first scene of *From the House of the Dead* recall Dr Dehmel in *Heldenleben* – Janáček is a more economical orchestrator. A defining characteristic is his creation of space in the sound by leaving out middle ranges. His brass writing generally has extremely low trombone parts accompanying high trumpets and wind. In *The Makropulos Affair* (1925) the trombones find themselves wedded to the timpani in a parody of eighteenth-century trumpets.

Russia and Italy need to be considered separately. The only durable nineteenth-century Italian music is opera, and here the brass band set up home in the orchestra more thoroughly and with less modification than anywhere else. This is apparent in the earliest work of Rossini. He was himself a brass player: his father was Trombetta del Commune di Pesaro and professor of *Corno da caccia* from 1801. When not playing, Rossini père made ends meet as an inspector of slaughter-houses.²⁹ He taught his son the horn: whether his father's other trade influenced Gioachino's lifelong interest in gastronomy remains a matter for speculation. Having

spent his childhood around the town band, Rossini wrote almost from the outset in a thoroughly 'bandy' style for the brass, and with first-hand knowledge of the instruments. Clearly hand-horn technique had progressed to an extraordinary level of virtuosity. In the operas he wrote for Naples, notably *La gazza ladra* (1817) and *La donna del lago* (1819), the first player is treated on exactly equal terms with woodwind soloists, with very fast passagework. From his earliest successful opera, *La pietra del paragone* (1812), Rossini's trombone parts are virtuosic, and continue to be so up to *Guillaume Tell* (1829), his last opera. This confirms the fact that though the high-speed writing for valved brass that is so characteristic of Verdi might have been facilitated by the invention of valves, it was not prompted by them; rather it continues a style that was established with older instruments.

In nineteenth-century Italy, the stage band assumes great importance, to the point where, in Rossini's *La donna del lago*, a military band and a pair of roving hunting horns become agents in the drama. As virtual characters on stage they provide spectacle and act as foils to the orchestral writing. Rossini was hugely influential in his day as a composer of *opera seria* and this technique has echoes in the work of Verdi: *Nabucco* (1842) and *La Traviata* (1853) use a military and dance band respectively as part of the action. The stage band became so common that it was retained on salary in many theatres (Sax was director of the one at the Paris Opéra), and in Vienna and Milan they still exist.

Italian brass writing is idiosyncratic: the section is used tutti for a lot of the time. This, plus the preponderance of unison trombones à 3 in the work of Bellini and Donizetti, suggests that for all its outdoor origins the Italian style of brass playing was not a domineering one. Verdi's brass section avoids the high register, making for a denser sound, and the use of valved trombones on equal terms with the lower strings gives an aggressive athleticism to bass lines. This is nowhere better illustrated than in the first five minutes or so of *Otello* (1887), though examples may be found in most of his operas. Solos for first trumpet and trombone are frequent – *Nabucco* is probably the most liberally supplied with these. The use of brass in this way is general throughout Italian music and persists as late as the work of Cilea and Puccini. It is such a feature of the national style that Tchaikovsky parodies it in the slow introduction to *Capriccio Italien* (1880). Even when Italian composers ventured abroad they took their habits of scoring with

them: when Donizetti wrote *La favorita* for Paris in 1840 he introduced a trombone obbligato (to be played *in mancanza del pistone*, ‘if no cornet available’) which presses slide technique to the limit.

Some editions of Rossini’s *Armida* (1817) have parts for ophicleide and serpent in unison. At the start of the piece they tiptoe hand in hand along the tightrope of a quiet staccato bass line. They must often have fallen off: apart from a part in *Maometto II* (1820) Rossini never again ventures deeper than a third trombone part. Bombardons reached Italy from Austria in the 1830s and were being made in Modena by 1841. Verdi calls the lowest brass part *cimbasso* in his works up to *Aida* (1871). The identity of this part is discussed in [Chapter 11](#). The parts written for it resemble tuba parts. Puccini specifies a *trombone contrabasso* in his scores, though at the first performance of *Turandot* (1926) a tuba was used.

Russia remained apart from the mainstream of western music, at first for geographical and later for political reasons. Her nineteenth-century composers were mostly amateur and partly self-taught. Though naturally familiar with western scores, they confined themselves to a modest size of orchestra and the extended *Ring* brass section was almost unknown. It makes an appearance in *St John’s Night on the Bare Mountain* (1867) by Mussorgsky, but was tidied away by Rimsky-Korsakov when he reduced its magnificent sprawl to a rather prissy overture for standard orchestra. The Russian school of brass playing was heavy and to this day cultivates considerable aggression: the presence of dynamics down to *pppppp* in Tchaikovsky suggests a certain intransigence by players in respect of quiet playing! Rimsky-Korsakov is cursory in his discussion of brass timbres in the *Principles of Orchestration*³⁰ and makes no mention of the alto trombone or different sizes of tuba, though he does make the surprising claim that he invented the long F and the $E\flat$ trumpet. Curiously, the trombone solos in *Scheherezade* (1888) and *Russian Easter Festival Overture* (1888) are in the second (tenor) part, as if an alto were assumed for first trombone. Brass instruments enjoyed considerable vogue after Arban’s visits in the 1870s, and his influence is apparent in the fast-tongued trumpet arabesques that pepper *Scheherezade* and the Neapolitan dance in *Swan Lake* (1876).

Rimsky-Korsakov uses brass as a component in carefully contrived blends of colour, but Tchaikovsky is more direct, treating brass, wind and strings as separate, at times antiphonal, choirs within the orchestra. This

approach often leads to passages for the brass section alone: the Fourth Symphony begins with them and the coda of the 'Pathétique' (1893) is prefaced by a long chorale for trombones and tuba by themselves. The scherzo of the Fourth (1878) carries this as far as it can go by separating the three orchestral groups completely, with the brass imitating a military band. This aspect of Tchaikovsky's work strongly influences Shostakovich from the Fifth Symphony (1888) onwards, though Shostakovich is more aggressive in his use of very high trumpets and horns at climactic points. Before Stalin administered his celebrated rap across the knuckles in 1934,³¹ Shostakovich was much preoccupied with experimental writing. The brass trio in *The Nose* (1928) engages in frantic random cavortings (the opera has seventy-odd characters but a tiny orchestra) and memorably imitates snoring in Scene II. A solo baritone horn in *The Golden Age* (1930) plays a stratospherically high solo, and a political speech is parodied in the Third Symphony (1929) by a lengthy recitative for three unison trombones. There are signs of a less experimental approach emerging as early as the Third Symphony, and once conventional forms are adopted, Shostakovich almost never uses an enlarged brass section. The most important exception to this is Symphony No. 7 (the 'Leningrad'), which has a brass sextet used antiphonally, most strikingly in the first movement, when the E_b major of the repetitive 'invasion' theme is challenged by the extra brass entering a tritone distant.

The combative approach to brass playing in Russia is well suited to the industrial brutality that infected composers from 1914 onwards. *Ala and Lolly* (1915), Prokofiev's self-conscious attempt at a *Sacre du printemps*, shows little of the exotic colour of that work, but in 'The Dance of the Evil God Chuzhbog' combines the more brutal elements of Stravinsky's brass writing with a driving rhythm vaguely reminiscent of the 'Danse sacrée'. A taste for orchestral *blitzkrieg* persists in the Second (1925) and Third (1928) Symphonies, and though it is less evident in later orchestral works (it is more persistent in the piano music) a mechanical bent surfaces from time to time – for example, at the stroke of midnight in *Cinderella*. Lesser figures, such as the Stakhanovite Mosolov, embraced this limited style to depict industrial subjects. His notorious *Zavod* (*The Foundry*) does the job well, but the music has about as much charm as a tractor engine and palls before the four minutes it takes to play have elapsed.

With the increasing amount of sheer noise in music by the turn of the century, it was natural that reaction against large forces should set in. Adding players to a big orchestra brings diminishing returns, and an urge towards Classical models is occasionally detectable even in Mahler. Economic stringency after the First World War fuelled the urge to contract, and it is hardly surprising that when jazz introduced the sound of what amounted to a latter-day broken consort to Europe, its influence was pervasive. As we have seen, brass players had by this time acquired sufficient flexibility to be able to perform on equal terms with wind. Jazz added the notion of extrovert playing on a small scale. Specifics of jazz style – in particular long brass solos – were already established in Europe. Even the written trombone glissando predates jazz. It appears as early as 1892 in Rimsky-Korsakov's *Mlada*, a work that strongly influenced Stravinsky. The exoticism of the three great ballets written for Diaghilev derives closely from *Mlada*, and though Stravinsky never went so far as to imitate Rimsky-Korsakov's pan-pipe solos, the infernal dances in *Mlada* and *Firebird* (which some would say consist of uncomfortably similar material) both give prominence to the glissando.

Parodies of jazz occur in the works of many composers. The jazz fugue in Milhaud's *La création du monde* (1923) is a blatant example, the blues harmonics in Weill's Second Symphony (1933) slightly less so. More important was the way in which the fractured counterpoint of jazz informed the brass writing. In Stravinsky's Octet for wind (1923) the trumpets and trombones drop in and out of the contrapuntal texture and play small solos in a way that mimics a jazz band, even though the style of the music is far removed. The broken textures of *L'histoire du soldat* (1918) – which includes a ragtime – recall the ramshackle jazz-band sound more overtly, and *Ebony Concerto* (1945) goes so far as to use a big band – though it is unlikely that Stravinsky would have accepted the commission to write this pot-boiler for Paul Whiteman if he had been able to collect all the royalties from his popular early works.

This period was one of unparalleled diversity in all the arts, and 'conventional' orchestral brass writing continued alongside the innovations. Though musical procedures showed increasing individuality, the music was often orchestrated in ways that were conventional. The brass writing of Sibelius owes much to Tchaikovsky while Bartok continued scoring for large forces worthy of Strauss (there are four alto trombones off-stage in

Duke Bluebeard's Castle), occasionally, like him, pressing the brass section's flexibility to its limit. *The Miraculous Mandarin* (1919) uses brass with heavy obduracy worthy of Mosolov and contains more trombone glissandos than are found in any other orchestral work in existence. But more and more composers wrote for reduced forces. Increased concentration on timbres and individual notes as expressive devices led inevitably to the extension of brass techniques, a topic that is the subject of [Chapter 18](#). The small orchestras used in neoclassical music do not revert to the limited brass writing of Haydn's day, but reduced numbers (often to one of each instrument) do to some extent re-abolish the cooperative brass section. In *Pulcinella* (1920) the horns integrate with the winds, while the trumpet caricatures Bach's writing for the instrument. The trombone, in a parody of its ancient role, acts as a comedian and interferes with the vocal soloists. Even when Stravinsky reverts to pseudo-Haydn orchestration, as in *The Rake's Progress* (1951), the trumpets and horns are used adventurously – the chattering repeated trumpet notes at the auction are a particularly unclassical musical object! Other composers, less interested in past forms than was Stravinsky, nevertheless wrote for small groups of instruments. Webern, having used a sprawling orchestra in the *Six Pieces* (a tuba plus six each of trumpets, horns and trombones in the 1909 version,³² though none of them have much to do), clearly expects the brass to play with a weight equal to single strings and wind in the *Kammerkonzert* (1934), and in his curious but expressive arrangement of the six-part 'Ricercare' (1935) from the *Musikalisches Opfer*. Webern is particularly fond of muted brass, no doubt as an aid to balance.

The twentieth century has not produced a Wagner, nor for that matter a Sax or even a Halary. Instrumental design and technique have developed none the less. Brass instruments are better made than ever before, but not all change has been progress. It costs a lot to develop a 'new' trumpet or trombone (they are not, to be sure, as different from each other as the various inventions of Sax, but attention to minutiae seems to be more time-consuming than bold experimentation), and in order to recoup costs manufacturers have sought a global market. In the late twentieth century, sameness is triumphant. Gone are the narrow sound and fast vibrato of a traditional French french horn section. In Germany and Austria the sound of trumpets designed for an American high-school band is common, while the concentrated fizz of two English 'pea-shooter' trombones and a G bass

trombone is extinct and it is many years since a valve trombone ventured into the pit at La Scala. Germany has tried to hang on to some semblance of a national style (job advertisements in the Berlin Philharmonic still demand that a German instrument be brought to the audition), and the Vienna design of horn persists.³³ But the trend pulls in another direction. The sound of brass has become denser and it projects more effectively. In many orchestras a tutti has become an assault by the brass: it is exciting for the first few sallies but ultimately exhausting and inimical to the expressiveness of the orchestra as a whole. This matters less in Shostakovich and Tchaikovsky than in Brahms and Wagner, but even in late Romantic works some finesse is lost. An oversized trombone lending feet of lead to *L'histoire du soldat*, or a woolly large-bore french horn in a sparse Webern texture, are encountered depressingly often. The strings, and for the most part the wind, have not increased their innate ability to project: it is as if an electric bass guitar had been introduced into a string quartet.

The noisy folly that besets many orchestral brass players has been compounded by a number of factors. Their education is narrow: students react to the nugatory solo repertoire for most of the brass by concentrating on orchestral excerpts and on the physical aspects of playing. Many conservatoire teachers use the language of the sports field: the race is to the swift and the battle to the strong, though it is doubtful whether, in these circumstances, bread is to the wise. An American company advertises lung-capacity monitors in the brass press, and there even exist special heavy mouthpieces, the express purpose of which is to make the sound of a section that is already too heavy even louder! That these are commercially successful only goes to prove how divorced many brass players have become from any sense of their place in music. Matters have hardly been improved by the formation of inward-looking societies³⁴ devoted to obsession with each of the orchestral brass. These organisations are socially agreeable, but have created ghettos of interest. By throwing so much emphasis onto a single component of music they have promoted a lowering of musical intelligence in many areas of brass playing.

Reaction has set in. The period-instrument industry has for some years been colonising the standard orchestral repertoire. 'Authentic' performances of Brahms, Wagner, even Elgar, take place regularly. We may not wish to go as far as Pierre Boulez, who is suspicious of the search for historical particularities and has described historicism as 'a revealing

symptom of the dangers a culture runs when it reveals its own poverty',³⁵ but we should regret the fact that there exists no large public for late twentieth-century art music. This is sad, for it means that much that is inventive and exciting passes relatively unnoticed. Our musical culture may or may not be impoverished; certainly it pays extravagant attention to a small repertoire of old masterpieces, and scholarly conductors like Roger Norrington and Nikolaus Harnoncourt, who are reinventing or rediscovering sounds from old scores, receive more acclaim than most composers do. Their choice of brass instruments is critical: no greater difference can be made to the sound of an orchestra than by the banishment of the opaque sound of modern brass. It is instructive to compare the brass instruments of the 1840s with those marketed in the 1990s, and ask whether Schubert would have used the trombones as much as he did in the 'Great C Major' if they had sounded so overbearing. Some orchestras are adopting smaller instruments without entertaining any desire to be authentic: the Deutsche Kammerphilharmonie in Bremen and the Chamber Orchestra of Europe both employ natural trumpets for some repertoire, and the latter uses pea-shooter trombones as well. This is because the greater transparency of their sound allows the orchestra to play co-operatively, instead of doing battle with a monster. It remains to be seen whether manufacturers and players will recognise this trend and end their love-affair with size and power. At the time of writing there is little sign that they will.

Brass bands and other vernacular brass traditions¹

Trevor Herbert

Virtually every major involvement of the lower social orders with brass instruments in western cultures dates from the nineteenth century. There are exceptions of course; Moravian trombonists were not professional players,² and there are instances of horn and trumpet calls being sounded by enlisted military musicians. However, the engagement of *masses* of ordinary working people with brass instruments, both as players and listeners, starts between 1830 and 1850.

The idea that the brass players who populated Europe from the Middle Ages – *alta* band players, waits, *Stadt-pfeifer*, court or church musicians, state trumpeters or whatever else they were called – were connected to, or had a causal relationship with, the amateurs who bought valve instruments in the nineteenth century is spurious. To deny the compelling reality that widespread amateur brass playing was new in the nineteenth century, a feature of modernity, is to misunderstand one of the most remarkable sociological shifts to have occurred in the history of music.³ Almost anyone who, in say 1820, possessed a sophisticated skill on an art-music instrument and did not make a living at it was, virtually by definition, an aristocrat or a member of the wealthy bourgeoisie.⁴ Yet, within a single generation, such skills were commonplace among amateur brass band players across Europe and America. It was a moment of vast importance; it led to changes in the idiom of many brass instruments, and it was one of the ways in which sophisticated music making can genuinely be said to have contributed to social emancipation. In England in the eighteenth century, few people knew what a trombone was, and trumpet and horn players of high quality were in short supply; in the mid nineteenth century, cotton-mill workers could be

found whose mastery of the intricate skills of brass instruments matched that of some members of the world's greatest orchestras. Musical heroes emerged whose names became household words. Brass instruments were the first medium in modern times through which vernacular traditions fused with the deep history and values of western music so as to change those values.

The most important reasons why brass instruments became popular among amateurs are that the application of valves made them easier to play, and that a coincidence of other circumstances made it possible for poorer people to own them. Almost all brass players before the 1830s were professionals. The skills of trombonists, horn players and trumpeters were rare, and their instruments were expensive. Valve instruments changed all that. The production of the lower notes of basic harmonic series has always been easy on a brass instrument; the great innovatory facility of valves was that the manipulation of them – and, consequently, the chromatic notes to which they give access – required the use of just the three most dextrous fingers of the right hand. The new instruments could be learned easily by rote. Indeed there is abundant evidence that many of the so-called 'professors' who taught amateurs how to play brass instruments in the early days did so from simple instruction manuals, and did not have an ounce of skill on the instruments themselves.

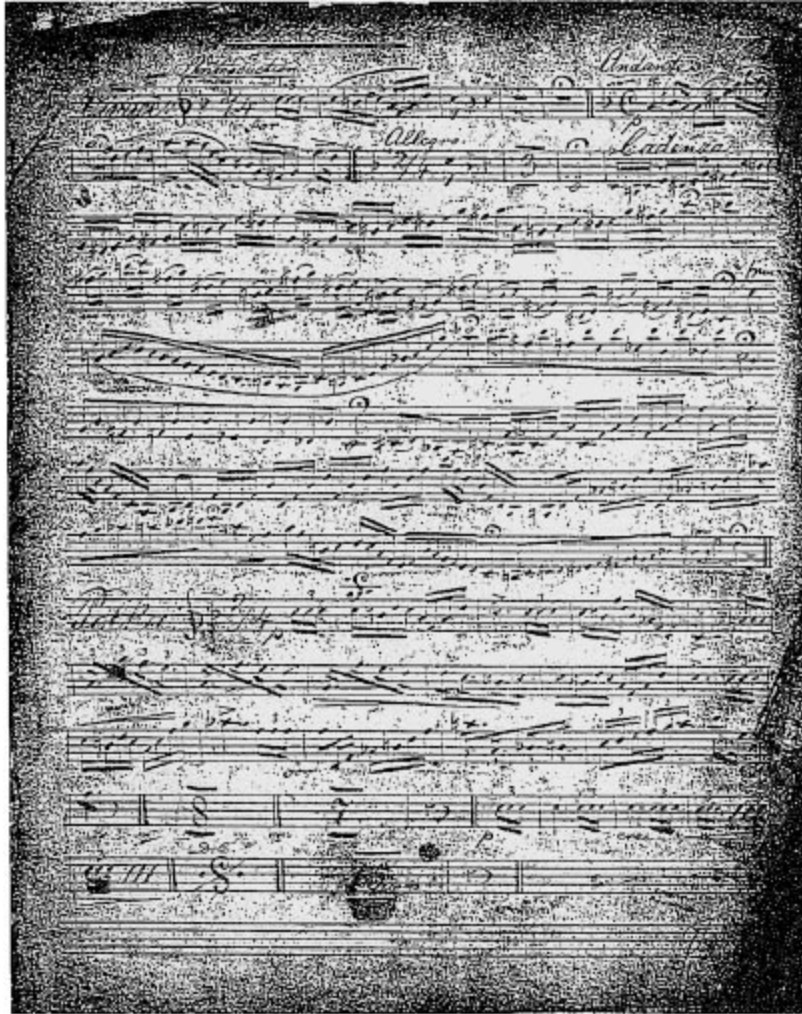


Figure 31 The cornet primo part of Levy's *Whirlwind Polka* from the Cyfarthfa Band library.

The invention of these new instruments came at a time when new methods of industrial manufacture and production were developing too. Instruments came in thousands off production lines in Europe and the United States. These fundamental musical and technological developments coincided with important demographic changes and a new commercial era which placed brass instruments in the classic producer-consumer relationship. The 1851 United Kingdom decennial census showed Britain to be the first place in the world which had more people living in towns than in the countryside. Other surveys further emphasised what must have seemed like an irreversible trend: populations were getting larger, and more and more people were moving from the countryside to towns, and away from a living made in agriculture to just about anything that was not

agriculture.⁵ The developed world was becoming a chain of urban settlements. People lived physically closer together and in greater concentrations of numbers. These conditions fashioned a new meaning for the idea of community, and for the inventors and producers of brass instruments they provided the market for a new and greatly improved production system. Brass bands were most often started up not in large cities, but in small to medium new towns which had grown around a particular source of employment such as a mine or a mill. Most were financed through subscriptions, to which the general public often contributed.

There were other demographic changes too, which extended beyond the confines of Europe. In America, towns grew at a more rapid rate than ever before, and many immigrants entered the country with musical skills, commercial flare and an appetite for musical entertainment. In areas as far-flung as Africa, India and New Zealand, white men holding brass instruments and playing in bands produced music that was to be a seductive stimulus for change, even in indigenous cultures. Some of the players were military bandsmen, many of whom had taken up a life in music after beginning in brass bands. But many others who emigrated in search of a new life – carpenters, saddlers, printers and miners – went with their cornets and euphoniums in their cabin bags.

The economic historian Cyril Ehrlich has described the point of rapid growth in musical activity in nineteenth-century England as ‘the flood’.⁶ He could have been speaking about any developed country in the world; but in England the story had a particular edge because the Victorian period produced one of the few genuinely new and lasting, uniquely British, musical formats of the nineteenth century: the brass band. The British brass band, unlike the brass bands of other countries, developed in a relatively short space of time into a fixed genre. By the 1880s it had assumed most of the characteristics – musical, technical and idiomatic – that make it distinctive today.

Though there were some professional bands in Britain from the 1830s, the major expansion of sales of brass instruments to working-class people did not come until the 1840s. It is probably not a coincidence that this development accelerated after about 1844, when the Distins, a family of brass players who had become celebrated in Britain, encountered Adolphe Sax in Paris. Sax had been trying unsuccessfully to market his new valve

instruments in Britain. The Distins took out the British agency for them,⁷ and, from then on, vast numbers of instruments were produced in Britain.

The lower orders were encouraged to take up music making by a sector of society who believed it to be a 'rational recreation', an improving and morally uplifting activity which was the perfect panacea for the perceived social threat posed by the fact that, suddenly and simultaneously, the urban masses possessed a small amount of disposable wealth and a modicum of leisure time. These concerns are exemplified by 'Anonymous', an ardent writer in *The Leisure Hour*, a weekly periodical published by the Religious Text Society: 'The leisure time of the English people is now greater than it ever was before. I think I know the English artisan nearly as well as any man; and when I think of his having eight hours for play, my instinctive inquiry is, What will he do with it?'⁸

Working-class people were also encouraged to take up music by highly effective commercial propaganda (aimed both at them and their social superiors), and by the existence of favourable economic circumstances which promoted apparently new, benevolent, devices enabling those without money to have access through deferred payments to the material goods of which their dreams were made. The most important of these devices was quickly named the 'hire purchase system', which Algernon Rose was to describe as 'the very basis of the brass band movement'.⁹

Within a short time, the mass-marketing of brass instruments was showing spectacular results. Then the most important thing of all happened. Brass bands were thrust into the public arena to become a part of the growing Victorian leisure industry. It was not just brass band concerts that proved popular, but also the spectacle of bands competing against each other for prizes. The man who claimed, probably justly, to have invented the modern brass band contest was Enderby Jackson (1827–1903), a candlemaker's son from the Yorkshire town of Hull. He was, so he said in his memoirs, inspired to do so by his observation of the success of agricultural shows in which pigs, cows and sheep were exhibited next to each other for the prize 'Best in Show'.¹⁰ He conceived the notion that bands, which were entertaining in their own right, would have a particular attraction if they too were exhibited in open competition. He first tried the idea with a drum and fife band contest at the Belle Vue Zoological Gardens in Manchester in 1852, under the auspices of John Jennison, a local entrepreneur who foresaw great prospects for the Victorian leisure industry.

In the following year they resolved to run a *brass* band contest. This was much more successful and it remained a permanent fixture under the title 'The Open Contest'.

It says much about the impact that brass instruments had made by this time, that Jackson and Jennison fixed on the idea of a *brass* band contest as opposed to any other type of musical competition, because the playing in that first contest could not have been of a very high standard. Jackson claimed that the 'musical proficiency [of most of the bands] was but small' at the first contest, because many of the bands which competed there were not established until the previous December, when he entreated local teachers to form bands ('the greatest proportion of the bands had been formed expressly for this contest').¹¹ Different types of musical contests were persevered with in the Victorian period, but the two that had most sustained success, both during and after the nineteenth century, were the Welsh *eisteddfodau*, which had comparatively local interest and were not commercially run, and brass band contests, which were commercial and genuinely wide-reaching in their appeal.

Their novelty must have played an important part in the appeal of early bands, and even modest musical efforts must have seemed entertaining, but bands were not the only attraction. At brass band contests, the host of other enticements might include balloon launches and tableaux of distant and exotic lands. Furthermore, Jackson was one of the early promoters of railway excursions (perhaps even the first), and major contests were served by special trains ferrying bands and audiences – a major factor in the huge success and influence of the contests. Most significantly, though, here were assemblies of working-class people who, in the spirit of competition, shared musical values and mimicked each other to the point where commonly held ideas of idiom and standards emerged. For the audiences who came in tens of thousands the experience was not just entertaining but potently edifying. Before the twentieth century – at least in Britain – brass bands were the main agency through which instrumental art music was disseminated to masses of working-class people.¹²

The most important influences in establishing the common brass band idiom in England were three north of England conductors: John Gladney, a military bandmaster's son, who became second clarinet of the Hallé Orchestra; Alexander Owen, whose main association was with the Besses o' th' Barn Band (one of the few bands to form itself into a limited

company); and Edwin Swift, the only one of the three who came from genuinely humble origins. He started his working life on a cotton loom and was entirely self-educated. Gladney was the most urbane and educated of the trio and at the time of his death he was widely referred to as ‘the father of the brass band movement’. Between 1873 and 1901, every Open Contest except one was won by bands conducted by one of these three. The standard brass band format was established by the instrumentation that they favoured. This format has lasted to the present time. All instruments, with the exception of the bass trombone, read in the treble clef:¹³



Figure 32 A picture of the Besses o' th' Barn Band, c. 1905, with its conductor, Alexander Owen. It was sold as a postcard when the band performed at spas and other resorts.

Soprano Cornet in E_b
4 Solo Cornets in B_b

2 Tenor Trombones
1 Bass Trombone

Repiano Cornet in B \flat	2 Euphoniums in B \flat
2 Second Cornets in B \flat	2 Baritones in B \flat
2 Third Cornets in B \flat	2 Basses in E \flat
Flugelhorn in B \flat	2 Basses in B \flat
3 Tenor Horns in E \flat	Percussion ¹⁴

Early repertory for brass band was usually ‘bespoke’; that is, the parts were arranged and written out by hand – usually by the bandmaster – for the particular players that he had at his disposal. (We should not be surprised by the possibility that some early players may have been able to read music when they could not read words. Almost every cognitive or social skill is acquired if its acquisition becomes genuinely necessary. They needed to be able to read music in order to play in a band, but they may not have needed to be literate to conduct any other part of their working or social life.) The fact that working-class brass players often played music from handwritten parts is helpful to those of us who, a century and a half later, are interested in what they did. This bespoke music tells us how well players could play, because it would make little sense for those who codified the music to have made demands on their players that those players were incapable of meeting. Much of the earliest music is very straightforward, but as playing techniques became more advanced and sophisticated, so did the music that was written and arranged for bands. A number of manuscript sources have survived. By far the earliest and most interesting is the collection of virtuoso music which was played, from c.1838, by the Cyfarthfa Band at Merthyr Tydfil, Wales. This repertory is quite exceptional because it was created for experienced players, many of whom were professionals. Other important collections which have survived in various stages of completeness include the music of the Black Dyke Mills Band (from 1855), the Goose Eye Band Books (from c. 1852) and the part books of the Besses o’ th’ Barn Band (from c. 1870s) which contain large-scale arrangements by Alexander Owen.

In the nineteenth century, the type of music most commonly arranged for brass band was European art music or its derivatives. Italian opera was particularly popular, as was middle-class dance music such as polkas, quadrilles and schottisches. Italian opera and dance music came together in the vast number of polkas and quadrilles that were based on operatic arias or fragments of arias; titles like the *Martha Quadrilles* (based on an aria

from Flotow's opera) and *The Lucia [di Lammermoor] Quickstep* abound. Polkas were also arranged as spectacular solos for cornet players.¹⁵ In the 1840s, 'journal music' became popular in both the UK and the USA. Journal music took the form of periodic – usually monthly – publications of entirely utilitarian, adaptable pieces, aimed at bands of low to moderate competence. The earliest British brass journal music was published by Wessell in the late 1840s. Other publishers, including the firms of Boosey, Distin, Smith and Chappell, also brought out journals. American journals served exactly the same purpose as the British versions and seem to have cloned their format and style.

Few printed, large-scale brass band works from the nineteenth century survive in the UK, because all the best bands played bespoke arrangements, but in America there were more such printed pieces. An interesting example is E. K. Eaton's *Twelve Pieces of Harmony for Military Brass Bands* (1846), scored for one E \flat cornopean and two E \flat trumpets, E \flat , bugle, cornopean, two french horns, two bass ophicleides, two alto ophicleides, three trombones and drums. This balance of keyed and valve instruments is not unusual. While valve instruments caused the huge expansion of brass playing, older types of instruments prevailed among amateurs and professionals on both sides of the Atlantic. Players with skills on these instruments had no need to abandon them in favour of the new technology. In New York's Niblo Gardens in 1834, John T. Norton and Allesandro Gambati engaged in a musical 'battle' in which the former played a slide trumpet and the latter a valve instrument, and there are several later examples of older-type instruments being used. Some London professionals continued to use slide trumpets until the end of the century. There are many instances of ophicleides being used in preference to euphoniums in brass bands and the Cyfarthfa Band's greatest virtuosi were keyed instrument players.

The American experience of brass bands was in some ways similar to what happened in Britain, but there were differences.¹⁶ Kendall's Boston Brass Band gave its first concert in 1835, and at about the same time Dodworth's Band was formed in New York City. However, contests were never the *raison d'être* for American bands as they were for the British, and subsequently the instrumentation was not formalised. In the early 1860s, several bands were caught up *en bloc* in the Civil War. (Even though the two events were entirely unconnected, this was matched in many respects

by the involvement of British bands in the Volunteer Movement from 1859).¹⁷ Much of the early repertory of American bands from the nineteenth century comes from the Civil War period, and the greatest advancement of band music came from bands that were either formed in, or had some outward resemblance to, the military.

Just as Jackson, Gladney, Swift and Owen had been so influential in Britain (and to these can be added important military bandmasters like Dan and Charles Godfrey, Sydney Jones and J. R. Tutton), so America had key figures with musical skill as well as entrepreneurial flair. The three with the greatest influence were Allen Dodworth, the son of a New York dance master who had emigrated from England; Patrick Gilmore, the Irish-born founder of the first really great American military brass band; and the most famous of them all, John Philip Sousa, who from 1880 was director of the US Marines Band. Sousa's band was a military band – made up of brass and reed instruments. Even though the term 'military brass band' was used frequently, it was only a loose definition. At about this time, the all-brass instrumentation gave way in many places in America to the mixed brass/reed combination.

In one key respect American brass playing was different from that in Britain and most other places. In Britain the brass band was a male domain until the second half of the twentieth century. Playing a brass instrument was conceived and articulated as an essentially masculine activity. The few initiatives to break through this barrier included the insistence by General Booth that women be enlisted in Salvationist bands,¹⁸ and the apparently unsuccessful attempt to promote the playing of Beatrice Pettit. In America, even in the earliest days brass instruments were successfully marketed as much for women as for men and at the turn of the century Alice Raymond had a highly successful career as a cornet soloist.¹⁹

Brass bands were also prevalent in continental Europe. They did not have the formal orthodoxies that the British versions picked up so quickly, but they did have distinct musical and social roles wherever they appeared. Russian and Prussian horn bands influenced the formation of what became known in Finland as *Torviseitsikko*, which was a septet of mixed brass.²⁰ Similarly, Danish bands in the nineteenth century had eclectic combinations of six to fifteen parts. Czech brass players were contracted to teach brass instruments to members of Bulgarian military bands from 1878, and by 1891 the Bulgarian army employed thirty-one professional military brass

bands.²¹ In France, Spain, Italy and other European countries, town bands were formed. Each had distinctive styles which were usually dictated by the needs and traditions of the communities in which they were formed.²²

It is probable that the best British bands in the late nineteenth century and for much of the twentieth century have had a much more advanced level of virtuosity than any other amateur bands in the world, because virtuosity was the principal motivation for such bands, and still is. This does not mean that they were or are musically the most interesting. The cultural meltdown that took place in the USA in the closing years of the nineteenth century produced a variety of playing styles. Even in 1900 only about a third of the inhabitants of New York City were either born there or had parents who had been born there. As German, Italian, British and other brass players carried their own traditions to the New World, the ensuing conflation of diverse national styles must have been influential on the way brass playing developed in the USA. Even in the late twentieth century, a comparison between amateur brass band playing in Britain and in other countries shows the British predilection for orthodoxy and musical discipline, as against the more relaxed and diverse forms found almost everywhere else.

The repertory of British brass bands in the twentieth century has been conservative. The reason is that, like American military band music, it is essentially a form of popular music that is steeped in traditional values. The musical language needs to be accessible and comprehensible to popular audiences, qualities which were recognised in the nineteenth century by figures as different as General William Booth ('let us have a real tune, that is a melody with some distinct air in it, that one can get hold of, which people learn, nay which makes them learn it, which takes hold of them and goes on humming in the mind until they have mastered it')²³ and John Philip Sousa, who always claimed that he 'wanted to make music for the people, a music to be grasped at once'.²⁴

Transcriptions have remained important in Britain, but Hollywood film themes and other popular pieces are transcribed as often as classical music. The earliest-known piece for brass band by an establishment composer is *The Tydfil Overture* (probably late 1870s) by Joseph Parry. Percy Fletcher's *Labour and Love* (1913), and *Coriolanus* (1920) and *Life Divine* (1921) by Cyril Jenkins, are often regarded as seminal early twentieth-century pieces for the genre. Since the 1920s, original works have been plentiful. Some major composers – Elgar, Holst, Birtwistle and Henze among them – have

written for brass band, but no composer who holds an undisputed place as a major figure in the mainstream of art music has shown a sustained interest in the medium. The most consistently popular composer of brass band contest music in the second half of the twentieth century was probably the former Salvationist Eric Ball, whose engaging, accessible and idiomatic style was employed in a number of successful contest 'test pieces' which were used at various levels (for contests bands are divided into leagues or 'sections' according to their proficiency – the music they are required to perform is appropriate for their standard). In the 1960s Gilbert Vinter showed the first hints of radicalism by writing in a more adventurous harmonic and rhythmic language. Since then there have been a number of more progressive developments of the idiom by an imaginative group of composers which includes Elgar Howarth, Edward Gregson and Derek Bourgeois.

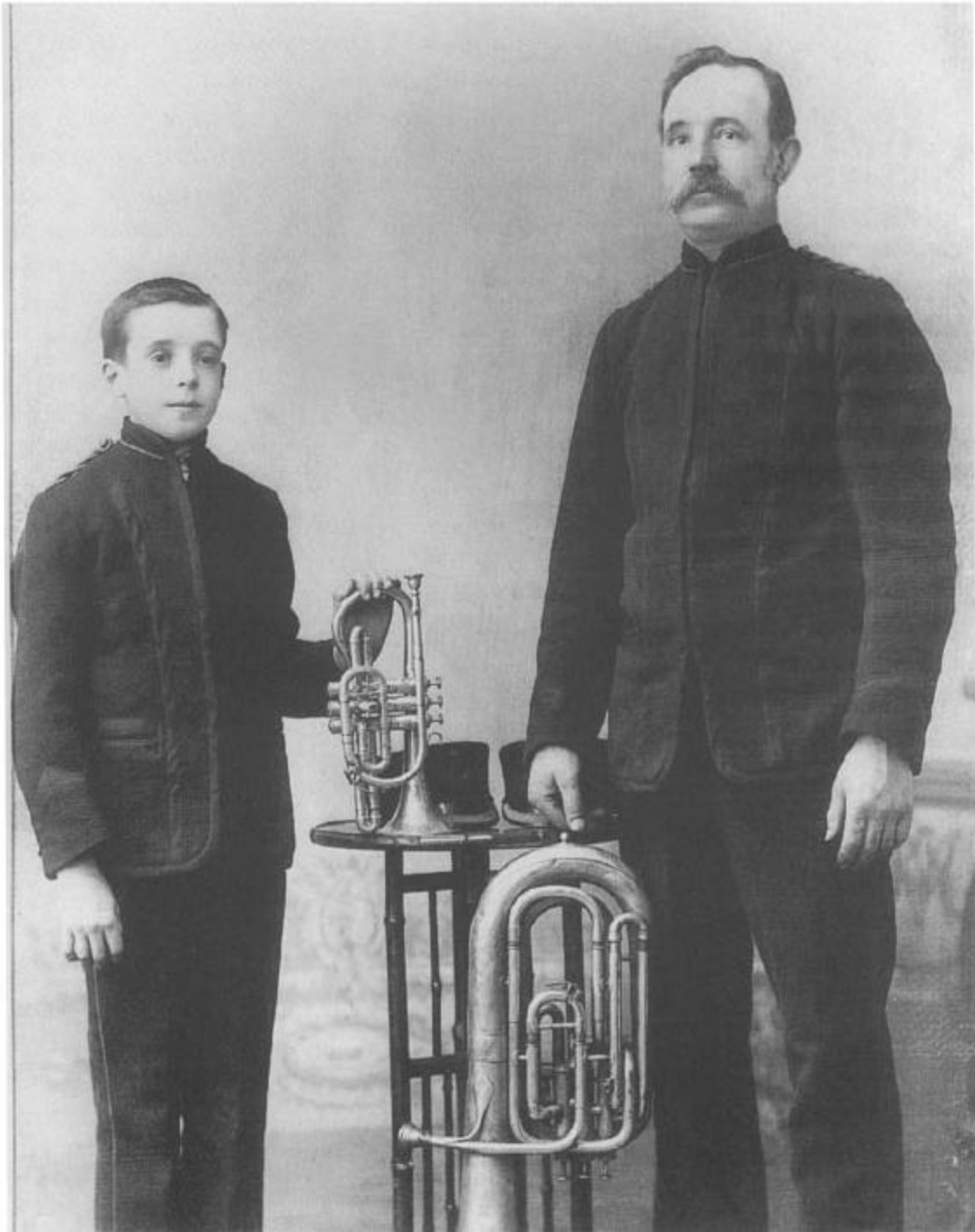


Figure 33 The famous trumpet teacher Philip Parker Sr with his father Napoleon Parker, 1896.

The cloning of the British brass band format has been most wide-spread in Australasia where instruments, tastes and practices were transported with British colonists.²⁵ More complex developments occurred in countries

where local, indigenous populations have been influenced by western brass playing to produce a music in which brass instruments are important, but which is a cultural hybrid of western and local traditions. This acculturalisation – the process by which people of one culture absorb and adapt the products or influences of another – of brass instruments in parts of the world which were colonised by European powers in the nineteenth century is one of the most interesting aspects of the relationship between brass instruments and vernacular practices. Brass bands and brass instruments have featured prominently in acculturalisation processes since the nineteenth century, and it is easy to suggest reasons for this. The sonic impact of brass instruments may have been appealing to native populations, but other, more simple and practical reasons can be put forward too. Brass instruments had a high visibility in public ceremonies – the type that would have been witnessed by local people. Also, perhaps the most important aspect of all is the sheer practical utility of brass: they are easier to play at a primary level than any other instruments except percussion; they are not affected to anything like the extent of other instruments by extremes of temperature or humidity, and, because the vibrating membrane is the player's lips, no part of the instruments needs to be routinely renewed at short intervals, as is necessary on string or woodwind instruments.

Several agencies were responsible for taking brass instruments to the colonies; the most important were bands formally attached to colonising forces, individual players who emigrated, and some colonists who actually taught local populations to play brass instruments. (The Band of the British West Indian Regiment was almost entirely made up of West Indians, and Dutch colonists in Indonesia gave local people brass instruments in order that they could provide them with musical entertainment.)²⁶ Christian missions were also important agencies for the transplantation of brass instruments – particularly the Salvation Army, which used brass bands in its foreign campaigns, partly for the practical reasons given above, but primarily because they were important to the military metaphor which pervaded almost every aspect of the organisation, presentation and vocabulary of Salvationism. By the beginning of the twentieth century the Salvation Army had set up bands in Africa, Asia and the Pacific, and in 1902 it set up the first brass band in Japan.

In the African continent there are many examples of the cultural assimilation of brass bands. On the east coast in the late nineteenth century,

German military brass band musicians taught Tanganyikans to play brass instruments, and from this tradition developed the variety of dance band forms known as *beni ngoma*.²⁷ On the west coast, *adaha*, an aspect of the popular dance styles known as *highlife*, has its origins in a transformation of European military brass band march music.²⁸ Similar assimilations have taken place in South America, Tonga and Asia. Today there are estimated to be between 500,000 and 800,000 professional brass band players in India.²⁹ Each band maintains a 'shop' run by a *mālik* from which the band is organised. These bands play for parades and particularly for weddings, with a hybrid repertory of western brass and Indian traditions.³⁰ In Jakarta, bands retaining the name by which Portuguese colonists called them – *Tanjidor* – play what Ernst Heins has described as 'Jakarta-Chinese, and Sundanese gamelan music ... on the instruments of the European brass band', the effect of which is a 'dazzling heterophony, which defies any rule and regulation of European musical theory'.³¹ This case is a particularly vivid example of a phenomenon that has become widespread in the twentieth century. Any western brass player uninformed of such practices who listens to one of these non-western brass bands could be forgiven for mistaking the sound it makes for a cacophony. In fact the players in such bands are exercising a different set of values. They may be playing western brass instruments, but the musical culture that shapes their terms of reference derives from their own indigenous roots.³²

Any attempt to summarise the way that the brass playing of the lower orders has influenced such a diverse array of brass music in the last two centuries will by necessity be simplistic. But it seems clear that almost every exciting stride that has been taken during this period has had the imprint of the popular or vernacular on it. The expansion of the idiom of brass instruments in art music from the nineteenth century is a good example. Many of the 'advanced techniques' of late and post-Romantic composers have their origins in vernacular and popular practices. The concept of virtuosity was also influenced by these developments; there is virtually nothing in the canon of nineteenth-century art music that places the same technical demands on orchestral brass players as brass band transcriptions ask of bandsmen. At a purely social level too, the vast network of learning opportunities for brass players through informal routes, whether they be brass bands, Salvationist bands or high-school bands, has produced many of the greatest orchestral and solo brass players. This is

particularly noticeable in Britain, where such players as George Eskdale, Jack Mackintosh, Harry Mortimer, Willie Lang, Maurice Murphy, Derek James, Evan Watkin, Harold Nash, Dudley Bright and John Wallace are all products of such systems.



Figure 34 Louis ‘Satchmo’ Armstrong (1901–71).

Outside professional art music, brass instrument playing and brass bands have maintained strong links with vernacular origins. Two features seem to be common among much amateur music making of this type, whether it be western or non-western. Firstly, bands generally seem to have identifiable links with communities. Almost always, a band is more than its players; it represents and entertains people who regard the band in part as their own. Secondly, from the most sophisticated to the most apparently crude examples of brass bands, aural transmission is important. Even the most virtuoso brass bandsmen learned their technique through copying better players. In many cultures, western as well as non-western learning processes are still encountered that rely entirely on such methods.

The most significant manifestation of this is jazz. This topic is dealt with in depth later in this book but it is worth noting here that in jazz one sees the most sophisticated example of the alchemy of vernacular and mainstream influences and the tremendous power that aural communication has had in shaping a musical culture. Jazz is also the most enduring and probably the most important way that the musical expression of vernacular cultures, uncluttered by the orthodoxies of art-music establishments and their attendant values, has resulted in a musical practice which is on the one hand sophisticated, and yet on the other transparently vernacular in origin. No family of instruments has been more important in this story than brass.

One need look no further than the career of Louis ‘Satchmo’ Armstrong for a metaphor, not just for jazz brass, but for the importance of vernacular culture to brass players and its fusion with the modern musical world. He was born in a hopelessly deprived neighbourhood of New Orleans. His father deserted his mother when he was a child. From the tiny quarters in which he lived, he must have heard the sounds of early jazz echoing from the saloons and bars that populated the town. He first blew a brass instrument not in a school or private teaching studio but in ‘The Home for Colored Waifs’, where he was incarcerated for a teenage misdemeanour. The home had a brass band – a formal brass band – which played from written music.³³

Armstrong was, of course, more than just a trumpeter. He was an actor, a singer and a major player on the world media stage. But it was as a trumpeter, a *jazz* trumpeter, that his greatness manifested itself, and all else that he did was ignited by that dimension of his musical persona. He was

truly virtuoso; every brass player recognises the sheer technical brilliance that his playing contained, even though it was characterised by layers of idiomatic and idiosyncratic nuances. In its obituary of him, *The Times*, an icon of British establishment values, noted that the significant thing about his playing was ‘the intuitive sense of logic and balance with which he welded phrase to phrase’.³⁴ These were fine words for what had started off as ‘dirty music’.

There have been other great players in the last two hundred years, but Armstrong was the first vernacular brass player to have been unambiguously recognised as a genius on a global scale. Indeed, it says much about the pace and nature of cultural change in the twentieth century, and the way that vernacular influences have affected the idiom of brass instruments, that in Armstrong we may have had the first brass player whose stellar talent shone as brightly as that of any other musical celebrity.

Playing, learning and teaching brass

Ralph T. Dudgeon, Phillip Eastop, Trevor Herbert and John Wallace

The earliest methods of instruction on brass instruments were probably based on imitation; signals and simple ensemble pieces were probably learned by rote. The first documented brotherhood of musicians was the Nicolai-Zechbrüder which was chartered in 1288 in Vienna and functioned until 1782. Five trumpets formed a fraternity in Lucca, also in 1288. The Confrérie de Saint-Julien was founded in 1321 and lasted until 1773. By 1330, musicians' brotherhoods expanded, and thirty-one such organisations met in Tournai to discuss common issues.¹ Not until the written records and apprenticeship indentures of the guilds and *Stadtpeifer* become available is there tangible evidence of how instruction actually took place. Members of church or civic ensembles and court musicians are seldom seen in pictures with printed music in front of them. This suggests that the music they were playing was memorised. Keith Polk has described 'the existence of a tightly interwoven network of contacts which would have connected players and repertory in Glogau, Leipzig, Nuremberg, Augsburg, Ferrara, and Florence, and, for that matter with Brussels, Mechelen and Antwerp'.² How did they learn their craft? The possession of a highly developed memory and a talent for improvisation, in addition to the timeless prerequisite of a keen ear, were essential to success as a musician in the Middle Ages and early Renaissance.

Manuscript and printed instruction material survives from the Renaissance. The idiom that brass players followed can be deduced from the works of such writers as Ganassi, Ortiz, Maffei, Dalla Casa, Bassano, Conforti, Bovicelli and Virgiliano. A concise study of the manuals of these writers by Howard Mayor Brown, *Embellishing Sixteenth-Century Music*,³ is a good starting point for modern players of early brass instruments, as it provides an overview of sixteenth-century practices. In the seventeenth

century, Rognoni continued the discussion of technique and used the model of the human voice as the ideal for wind players to imitate.⁴

Bendinelli's manuscript of 1614, 'Tutta l'arte della trombetta', is the earliest trumpet tutor and documents the trumpet ensemble tradition of the Renaissance.⁵ Girolamo Fantini's *Modo per imparare a sonare di tromba* (1638), the earliest printed method for trumpet, documents the new sonatas of the Baroque era. In comparing the two works, it could be said that Bendinelli represents a summary of the use of the trumpet in the Renaissance, while Fantini demonstrates the potential the trumpet would realise in the Baroque. Only in 1795 did Johann Ernst Altenburg feel free enough of guild restrictions to issue his important treatise *Trumpeters' and Kettledrummers' Art*.

There are a number of surviving sources which increase our understanding of the early trombone. Virgiliano's *II dolcimelo* has the earliest diagrammatic information on slide positions, and later treatises by Praetorius (*Syntagma musicum*, Wittenberg/Wolfenbüttel, 1614–20), Mersenne (*Harmonie universelle*, Paris, 1635) and Daniel Speer (*Grundrichtiger ... Unterricht der musicalischen Kunst*, Ulm, 1687) also provide valuable insights into the idiom of the trombone.⁶ Not until 1795, however, does André Braun, in *La gamme et méthodes pour les trombones alto, ténor et basse*, describe the tenor trombone in B₁ with seven chromatic positions.⁷ Joseph Fröhlich's *Vollständige theoretisch-practische Musikschule* (Bonn, 1811) in four volumes outlined many of the new practices in the trombone and the other brass. While his coverage of the trumpet is more complete than that of the trombone, he enters into much more detail than previous writers, discussing mouthpieces, methods of holding the instrument, and alternative slide positions.⁸

The method books of John Hyde, and the Thomas Harpers, Sr and Jr, dealing with the nineteenth-century English slide trumpet, show some continuity in trumpet-playing traditions from the eighteenth century, but many authors writing keyed bugle and early cornet or 'cornopean' methods show more interest in developing a fluid, legato style, expressive more of Romantic ideals.

A prevailing view among modern trumpeters is that their traditions began in Paris with the work of Jean-Baptiste Arban, but recent studies by Tarr have shown the importance of Josef Kail (1795–1871), who was the first professor of valve trumpet at the Prague Conservatoire.⁹ Though chromatic

brass instruments were available, the natural trumpet was still an important instrument in the first part of the nineteenth century and is referred to in over forty method books.¹⁰ The classic text for the natural trumpet of this era was written by François Dauverné, trumpet professor at the Paris Conservatoire. His *Méthode pour la trompette* (1857) predates Arban's. Because of its completeness, Dauverné makes an ideal starting-point for study of the natural trumpet today. Period brass of all varieties, including cornett, serpent, keyed bugle and ophicleide, are increasingly popular in the late twentieth century and specialised study can enlighten a performer on modern brass in many ways. Besides the use of historic methods and repertoire, methods by contemporary players are now becoming available.¹¹

Important method books for the hand-horn also originate in Paris from the early nineteenth century, and are referred to in [Chapter 8](#). Jacques-François Gallay's *Méthode pour le cor* (1845) was the last to cover only hand-horn technique. Methods that deal with the valve horn begin around 1835. It is interesting to note that in 1833 Pierre Meifred was appointed professor of valve horn in the Paris Conservatoire, but upon his retirement in 1864, the study of valve horn was discontinued until 1897. It was not until 1903 that François Brémond was given the authority to teach the valved horn as a principal instrument. Study of the natural trumpet also remained in the curriculum of the Paris Conservatoire into the twentieth century.

The early nineteenth century saw the rise of self-instruction, and methods for keyed bugle, ophicleide, cornet and the other new instruments of the Romantic era were published. There are fundamental similarities between the practical aspects of teaching and learning any brass instrument and from the nineteenth century authors have written methods for more than one brass instrument. Victor Cornette wrote methods for ophicleide (1835), trombone (1838) and horn (1854); V. Caussin for ophicleide (c.1840) and cornet (1846); J. G. Kastner for cornet (1837–8), ophicleide (1845) and trombone (c.1845); Nemetz for trumpet, trombone and horn (all 1828); and Muller for keyed bugle (with Roy) (1839), bass horn (c.1830) and trombone (1845). Conservatoire teacher/performers such as Arban, Dauverné and Dauprat projected their influence far beyond their immediate circles of students through their publications. Particularly influential have been the teachers of the trombone who ran classes which eventually became formally constituted at the Paris Conservatoire: Pierre Marcillac (1796–

1802), Felix Vobaron (1833–6), Antoine Dieppo (1836–71), Paul Delisse (1871–88), Louis Allard (1888–1925), Henri Couillaud (1925–48) and André Lafosse (1948–60). The bass trombone was not taught as a separate class at the Conservatoire until after the Second World War.¹²

Study material for euphonium and tuba was initially a bass clef version of method books for other instruments. This practice continues through to the present with methods like those of Charles Colin,¹³ with their emphasis on flexibility, or those of Carmine Caruso¹⁴ and Claude Gordon.¹⁵ Nowadays, serious tuba students have no shortage of study material, if of variable quality (see [Chapter 11](#)).¹⁶

The rise of the band movement in England and America, in conjunction with late nineteenth-century improvements to instruments, influenced teaching and learning brass. Important representative soloists on cornet, trombone and euphonium wrote study materials and became influential teachers at increasingly well-funded music education institutions in the United States. Herbert L. Clarke, Gustav Heim, Walter M. Smith, Simone Mantia (euphonium) and Jaroslav Cimerá (trombone) have become as important for the legacy of their teaching as for the virtuosity of their playing.



Figure 35 The title page of Thomas Harper's *Instructions for the Trumpet*...

New study books have appeared frequently since this period, keeping up with and tracking new instrumental developments. The jazz age was still in

its infancy when Henry Fillmore's *Jazz Trombonist for Slide Trombone, Bass Clef ... a Unique Treatise Showing How to Play Practical Jazzes, and How and Where to Insert them in Plain Trombone Parts* was published in Cincinnati in 1919. Competition is always rife in the active market in self-educational brass study material. Fillmore's *Jazz Trombonist* was unique until only 1920, when Fortunato Sordillo's *Art of Jazzing for the Trombone; a Complete Treatise upon the Possibilities of the Slide* was published in Boston. Often the substance of these books is substantially less than the extravagant claims of their titles. The staggering virtuosity of improvising jazz players has led to the formulation of many quasi-athletic training methods which aim to enable others to achieve the same feats to order. If unsupervised by a specialist teacher, these methods may do more harm than good. One of the first, Eby's *Complete Scientific Method for Cornet and Trumpet*, appeared in 1926. This was anything but scientific, but it found a market among brass players preoccupied with range and stamina to a degree which bordered on the obsessive. The Eby thus became the prototype for grotesqueries such as *Double High C in 37 weeks*.¹⁷ In the wrong hands, allied to the wrong mentality, it is possible to have great success turning the trumpet or indeed any other brass instrument, into the musical equivalent of a buzz-saw.

That it is possible to achieve the more difficult task of keeping the musical dimension constantly and simultaneously in the same frame as the physical is shown by the 'warm-up' routines of Vincent Cichowicz (Northwestern University, Evanston, IL) and James Stamp.¹⁸ Systematic 'warming up' is a concept exported from the USA to the rest of the world's brass players. Despite the athletic analogy implied in the phrase 'warming up', the purpose of these exercises is not so much to limber up, but rather in the manner of a classical dancer's daily 'class' to instil consistency in production, to maintain technique and to rectify incipient faults which could develop if neglected. Cichowicz's melismatic warm-ups are very similar to vocal warm-ups, and demonstrate the durability of the oral tradition. These Cichowicz melismas (Ex. 8) can be heard in practice rooms world-wide despite remaining unpublished for many years, distributed by word of mouth by pupils of pupils who have gone forth and multiplied. Like the warm-ups by Stamp, they are an antidote to an over-physical approach to playing brass, with their emphasis on listening to the basic beauty of the sound produced, and on an even legato over the entire range. The origins of

‘the Stamp’ are interesting. Stamp developed his exercises from those of his teacher, Edward Llewellyn, of the Chicago Symphony Orchestra, who, in turn, had developed them from phrases used in Brahms’s Symphony No. 2. He was only persuaded to write them down in the 1970s through the efforts of the virtuoso Los Angeles trumpet player Thomas Stevens and the brass publisher Jean-Pierre Mathez, two kindred spirits in their efforts to raise the level of artistic brass playing. Stamp’s exercises, as well as strengthening the brass player’s physique, are satisfying to play, because of their foundation in quality music, which is perhaps the reason for their widespread adoption, and high success rate.

Ex. 8 Warm-up patterns after Vincent Cichowicz (A and A₂), James Stamp (B), Phil Parker Sr (C), Thomas Clough (D), John Wallace (E), Denis Wick (F and F₂)

The image displays six musical exercises, each on a single staff, designed for brass instrument warm-ups. Exercise (A) is in treble clef, showing two phrases: the first starts on middle C and moves up stepwise to G4, and the second starts on A4 and moves up stepwise to E5. Exercise (B) is in treble clef, featuring a descending scale from G4 to C4. Exercise (C) is in treble clef, showing a series of chords (dyads) moving up and then down. Exercise (D) is in bass clef, featuring a series of chords moving up and then down, with a 'f' (forte) dynamic marking. Exercise (E) is in treble clef, featuring a series of chords moving up and then down, with a 'f' (forte) dynamic marking. Exercise (F) is in bass clef, showing two phrases: the first starts on C2 and moves up stepwise to G2, and the second starts on A2 and moves up stepwise to E3.

Formal lessons from an early age are often accompanied by graded examinations and graded, specially composed, pieces. (This is particularly

prevalent in the UK, from where the world-wide examining system of The Associated Board of the Royal Schools of Music is run.) Though these systems are helpful, for the best results, the teacher has to introduce an element of imagination and improvisation into the teaching, learning and practice situation, to avoid cloned pupils unable to think for themselves, who all play and sound the same. In certain quarters, this last phenomenon is seen as a positive advantage, and the ‘there is only one way to play’ approach has influenced limited preservation of national styles of playing. In Germany, Austria and the United States, brass teaching has tended to be more prescriptive than in France, Britain and Scandinavia, where a more empirical method has tended to be favoured.

An important ‘learning by osmosis’ tradition is found in connection with the British amateur brass band movement, where up to forty players at a time learned in junior bands. This tradition continues to be the breeding ground for many – perhaps most – major players.

Though each brass instrument has its own idiom, its own idiosyncrasies and its own difficulties, brass players of all periods have had much in common in the way they produce a sound: in *embouchure*, breathing, posture and tonguing. There is no consensus about these universals of brass playing. In the remainder of the chapter some of the technical issues concerning brass playing and the way it is taught are outlined.

Sound production

On all brass instruments, the lips, held under tension within the circle of the mouthpiece rim, begin to vibrate when turbulence occurs in the air passing steadily between them. If the muscle tone of the lips and the rate of airflow are kept constant, then the excitation of the edges of the lips caused by their contact with the moving air sets up standing-wave oscillations within the instrument. This vibration of the air sets the lips vibrating in sympathy, and in turn affects the exact way the air vibrates as it passes between them. This interplay between vibrating lips and air controls the complex shape of the sound wave-form, and helps give each player his/her unique sound.

Embouchure¹⁹

The word *embouchure* is important to brass players. It is used to describe the precise arrangement, in the playing position, of an individual player's mouth in relation to the mouthpiece. Because of the demands placed upon the modern orchestral brass player, there has evolved, for each instrument, an ideal embouchure model, which the beginner would do well to emulate. There is a form of natural selection among embouchures, where only the fittest can survive the demands of the repertory expected of the present-day player. The difficulty of achieving such an ideal embouchure (and thinking on this is still in the process of evolution) can be judged by the variation of embouchures seen among beginners and amateurs. In more advanced players, for example full-time students, it can be seen that the range of variation in embouchure structure has narrowed; and this range is further reduced among professionals to the point where, with a few rare exceptions, most use a similar model.²⁰

Ideally, a good embouchure should be able to produce any note at any dynamic. It should then be able to change to any other note without compromising its structure. An ideal embouchure has minimal visible movement. On instruments with larger mouthpieces, trombone and tuba especially, producing deeper notes requires the jaw to be lowered to increase the space between the teeth, allowing the lips more freedom to vibrate at lower frequencies. This action also helps the lower register by increasing the resonating space inside the mouth. Jaw position and more obviously visible adjustments between registers are more evident on the larger brass. In general, however, the embouchure should allow the player to roam from high to low without pausing to reseat in an embouchure 'break'.

An embouchure break occurs when, for example, the beginner who has established a foothold in the middle register establishes another in the upper register, with a different embouchure seating, and perhaps yet another in the lower. An experienced teacher will guard against this, encouraging the gradual development of range by incremental degrees – perhaps a semitone at a time – to slowly build up strength and to ensure that the entire range is integrated under one well-formed embouchure. Most methods follow this incremental approach, building strength in the facial muscles through a cycle of play–rest–play–rest. Patient repetitive practice of basic embouchure foundation and maintenance exercises has to be built into a disciplined routine for any achieving brass player. A regime of self-training

invariably includes long tones; adding crescendo and diminuendo to these to learn and maintain dynamic control; slurring between notes on the same harmonic series at first slowly, then gradually quicker. These last, commonly and somewhat misleadingly called ‘lip flexibility’ exercises, stimulate the development of the many embouchure muscles as does exaggerating the vibration of the lip to form a buzz. This last has been a central tenet of much twentieth-century brass teaching,²¹ on lips alone, or with the mouthpiece, away from the instrument. Although there is some controversy about its ultimate usefulness, it would seem to be a useful tool in embouchure forming, and in habitualising minimal frontal pressure of the mouthpiece on the lips.

The tuba amplifies many of the problems which beset brass players, not the least of which is control of the air supply. A large amount is needed, especially to play loudly in the low register. The tuba player has to become a more efficient breathing machine than other brass players, among whom there exists a tremendous amount of argument and confusion about breathing and blowing. Arnold Jacobs,²² former tuba player with the Chicago Symphony Orchestra, was one of the first to point out that brass players were not helping their playing by jumping to false conclusions about breathing. Nevertheless, some players perform very well without a thought about breathing, whilst others excel despite adhering to bizarre theories.

Breathing²³

Although the acquisition of good breathing technique is essential to brass playing, and bad habits which are acquired early are difficult and time-consuming to overcome later, very few teachers speak about it in an exact way and many teach it and describe it using only blurred imagery. One of the reasons for the persistence of what might be called folk-theories about breathing is that in practice they often work, simply in terms of learning to play something better, or at least differently. However, because these theories are mostly based on incorrect physiology, they are often not useful outside the specific context for which they were contrived and can cause difficulties and confusion when applied elsewhere. In any discussion of breathing, the word *diaphragm* will occur, and along with *embouchure* is one of the most common words used by brass players.

The diaphragm

The diaphragm is the principal muscle of inspiration – of the drawing in of air, or inhalation. As with all muscles, contraction and relaxation of the diaphragm are controlled by nerves ‘wired’ into it. When stimulated into a contraction, the diaphragm shrinks powerfully in its first phase of action, pulling its centre downwards, stretching the lungs down with it. Besides causing the lungs to expand, this displaces the contents of the abdomen below downwards and forwards. It is impossible to feel the diaphragm, but ballooning out the belly (without arching the lower back) is a good way of indirectly demonstrating its working, as there is no other muscle apart from the diaphragm which can cause this to happen. The size of the lungs, and thus the volume of air they contain, directly follows the expansion and contraction of the ribcage. In addition to the effects of the diaphragm acting on the ribcage, there are other muscles, the scalene and the internal and external intercostal, which contribute to its expansion or contraction. None of these, however, are capable of expanding the lungs downwards; only the diaphragm can do this.

However, when it comes to expelling air, the most powerful and important group of muscles are the abdominal muscles. Unlike the diaphragm it is easy to feel the state of tension of the abdominal muscles with the fingers. Relaxing the belly, gently pushing the fingertips into it and giving a cough, pushing out the breath against the resistance of the glottis which suddenly opens, will demonstrate unquestionably that it is the contraction of abdominal muscle which propels the air out of the body.

There are outwardly visible signs of good breathing technique. When the player takes a deep breath to play, the belly swells out to the front and sides (a little widening of the ribcage here is inevitable and should not be resisted). As the belly nears its maximum size the ribcage then becomes more involved, expanding outwards and upwards. During this, the sternum moves forwards and upwards, while the width of the ribcage, from one armpit to the other, increases. The shoulders lift slightly, pushed up from underneath by the ribcage, not pulled up by the shoulder muscles above. Care must be taken not to raise them any more than the ribcage needs as this causes chronic shoulder tension. The instinctive way of producing a perfectly co-ordinated, full and deep *inspiration*, which accomplishes

everything to do with the in-breath covered in this writing and is immune to any interference by our conscious thoughts, is *yawning*.

It should be held in mind by all brass players that developing good habits of breathing, or good habits in any aspect of instrumental technique, is a means to an end and not an end in itself. Trumpet players are particularly prone to ignoring this philosophy. Obsessive practice patterns which deviate from a musical to a muscular objective are increasingly common, and can lead to very considerable physical problems. A particular difficulty encountered by advanced trumpeters is the resistance encountered in producing notes in the highest register, and the tiring ‘backpressure’ with ensuing tensions this builds up in the body of the player. All playing methods emphasise relaxation repeatedly, resting as much as playing in practice, trying to get the easiest physical approach to the instrument. But hardly any attempt to give structure to the good habits they advocate. One structured set of knowledge concerning postural considerations and the use of the body particularly useful to the brass player is the Alexander Technique.

The Alexander Technique

Nearly everyone has muscles or groups of muscles in their body which are habitually clenched, or at least held under more tension than is really necessary. The causes are many – the most obvious being the mimicking of role models with poor habits of posture and movement, depression and chronic muscle-knotting through fear. Over a long period, such misuse leads to a distorted posture, to idiosyncratic styles of walking, and to inefficient breathing. These conditions usually become entrenched with age, and eventually lead towards physical deterioration. The Alexander Technique provides a sensible way out of these harmful tensions, and thereby prevents the associated long-term ills. A particularly favoured area of focus for the various mental visualisations (known as ‘directions’ in Alexander terminology) is the neck, which is of great importance in posture because of its crucial role in carrying the head.

Having triumphed over his own detrimental habits of posture and movement (‘use’ in Alexander terminology), saving his career in recitation in the process, F. M. Alexander developed a gentle but persuasive way of using his hands to teach better use, and found that he could bring about

long-term improvements in the posture and movement of those who sought his help. His revolutionary style of body work became known as the Alexander Technique.²⁴

Put simply, the idea is that, by reminding the body continually to lengthen and widen, rather than to shorten and narrow, existing tensions will be undone, and not simply replaced with new ones. Given time, this can change ingrained habits and improve posture and styles of movement. Alexander Technique is not a therapy in the sense of being a treatment given by a therapist, but is learned from a teacher and used from then on with occasional refresher lessons. The principles of the Alexander Technique are close to those of learning to play an instrument. In playing any instrument, the best-sounding tone is achieved when the body works in co-operation with the instrument, not by oppressing or forcing it. So it is with the Alexander Technique, which in a sense is a series of lessons in how to play the body to get the best array of *muscle tone* – analogous to striving for the best *sound tone* when playing an instrument.

The Alexander Technique demonstrates the knock-on effect of one part of the body on another, and the fact that sound production on a brass instrument is multi-, not monocausal on every level. To take even the simple example of tonguing, there is a common misconception among brass players that the tongue alone starts the sound on a brass instrument. Would that it were that straightforward! The shaping and modulation of the sound into musical phrases in brass playing is done by the same parts of the body which form speech and song – the glottis, tongue, palate and teeth. For example, articulating the wide-bore contemporary trombone only with the tongue can make an unpleasant hard attack divorced in quality from the core sound. Successful trombonists, even virtuosos with transcendental techniques like Joe Alessi of the New York Philharmonic, advocate breath attacks, which, in effect, control the production from the glottis.

The glottis (vocal cords)

The tough folds of muscle in the larynx which form the glottis and move with great precision to restrict or stop the airflow are commonly known as the vocal cords. In fact the only point within the throat where the airflow can be voluntarily restricted is at the glottis. Opening and closing of the glottis to vary resistance in the airflow is used almost constantly, but rarely

noticed, during brass playing, as in singing. This can be observed in most players in the small movements of the Adam's apple which often happen at the articulations between notes and can be particularly helpful in wide slurs to mask the unwanted notes in between. The tongue, however, *is*, as in speech, of primary importance in brass playing, and the type of articulations used by players are, interestingly, influenced by their native language, contributing to those national styles of playing whose decline (perhaps concurrent with English becoming an international *lingua franca*) is lamented by Simon Wills in [Chapter 12](#).

The tongue

Articulation was a prime topic of sixteenth- and seventeenth-century tutors for wind instruments. The variety of soft articulations formed by various syllables as found in sixteenth-century literature points to an array of subtle articulations. In period instrument performance the appropriate articulations are dictated by the musical context – which other instruments are playing in a consort, whether vocal music is being accompanied and so on – rather than by the instructions on the written page.

The rear part of the tongue is bulkier and stronger than the tip, which is more mobile and delicate. To say *k*, the rear of the tongue presses up onto the rear edge of the hard palate (where the soft palate begins), to make a firm seal. Opening this seal to release a prior build-up of pressure in the lungs will produce the *k* or *g* used in double (*tktktk* or *dgdgdg*) and triple tonguing (*ttktkttk* or *ddgddgddg*). The fast, lightweight tip of the tongue interrupts the flow of air into the instrument when it is placed against the roof of the mouth, against the front teeth or even plugged between the lips. The tip of the tongue can produce a variety of starts to a note, from the most gentle to the most explosive, by allowing air pressure to build up behind it before withdrawing its obstruction. The tip of the tongue is also used to produce runs of rapidly repeated notes by alternately interrupting and releasing an otherwise continuous airflow. Rapid alternation between consonants has long been advocated to facilitate fast passagework: *tiritiri* in the Renaissance and Baroque; *tktktk* from the nineteenth century onwards. The technique of jazz doodle-tonguing existed centuries before Satchmo in the recorder player's *d'dl* articulation which is sometimes also used by cornett players.

Hands and fingers

For any pianist, violinist or woodwind player, fingering a brass instrument is child's play. In general, valved brass are fingered by the three most dextrous digits, and only in the case of the tuba is there a problem with hand size. Nevertheless, this does not stop the combative brass player grasping the instrument with the fingering hand as if she/he were continuously crushing a beer can, setting up a chain of unnecessary tensions throughout his body. Relaxation of the hand, and techniques to overcome awkward and forked fingering are admirably served (as are many other areas) by the study books of Herbert L. Clarke²⁵ and Allen Vizutti.²⁶

The way that hands and fingers are used when playing brass instruments is often neglected by teachers. Dexterity on the trombone involves developing a technique in which the slide is moved quickly between positions. A common fault among less experienced players is to move the slide more slowly when the tempo of the music is slower. This tends to emphasise the problems caused by a bad slide technique because its effects are more audible.

As is often the case in music, the teaching of brass instruments does not simply follow a literary tradition, but involves a high level of aural transmission. Indeed this is probably particularly true in the case of brass instrument teaching since the nineteenth century, because of the strong influence of vernacular and popular traditions (see [Chapter 13](#)). Methods of teaching are becoming more scientific (or at least quasiscientific), and the quantity of literature associated with brass teaching is consistently growing. One of the most positive aspects of modern teaching is the growth of interest in more holistic approaches to learning, which show greater sensitivity to the needs and individuality of players – particularly young players. The Alexander Technique, for instance, is of benefit in general terms to a student, not just to his/her future as a brass player. Also there is an encouraging emphasis on the need for students to understand music in its wide cultural context and not simply to learn to play a musical instrument. The array of different techniques and approaches used by teachers reflects the different modes of musical expression of amateur and professional brass teachers. This variety may be no bad thing in a musical world in which mass communication has tended to encourage a common orthodoxy. At the end of the twentieth century two of the most optimistic features of the story

of brass are the continued expansion of the numbers of people who play, and the fact that a diversity of styles of and approaches to teaching still survives.

The post-classical horn

Robert Evans

The dichotomy between the old and the new

The horn had a complex transition from the classical hand-horn to the fully chromatic valved instrument that we know today. The transition was also very gradual and did not follow a logical sequence. This is borne out by the fact that a work as late as Brahms's Horn Trio, Op. 40 for horn, violin and piano (1865), is designed for the hand-horn, while other works of the same period require valves. Another illustration of the coexistence of the valve horn and the hand-horn is demonstrated by the fact that the Paris Conservatoire offered hand-horn classes into the twentieth century. The valve horn class was actually suspended temporarily in 1864. French composers (notably Debussy and Ravel) seemed far more concerned with the minute details of orchestral colour and 'pointillism' well into the twentieth century, while the Austro-German composers (even Brahms, who favoured the hand-horn) were much more concerned with structure and motivic coherence; it is, therefore, understandable that French composers and writers showed the most concern over the loss of the range of colours that the hand-horn had to offer. Nineteenth-century music was, however, to be dominated by the Austro-Germans, and the 'modern' use of the valves for all notes was to be the way forward. Differences in attitude were, however, to cause problems. David Charlton has pointed out that, 'By about 1860 [horn] technique was in a transitional and confusing state.'¹ Resentment towards the valves can be seen in the writings of Edouard E. Blitz, as late as 1887, who states that the 'great homogeneity of sound [provided by valved instruments was] ... disastrous ... for instrumental richness'. He also says that valved brass, while being 'excellent for augmenting the instrumental intensity and completing the sonority of the

orchestra, [had] sacrificed its most precious quality, namely: diversity of timbres [that were available from hand-stopped notes]’.²

Two clear schools of thought emerged among composers and players in reaction to the application of valves. Some ignored them and persevered with a style of writing characteristic of the hand-horn. Others adopted them, but even within this group there were differing attitudes. Some composers used the valve instruments in a fully chromatic manner, opening up opportunities for unprecedented evenness of tone over the entire range. Others saw valve instruments only as an expedient way of changing crooks quickly. These two attitudes were therefore represented by: (a) composers (notably Schumann) who used the valve horn as it is used today, and (b) composers (notably Berlioz) who used the valve horn as a compact hand-horn with more than one crook built in. With no valves depressed the valve horn is a hand-horn in F, with the second valve depressed it stands in E, the use of the first valve places it in E_b, and with the first and second valves depressed it becomes a hand-horn in D. Hand-stopping can then be used within the given key.

The audience for art music grew in the nineteenth century in tandem with the growth of the new philharmonic societies and symphony orchestras. Notable among these were the Paris Société des Concerts du Conservatoire in 1828, and the philharmonic societies of New York and Vienna in 1842. This trend was to continue throughout the century with the establishment of orchestras such as the Berlin Philharmonic (1882), the Amsterdam Concertgebouw (1883) and, in America, the Boston Symphony (1881), the Chicago Symphony (1891) and the Philadelphia Orchestra (1900). With the establishment of many conservatoires and music colleges (Prague, 1811; Vienna, 1817; London, 1822; Leipzig, 1843; St Petersburg, 1862) the musical resources available to composers increased and larger orchestras producing a richer range of sonorities resulted. Particularly important in this respect is the expansion of the viola and cello sections, which tend to share the horn’s tessitura. (While Baroque and Classical orchestras had often had large violin and bass sections the middle of the texture had normally been quite transparent.) Diminishing private patronage and more public concerts led to the need for larger venues. The horn accordingly had to become more powerful. The domination of Austro-German music at this time also meant that the type of chromatic writing found in the works of Schumann was to be the way forward, despite the efforts of Berlioz and other composers to

retain and extend the colours available on the hand-horn by a limited use of valves. The latter style of playing is interesting from a performance-practice point of view because it suggests that the move from hand to valve technique was extremely gradual.

A player who used the valves as a fast way of changing crook was Joseph Rodolphe Lewy (1804–81) who, together with his brother Eduard Constantin Lewy (1796–1846), was influential in aiding composers' understanding of the early valve horn. In his *Douze études pour le cor chromatique et le cor simple avec accompagnement de piano* (c.1850) J. R. Lewy explains that the valves are to be used only for notes that would be otherwise 'too dull or indistinct'. The studies call for many swift changes of transposition, and they were obviously designed to use the valves as a quick way of changing crooks. Then, within the new key, hand technique would be used. Lewy stated that this was the only way to preserve the beauty of tone of the natural horn while retaining the advantages of the extended capacity of the valve horn.

An example of a work written for the valves to be used in this way is Schubert's song 'Auf dem Strom', D. 943 (1828), which was written for J. R. Lewy. The outer sections are obviously designed for the hand-horn in E, or the valve horn in F with the second valve depressed and then hand-stopped, but the middle section contains many notes which would be virtually unplayable on the hand-horn; in this section the valves would be used for difficult notes. This work and many others of the period suggest the need for a flexibility of attitude on the part of modern performers.

Composers reacted in various ways to the introduction of valves. C. M. Weber is said to have found them 'intolerable', as did Mendelssohn who continued to write for the hand-horn (notably in the exquisite 'Nocturne' from *Ein Sommernachtstraum* (1842) which is one of the pinnacles of hand-horn writing). Berlioz adopted valved instruments in a very individual manner. The benefit of valves for Berlioz was that any note could now be stopped. He wrote in a letter to Louise Bertin regarding the Berlin Opera:

certain cornists [*sic*] who play natural horn parts on rotary-valve horns find it less trouble to produce the stopped notes indicated by the composer, as open notes. This is certainly a serious abuse ... the rotary-valve horn not merely produces all the stopped notes which the natural horn produces but can actually play the entire compass without resorting to a single open note. The conclusion is simply that horn players should know the technique of hand-stopping as if the rotary-valve instrument did not exist.³

The programmatic use of the horn

One of the first composers to write consistently for the valve horn as a fully chromatic instrument was Robert Schumann. Schumann was at the centre of the nineteenth-century German Romantic tradition and several of his most poetic works were written for the horn. The *Adagio and Allegro*, Op. 70 (1849), is a fine example. The horn's lingering venatic associations meant that it had previously been allocated a clearly defined range of thematic material. It is important to note here, however, that the symbolism attached to the horn is not merely to do with its venatic associations, but that, in fact, it provides a broader allegory in that it evokes 'pastoral' associations. This is the case in music ranging from Handel (*Orlando furioso* (1733), *Theodora* (1750)) through to Beethoven's Sixth Symphony, 'Pastoral', Op. 68 (1808). The wider use of the horn throughout the nineteenth and twentieth centuries is obviously coupled with the growing penchant for programme music. Hindemith's Horn Concerto (1949) (written for Dennis Brain) has a short poem interpolated into the score at a particularly evocative moment – 'My call transforms the hall into an echoing autumnal grove ...'. Bayan Northcott noted that, 'even dry old Hindemith was powerless to resist the special magic of the horn'.⁴ The horn's venatic and pastoral origins, and its literary and iconographic associations give the instrument a rich heritage of programmatic evocations that are difficult to evade when writing for it.



Figure 36 The virtuoso horn player, Dennis Brain (1921–57).

It is, perhaps, the venatic aspect that remained strongest, however, and the hunting-horn style of the ‘Chorus of the Youths’ from Handel’s *Judas Maccabeus* (1747) is not far removed in spirit from the rumbustious writing

found in Beethoven's Symphony No. 7, Op. 92 (1811–12). Schumann was to use this aspect of the horn's character in many of his works as were numerous later composers, but his principal importance is in the development of the 'long line' or sustained melodic solo. This type of writing is partly foreshadowed in the slow movements of Mozart's concertos (notably K. 495), and indeed in the slow movements of the horn concertos by Telemann and Haydn too, but Schumann extends this to an unprecedented scale. The *Adagio* (Op. 70) contains extremely long and demanding phrases covering the entire range of the instrument. This brings a vocal style to the instrument that had not been previously exploited to any comparable degree. (Glazunov's *Rêverie*, Op. 24 (1890), is a fine solo example, and orchestral examples are cited in [Chapter 12](#)). The development of the modern idiom is based around the 'long line' style which evolves from several sources. These include, firstly, the Mozart concerto slow movements; secondly, the influence of operatic styles (notably Rossini's Overture to *Semiramide* (first performed 1823)); and, perhaps most importantly, the rapidly growing perception throughout the nineteenth century that the horn was an instrument associated with heroism.

Another significant work is the *Konzertstück* for four horns and orchestra, Op. 86 (1849). This overflows with a range of previously unexplored 'Romantic' gestures that are particularly appropriate to the horn. This work is particularly notable as it combines Schumann's new-found, expressive melodic horn writing with the more traditional hunting-horn flourishes. The fanfare that starts the work is typical of the programmatic use of the horn, whereas the slow movement looks forward to the expansive chorale style of Bruckner. However, Schumann's enthusiasm for the new instrument resulted in demands which are almost too great. The stamina problems which faced the first and second players meant that the work was not performed for many years after its first performance. The extensive use of the upper register was problematic because, as a result of the new, long melodic lines being written for the valve horn, the bore size of the instrument had begun to increase to produce a larger, more sustained tone-quality. Indeed, it is alleged that at the first performance in 1850 Pohle, the principal horn, opted to perform on a hand-horn, an interesting reflection of the gradual transfer from hand technique to fully chromatic valve technique.

The development of the modern idiom and the continuation of the ‘long line’ solo

The valve horn, with its more weighty and even sound, offered a way forward, and there were two notable pioneers – Pierre-Joseph-Emile Meifred (1791–1867) and Franz Strauss (1822–1905). Meifred, in his *Méthode pour le cor chromatique ou à pistons*, provided the first comprehensive valve horn tutor. It was first published in 1840 for the two-valve instrument, but in 1849 a version for the three-valve instrument was introduced after the ascending third valve had been invented by Halary. Meifred also established a valve horn class at the Paris Conservatoire in 1833 although it was disbanded in 1864 on his retirement.

Franz Strauss was influential in Germany as a player and as a composer. His intensely lyrical Concerto, Op. 8 (1865), when premièred by the composer in Munich, prompted Hans von Bülow to state that Franz Strauss was ‘the Joachim of the Waldhorn’.⁵ In his position as first horn at the Munich Opera, Strauss also came into contact with much of Wagner’s music. He played in the Munich premières of *Tristan und Isolde*, *Die Meistersinger von Nürnberg*, *Das Rheingold* and *Die Walküre*. He detested Wagner’s music and Wagner was reputed to have said, ‘This Strauss is a quite unbearable fellow, but when he plays, you can’t be angry with him.’

Franz Strauss’s son, Richard, was also to influence the horn’s evolution in both solo and orchestral contexts. His two concertos, written in 1883 and 1942, are both landmarks of solo writing. These works stand at the beginning and at the end of Strauss’s career and in many ways reflect the difference between nineteenth- and twentieth-century horn playing in terms of technical demands and the fully chromatic use of the valves. The 1883 work has passages that are characteristic of the hand-horn while the second concerto is obviously designed idiomatically, if in a technically demanding manner, for the valve horn.

However, the two concertos share features. Both begin with solo horn fanfares, both present broad majestic themes in the first-movement expositions, both have expansive ‘long line’ melodic slow movements, and both have hunting-style rondo finales. The two concertos are completely idiomatic, though they are difficult to play, and both present the essential, intrinsic character of the instrument despite the fact that fifty-nine years and

a wealth of changes, both to the structure of the instrument and to composition, had intervened. What distinguishes the two works, apart from the obvious differences in harmonic language, is the full chromatic use of three valves found in the second concerto. It is almost as if the ‘personality’ of the horn, in terms of the musical material that could be written for it, was too strong for composers to override. Examples 9a and 9b are taken from the openings of the first and second concerti respectively. It can be clearly seen that the start of the first concerto would be perfectly playable on an E_b hand-horn, whereas the opening of the second would be impossible without valves, while the hunting-horn style is innate to both, despite the vast differences in harmonic language.

Ex. 9 (a) Richard Strauss, Horn Concerto No. 1 (bars 1–5), 1882–3

(a) Richard Strauss, Horn Concerto No. 1 (bars 1–5), 1882–3



(b) Richard Strauss, Horn Concerto No. 2 (bars 1–4), 1942



The most successful styles of writing for the solo horn throughout this period and up to the present day continued to be the two distinct types already discussed. They embody, firstly, the language of the hunting horn, and, secondly, the ‘long line’ melodic solo. Departures from these styles have not met with a great deal of success. Webern is an instructive case in point. While it is true that some of his early works, notably the *Passacaglia*, Op. 1 (1908), are challenging but idiomatic (as Gunther Schuller states),⁶ many of his mature works cause problems for horn players. His later works are characterised by tiny changes of colour within minute structures; there is rarely a need for the sustained sonority that the horn provides so well. It must be noted that it is not the angularity in itself that militates against idiomatic writing (Schoenberg and Berg wrote very successfully in an angular ‘long line’ style), but the fragmentary, disjunct nature of Webern’s music. The character of the instrument is not allowed to come to the fore, and on occasions seems to be unidiomatic. Webern also writes extensively for muted horn. Much is thus demanded of a strong player in the louder

passages in order to match the forward-pointing trumpet and trombone. Furthermore, Webern's dynamic markings have to be read as the dynamic that is to be heard by the audience and not by the player.

The first of the successful styles of writing for the horn throughout this period is, then, the programmatic hunting-horn style. Notable examples can be found in Richard Strauss's symphonic poem *Till Eulenspiegels lustige Streiche*, Op. 28 (1894–5), until, more recently, Britten's *Serenade for Tenor, Horn and Strings* (1943), Peter Maxwell-Davies's *Sea Eagle* (1982) and Simon Bainbridge's Horn Concerto, *Landscape and Memory* (1995). The second main style is the 'long line' solo. This can be found in works ranging from Richard Strauss's *Andante* (1888) through to Reinhold Glière's Concerto (1950) and Francis Poulenc's *Elegy for Horn and Piano* (1957) ('In Memory of Dennis Brain'). The latter example is of particular importance as it combines the melodic and the fanfare style as Schumann and Strauss had done. The melodic lines also cover a range of well over two octaves and contain many seemingly awkward leaps.

Players and composers, national styles and the avant-garde

Many twentieth-century works have extended the demands on the player in terms of stamina, range and techniques. The previously mentioned Britten *Serenade* (1943), written for Dennis Brain, is an obvious example. Brain's sound was very light, pure and focused, and ideally partnered the tenor voice of Peter Pears. The lightness of tone was particularly appropriate in the many high tessitura passages that occur in the work, providing a penetrating sound without the weight of tone that many modern players produce. This work contains the hunting-horn style in 'Hymn' and the 'long line' in 'Dirge'. The solo writing in 'Prologue' and 'Epilogue' is also of interest. Britten instructs the performer to play without any valves, i.e. on the natural harmonics for horn in F. This creates some naturally 'out-of-tune' harmonics, particularly the seventh (B_b) which is flat, and the eleventh (F) which is very sharp, as is the thirteenth (A) (actually a flat fourteenth harmonic (B_b), as is borne out by the recordings made under the direction of the composer). Another occurrence of the use of 'out-of-tune' harmonics is found in Thea Musgrave's Concerto (1971) (written for Barry Tuckwell).

Twentieth-century composers have continued to use the horn in chamber music. While most brass instruments had been used in this context, it could be argued that it is only the horn which is truly used as a chamber instrument. The trumpet, trombone and tuba have tended to be used mainly in *brass* chamber music. This makes the horn distinct from other brass instruments which were otherwise used in chamber contexts for ‘special effects’ rather than being fully integrated into the harmonic and motivic framework of a chamber group. The horn blends well as part of harmonic and mixed timbres and enters into genuine dialogue in a quintet or sextet environment. It is therefore rather strange that few chamber works were written for the valve horn until the twentieth century. That so little quality nineteenth-century chamber music requires a valve horn suggests that the great chamber music written previously for the hand-horn overshadowed the composers of the nineteenth century. Many composers may not sufficiently have understood an instrument that was in a state of flux (in terms of structure and technique) to write extensively for it. The horn has, however, established its full role in chamber music in the twentieth century, in works such as Schoenberg’s Quintet, Op. 26 (1924), Berg’s Chamber Concerto (1925), Dohnányi’s Sextet, Op. 37 (1933), Ligeti’s *Ten Pieces for Wind Quintet* (1951–2) and his *Six Bagatelles* (1953), and Enesco’s little-known last work, Chamber Symphony (1954).

The evolution of horn writing, as with all brass instruments, was very much influenced by the leading players of the age. Whereas a composer writing a piano concerto would almost certainly be a pianist, or have a thorough knowledge of established string and woodwind techniques, the horn’s development, with the newly added valves, was led by the important players of the time. This had, of course, been the same with the Classical horn. The huge disparity between Haydn, Mozart and Beethoven’s writing in terms of difficulty is testament to the ability of the players available to them. This was to continue to be the case with the valve horn. The Lewy brothers and Franz Strauss in Germany were pioneers, as was Meifred in France.

With regard to national style in the twentieth century, in England, Dennis Brain’s move from a French to a German horn ultimately tipped the balance in favour of the German-style instruments. The German style of instrument (the F/B \flat double horn) was to gain supremacy, with notable German players such as Friedrich-Adolf Gumbert, Anton Horner and Max Pottag taking

these instruments and styles to the USA (particularly Pittsburgh and Philadelphia). There was, however, a certain amount of resistance to the double horn even in Germany. Richard Strauss wrote on the use of the B₁ horn: 'it requires practice to change the bright and sharp horn in B₁ into the soft and noble timbre of the horn in F'.⁷ Barry Tuckwell states that 'up to the mid-twentieth century horn styles were distinctive, and it was relatively easy to detect the nationality of a player'.⁸ He talks of the 'light tone' and 'pronounced vibrato' of the French, the 'thick, dark sound with no vibrato' from the Germans, and the 'pure, thinner quality, again without vibrato' produced by the English. As a result of the similarity of most players' instruments, there is far less variety today.

The leading players today generally use double horns, and they continue to fulfil the same role as their predecessors in pushing forward, by their own virtuosity, the boundaries of what composers write. This is illustrated by the fact that several of the works mentioned earlier were written for leading players; Britten's *Serenade* and Hindemith's Concerto were written for Dennis Brain, Maxwell-Davies's *Sea Eagle* was written for Richard Watkins, and Simon Bainbridge's Horn Concerto, *Landscape and Memory*, was written for Michael Thompson and the London Sinfonietta.⁹ Hans Werner Henze has written for Hermann Baumann, Richard Rodney Bennett for Barry Tuckwell, and Messiaen for Daniel Bourgue and Georges Barboteu. The horn has inspired many great works while evolving in a slow and complex manner. The technicality of horn writing has increased and its role within solo, chamber and orchestral contexts has widened, but it has never lost the colour and vibrancy of its past. Its rich heritage, built on historical associations (literary, iconographical and factual), makes it an instrument capable of great extremes: Bruno Jaenicke stated that the horn was 'the wild beast of the orchestra', while Schumann called it the orchestra's 'soul'.¹⁰

Jazz, improvisation and brass¹

Roger T. Dean

In music, improvisation is a process in which a major portion of the resultant performance is not prearranged or anticipated. It is generated by the creator(s) during a performance. The degree to which improvisation is important varies between different musical styles, but in jazz it is virtually always central. The nature and definition of improvisation are complex issues which have been discussed in detail elsewhere.² For the particularly technical purposes of the present book, it is noteworthy that improvisation commonly involves a redrawing of the assumed ground of a musical form, through instrumental technique, just as much as by musical vocabulary or structure. As John Corbett entertainingly puts it:

Old Pat Question: How does an improviser improvise?

New Pat Answer: By developing and employing a repertoire of possibilities in order to risk the unknown.³

Jazz is a music of the twentieth century which originated in the USA from Afro-American traditions. It achieves improvised intensification by rhythmic repetition and cyclic harmonic repetition. Much jazz involves 4/4 metre, with considerable accentuation of the constituent pulses, and a vital concern with syncopation, of a subtle and complex kind. The syncopation is not simply displacing strong beats to their half-point or by whole beats, but also making irregular displacements, often in complex subdivisions of triplets and quintuplets, and accompanied by large, abrupt and transient variations in dynamic and/or emphasis: these are components of the special rhythmic 'swing' inherent in most jazz.⁴

Jazz, and, more broadly, improvisation, accommodate flexibility and variability in every aspect. They do not necessarily respect correctness or elegance, and technical mistakes, in the sense of effects which were not

intended or anticipated, are often positively exploited features. An improvising musician can subsequently in performance rewrite the impact of an unchosen phrase or note much more extensively than can an interpreter of a classical composition. In part because of this, jazz and its musicians have always tended to be marginalised: for example in the negligible income and limited bureaucratic support given to the music, and in its frequent exclusion from the educational system.

Brass instruments are central to jazz; so central that any instrument on which a musician is capable of improvising, be it trumpet or piano, can be referred to in jazz argot as a 'horn'. Instruments which are not thought 'correct' for the classical canon are much more common in jazz: the cornet in early jazz, and the flugelhorn notably with players of the last thirty years, such as Freddie Hubbard and Ken Wheeler.

The main evolution of jazz has occurred in a short period (mainly 1900–70), and in this time it has encompassed change probably as drastic as that within western classical music from 1200 to the present.

Early jazz was primarily a polyphonic sphere, in which trumpet, trombone and other wind instruments interwove swung melodic lines with the support of the rhythm section. Bolden and Armstrong were early pioneers who heightened public awareness of jazz. After the early phases of Dixieland and other polyphonic forms, the big-band movement and then the movement known as 'swing' became commercially successful. The public first became aware of the concept of swing at this stage, and jazz became a world-wide craze.

The swing orchestras of Jimmy Lunceford, Tommy Dorsey and Glenn Miller, and the orchestras of Duke Ellington and Count Basie, which defy such simple classification, were central influences in the 20s to 40s. By the mid 40s, an avant-garde centred on Charlie Parker and Dizzy Gillespie was asserting itself in the radical shift to the small-group style of bebop. Brilliance of speed, articulation and technique were central, and brass, like saxophones and other instruments, took a great stride towards more complex virtuosity. The movement was consolidated in the hard-bop of the 50s, and also in the more individualistic 'cool' movement led by figures such as saxophonist Stan Getz and trumpeter Chet Baker.

It was also in the 50s that Miles Davis, arguably the most influential musician in jazz to this day, and certainly the most influential brass player, emerged. He first recorded with Charlie Parker as an unorthodox bebop

musician; then with Lee Konitz (alto saxophone) as a calmer, more lyrical and introverted 'cool' player. He then formed his chamber jazz 'Birth of the Cool' band, which played sophisticated arrangements, with subtle instrumentation, using horn and tuba, and featured Davis's unique projection as solo improviser. Davis pioneered rhythmic developments subsequent to 50s hard-bop, particularly with his early 60s group. He also pioneered elements of jazz rock and of free playing, and was undoubtedly the single greatest force in the development of all subsequent forms of jazz, other than the freest improvising.

The latter was particularly the province of a group of European improvisers, who paralleled the developments of Afro-American free jazz such as those initiated by Ornette Coleman, John Coltrane and Cecil Taylor from the 60s onwards. Some of their key efforts were to remove the repetitious jazz pulse, replacing it by swing of a less regular kind; and to dismantle the reliance on the cyclic harmonic structures of the 32-bar popular song or the 12-bar blues, which had been the main ground for jazz until then. Hand in hand with this was an increasing awareness of timbre and texture as improvising vehicles in themselves.⁵ Since the 1970s the field of jazz and free improvisation has been one heterogeneous cross-exchanging melting-pot. While the world at large recognises a recent brass musician such as Wynton Marsalis for his brilliance and his respect for traditions, there is no question of his occupying any central position in the evolution of the music: this is dispersed so widely and with such healthy complexity that it is perfectly arguable that many musicians of (much) smaller public repute, such as Leo Smith or Albert Mangelsdorff, are at least as central. Presently, no one is likely to gain the centrality occupied by Miles Davis from 1945 until the 80s.

While Miles Davis allowed musical creativity to lead his work, and resisted developing a virtuosic technique, there was also amongst his competitors the converse tendency: towards demonstrative, aggressive, even flashy playing, with extreme technical brilliance. The latter style, sometimes even reaching the point of crudity, was associated (amongst Davis's competitors) with Freddie Hubbard and his peers. It has been interestingly categorised as 'phallic',⁶ and probably originated with Louis Armstrong, the most demonstrably phallic of the progression of great jazz trumpeters. Reserve, distance and control were hallmarks of Davis's playing. This has correspondingly been called the 'post-phallic' style. As

Gabbard points out, several films of Louis Armstrong make explicit the obvious possible connection between the trumpet, the phallus and male virility. In turn Dizzy Gillespie often made this association verbally, and his crooked bell amplifies the idea. 'Phallic' power can of course be generalised into political, racial and economic power. Gabbard sketches the phallic trumpet components as 'pitch, speed of execution, emotional intensity',⁷ and this is evocative. As always such styles contain elements of their opposites, and continuously deconstruct themselves: so the flugel-horn is much more a post-phallic instrument than the trumpet, and yet it is equally used by Ken Wheeler and the more phallic Hubbard. Later comments on Miles Davis, perhaps the archetypal post-phallic player in his work in the late 50s and early 60s, such as his recordings of 'My Funny Valentine' (discussed below), nevertheless exemplify how disturbed technical and instrumental features can become central to musical meaning. The resistance to correctness is but a minor aspect of a more general commitment to non-conformism, rebellion, transformation, even social revolution, which jazz improvisers have frequently expressed.



Figure 37 Miles Davis (1926–91).

One component of the establishment of musical styles is the choice of opposition to, or development from, conventional instrumental techniques. Different styles may be contiguous, and are often categorised only for convenience and analysis. It is a fascinating question to what extent the

bebop jazz musicians' sense of revolt (or that of the 'free improvisers' since about 1960) is both a revolt against social conditions and one against previous musical conventions. As Lott⁸ has suggested, bebop was in part 'about making disciplined imagination alive and answerable to the social change of its time', and he refers to strikes, riots and social relocation. For him, bebop sought to resolve in matters of 'style, what the militancy combated in the streets'. Similarly Prevost has related free music to the social pressures of the UK and Europe.⁹ In complete contrast to this emphasis on revolt, there also exists a strong association between brass playing, carnival and celebration, dating from the time of the brass marching bands. The infusion of humour, self-deprecatory or otherwise, is also central to players from Louis Armstrong to Lester Bowie. A desire to entertain can both coexist with and help to defuse the tensions of revolt and marginalisation inherent in much jazz creativity.

An overview of brass instruments in jazz

The trumpet and trombone have always been key instruments in jazz. In the polyphonic styles of early jazz they intertwined melodically. The trombone contributed middle harmonies and rhythmic and humorous thrust. This exaggerated, sliding hallmark of early jazz became known as 'tailgate' style. Later, trumpet and trombone formed sections in the big bands, and a development of their timbral and textural roles in ensemble ensued. As bebop and its successors progressed, trumpet and trombone techniques became increasingly fluid and virtuosic, partly to match the ready fluency of bebop saxophonists. In US free jazz and European free improvisation since the 60s, further growth in instrumental technique has taken place. The areas of timbre, internal texture, multiphonics and solo polyphonic playing underwent particular development. Since the 50s, the flugelhorn has had a role of comparable importance to that of the trumpet.

The horn was rare in jazz until used regularly in the orchestra of Claude Thornhill in the 40s. It was then featured in Miles Davis's nonet of the 'Birth of the Cool' period (1948–50), and with Gil Evans's orchestra subsequently. A few impressive soloists have used the instrument.

The tuba was a common feature of marching bands around 1900, providing the regular rhythm section bass line; the sousaphone replaced it on occasion. The tuba retained this role in early jazz, but in both contexts it

soon became largely superseded by the string bass. In parallel with its resurgence in the Dixieland revival of the 40s, the tuba also took on a new ensemble role (as opposed to a rhythmic section role) in the large groups of Claude Thornhill, and most notably the Birth of the Cool band of Miles Davis. Bill Barber was the favoured tuba player for the several arrangers contributing to the Birth of the Cool. Amongst these, Gil Evans continued to feature the tuba for several decades.

(Table 5, pp. 232 ff., lists some of the key brass musicians in jazz and improvisation.)

Instrumental techniques and musical styles in jazz brass

A useful starting-point for categorising instrumental techniques (and the styles in which they are used) is the degree of differentiation they establish from other techniques. The wa-wa technique, for example, creates a trumpet sound separate from that of the unmuted instrument. The resultant timbre can also be used to bind together the otherwise individualistic sounds of a group of trumpet players in a jazz brass section. Bebop musicians such as trumpeter Dizzy Gillespie made themselves less accessible to competition (perhaps from the financially dominant swing musicians), or to unwelcome guest appearances (the familiar jazz process of ‘sitting in’), by radically emancipating some highly personal features of their music: for example, very fast tempi, chord sequences which were familiar but accompanied by reconstructed themes, and unusual, somewhat exaggerated, harmonies, such as the great emphasis on the flattened fifth. These and other features separated them from their fellow musicians, although sometimes also from their audience.

Instrumental techniques can *collectivise* and *individualise*. *Collectivising* techniques merge the instrumental sound of a particular player with that of his/her partners, as in the case of the wa-wa mute. This is equally the case with the avant-garde technique of converting centred sounds into multiphonics. Collectivising instrumental techniques were important in early big-band brass sections, and became so again in the style of free improvisation which has developed since the 60s from the jazz tradition. Sometimes, these collectivising techniques contribute to a marginalisation

of the instrument itself¹⁰ when novel instrumental sounds are generated by deconstructing an instrument (in its simplest form, mouthpiece alone). Developing from this process, several musicians in free improvisation, such as Jim Denley, have made hybrid instruments well suited to group collectivisation – the ‘flax’ being a combination of flute and saxophone.¹¹ (On the other hand, brass instruments such as the firebird and superbone were designed more to individualise than to collectivise, by facilitating certain technical procedures difficult on the parent instruments).

For the jazz brass player, the cultivation of a ‘personal’ sound through the use of *individualising* instrumental techniques is paramount. Miles Davis with or without mute is readily distinguished from Freddie Hubbard or Dizzy Gillespie, and often uniquely identifiable. The modelling of sound on such archetypes, followed by some gentle individualisation, is also readily audible in the work of other trumpeters such as Terence Blanchard and Jon Faddis (see [Table 5](#) for indications of ‘genealogy’). Post-phallic players such as Wheeler and Wynton Marsalis have also individualised, smoothing over the traces of their influences in the process.

Marsalis in particular has responded to a strong classicising influence. His trumpet playing involves far more of the schooled orchestral or concerto sound than is the case with most jazz musicians. One feature of this is his relatively constant tone within individual attacks. Marsalis has also merged this into aspects of his style closely related to pitch structure; for example, his very clearly articulated, classical delivery of staccato octave jumps, not often used by jazz trumpeters. This distinction of jazz and classical stylistic approaches is exploited by the score of a work of mine featuring both Ken Wheeler and John Wallace, and well represented on the recording.¹²

The next section discusses a limited selection of brass techniques and styles prevalent in jazz and improvisation, from the perspective of their individualising or collectivising roles. For a broad selection of transcriptions of brass performers in jazz, see a series of publications by the trombonist David Baker, listed, with other examples, in *The Grove Dictionary of Jazz*. Many transcriptions of solos by Miles Davis are available.¹³ In addition, transcriptions, recorded demonstrations and discussions of adventurous and/or recent players are readily available.¹⁴

A synopsis of individualising and collectivising techniques and styles in jazz and improvised brass playing

The axis between individualising and collectivising techniques is one basis for the analysis of technique in general. But it is important to bear in mind that any technique can be used in an extreme way, which may deconstruct it and reverse its position on the axis. Equally, if two or more players from a larger group use a particular technique in a prominent way, they may thereby distinguish themselves from the others, and become collectivised in the process. An important point is that these techniques can profitably be used to control a musician's position in relation to others. This can then significantly affect their impact on musical form and style.

To summarise the development of instrumental use, in early jazz, brass players worked individually, rather than with others playing the same instrument. Brass sections developed in big bands, so that by the late 1920s the orchestras of Fletcher Henderson and Duke Ellington usually contained two trumpets and one trombone. This brass section expanded in the 30s, and by the 40s Stan Kenton was often using five trumpets and four trombones. They had both melodic and harmonic roles in the written arrangements, and might also provide solo improvisers. In the smaller group music of bebop and after, it was usual for the instruments to be used singly once more. The tuba and french horn were rarities in any jazz context, but notable in the orchestrations of Gil Evans. An important consequence of the juxtaposition of brass players with saxophones and with rhythm sections, as opposed to their juxtaposition with other members of a classical orchestra, is the pressure to develop techniques which parallel those of the other instruments. In free jazz and free improvisation it is rare to have large groups or brass sections, though, since the 70s, ensembles like the Jazz Composers' Orchestra, the London Jazz Composers' Orchestra or the Globe Unity Orchestra have occasionally done so. Through influences such as these, brass players became more virtuosic and fluent, could achieve rhythmic, harmonic and melodic functions, and emancipated the idiom of their instruments along quite different paths to those pursued by classical musicians. The component techniques of individualising and

collectivising evolve through the changing contexts with which jazz musicians have to deal. A simplified summary follows.

Individualising brass instrumental techniques include:

Vibrato.

Restriction of lip vibration, to produce an 'airy' tone-colour, with an increased noise component.

Pitch bend. Bend can be produced by embouchure manipulation alone, or with the aid of half-valving.

Smear. The smear is a brash bend up or down, usually of a semitone to one tone, specific to jazz, and heard in trumpeters from Louis Armstrong onwards.

Other timbral distortions include the growl and other vocal imitations.

Muting. From Louis Armstrong, through Miles Davis, to the present, mutes have been central in jazz performance, and their use is heavily improvised within small-group settings, though it is usually more rigid in big bands. Markus Stockhausen, active today in improvisation on the close edges of jazz, as well as in his father's compositions, performs wearing a belt which carries a large number of mutes, used in rapid succession. The most prominent individualising use of muting is of course in the work of Miles Davis since the mid 50s. Davis commonly used a Harmon mute, which has a retractable central tube known as the stem, which he often removed completely. The stemless Harmon produced his most characteristic sound, distant and intense, often requiring amplification.

While muting is an individualising force in small-group performance, in big bands it can be used for collectivisation. Thus a swing-band trumpet section might all theatrically pick up, wave, and insert a particular type of mute, thereby merging their sounds as well as their impact.

Most techniques can be moulded into a personal, individualising version; yet some are most commonly used for collectivising purposes.

Collectivising techniques include:

Glissandi – the rip, the doit and the fall (or drop). Some of these were first used extensively in big-band formations in the 30s, and achieved the effect of making the brass section more homogeneous by subordinating the individualising components of the players' sounds. The rip is a loud gliss

rising to the start of a note, found frequently in Louis Armstrong's work. The *doit* is rather a gliss rising at the note-end, and a drop is its reciprocal.

Multiphonics. Players such as the trumpeter Leo Smith, and the trombonists Vinko Globokar, Roswell Rudd, Paul Rutherford and, most notably, Albert Mangelsdorff have developed multiphonic sounds which, together with circular breathing, permit the brass player to be part of a continuously evolving texture. By texture, I mean a complex of sound in which individual events are subordinated to a sense of continuity. While changes occur, they are not perceived as separate, in the way that classical 'notes' normally are. Nor are they necessarily part of a controlled repetitive pitch structure, such as a pitch motif. It is interesting that such a process is also present in certain non-western musics. As with glissandi, the ease with which the technique can effect a collectivising result is related to the complexity of sound produced: in some respects at least, the more complex a sound, the more it must have in common with other sounds which are normally individualised and readily separable. Multiphonics form a central part of the vocabulary of Mangelsdorff. A variety of techniques are used to generate multiphonics on brass, including playing one pitch while singing another, abnormal lip pressure or embouchure, and, as Bevan puts it, 'blowing between the harmonics'.

[Table 5](#) at the end of this chapter provides further information about specific performers and their application of many of these individualising and collectivising techniques.

Miles Davis's performances of 'My Funny Valentine'

Technique underpins music, and it is at the musical level that Miles Davis's influence is most keenly felt. Davis is central to most developments in jazz since 1945, and even more so to jazz brass. His influence is critical at a technical level, in showing that virtuosity is only one way towards expressiveness. This influence is equally critical in relation to musical structures in jazz, and in the movements away from hard-bop towards rock on the one hand, and towards free improvisation on the other. Though not a pioneer of free improvisation, Davis influenced John Coltrane, a long-time collaborator, and the eventual spearhead of the movement towards free jazz.

The innovations of Davis's group in the 60s have received more detailed scrutiny than most aspects of jazz. They have been used to exemplify the concept that jazz and improvising musicians may develop their expression with materials quite other than harmony, tonality or rhythmic structure. The musician may be 'out of notes',¹⁵ and yet still signify. To signify 'out of notes' (outside the pitches of the piano) is a desirable political freedom, and some analysts of jazz¹⁶ have termed this 'signifyin', in the wake of H. L. Gates's use of the term in Afro-American literary contexts.¹⁷

To take one specific musical example, several authors have transcribed some of the commercial recordings of Davis playing 'My Funny Valentine'. They have all commented on the inability of classical notation to encompass the sound which goes on 'outside' the notes (or, for that matter, 'inside' them). They focus on the minute pitch fluctuations, the periodic enhancement of certain overtones within a pitch, the 'cracking' of notes, by design or otherwise, and the whole range of individualising techniques which can be applied to a sustained sound. The contribution of Walser¹⁸ is particularly valuable in this respect, since it announces the importance of the slippage between Miles Davis's notes and his meaning, and the possible utility of 'errors', in the form of imperfections as viewed in the context of conventional instrumental techniques. Walser points to this slippage as a probable source of meaning. He contrasts 'signification', as logical and fixed, and 'signifying as working through gesture, reference and suggesting multiple meanings; and he indicates that multiple sounds within, or generated from, what would otherwise be a 'single' sound, including errors, cracked notes etc., are pertinent to signifyin'. Walser goes on to argue that Davis primarily uses signifyin' rather than signification. The distinctions he makes are reminiscent of those made between modernism and post-modernism.¹⁹ Clearly, the two categories are distant members of a relativistic continuum, which may also extend beyond each of them. Furthermore, one might hesitate to view any signification as fixed or single. The analyses of signifyin' are as yet inevitably subjective, requiring almost impossible psychosocial investigation for further substantiation. There should be no suggestion that signifyin' is unique to Afro-American culture, or to jazz. However, these factors do not undermine the potential importance or usefulness of this approach to understanding.

In earlier studies, without using the terminology of signifyin'/signification, I have emphasised the expressive potential of the

multilayered rhythmic complexities introduced by the classic Davis group of the 60s to their standard repertoire (for example 'All Blues').²⁰ I have also pointed to the force of some particular technical errors in Davis's work.²¹ A comparison of the performances of 'My Funny Valentine' previously discussed and transcribed²² with those more recently released²³ brings to the foreground the quintessential Miles Davis qualities which had a profound influence on jazz playing styles, and reveals the dual importance of signifyin' and signification.

The key features identified by Walser can be listed as follows: (1) choosing to play only a few snatches of the original melody before signifyin' on the remainder; (2) selective use of vibrato, only on sounds of particular focus; (3) lipped pitch slides, which have an inherent substantial risk of failure – that is, cracking; (4) half-valving, to produce more complex and varied timbres than normal; (5) long silences, while the rhythm section continues, if sparsely; (6) cracked notes, some seemingly initiated by mistake (i.e. not preconceived), others perhaps by design; (7) false fingerings, to produce microtonal variants, something shared with Davis's colleague, John Coltrane; (8) superimposed pulses, in this case at double the speed with unchanged bar length;²⁴ (9) calculated dissonances, and timbral devices which, in pitch terms, are uncentred.

Amongst these, (8) may be thought more a structural device of signification, and this raises the question of the relative importance of signifyin' and signification. Are the signifyin' devices recurrent in Davis's performances of this piece? And are those of signification recurrent too?

On the performance of 'My Funny Valentine' from 22 December 1965,²⁵ Davis again immediately diverges from the original melody, and incorporates long silences into his solo line. The same A \flat /G pitch-bend up and down as on the 1964 performance is heavily featured in the opening choruses. Other microtonal variants and timbre fluctuations remain. The double-tempo section is very prolonged, but this time the entry and reversible exits/entries during the rhythm section solos are more gradual and subtle, rather than being cued by an accentuated gesture, like a shout, as in the Philharmonic version. There is much more emphasis on triplet subdivisions of the double-tempo pulse, and also considerable use of a triple-time pulse. The harmonic complexity of Herbie Hancock's keyboard playing is as central to the 22 December 1965 performance as to the 1964 performance. The very opening Hancock harmonies, in which Cmin7

chords are built up by added A and F \sharp , are typical. The bass lines also pick out and emphasise harmonic deviancy more extensively than the 1964 recording. This performance, at least in the parts in which Davis plays, does not seem so intense as the earlier recording, though the rhythm section and the solos of the saxophonist, Wayne Shorter, are very strong.

In the second performance of 'My Funny Valentine' from the 'Plugged Nickel', 23 December 1965,²⁶ Davis's performance is much more continuous, a little more virtuosic with some very effective long glissandi, and less 'mistake'-laden. Nevertheless the phenomenon of 'out of notes' signifyin' remains. As on 22 December, harmonic adventure, and particularly rhythmic superimposition, are even more apparent than on the 1964 recording. The sliding in and out of double and triple tempo are much more cases of multilayering, where each level of pulse remains stated or implied; particularly clear are the triple-time passages in which drums often play triple-time swing, with short note subdivisions of some pulses, and sometimes with every second pulse accentuated, across the groups of three.²⁷

Thus signifyin' inside and out of the individual notes remains a feature of these performances. Signifyin' is a valuable concept in understanding Davis's work, but it is enveloped together with signification in a 'web' which includes many layers.

Improvising brass and electronics

Since the 1960s, another important approach to expanding the resources of sonority and musical structure in improvisation has involved the use of electronics. Brass instruments have been archetypes in the field of computer synthesis of instrumental sound.²⁸ Equally, electronics have been important in brass playing in jazz – for example, in the work of Don Ellis from the 60s until his death. He concentrated with his orchestra on the rhythmically intense application of asymmetric metres. At the same time he used a variety of sequencing and analogue delay techniques, and sequencing, to elaborate his own trumpet sound. A delay line (often a foot-pedal) makes a transient recording of a short segment of sound, and then replays after a delay, with the number of repeats depending on the degree of intensity change per repeat. One can even use an intensity *increase*, so that the sound eventually breaks up into overloaded noise, and the whole range of

approaches between these extremes has been used by brass players such as Davis, Ellis, Jon Hassell and Mark Isham.

Brass–electronic interaction at its most fundamental occurs when the player supplies musical material to a computer program which then generates its own modified material, exporting it in turn to a range of sound-generating devices. This approach has been developed with intensity, seriousness and humour by trombonist George Lewis.²⁹ He has also articulated³⁰ his perception of the importance of musical parsing by the computer, prior to export of resultant material. Parsing involves providing the computer with musical criteria by which to extract salient features of the musical input. Similarly, the programmer has to provide a defined set of responses which the computer can make once the salient features have been codified.

One of the inherent difficulties of this process is to make the computer as unpredictable as the human improviser. Random functions can be built into all stages so that the responses to certain salient input may be either invariable or dependent on chance or other factors. The greater the dependence on salience, the more the performer is aided by recognition to exert precise control. For the present author, who has also developed extensive interactive improvising programs, using the platform MAX,³¹ a key attraction is to make the ‘parsing’ parameters time-variant, as well as the response unpredictable. There is also a reciprocal approach in which the computer program acquires all input information non-selectively, and integrates it continuously to generate output modelled on it: for example, computer ‘neural nets’ can be made moderately effective in generating jazz styles such as bebop melodic lines.³² These approaches have the potential to expand improvisatory possibilities infinitely; and this applies as much to brass as to any other instruments.

Brass, improvisation and musical style

To what degree do the techniques discussed above translate into musical style? At the most basic level, techniques like the trombone ‘tailgate’ are simple, low-level components of musical style, while the phallic styles are complex and higher-level. In some sense the lowest-level components

aggregate to form the higher: but with what else do they interact? We can only scratch the exposed tip of these issues here.

The phallic style of overflowing demonstrativeness probably originated with the 'hot' Afro-American trumpet players, such as Louis Armstrong, Fats Navarro and Dizzy Gillespie. 'Hot' is a term descriptive of highly charged jazz, full of energy and dynamism, peppered with high notes, and with rapid and fluid exchanges of ideas between performers. The post-phallic style is now typical of both Afro-American and white musicians; but it may have originated in the work of Bix Beiderbecke. The conflation of phallic with Afro-American is inaccurate, but it may well be a pertinent feature, since the Afro-American approach to jazz has often actively associated *itself* with the assertive, the revolutionary and the emotive. The frequently promoted image of the 'call', the sound of Navarro on 52nd Street in the 40s and 50s, or Freddie Hubbard at the Town Hall in the 60s, exciting overt vocal and physical response from the committed audience, has a degree of reality. Similarly, the introversion of Chet Baker reverberates for the Californian white hippie, or the post-Kerouac poet. Baker lost his teeth in an accident, and had to develop a completely new embouchure and technique, involving a softer articulation, and achieving an extreme of post-phallic reserve and lyricism as a result. But the association of the white Beat Poets, including Kerouac, with the more phallic Afro-American bebop idiom shows how these ideas necessarily contain their own denials.

More recently one aspect of the phallic approach has been confluent with the emphasis on the liberation of the body, and on the body as liberation. The German free trombonist Gunter Christmann has said: 'Above all my consideration about free improvisation was developed from the position of this instrument = player'.³³ Don Cherry has put this interestingly and more technically:

The conch is one of the natural instruments using the embouchure. The embouchure is the real instrument within itself. You get different textures of it with horns like the elephant tusk trumpets they use in Africa. That sound is something special to me. What I'm really into is just the horn itself ... Once you start using the valves, you realise they're auxiliary fingering, and trumpet players are usually playing up and down and down and up, but there's a way that the trumpet can be brought out in intervals, like you have in bugle calls. I'm very much interested in all that... I realise that most of all the trumpet is an amplifier of the voice. That's the way I want to approach it.³⁴

Yet while the male body may have been liberated in jazz brass, the female has been actively excluded, largely as a result of gender stereotyping. Surveys of these issues have been published.³⁵ Gabbard focuses on the trumpet³⁶ and provides a list of female players, but it is quite clear that few jazz brass players who achieve recognition are female; in the informative articles on jazz brass instruments in *The New Grove Dictionary of Jazz*, no female brass musicians are listed. Recognition has been achieved by a few female brass players: trombonist and arranger Melba Liston and British trombonist Annie Whitehead stand out, but female brass players do so far less frequently than do female pianists, guitarists and even saxophonists. The situation in freer improvisation is hardly any better, though there are signs of increasing female participation in the 1990s.

In conclusion, an overall theme of this *Companion* is that brass instrumental techniques are critical for the formation of musical styles, these being the higher-level structures which establish the range and framework for musical expression. This chapter has shown that the minute instrumental sounds ‘out of the notes’ can be central to expression, especially in a music such as jazz with relatively simple higher-level structures like those of the popular song: repeating chord sequences; repetitive metres and rhythms; and development by intensification. Yet at the same time, or at least in a longer time-scale, these instrumental techniques become fused with the higher-level vocabulary and structure, especially in more freely improvised music. The phallic jazz trumpet influences the post-phallic free improviser, such as Leo Smith. He in turn may focus as much on the marginalisation of his instrument as on the overall structure of his music. The relationships between technique and structure relocate, recycle and reciprocate; yet jazz innovators are probably always considered somewhat dangerous (‘outside’, in revolt), often particularly in the earliest phase of their career. Computers offer a means for systematising the exchange between technique and structure, and yet at the same time increasing its unpredictability and speed of development. If brass musicians respond to and interact with these possibilities, they can create a new era for their music. If not, they risk being subordinated totally by the electronic.

Table 5. Brass players in jazz and improvisation

Trumpet/buglehorn/cornet		
Buddy Bolden	1877–1931	New Orleans pioneer of the cornet, and of jazz. Apparently improvising little, but played with force and rhythmic drive, though no recordings are known. Represented in the novel <i>Coming through Rapture</i> (1976) by M. Ondaatje.
King Oliver	1885–1938	Cornet player. Took the symmetrical New Orleans driving style to Chicago (1918), and was joined by Armstrong. Focus of his signification was often <i>wa-wa</i> or other timbral modifications. Earlier players had used the hand in the bell to achieve this; Oliver did not need to do it and was adept with plunger and Harmon.
Louis Armstrong	1901–91	Originally a cornet player, he first recorded on trumpet in 1926. Extended the harmonic and melodic range of the music. Highly individualised timbres, such as terminal vibrato sometimes concluding in a shake. ²
Big Sidie Beckie	1903–31	Cornet player. Used unconventional fingerings, exploiting higher harmonies, and a calm, lyrical style, anticipating the post-phallic and 'cool'. Also impressionistic pianist. Became a commercial stereotype in D. Baker's novel <i>King Men with a Horn</i> (1958).
Bobster Miller	1903–32	Trumpeter, featured heavily in the Duke Ellington Orchestras of the 20s. Used a plunger mute in combination with a straight mute to create a <i>wa-wa</i> . Also exploited growl, and passed it to many subsequent players.
Key E. Dridge	1911–49	Armstrong and Red Allen were the key brass influences on Dridge, an important trumpeter in the latter swing era. Also responded to the impact of the saxophone by harmonic extension, increased facility, fast tempo, slight overblowing with occasional cracks. A formative influence on Gillespie, through competitive sessions.
Clayton Gillette	1917–93	Pioneer jazz player in the bebop. Used trumpet with bell pointing 45° upwards. Often very free harmonic improvisation; little other than transient use of minor seconds, traves and cup. Harmonic notes mostly suitable for amplification.
<i>Some Gillespie followers</i>		
Clark Terry	1920–	Played in big bands such as those of Basie and Ellington. Developed an unusual, mumbling, singing style, and evinced great humour. Often dialogued with himself, playing differently muted trumpets, held in either hand, and after the other, in quick succession; later made frequent use of foghorn.
Fats Navarro	1923–50	Gillespie's peer and competitor in small-group bebop trumpet.
Maynard Ferguson	1924–	Brilliant in high register. Developed a combination valve and slide trumpet (the 'fueborf') and the analogous superbore (a combination valve and slide trombone). ³ The ultimate hyperphallic trumpeter? ⁴
Clifford Brown	1929–56	Wide-ranging trumpet; broad tone. Influenced by Gillespie and Navarro in turn, influenced Morgan and Hubbard, and other hard-bop players. One of the few brass players canonised by minute technical analysis. ⁵
Boston Little	1929–81	Discman; playing collaboration with Eric Dolphy.
Jon Faddis	1925–	The current heir to Gillespie's bebop and hard-bop phallic playing.
Miles Davis	1926–91	Trumpeter and composer the most innovative and influential jazz musician in many idioms from bebop onwards. Pioneered modal improvising in jazz, and later, jazz rock. As a virtuoso like Gillespie, more a melodic improviser, and exponent of signification of the notes. Developed his rhythmic sections to rare subtleties.
<i>Some Miles Davis followers</i>		
Art Farmer	1928–	Post-phallic, introverted.
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Chris Baker	1929–88	Early polyphonic improviser of modern jazz, in Gerry Mulligan's pianoless quartets. Lost his teeth; subsequently developed a new playing technique; stan brought his singing to greater prominence. A white archetype of the post-phallic style.
Kenny Wheeler	1930–	Post-phallic player, active in and crucial to European developments. Involved in the mainstream of jazz, and in free improvising.
Woody Shaw	1944–89	A lyrical yet often phallic player.
Ian Carr	1932–	Leading figure in British jazz, developing jazz rock in the 70s with Nucleus, and making many compositional contributions, as well as publishing a valuable book on Davis.
Don Ellis	1931–78	Often used a four-valve, quarter-tone trumpet, brilliantly exploiting the microtonal possibilities of the instrument. Used a ring modulator on several recordings. Later he played Ferguson's superbore, a combination of valve and slide trombone.
Harry Beckett	1935–	Trumpet/flugel player from Barbados. Very wide timbral range, primarily used within conventional modern jazz, but branching occasionally into free playing.
Ted Curson	1935–	Both introverted, post-phallic, and more conventionally brassy player.
Lee Morgan	1938–72	Played with Gillespie's orchestra, and with Art Blakey; also influenced by Brown. Virtuoso player; many half-valve effects.
Fredde Hubbard	1930–	The most brilliant hard-bop trumpeter: a highly phallic player, for example in his persistent 'shakes', repeated alternations of pairs of pitches (often a tone apart). Also collaborated in some pioneering early 60s free jazz with Coleman and Coltrane.
Henry Lewther	1941–	Trumpet/flugel and violin player from UK. Highly diverse musician, working in the Dankworth and Collier bands, with his own group, and in jazz rock as well as free playing.
Guy Barker	1957–	British trumpeter with brassy and romantic approaches, yet highly disciplined.
Wynton Marsalis	1961–	Both a jazz and classical performer; unusual in revealing his classical influences sacrilegiously within his jazz work. A key post-phallic player, self-consciously moulding the social image as well as the idiom of his music.
Terence Blanchard	1962–	A post-phallic player. The trumpet player for Spike Lee's film <i>Mojave Blues</i> .
Gerard Presencer	1972–	Brilliant trumpeter who has worked with pop groups from Tina Turner to the Pet Shop Boys, yet is also forceful and individual in funk (e.g. with DGC) and in more wide-ranging contexts (e.g. with Stan Tracey).
<hr/>		
Free jazz and free improvisation trumpet pioneers		
Bill Dixon	1925–	Part of the free jazz movement of the early 1960s and after, notably in collaboration with Shipp and Tchicai. Also composer of extended structures. Exploited microtoning, large vibrato and timbral distortion.
Don Cherry	1936–83	Exponent of the pocket trumpet. Key collaborator of Ornette Coleman.
Bush Morris	1940–	Often plays self-portraying sounds into/with the bell of his instrument. Pioneered 'conduction', in which he conducts improvisers, using visual cues and a training period.
Lester Bowie	1941–	A highly individual and chaotic player, using a very wide range of timbral modifications, including half-valving. Founded the avant-garde musico-political group the Association for the Advancement of Creative Musicians, and the music-theatrical group the Art Ensemble of Chicago. Often performs wearing a white doctor's coat.
Lee Smith	1941–	Lyrical free improviser, closely concerned with timbral manipulation.
Tomasz Stanko	1942–	Polish trumpeter and composer. Energetic yet idiosyncratic player, particularly in freer contexts. Has a narrative approach unlike that of most American jazz.

French horn		
Julius Watkins	1921–77	Pioneer of bop horn playing.
John Graas	1924–62	After Claude Thornhill's orchestra, played with Kenton, and in small groups on the West Coast.
Willie Ruff	1931–	Duo recordings with Duke Mitchell; often featured bop soloist.
Trombone		
Kic Ory	1890–1973	Started in New Orleans, and, after a period in California, joined Louis Armstrong in Chicago. Foregrounded the sliding and vibrato effects that constitute 'tailgate'. Highly rhythmic players used a range of mutes, particularly the straight mute.
Miff Mole	1898–1961	Perhaps the first jazz trombonist virtuoso. Eschewed the tailgate approach; favoured precise attack and large pitch jumps.
Ticky Sam Nanton	1901–46	Pioneered growling and plunger techniques with Ellington from the late 1920s onwards; a key component of the 'jungle' style, yet using limited range and density.
Jack Teagarden	1905–44	Probably one of the earliest white musicians to master the blues, often rhythmically and melodically side-stepping the pulse. An early exponent of instrumental deconstruction, recording one solo without the bell of his trombone. Sometimes used a glow in place of the bell, creating a novel muted effect.
J.J. Johnson	1924–	The key bebop player, developing a fast technique (sometimes confused with valve trombone facility) in response to the competitive pressures of the bebop saxophonists, and of Dizzy Gillespie. Initially he used much repetition in his work.
<i>Johnson followers</i>		
Kai Winding	1922–83	Danish musician. One of the first bop trombonists. Made many recordings with Johnson, and had comparable proficiency.
Bob Brookmeyer	1929–	The key proponent of valve trombone in the 50s, associated with the West Coast scene and cool jazz. Replaced Elton Baker in the piano-less Gerry Mulligan Quartet, and developed polyphonic improvising abilities.
Grachan Moncur	1937–	Trombonist and actor. Important contributor to some of the few experimental albums on the Blue Note label.
Eke Thelin	1938–	One of the first European improvising trombonists to develop away from conventional jazz idioms. Early experimenter with electronic pickups and analogue amplification/modification.
Bill Watrous	1939–	An exceptional virtuoso of the instrument, performing in conventional idioms, in large and small groups.
Annie Whitehead	1955–	Leading British improviser often in jazz-rock or world music contexts.
Trombonists developing free jazz and free improvisation		
Albert Mangeldorff	1928–	Perhaps the most brilliant technician amongst the free improvising trombonists. Adopted both serial multiphonics and microtones ¹ or dissonance ones, both sung and pitched. Often appears solo.
Vinko Globokar	1934–	An improviser and composer; also a favoured interpreter of compositions by Cage and others which involve little improvisation, but use extended techniques, such as multiphonics and circular breathing. His compositions for improvisers exploit a complex orchestral approach to the improvised work.
Russell Rudd	1935–	Responsive to what he terms the 'aboriginal' music of the world, and recognises and exploits its affinities with jazz through vocalisation, singing and multiphonics.
Paul Rutherford	1940–	Also plays euphonium. Free player with individualistic timbres and textures, some based on speaking into the instrument, others on rapidly reorientating it to create spacial effects.
Gunter Christmann	1942–	Uses found objects; also double bass player.
Connie Bufer	1943–	Responded to Mangeldorff's technical lead, with a free improvising style often laden with marching, militaristic overtones.
George Lewis	1953–	Free improviser; pioneer of computer interactive improvisation.
Tuba		
Bill Barber	1920–	Tuba player in Davis's Birth of the Cool band.
Don Butterfield	1931–	Developed a remarkable agility. Featured soloing with Rollins, Adderley and notably Mingus (1950s and 60s).
Howard Johnson	1941–	Performed and recorded frequently with Archie Shepp, a radical 60s innovator. Also featured with Gil Evans's orchestra.
Bob Stewart	1943–	Later tuba player with Evans and others. Provides complex and fluid rhythmic lines or high-range harmony and timbral texture.
Melvin Poore	1950–	A pioneer of improvised tuba and electronics; developer of individualistic timbres with and without electronics or deconstruction of the instrument.

Notes

For reasons of space, the table is a very restricted selection. It is also inevitably a personal selection, particularly in relation to the post-bebop era. It is intended to give at least some historical leads for those unfamiliar with this aspect of brass playing, and so focuses on major figures (given chronologically by date of birth), and, in the case of the (more numerous) trumpeters and trombonists, seeks arbitrarily to join their peers under their umbrella, when possible. This should not be taken to devalue those listed in this way. Biographical information about the musicians listed in the table, together with brief musical comments, is in most cases to be found in Carr, Palmerweather and Priestley, *Jazz: The Essential Companion* and Kernfeld (ed.), *The New Grove Dictionary of Jazz*. Jazz and improvising brass players discussed (at the stylistic and analytic levels) elsewhere in my own work (see mainly *New Structures in Jazz and Deconstructed Music Since 1960*) include: the trumpet/flugel players Harry Becken, Terence Blanchard, Don Cherry, Miles Davis, Bill Dixon, Kenny Durham, Don Ellis, Dizzy Gillespie, Freddie Hubbard, Lee Morgan, Manfred Schoof, Mike Snow and Ken Wheeler; and the trombonists Stan Dempster, Jim Fenson, Vinko Globokar, Albert Mangeldorff, Grachan Moncur, Russell Rudd, Paul Rutherford and Brian Thornton. Valuable technical and stylistic information about the following is available in the alternative sources specified here: Globokar – D. Mc Cammings and D. K. McFarlane (eds.), *International Who's Who in Music*, 22nd edition (Cambridge: 1990); Cherry, Dixon, Hubbard, Booker Little, Grachan Moncur, Russell Rudd and Leo Smith – *Jazz, Free Jazz*. Other important sources are: for jazz until 1960, and excluding free jazz or free improvisation, Berlin, *Thinking in Jazz: The Infinite Art of Improvisation* for free improvisation specifically Prevett, *No Sound is Reason*, and Bailey, *Improvisation: Its Nature and Practice in Music*. Information about available recordings of the musicians mentioned is given in these books and in specialist discographies. Discussion of the difficulty of understanding any music solely or even largely on the basis of recordings is to be found in *New Structures*, and more particularly in J. Rawls, 'The Media of Memory: The Seductive Nonsense of Records in Jazz History', in Gabbard (ed.), *Jazz among the Discourses*.

¹ G. Schuller, *Early Jazz* (New York, 1968).

² *Ibid.*

³ J. B. Elsworth, 'Jazz in Crisis, 1910–50', in R. Gabbard (ed.), *Jazz among the Discourses* (Durham, N.H., 1995), pp. 99–125.

⁴ M. L. Stewart, 'Some Characteristics of Clifford Brown's Improvisational Style', *Jazzforschung* 11 (1979), 135–64.

Brass solo and chamber music from 1800

John Wallace

In the early years of the nineteenth century, the horn concertos of Mozart were recently composed, and the trumpet concertos by Haydn (1796) and Hummel (1803) suggested the birth of an era in which soloistic writing for brass instruments might provide an important means of musical expression. In fact, these propitious signals proved to be false, at least as far as the art music canon is concerned. The fact that few major composers from the nineteenth century wrote solo works for brass is surprising, given the new facility that technology brought to brass instruments.

The chief role of the trumpet, trombone and tuba in art music remained orchestral until the later twentieth century. Earlier solo and chamber music inspire curiosity and affection in the brass enthusiast, but such pieces were sporadic phenomena, arising largely through the efforts of exceptional individuals active in the orbit of some major cultural centres. A convergence of military, conservatoire and manufacturing connections were preconditions for the solo and chamber music to flourish, as indeed they did, though intermittently, in Paris, London, Vienna, Prague, Leipzig, Stockholm and St Petersburg.

The trumpet enjoyed a brief flourish of solo activity in Vienna, around the beginning of the nineteenth century, centred on the exceptional Anton Weidinger (1766–1852). Weidinger was a solo performer, inventor and entrepreneur. In 1800, he premièred the work which Joseph Haydn had been inspired to write specifically for him and his *Inventions-Trompète* in 1796, the Trumpet Concerto in E \flat (Hoboken VIIe:1). The delay between composition and performance points to the innovatory technical and conceptual difficulties of this work. Weidinger had perfected his experimental keyed trumpet over many years in order to overcome the limitations of the natural trumpet, which was imprisoned by its narrow

modulating possibilities. Weidinger's keyed trumpet could participate in widely modulating and startlingly chromatic passages such as bars 19 to 26 of the second movement of Haydn's concerto, which leaves the home key of A_b , and ends in the remote key of C_b major (Ex. 10).

This is as far removed from the favourite Baroque trumpet key of D major as it is possible to be, and perhaps Haydn was consciously demonstrating the emancipation of the instrument. Certainly, it was so outlandish that even Haydn made an uncharacteristic mistake transposing the trumpet part, writing in bars 25 and 26 an $F\sharp$, instead of an $F\sharp$.¹ Middle- and low-register stepwise movement, an impossibility on the natural trumpet, is commonplace throughout the concerto.

Ex. 10 Joseph Haydn, Trumpet Concerto in E_b , 2nd movement (bars 19–26), 1796

(Andante)

Woodwind

Tpt solo (in E \flat)

Vln

Vla

Vlc., Cb.

23

24

25

26

oboes 1, 2

flute

ob. 1

flute

* The trumpet part should be:

Johann Nepomuk Hummel's Trumpet Concerto in E (1803–4), most often played nowadays in simplified editions transposed down to E \flat , further extended the instrument's florid chromatic technique. Other pieces (see [Chapter 7](#)) had less adventurous solo trumpet parts, like Joseph Weigl's Concerto in E \flat (1799) for cor anglais, flauto d'amore, keyed trumpet, viola d'amore, cembalo, cello, euphon² and an echo group of instruments. The participation by the keyed trumpet in such exotic instrumentations as this by Weigl (1766–1846) indicates that it was part of a more general quest for novelty which was to characterise the new century. The keyed trumpet's pre-eminence proved to be shortlived. By the time he wrote his *Military Septet* (1829), Hummel had reverted to conventional natural trumpet

fanfare-writing. The last significant pieces written for Weidinger, from Sigismund Neukomm's *Requiem* (1815), were early examples of nineteenth-century brass ensemble music.

The concertos which Haydn and Hummel wrote for Weidinger made no lasting impact on concert life in the nineteenth century. They became part of regularly performed repertory only in the second half of the twentieth century, their eventual popularity fostered by many fine recordings. In their own time they were part of a passing fashion. Surprisingly, given their quality, they were not adopted by players of the valved trumpets which were in ever-increasing use after the patenting of the valve in 1818. Also, despite the fact that Vienna was to become an important centre of valved brass manufacture, there is only sporadic evidence of new composition for brass instruments, like Franz Lachner's brief Schubertian *Andante in A* (1833) written for the brass section – two valve trumpets, four valve horns, three trombones – of the Künstlerverein, a forerunner of the Vienna Philharmonic Orchestra.

One reason for this truncated growth of art music for brass instruments was the fact that the Conservatoire founded by the Gesellschaft der Musikfreunde in 1817 initially taught only singing. However, the newly emerging Conservatoire system provided a new focus of interest for solo brass in Prague (founded 1811) and in Paris (founded 1795). Brass instruments needed to be taught, and the fact that they were undergoing a revolution in design presented a challenge. New teaching materials in the form of exercises, studies and pieces exploring the new potential of brass were written, providing another source of solo music. The Prague Conservatoire was one of the early leaders in this field, under its director, Bedřich Diviš Weber (1766–1842). Weber composed one of the first works for valve trumpet and orchestra, *Variations in F*,³ and encouraged teachers and students to write works for performance on valve trumpet and valve trombone. Josef Kail (1795–1871), who studied horn in Prague, became the first professor of valve trumpet and trombone. He composed another set of *Variations in F* (1827), the first surviving piece for trumpet with piano accompaniment. Other pieces from the Prague Conservatoire Library include Conradin Kreutzer's *Variations on God Save the King* for two trumpets or horns and orchestra (1826); the same composer's *Variations concertantes* (1823), originally for bassoon and horn, later in a version for valve trumpet, valve trombone and piano; his *Variations in G for Chromatic*

Trumpet and Orchestra, first performed in Prague in 1837; and Kalliwoda's *Potpourri for Two Valve Trumpets and Orchestra* (1832).⁴



Figure 38 Thomas Harper Jr, Professor of Trumpet at the Royal Academy of Music from some time prior to 1880 until 1894, in the uniform of trumpeter to Her Majesty Queen Victoria.

Meanwhile, in Leipzig, the slide trombone found advocacy in an exceptional virtuoso, Carl Queisser (1800–46).⁵ Queisser appeared as soloist no fewer than twenty-six times between 1821 and 1843 in the prestigious Gewandhaus concerts. His repertory included the C. H. Meyer *Concertino for Bass Trombone* (1820, first performed 1821), a transcription of the *Horn Concertino* (1826) by Carl Maria von Weber (1786–1826), and the *Concertino in B \flat* , Op. 4 (1837), by Ferdinand David (1810–73). The latter is probably the most important nineteenth-century work for solo trombone. Ferdinand David, leader of the Gewandhaus Orchestra, dedicatee of Mendelssohn's *Violin Concerto in E* (1844), and influential teacher of Joachim (1831–1907) at the Leipzig Conservatoire, also wrote another solo trombone work, the *Concerto Militaire* (1841). The trombone's popularity in Leipzig waned with Queisser's death.

Performers, composers, inventors and music promoters all helped shape the destiny of brass instruments in what was a period of rapid change. The application of new technology to brass resulted in a level of manufacturing inventiveness unmatched by any other period. Performers collaborated with inventors and manufacturers to promote commercial exploitation of the new inventions in keyed and valved brass instruments of all shapes and sizes. The most fertile convergence of all these factors occurred in Paris. Here there also originated a new breed of impresarios typified by Philippe Musard (1793–1859) and Louis Jullien (1812–60), who were to export their entrepreneurial activities to nearby London. They were eager for novelty to feed a rapidly expanding mass audience, and helped create a market for promenade and popular concerts, which often featured brass soloists.

In addition, Paris also became an important brass-manufacturing centre, and possessed a Conservatoire alive to the new possibilities of brass, producing trained virtuosos by the 1830s. Cherubini (1760–1842), director from 1822, had already composed, in 1814, *Pas redoublés et marches pour la Garde du Roi de Prusse*, sophisticated military music in the French Revolutionary tradition scored for five brass – natural trumpet, three hand-horns and serpent or trombone. Some Conservatoire-trained composers wrote for brass. A substantial *Nonetto in C minor*⁶ (1839) by Félicien David (1810–76) and a companion *Nonetto in F major* (1839) (since lost), scored for two *cornets à pistons*, four *cors à pistons*, two trombones and

ophicleide, were composed for Musard concerts in Paris. Berlioz (1803–69) conducted the lost *Nonetto* in 1845. The performers taking part included the emergent Parisian virtuosi – Forestier, author of the first *Méthode pour le cornet à pistons* (1834); Dufresne, a cornet soloist at Musard’s proms from 1833; and Urbain, professor of the *cor à pistons* at the Conservatoire, also from 1833. The ophicleidist in these concerts was Caussin, co-author of a *Méthode complète d’ophicléide* (1837); and the trombonist, Antoine Dieppo, author of *Méthode complète pour le trombone* (c.1836). Berlioz was familiar with the capabilities of all the prominent Parisian players, writing the ‘Oraison funèbre’ from the *Grande symphonie funèbre et triomphale* (1840) for Dieppo, and adding a later supplementary solo cornet part to the second movement, ‘Un bal’, of *Symphonie fantastique* (1830), purportedly for Jean-Baptiste Arban (1825–89).⁷

The main activity of solo brass instruments lay outside art music, however, in the world of light entertainment and popular music, which flourished around the activities of Musard, Jullien and other showmen, like Barnum in the USA. Cornet and ophicleide players became sought after as soloists, typically showing off their virtuosity in stunning sets of variations composed on favourite melodies and popular songs. One of the most famous and influential of the brass solo groups which became active in this popular medium was the Distin Family Quintet. Already active in 1835,⁸ the Distins endorsed and sold Adolphe Sax’s instruments from 1844, manufactured their own in London from 1850, and during extensive tours at home and abroad played repertory like a fantasia on Meyerbeer’s *Robert le diable* (1831) to popular acclaim. They enjoyed such celebrity that the great Philharmonic Society, responsible for the most prestigious concert season in London, engaged them in 1845 to show their prowess on their newly acquired Sax instruments, in an attempt to stimulate flagging audiences for serious music.⁹

Military bands were a most important focus for brass during this period. There was a continuous world-wide growth in use of the new brass instruments in military bands. Brass was easily transportable, and highly audible. French developments in the military use of brass spread northwards to the Baltic through the Paris-trained Bernhard Crusell (1775–1838). The Finnish clarinetist and composer studied composition with Gossec (1734–1824), a key participant in the military wind music of the revolutionary period. Crusell’s base became Stockholm, Finland being under Swedish

control during this period. Ten short military marches and dances by Crusell survive from the 1820s. The instrumentation is for keyed bugle, three horns, two natural trumpets and trombone. This is an embryonic form of the *Hornseptett*, which became the mainstay of Swedish military music.

In Finland, the *Hornseptett* was called the *Torviseitsikolle*. This ensemble of E \flat , soprano cornet, two B \flat cornets, E \flat althorn, B \flat tenorhorn, B \flat baritonehorn, E \flat tuba and percussion was adopted by the military in 1874, and also became the model for civilian brass bands. The young Sibelius (1865–1957) wrote works for a volunteer fire-brigade band of this type. The *Allegro in E \flat minor* (1889), the *Overture in F minor* (1889–90), the *Andantino and Menuetto* (1890–1) and the *Praeludium* (1891), though early works, have flashes of his mature genius, and demonstrate his understanding of the brass ensemble idiom. After his return from studies in Berlin and Vienna, Sibelius composed only the short tone-poem *Tiera* (1898) for the *Torviseitsikolle*.



Figure 39 The Distin Family Quintet, lithograph.

Two of the most widely travelled virtuosi were the cornet players Jean-Baptiste Arban and Jules Levy (1838–1903). Arban undertook summer seasons in St Petersburg from 1873, appearing with orchestra as conductor and soloist in fashionable society venues such as La salle des concerts d'été de Pavlovsk.¹⁰

Arban was celebrated as a conductor, composer, performer, instrument designer and pedagogue. He fought to establish the cornet as an instrument of high status. His *Grande méthode complète pour cornet à pistons et de saxhorn* (1864) is the most universally used brass treatise. Arban's many solos attempted to raise the *air varié* form to the status of art music through the use of extended introductions, expressive adagios, interludes and codas, utilising orchestral rather than band accompaniment. The one work surviving in orchestral form, *Air varié sur le petit suisse*, has a balletic grace. The orchestration is transparent, aiding the soloist in his use of timbral shading and quasi-vocal nuance. The performance practice of subtle phrasing, delicate rubato and discreet vibrato has fallen out of use during the twentieth century, though preserved by a few English brass band soloists, and in certain elements of Maurice Andre's playing, a major reason for his immense popularity.

Arban's presence in St Petersburg influenced the young Victor Ewald (1860–1934), as the presence of Jules Levy, a regular guest of the Tsarevich (an amateur cornet player) during the 1870s, may also have done. Ewald,¹¹ who became a prominent civil engineer, had studied cornet and composition at the St Petersburg Conservatoire. He went on to write four Quintets for brass, the first, Op. 5, in $D\flat$ minor, dating from c.1890. Ewald composed for an amateur circle of dilettante music lovers, his quintet consisting of cornets and saxhorns. His hallmark was a Russian penchant for the minor mode, unusual in brass until that date, although also favoured in the contemporaneous works of Sibelius. The genre is not too distant from the amateur brass band quartet then flourishing in England. Further evidence of a pre-revolutionary interest in brass chamber music in Russia exists in the 12 *Kleine Stücke* of Ludwig Maurer (1789–1878), *In modo religioso* (c.1893) by Glazunov (1865–1936), and 22 *petits morceaux d'ensemble pour instruments de cuivre* (c.1887) by Anton Simon (1850–1916). Brass was also important in Russian military bands. Rimsky-Korsakov (1844–1908), as a result of his post as inspector of naval bands, composed the Concerto in $B\flat$ (1877) for trombone and military band, though it is sadly uninspiring, considering his exciting orchestral writing for brass.

Ultimately, however, the nineteenth century remains poor in brass solo and chamber art music despite the continuing discovery of new repertory like the *Fantasia para la tromba* (1847) of Agustín Millares (1826–96), a composer active in Las Palmas, the Canary Islands, and the *Divertissement*

for *Obbligato Trumpet* (1874), composed in Vienna by Franz von Suppé (1819–95). Entertaining and attractive though this music is, it serves to underline the fact that there was no composer of stature who was also a brass player. A comparison with instruments better endowed with repertory, such as the piano and violin, is revealing. By the start of the nineteenth century a tradition of violinist-composer and keyboard-composer virtuoso exponents had given these instruments lasting repertoire on which succeeding generations could build. The concertos and chamber music for violin and piano by Mozart, Beethoven and Haydn alone put the small amount of brass repertory into sobering perspective. Despite unparalleled opportunities, and the commercial popularity of brass performers in the nineteenth century, there is little evidence after Weidinger and Queisser of a conscious and continuing investment in high-quality music, unlike that of pianists and violinists, who continued to add significantly to their great repertory, though operating in the same expansionist, *laissez-faire* economic environment. Strangely, in an otherwise revolutionary period of rapid change, the idiom of the old brass instruments in art music remained largely unemancipated by technology for much of the nineteenth century, the idiom of the trumpet remaining noble, that of the trombone solemn. This fossilisation of idiom can be seen in the work of the Thomas Harpers, father and son,¹² who, by their dual longevity, managed to retain and enshrine a noble and artistic concept of the trumpet in England throughout the nineteenth century. To do this, they retained the essential length of the natural trumpet, adding only a simple clock-spring slide mechanism which gave it limited diatonic use. The Harpers unwittingly became the first period performers on brass, playing the great Handel obligati, ‘Let the Bright Seraphim’ from *Samson* (1743) and ‘The Trumpet Shall Sound’ from *Messiah* (1742), with something very close to the original sonority. That the nomenclature *trumpet* symbolised high art and high ideals to them is emphasised by the fact that, in their professional lives, the Harpers played and taught every manifestation of Victorian brass technology, including the cornet.

By the latter part of the nineteenth century, a fusion began to occur between the capabilities of brass instruments in popular music and their usage in art music. In many areas of Europe and the USA, the easier-to-play cornet and valve trombone had ousted the trumpet and slide trombone, playing their designated parts in the orchestra. This phenomenon was short-

lived, except in the case of the valve trombone in certain areas – notably Italy. The design of trumpets and trombones was adapted, and their players' techniques grafted on the new skills learnt in popular music. In the case of the trumpet, there was an imperative to maintain the ascendancy of the soprano voice in an ever more powerful brass section: hence, through a process of empirical experiment, a whole family of shorter, higher-pitched valve trumpets evolved. This family began to accumulate solo repertoire, and facilitate Baroque repertory from the turn of the century. The Belgian trumpeter Théo Charlier (1868–1944), author of the evergreen *Études transcendentes*, was the first in the modern era to play Bach's Brandenburg Concerto No. 2, which he did in Antwerp in 1898, on a Mahillon piccolo trumpet in G.¹³

During the last two decades of the nineteenth century and the first two decades of the twentieth, the brass idiom metamorphosed. This was first evident in the orchestral music of Richard Strauss (1864–1949), son of the distinguished hornist Franz Strauss,¹⁴ and Gustav Mahler (1860–1911), who both built on a legacy laid down by Richard Wagner (1813–83). Then the popular styles of ragtime and jazz transformed the brass idiom further. This influence was eventually all-pervasive, but initially it was most discernible in avant-garde composers of the time like Stravinsky (1882–1971), Antheil (1900–59), Walton (1902–83) and Les Six.



Figure 40 Caricature of Jean-Baptiste Arban, by H. Meyer.

It was in this forty-year period up to the 1920s that the USA became a central player in brass innovation. European centres continued to produce exceptional individuals, but the economic power of the USA exerted a gravitational pull on the best brass talents of Europe. This sparked an extraordinary growth of home-grown virtuoso brass talent. The focus for

brass solo activity was the professional concert band. Sousa's Band was one among many which grew out of the military model in the period following the American Civil War. John Philip Sousa (1854–1932) was at the centre of a golden era of cornet, trombone and euphonium soloists.¹⁵ Bands like his enjoyed a vogue, touring the world, from the late nineteenth century until the First World War. Like the jazz soloists of later generations, the virtuosity of their soloists enthralled audiences. The cornet players Herman Bellstedt (1858–1926), composer of *Napoli*, and Alessandro Liberati (1847–1927), composer of *The Four-Octave Schottische*, were recent immigrants to the USA, as was Simone Mantia (1873–1951) the virtuoso euphonium player. The most influential American-born brass musicians of this era were the cornet player Herbert L. Clarke (1867–1945), composer of *Bride of the Waves*, and the trombonist Arthur Pryor (1870–1942), composer of the still popular *Bluebells of Scotland* and *Love's Enchantment*. Clarke and Pryor were pivotal figures in the swift evolution of the brass idiom in this period. Clarke was noted for standing up and improvising variations during dance music – a link between the older tradition of classical extemporisation and the yet-to-come improvisation of jazz. Pryor, as well as acquiring an unprecedented technique which earned him the soubriquet 'Paganini of the trombone', was one of the earliest ragtime composers, writing *A Coon Band Contest* (1899) and the trombone extravaganza *Razzazza Mazzazza* (1906). He persuaded Sousa to keep up with the times. In 1900, under Pryor's influence, Sousa took ragtime to Paris, Berlin and all major European cities. Numerous influential composers, including Debussy (1862–1918) and Richard Strauss, attended rehearsals and concerts, underscoring the importance of Sousa's brass virtuosi. They were taken seriously, and influenced the instrumental writing of the greatest composers of the time. Pryor especially paved the way for increasingly sophisticated and multi-dimensional trombone writing.

The aftermath of the First World War brought accelerated changes in musical style, taste and organisation. The touring concert band disappeared rapidly after 1918, players like Clarke and Pryor settling down into the rapidly institutionalising system of college and municipal bands, which was to provide a pan-American focus for brass teaching. As the bands active in the American Civil War had broken up, to be absorbed into a thriving market for concert bands, the brass musicians amongst the demobbing First World War soldiers found work in dance orchestras and the silent cinema.

Because of the illustrative and programmatic nature of cinema music, the solo voices of trumpet and trombone were important. The tuba was largely confined to caricature and rumbustiousness, notably in its oompah Dixieland role. The euphonium became restricted to the territories of college band and brass band, as eventually did the cornet, after early advocacy by Stravinsky and soloistic small orchestra use by Satie (1866–1925), Poulenc (1899–1963), Hindemith (1895–1963) and others. Stravinsky's soloistic use of cornet, trumpet and trombone in *The Soldier's Tale* (1918) and the *Octet* (1922) is part Russian (from the North Baltic brass tradition), part French and part influenced by popular styles.

Poulenc's *Sonata for Horn, Trumpet and Trombone* (1922) shows the influence of Stravinsky, but a trend towards increasingly sophisticated chamber use of brass had existed in France for some time. Saint-Saëns (1835–1921) had included trumpet in his *Septet*, Op. 65 (1881), and D'Indy (1851–1931) had used trumpet with two flutes and string quartet in the interesting instrumentation of his *Suite dans le style ancien*, Op. 24 (1886). Saint-Saëns also composed a beautiful *Cavatine*, Op. 144, in 1915 for trombone and piano, to add to the Paris Conservatoire repertory, which was expanding under the influence of the virtuoso player and master teacher Louis Allard.

The possibilities of the orchestral brass section as a separate entity came to be more fully recognised in this period. Dukas (1865–1935) began his ballet *La péri* (1911–12) with an extended brass fanfare. Debussy's *Le martyre de Saint Sebastien* (1911) contains many episodes for brass alone. Roussel (1869–1937) composed *Fanfare pour un sacre païen* (1921), and Florent Schmitt (1870–1958) 'Le camp de Pompée' from *Antoine et Cléopâtre*, Op. 69 (1921). These works exploit the capability of orchestral brass to thrill and excite with displays of raw power and energy. In Germany, Hindemith recognised the concertante possibilities of this grouping, composing two *Konzertmusik* for brass – Op. 49 (1930) with piano and two harps, and Op. 50 (1930) with strings. In the enlarged chamber-music context of his *Kammermusik* 1–5 (1922–7), he makes adventurous use of trumpet and trombone, and, in one instance, cornet. The brass writing is technically challenging and the brass are used democratically, as equals of the other participating instruments and integral to the main musical arguments.

Richard Strauss, who had done much to extend the orchestral idiom of brass, now extended the fanfare to sublime length. He wrote fanfares for ceremonial functions, at which symphony orchestra brass sections, such as the Vienna Philharmonic, played as emblems of civic pride. Strauss's series of brass works includes the *Feierlicher Einzug* AV103 (1909), *Wiener Philharmoniker Fanfare* AV109 (1924), *Fanfare zur Eröffnung der Musikwoche der Stadt Wien* AV110 (1924) and *Festmusik der Stadt Wien* AV133 (1943) which, in its nine-minute span, gives the first trumpet the next best thing to a concerto. In sharp contrast to the triumphalism of Strauss, for British orchestral brass the young Benjamin Britten (1913–76) wrote *Russian Funeral* (1936), full of inter-war pessimism.

Czechoslovakia flourished both culturally and economically in the turbulent inter-war years. Both Janáček (1854–1928) and Martinů (1890–1959) wrote idiosyncratically for brass. Janáček's *Sokol Fanfare* is the basis of his celebratory *Sinfonietta* (1926), using nine trumpets, two bass trumpets and two tenor tubas. On a more intimate level, Janáček demonstrates his genius for soloistic brass writing in *Capriccio* (1926), scored for flute/piccolo, two trumpets, three trombones and tenor tuba, accompanying left-hand piano solo. The far-reaching influence of jazz is evident from the trumpet part of Martinů's *Kuchynská revue* (1927).

The jazz explosion of the 1920s renewed the vigour of solo brass. Much brass writing was influenced by the new musical craze, the trumpet in *Façade* (1921–2) by Walton, and the trumpet and trombone in the *Kleine Dreigroschenmusik* (1929) by Kurt Weill (1900–50) being typical. However, this new style of music, and avant-garde music in general, was outlawed as dangerous and subversive in the dictatorships of Germany and Russia, forcing many composers into exile. While in exile, Hindemith began his great series of sonatas for every orchestral instrument, including the Trumpet Sonata (1939), which ends tellingly with the Chorale 'Alle Menschen müssen sterben', the Trombone Sonata (1941) and the highly unusual Althorn Sonata (1943), involving a programmatic poetry reading. From his eventual position at Yale University, Hindemith had a powerful influence on American higher musical education and showed, furthermore, that works with serious intent could be written for brass. Hindemith's example was followed in the post-war era by a series of brass concertos like those of Gunther Schuller (b.1925) and Raymond Premru (b.1934), and an active all-round growth in brass solo repertory in the USA, though an effect

of the educational intent of much of this output was the derivative cloning tendency of 'campus music', a phenomenon also prevalent in the French Conservatoire *Morceau de concours* system. In Russia, the subversive element in composers like Shostakovitch (1906–75), so noticeable in the exuberant solo trumpet part of the Piano Concerto, Op. 35 (1933), became internalised through the necessity of surviving Stalin. This perpetuated a brass culture which clung to Romantic language, close to that of Ewald and Glazunov, surviving until *perestroika* heralded the end of the cold-war era. The upside of this was the preservation of a body of Romantic repertory by Vassily Brandt (1869–1923), Oskar Boehme (1870–1938) and others, given authoritative performance in a Romantic interpretative tradition by artists such as trumpeter Timofei Dokschitser (b.1921).

The 1930s saw rapid technical advances and expansion of opportunity for brass in the popular idiom of jazz. The complete penetration of jazz into the popular media made the improvising genius of musicians like Louis Armstrong (1901–71) and Tommy Dorsey (1905–56) common currency, and affected the technical demands made on brass players by composers. A new breed of orchestral soloist came into being, like George Eskdale (1897–1960) of the London Symphony Orchestra, the first to record, for Columbia in the 1930s, Haydn's Trumpet Concerto (second and third movements). After the interruption of the Second World War, many brilliant players in centres like London, Vienna, Paris and New York developed the versatility to cope with the many different styles then demanded of the brass player, including, on trumpet, the high tessitura of Bach, Handel and Purcell, then becoming part of the regular concert repertory. Composers like John Addison (b.1920) were inspired to write demanding works like *Concerto for Trumpet and Strings* (1951) for artists like David Mason (b.1926). The influence of jazz inspired the masterpiece trumpet concerto *Nobody Knows de Trouble I See* (1954) by Berndt Alois Zimmerman (1918–70), and the *Concerto for Jazz Trumpet* (1957) from Iain Hamilton (b.1922), both unjustly neglected.

Tuba players were still seriously underendowed with repertory, but 1955 saw this problem addressed by two major composers. Hindemith completed his series of sonatas for every orchestral instrument with the Tuba Sonata, an adventurous work with a twelve-note theme, and Vaughan Williams (1872–1958) wrote his popular Tuba Concerto in F minor in the same year. Vaughan Williams's concerto stimulated a demand for tuba, and, by

association, euphonium, repertory, supplied later by Walter Hartley (b.1927), Edward Gregson (b.1945), Joseph Horowitz (b.1926) and many others. The tuba had affectionate advocacy at this time by amateur tuba player and cartoonist Gerard Hoffnung (1925–59), who heightened its profile.

In the 1950s, there occurred a break in the continuum of musical development, when groups of avant-garde composers, initially from Darmstadt, began to question the way music had been perceived hitherto in the West. Brass instruments were advantaged in this new exploratory world, because, relative to instruments like the violin and piano, they were not weighed down by a tradition of Classical and Romantic solo works which defined their idiom.

Innovative trombonists Stuart Dempster (b.1936) and Vinko Globokar (b.1934) discovered vast potential in areas of sound previously ignored by composers. This was being explored as early as 1957–8 by John Cage (1912–92) in the ‘Solo for Sliding Trombone’ excerpt from his Piano Concerto, and further by Jan Bark (b.1934) and Folk Rabe (b.1935) in *Bolos for Four Trombones* (1962). Dempster and Globokar provided a focus for this revolution in trombone technique in the 1960s, giving widespread performances of the now classic *Sequenza V* (1966) by Luciano Berio (b.1925). Globokar composed his landmark *Discours II for Five Trombones* (1967–8), maintaining like Rabe the age-old *Equale* like-instrument grouping. The trombone proved an ideal medium for avant-garde music of this period. The slide was a great asset in an exploratory medium of microtonal inflection and wild improvisatory glissandi, uninhibited by the pitching exactitude of a piano keyboard, for instance. The tenor and alto register which the trombone inhabited was another advantage. When mixed with the player’s voice, male or female, complicated multiphonics became possible, making the trombone a harmonic as well as a melodic instrument. This technique, part of trombonists’ folklore, had been used as a trick by Arthur Pryor and others; Carl Queisser would have used it in the cadenza chords of his Weber *Horn Concertino* transcription of 1826.

As the popularity of the rediscovered Classical and Baroque repertory grew, a remarkable artist, Maurice André (b.1933), came to prominence on classical trumpet. André came to epitomise the finest French virtues – a flawless, systematically trained technique, honed through the conservatoire

system of competition, allied to a cantabile style that had evolved from Arban, continued by Franquin (1848–1934), through Charlier, Foveau (1886–1957) and Sabarich (1909–66) in the twentieth century. In this process of evolution, the cornet's attributes of agility and lyricism became absorbed into the techniques of French trumpet players. Transcription played a prominent part in André's rise, as it did in the concurrent development of the brass quintet medium, but unlike in the case of Arban and Distin more than a century previously, this time it was of Baroque, not operatic repertory.

André, like many post-war musicians, was out of sympathy with the Darmstadt developments. He was conservative in his choice of commissioned composers, as was Philip Jones (b.1928), who, operating from London, was simultaneously establishing the medium of brass chamber music. André's most durable choices were perhaps the *Heptade* for trumpet and percussion (1971) by André Jolivet (1905–74), and the *Konzert für hohe Trompete* (1970) by Boris Blacher (1903–75). Philip Jones's roll-call of original works includes works by the British composers Joseph Horowitz, John Gardner (b.1917), Stephen Dodgson (b.1924) and Leonard Salzedo (b.1921). His commissioning policy was laudably wide-ranging, however, and resulted in the tantalisingly short *Mini Overture* (1982) by Lutoslawski (1913–94), and the more substantial *Garden Rain* (1974) by Takemitsu (1930–96) and *Playgrounds for Angels* (1981) by Rautavaara (b.1928). The rise of the Philip Jones Brass Ensemble (PJBE) was inexorable. Jones's articulate advocacy broke old moulds and spawned a host of imitators world-wide. The New York Brass Quintet developed independently, in 1960 commissioning the enduring *Quintet for Brass* by Malcolm Arnold (b.1921). The American Brass Quintet commissioned the challenging and complex *Brass Quintet* by Elliot Carter (b.1908) in 1974.

In North America, two highly successful quintets, on the standardising two trumpets-horn-trombone-tuba model, exploited the less serious jazz cross-over and entertainment potential of the medium, utilising the ready availability of virtuoso players with training in both classical and jazz disciplines. Training has long been integrated into American musical education for both jazz and classical musicians. Both Miles Davis (1926–91) and Wynton Marsalis (b.1961) trained at the Juilliard, taking lessons from William Vacchiano (b.1912), for many years principal trumpet of the New York Philharmonic. First Canadian Brass, then Empire Brass, based

respectively in Toronto and Boston, became part of the international jet-set. The parallels with the Distin Family Quintet from a century earlier are striking. Canadian Brass, after a period spent endorsing other manufacturers' instruments, now have their own branded instruments, publish their own music, and undertake extensive international concert tours, performing transcriptions of popular serious music, including a potted version of Bizet's opera *Carmen*, an almost identical pattern to the Distins.

Empire Brass tried for a time to occupy the high ground, commissioning the *Brass Quintet* (1981) by Peter Maxwell Davies (b.1934), which, like Elliot Carter's *Quintet* (1974), treats the medium with infinite seriousness, as pure chamber music. The brass quintet now has a respectable repertoire of excellent serious music, and more is being written all the time, *Adam's Rib* (1995) by James Macmillan (b.1959) being a recent weighty addition. Quintets are also used as concertante groups, as in Michael Torke's orchestral work *Copper* (1988), commissioned by Empire Brass. Xenakis (b.1922) uses the quintet as an accompanying group, as in *Eonta* (1963–4) with piano, or with the addition of other instruments like percussion, as in *Khalperr* (1983). One effect of the quintet's popularity was the prominence it gave to the tuba, in comparison to the usual obscurity of the instrument in the remote extremities of the orchestra. First John Fletcher (1941–87) of the PJBE rose to regular solo status, helped by his superb recording of the Vaughan Williams concerto with the London Symphony Orchestra and Andre Previn. Then Sam Pilafian rose to prominence through Empire, in the USA.

Another major benefit of the rise of brass chamber music was the uncovering of a whole repertoire of Renaissance and early Baroque music involving brass. This repertoire, however, only really came into its own when specialist cornetto players like Jeremy West (b.1953) and Bruce Dickey mastered the intricacies of this extinct instrument, and joined with like-minded trombonists to form their own period-instrument brass ensembles, respectively, in London, His Majesty's Sagbutts and Cornetts, and in Bologna, Concerto Palatino.

Ultimately, however, like the Distins, present-day professional brass quintets must entertain to eat, forcing the serious, more contemporary part of their repertoire into obscurity. The future of the brass ensemble may lie, like the professional concert band before it, in its development as an

educational resource, resident in colleges and conservatoires, coaching burgeoning student brass ensembles.

To keep ahead of the host of imitators in the 1970s, and to rise above the limitations of the quintet, Philip Jones invented the 'tentet' (four trumpets, four trombones, horn and tuba). This grouping became generic, spawning groups world-wide like London Brass, German Brass and Austrian Brass. The transcription by Elgar Howarth (b.1935) of Mussorgsky's *Pictures at an Exhibition* (1977) extended the PJBE to eighteen, giving the orchestral brass section a substantial work. A far-reaching effect of this transcription was to remind orchestral brass players of their chamber potential. Today it is a commonplace to have a brass ensemble operating from within an orchestra, both for educational and concert-giving purposes. The London Symphony Orchestra Brass is one of the most successful, and, at a 1996 commemorative concert on the tenth anniversary of Jones's retirement, it proved the lasting alchemy of his formula of stylish transcriptions and straightforward twentieth-century repertory, by playing to a capacity audience.

Patterns which had been established in the nineteenth century, the influence of jazz performers, and the social and educational policies of post-war governments now fused in the last quarter of the twentieth century to form the next developments in brass solo music.

By the 1980s, the Darmstadt period experimenters, including those formerly referred to in Britain as the 'Manchester School', a loose grouping containing, among others, Maxwell Davies, Harrison Birtwistle (b.1934), and Elgar Howarth and John Ogdon (1937–89), the first performers of Maxwell Davies's *Trumpet Sonata*, Op. 1 (1955), had become establishment figures. In Britain, the Arts Council's subsidy to music ensured a steady flow of new commissioned works to specialist new music ensembles like the London Sinfonietta and to British symphony orchestras. Brass soloists also now came on the scene, encouraged by a generally raised perception of brass brought about by the ongoing development of jazz, which was boosted when a jazz musician, Wynton Marsalis, had an unprecedented success recording classical trumpet repertory. Maxwell Davies and Tim Souster (1943–94) wrote their trumpet concerti for the present author in 1988, as did Dominic Muldowney (b.1952) with *Concerto*, Robert Saxton (b.1953) with *Psalm of Ascents* and James Macmillan with *Epiclesis*, all written in 1993. Sweden, a country with an

enlightened programme fostering exceptional musical talent, produced three brass soloists capable of meeting the technical demands of avant-garde composers – Haken Hardenberger (b.1961) on trumpet, Christian Lindberg (b.1958) on trombone and Michael Lind (b. 1951) on tuba. Hardenberger, Paris-trained like Crusell, and Lindberg, citing Jack Teagarden as his inspiration, have managed to sustain international careers playing largely contemporary music – for example, Birtwistle’s trumpet concerto *Endless Parade* (1986), or Jan Sandström’s (b.1954) *A Short Ride on a Motorbike* (1990), which extends the idea of trombone theatricality prominent in Berio and Globokar. Lindberg is amassing an impressive repertory for solo trombone by prominent composers. This includes *Dialog* (1990) by Schnittke (b.1934), *Troorkh* (1991) by Xenakis, *Fantasma Cantus II* (1994) by Takemitsu, and *Fratres* (1994), *An den Wassern*, *De Profundis*, *Pari Intervalli* and *Silouans Song* (all 1995) by Arvo Part (b.1935).

The tuba still has prejudices to overcome, despite the predilection for the instrument displayed by Kagel (b.1932), notably in *Mirum* (1985), and Birtwistle, who has admitted to a ‘love-affair with the tuba’.¹⁶ *The Cry of Anubis* (1994–5), written for Owen Slade (b.1963) and the London Philharmonic, follows remarkable tuba and euphonium writing in his opera *Gawain* (first performance 1991, revised 1995). Both flugelhorn and euphonium are enjoying a renaissance of interest among composers in England. In *Three Inventions for Chamber Orchestra* (1994–5), George Benjamin (b.1960) displays beautiful idiomatic solo writing for both instruments. The dramatic ability of the tuba to bring off an unaccompanied work has been demonstrated by Kristyof Penderecki (b.1933) in *Capriccio* (1980), and the effectiveness of the instrument in a live electronics context is shown by Tim Souster in works like *Heavy Reductions* (1977, revised 1994). Of other 50s rebels, Berio and Stockhausen (b.1928) have continued to write for brass, Berio adding *Sequenza X* for trumpet in 1984, for Thomas Stevens (b.1937), principal trumpet of the Los Angeles Philharmonic. In 1996, to mark Paul Sacher’s ninetieth birthday, Berio made an orchestral version of this work – *Kol-Od (Chains VI)* – for the Italian trumpeter Gabriele Cassone (b.1959). Potentially the most significant event for the trumpet in art music occurred, however, when Karlheinz Stockhausen’s son, Markus, took up the instrument, bringing to mind the family parallel of Franz and Richard Strauss. Since that point, the trumpet has been prominent in Stockhausen’s music, even to the point of

Markus taking the costumed role of Michael in *Licht*, his great series of operas, one for each day of the week, of which *Donnerstag aus Licht* (1978–80) was the first to be seen. This role demands from the trumpet as much stamina and variety in sustaining a role as is required of an opera singer.

There has been a growth of solo and chamber opportunities for brass, fulfilled by a profusion of expert brass virtuosi aided in their development by a great expansion of state-subsidised provision for instrumental training. Solo brass instrumentalists are championed by late twentieth-century composers. They seem, for the moment at least, to have found a breadth of emotional and intellectual expression which has appeal for the contemporary composer. Whether this will be sustained, or fade away like Weidinger or Queisser, remains to be seen. In 1996, during a break in recording *Dispelling the Fears*, by Mark-Anthony Turnage (b.1960), for two solo trumpets and orchestra, Haken Hardenberger was asked to what influences he traced the present resurgence in solo brass repertory. He replied, 'Has it happened yet?' Time will tell.

Frontiers or byways? Brass instruments in avant-garde music

Simon Wills

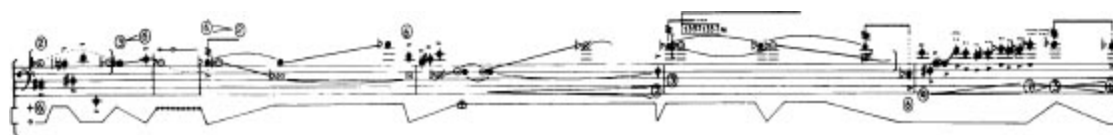
The stage is empty, except for a low stand and a chair. Enter a trombone player, immaculate in white tie. He points his instrument in the air and plays a single loud, high note. He repeats the action, at six-second intervals. At the fifth attempt, no sound comes. Rattled, he becomes more energetic. He has a tin basin, which he holds over the bell of his instrument: occasionally, he sings a pert ‘wa’ and the trombone, the basin acting as lips, mimics him. The notes come faster. The player is frantic, then hysterical, but the harder he works the less sound he makes. Paralysis ensues. The trombonist utters a bewildered ‘WHY?’ and crumples onto the chair. From this position he plays a complex, tormented lament. The sound is continuous; even when inhaling he groans and rattles his basin. The instrument enunciates syllables, sounds are distorted, losing any sense of defined pitch, and, more often than not, the trombonist wails and plays at the same time. The borders between instrument and player, voice and blown sound, speech and the tin lips of the basin, become blurred, and as the last note dies away it is difficult to tell if it is played or sung.

This is not the work of a fringe eccentric: *Sequenza V* by Luciano Berio (Ex. 11) has an enduring place in the repertoire. Nor is it an improvisation. Its notation is precise: the position of the mute is indicated by a separate stave, the pitches of the sung and played notes are for the most part clearly given, and even the angle of the instrument is shown with arrows and lines. Though the rhythms are indicated by proportion rather than mensuration it is a work as clearly conceived as a Beethoven quartet.

Sequenza V demonstrates the extremity of change that took place in brass writing after the Second World War. It was written in 1966: twenty years earlier, a survey of techniques used by serious composers would have

discovered nothing resembling it. There would have been the odd trill, an occasional flutter-tongue or glissando. 'Con sord' would have meant nothing more exotic than a metal or fibre cone mute. Jazz composers were using a much wider range of sounds – Glenn Miller's *Tuxedo Junction* even has some rudimentary syllable imitation – but nothing to compare with Berio's timbre painting. However, *Sequenza V* is unusual because it has proved so durable: very few avant-garde works have found an audience, and it must be admitted that *Sequenza V*'s popularity stems to a large degree from a strong theatrical content. Moreover, though the extensions of technique that have occurred since 1945 are fascinating, and often very beautiful, the mainstream of composition has at best toyed with them and often disregarded them altogether.

Ex. 11 Luciano Berio, *Sequenza V* (page 2, system 2), 1966



The advances made since 1945 may be simply summarised. The commonly used compass has not increased significantly, but composers are now more likely to treat all notes as equally accessible, as they would be on a sequencer or keyboard. Players' capacity for rapid execution has increased, and unorthodox ways of producing sounds – often called 'extended techniques' – have become more widely practised. Mutation of timbre, achieved electronically or with a wide range of acoustic mutes, has become commonplace.

The notion of making strange noises is not new. Medieval man, intemperate creature that he was, must have experimented with glissandos on his slide trumpet, or sampled the agreeable sinusoidal rattle that is experienced when one plays one note and sings another. Muting was certainly done in Renaissance times; Gluck occasionally hinted at a flutter tongue, if there were demons in the offing; and Weber wrote chords into the cadenza of his horn concertino. The acceptance of valves on the french horn was inhibited because so many people regretted the loss of tonal shading that this entailed. But, for the most part, players and composers were content to increase the range of what could be done with conventionally blown notes. Berlioz had trouble convincing his trombone players that

pedal notes existed at all, muting is exceedingly rare in scores written before 1880 and the intentional trombone glissando is unheard of.

In the years following the Second World War, styles in art music fragmented. As this happened, colour became a more important basic component of language, and interest began to centre not just on combining timbres, but on changing the sounds made by single instruments. This shift in emphasis was needed before noises – which had no doubt been tried in band rooms for centuries – could be incorporated into composition. The language of most music creates its tension and release through the relationship between notes, and the orchestrator's skill lies in elucidating the colours implicit in them. Play Wagner's *Magic Fire Music* on the piano, or arrange *Daphnis et Chloé* for brass band, and you will do them a disservice, but they will remain recognisably themselves. You might play the Webern *Kammerkonzert* on a brass quintet, but Messiaen's *Et exspecto* ... would be meaningless in any other form and *Gesang der Jünglinge*, like much of Stockhausen's work, is inseparable from the raw sounds from which it was constructed. Even the highly organised music of Nono and Boulez directs the listener's attention towards timbre, since it is shorn of what we conventionally think of as melody and harmony. Much the same is true of the static compositions of Morton Feldman – indeed in his case there is little else to listen to. Aleatoric scores – Earle Brown's *Available Forms* (1961) for example – supply notes, but confine themselves to quite a narrow range of pitches. Other composers, unwilling to be bound even to this extent, supply a text or picture for the performer to react to. It is hardly surprising that room was found for imaginative distortions of brass timbre.



Figure 41 Christian Lindberg (b. 1958) performing Berio's *Sequenza V*.

The foundations of extended technique were laid by advances in conventional playing. They had to be: the new sounds are taxing to perform

and require a high level of technical competence. Romantic composers used the stress of extremes of register as an expressive device, and as the nineteenth century ended there was an abrupt increase in the technical demands of the brass parts that were being written.¹ Naturally, players strove to meet the demands made, and the boldness with which composers used certain techniques is a barometer of the progress in playing. Consider, for example, the simple matter of a slur across the natural harmonics. It is a fundamental of brass technique: the more diligently slurs are practised, the stronger and more flexible the embouchure is likely to be. In *Daphnis et Chloé* (1909–12) Ravel uses the device cautiously (Ex. 12).

Stravinsky wrote lip glissandos of a twelfth for horns in *The Rite of Spring* (1913), but covered them with a busy orchestral texture. Bartok's second Violin Concerto (1937–8) has an alternative ending that makes copious use of exposed lip glissandos in all the brass, but the passage is optional, as if the composer were hesitant about its practicability (Ex. 13).

By the end of the war, technique had advanced to the point where this kind of writing was easily played. In *The Burning Fiery Furnace* (1966), Britten, after a lengthy correspondence with a trombone player, wrote strenuous passages across the harmonics of the alto trombone and horn in a small chamber ensemble (Ex. 14).

At about the same time, Harrison Birtwistle was writing 'glissando to the highest possible note' as an instruction in *Punch and Judy* (1968) and *Verses for Ensembles* (1969). George Benjamin's *At First Light* (1982) uses what amounts to a lip glissando as freely as he might employ fast moving woodwind (Ex. 15). Examples 14 and 15 raise an important general point: the new virtuosity is able to flourish within a small frame. The very high and loud parts written by Strauss in the *Alpine Symphony* (1915) have a large space in which to flourish. When Peter Maxwell Davies takes the trumpet player to the upper limit of his range in *The Lighthouse* (1980), he does so using only a dozen or so players as backdrop.

Ex. 12 Maurice Ravel, *Daphnis et Chloé* (fig. 49), 1909–12



Rapidity of execution was the obsession of the nineteenth-century virtuosi, and the cornet part in *L'histoire du soldat* (1918) is for this reason unremarkable. Bernd Alois Zimmermann's use of rapid arabesques in all the brass as washes of colour in *Die Soldaten* (1958–60) indicates how widely the expectation of agility has spread (Ex. 16). Composers do not write much higher or lower now than did Strauss or Berg, but they do so more readily, and in a more exposed way, whether for ethereal effect, as in Ligeti's *Kammerkonzert* (Ex. 17), or simply for the sake of grotesqueness, as is the case with the tuba part of Zimmermann's *Musique pour les soupers du Roi Ubu* (1966) (Ex. 18).

At first, virtuosity evolved naturally, in tandem with musical thought. It was boosted – some would say distorted – by the exigencies of playing music created as much by theory as aesthetic judgements. As early as 1948, Milton Babbitt started using series to govern all components of music, not just pitches. Messiaen's *Modes de valeurs et d'intensités* (1949) introduced the idea of giving individual pitches separate articulations and dynamics, and Boulez and Nono took up and developed various forms of strict numerical control. Xenakis rejected total serialism (on the grounds that precise calculations produce music that sounds random) in favour of stochastic organisation, a more aurally coherent technique, in which certain elements are left to chance within a mathematically disciplined structure. The effect of both on instrumental technique was dramatic. The more a work is governed by predetermined factors, the less likely a composer is to write sympathetically for his players.² This is true to an extreme extent of music of the post-war period, and the lack of sympathy some composers continue to show tempts one to agree with Berio's remark that numerical techniques had allowed people to write music without becoming personally involved (Ex. 19).³ Xenakis disregards difficulty, claiming that since the mathematical formulae on which he bases his pieces are universal truths they will eventually become universally accepted – 'in every schoolboy's satchel' as he puts it. This may be idealism or arrogance, but it goes some way towards explaining the long, remorseless, leaping unison duet for trumpet and trombone at the end of *L'île de Gorée* or the tyrannical patterns of *Keren* (1986) for solo trombone (Ex. 20).

Ex. 13 Béla Bartók, Violin Concerto No. 2 (bars 594–609), 1937–8

595

The musical score for 'The Rose Tree' is presented in a four-staff format. The top two staves are for the vocal parts, and the bottom two are for the piano accompaniment. The key signature has one flat (B-flat), and the time signature is 2/4. The score is divided into four measures. The first measure shows the vocal melody starting on a whole note, followed by a half note. The piano accompaniment features a bass line with a series of eighth notes and a treble line with a series of sixteenth notes. The second measure continues the vocal melody and piano accompaniment. The third measure shows the vocal melody and piano accompaniment. The fourth measure concludes the piece. The score includes various musical notations such as notes, rests, and dynamic markings like 'cresc.' and 'ff'.

sosten. e largamente 604 Risoluto, $\text{♩} = 70$

The musical score is arranged in two systems. The first system (measures 604-607) includes parts for Horns in F (I, III and II, IV), Trumpets in C (I and II), Trombones (I, II, and III), and Tuba II, III. The music features complex textures with glissandos, crescendos, and specific performance instructions like 'sosten. e largamente' and 'Risoluto, ♩ = 70'. The second system (measures 608-611) continues the orchestral texture with similar instruments and performance markings.

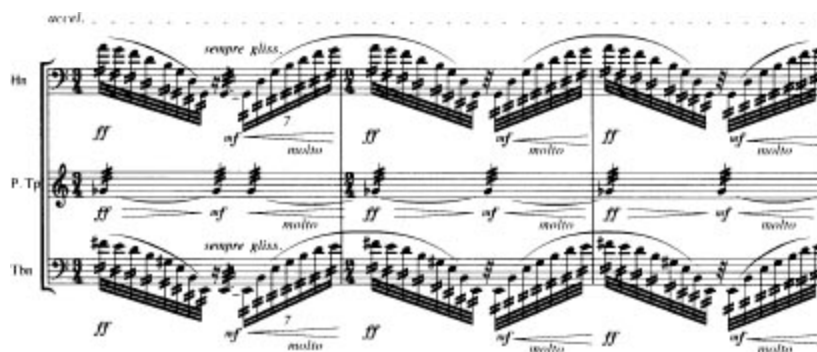
It is questionable whether, except in certain enclaves, the schism with the past desired by Boulez and others was achieved. It is fair to say, however, that one was, at least partially, made between 'conventional' players who, often repelled by the new music, devoted themselves to eighteenth- and nineteenth-century repertoire, and a new generation of virtuosi, who were involved not only in performance but also in research and composition. The influence exercised by Vinko Globokar, Markus Stockhausen and others has been considerable, despite their relatively modest accomplishment as composers. They have not only extended their vocabulary by private experiment, but have also absorbed outside influences, particularly jazz.

Even Dixieland music uses a modest repertoire of growls, half-valve sounds and so forth, and the extremely raucous ‘tailgate’ style favoured by Georg Brunis amounts to a separate method of blowing the instrument. Miles Davis and others explored new sounds, as jazz went through a bewildering range of serious styles in the post-war period – ‘hot’, ‘cool’ and so forth. Some went further, simply to amuse – the trumpeter in Spike Jones’s ‘City Slickers’ cultivated a frenetic snuffle produced by the fast alternation of blowing and sucking, while the trombonist in the band played melodies in a style known as ‘thunk’, in which the tongue is pushed out so far as to act like a third lip. Cup, Harmon, bucket and plunger mutes (the last of these so named because it was originally a large sink-plunger minus the stick) all first appeared in jazz bands. It is thus no exaggeration to say that many of the sonorities that we associate with contemporary music have a popular origin.

Ex. 14 Benjamin Britten, *The Burning Fiery Furnace* (fig. 108), 1966



Ex. 15 George Benjamin, *At First Light* (p. 46), 1982



Use of extended techniques is not confined to any one area of contemporary music, but the practice is at its most effective in compositions that concentrate on particularities of timbre and pitch. Such music often lies outside the mainstream of composition, and it would be pointless to try to identify trends in such a fragmented area. However, there are certain variations of tone and articulation that are common enough to be worth

listing. Some, such as the use of quarter-tones,⁴ the precise notation of mute opening and closing, hitting the instrument, making pops by pulling tuning-slides out rapidly, playing on the mouthpiece alone or plugging it into odd components of the instrument are self-explanatory and need no detailed description here. Others are more substantial. The most invasive and impressive of all is multiphonics. If one note is played and another sung simultaneously the two wave forms will, if the sung note is strong enough, interfere with one another. Should both belong to the same harmonic series, certain partials will become resonant in sympathy. Thus, if one plays a low B \flat (B \flat_2) and sings the D (D $_4$) a tenth above it, in tune and in balance, an F (F $_3$) will appear between them. The effect is a little unearthly and rather startling: it was this that Weber had in mind in his horn concertino (Ex. 21).

Ex. 16 Bernd Alois Zimmermann, *Die Soldaten*, Prelude (p. 25), 1958–60, rev. 1963–4

The image displays a page of a musical score for Bernd Alois Zimmermann's *Die Soldaten*, Prelude. The score is written for a large ensemble, with multiple staves for various instruments. The notation is highly complex, featuring many beamed notes, rests, and dynamic markings. The score is arranged in a traditional format with staves numbered 1 through 12 on the left. The notation includes a variety of note values, rests, and dynamic markings, indicating a highly textured and complex musical piece.

Ex. 17 György Ligeti, *Kammerkonzert* (closing bars), 1969–70

tempo primo pochiss. rall. molto senza tempo ca. 15"

♩ = 80

54

55

Fl. *fff feroce* *pp* *sempre pp*

Ob. *fff feroce*

Cl. I *fff feroce* *pp* *sempre pp*

Cl. basso *fff feroce*

Tbn *senza sordino* *gliss.* *pp dolcissimo*

Org. (Arm.) *sempre pp*

Cel. *(klingt Oktave höher)*
(sounds an octave higher) *pp* *sempre pp*

Vn I *(tr b)*

Vn 2 *(tr b)*

Vla *(tr b)*

Vc. *(suono reale)*

Cb. *(suono reale)*

* Trombone begins glissando immediately. Play evenly, no diminuendo.

If the interval between the notes is small, the interference results in a rhythmic beating which breaks up the tone and blurs one's sense of its pitch. If the notes are a fraction of a tone apart, the beat is slow, accelerating as the interval widens. Small trombone-playing boys often discover that by holding a sung note, playing a unison then glissandoing upwards, they can produce a fair imitation of a Spitfire flying past. In doing so, they grasp the principle behind multiphonic technique, that the sum of two musical notes

can be a sound in which pitch is of secondary value to colour. This is the technique that provides *Sequenza V* with its peculiar sound world.

Ex. 18 Bernd Alois Zimmermann, *Musique pour les soupers du Roi Ubu* (3rd movt, 'Pile, Cotice et l'Ours', bars 23–31), tuba part, 1966



Multiphonics are most potent on long instruments, and easier to achieve on those with a conical bore like the tuba. Even then, they are not always easy to control and their usefulness on the trumpet is very limited. In his *Sequenza X*, Berio eschews them in favour of precisely notated articulations (a preoccupation that extends into a great many of his other works, to the point where rapidly repeated notes have largely superseded other devices as the prime way of modifying sound). The enormous solos for trumpet in Stockhausen's *Donnerstag aus Licht* (1983) are similarly free of singing, despite the extensive use of other effects.

Other, less demanding, devices are used sporadically by many composers. Occasionally, it is asked that a text be sung into the mouthpiece, which renders it unintelligible but makes an interesting noise, and on odd occasions it is requested that the lips be buzzed while words are spoken. The tongue and mouth-cavity alterations thus produced do modify the sound to a certain extent, but the impact is not in proportion to the effort expended.⁵ More striking than most vocal sounds is the amplified hiss, produced when one simply blows air into the instrument. This is used extensively in Salvatore Schiarrino's disquieting *Autoritratto nella notte*, to depict the stertorous breathing of an encumbered sleeper. Curiously, Stockhausen seems to be the only composer to have noticed that mere blowing is inaudible and that a gentle sibilant is needed to produce the required effect.

The varied use of the tongue is a standard technique in contemporary music. The flutter, produced by rolling an 'R' while one plays, is well

understood, though it is worth mentioning that some very fine players are, for no apparent reason, unable to do it, and may resort to gargling instead, which is uncomfortable and unsatisfactory. The ‘slap tongue’ is easier to achieve: one blows hard and pokes one’s tongue into the embouchure to produce a percussive ‘whht’. John Kenny’s *Sonata for Alto Trombone* (1995), an entertaining work somewhat redolent of the spirit of Cathy Berberian’s *Stripsody*, uses the slap tongue to imitate a rhythm section. Repeated notes accelerating into a flutter are popular with some composers, but have achieved limited popularity because the ability to tongue quickly seems to some extent to be a question of natural endowment rather than acquired technique. The extended trumpet solo in *Donnerstag aus Licht* (1983) ([Ex. 22](#)) is a compendium of special effects that can be achieved on the trumpet.

Ex. 19 Iannis Xenakis, *Eonta* (bars 426–9), 1963–4

426 *ff* *fff*

Tpt 1
in C

Tpt 2
in C

Tbn 1

Tbn 2

Tbn 3

Pfte

mf

427

(fff)

(fff)

(fff)

(fff)

(fff)

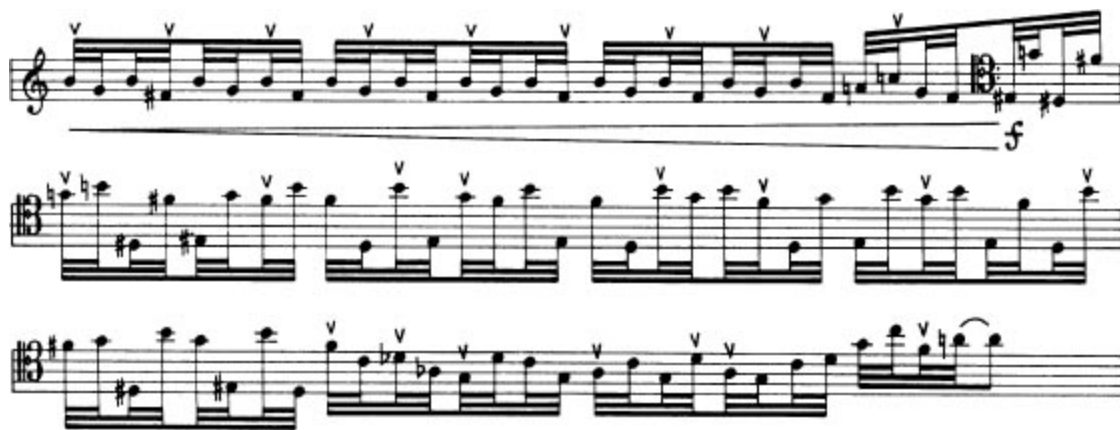
f

The image displays two systems of musical notation, measures 428 and 429, for an electroacoustic composition. Each system consists of five staves. The top four staves are for individual instruments or voices, and the bottom staff is for the piano accompaniment. The notation includes various musical symbols such as notes, rests, and dynamic markings. The key signature is one sharp (F#), and the time signature is 4/4. The notation is complex, with many notes and rests, and some measures contain multiple notes on a single staff. The piano part features dense chords and arpeggios. The overall style is contemporary and experimental.

The distinguished electroacoustic composer J. W. Mortenson was going too far when he stated that his chosen medium ‘cannot under present cultural conditions ... be psychologically classified as music’,⁶ but audiences are undoubtedly resistant to it. It may simply be that they feel the need of a living performer: the cult of personality that dominates the concert world in the late twentieth century suggests that this may be so. In that case, the addition of a real player to the loudspeaker may be the solution, and there is a substantial amount of music that uses brass in this

way. There are problems, however. If a tape is simply used as an accompaniment, the player is apt to be oppressed by the machine's inflexible time-code. Most of his energy goes into accommodating the clock, and one is left with the feeling that he is only there pending the invention of a synthesiser capable of making the same noises. Barry Anderson's *Sound the Tucket, Sonance and the Note to Mount* (1984) is a case in point. It pits a considerably distorted trombone against alarming and menacing sounds, describing the night before a battle. However, the drama is vitiated by the fact that the soloist has very little freedom and his part soon sounds like a mere list of extended techniques. Others are more subtle, particularly improvisers. Jonathan Impett's 'metatrumpet, for example, is an instrument covered with sensors which enable a computer to react, not only to the sounds the player makes, but also to his physical movements, enabling him to conduct a highly controlled and interactive improvisation duet with his electronics.⁷ Jonathan Harvey's combination of a Baroque form with technology in *Ricercare una melodia* (1985), for trumpet and delay, builds a moving polyphonic structure from a conventionally played melody which, in the final section, becomes slower and deeper until the sense of pitch is lost in a sea of resonance and booming.

Ex. 20 Iannis Xenakis, *Keren* (p. 3, systems 8, 9 and 10), 1986



Ex. 21 Carl Maria von Weber, Concertino for Horn and Orchestra (J. 188), final movement, cadenza (173 bars from end), 1806, rev. 1815 (given here at concert pitch)



Ex. 22 Karlheinz Stockhausen, opening of *FORMEL* (*EINGANG* und *FORMEL*) (bars 1–12), from Act 2, *Donnerstag aus Licht*, 1983.

FORMEL

4 $\text{J} \cdot 85$ 75.s 3 85 90 75.s genau mit dick

(H) vibr. Hand vor Öffnung

2 90 5 2 71 3 67 5 85 120

(R) habe (W) habe habe habe (W) in 3 Stufen hinein [u]

85 63.s 3 85 5 80

vibr. 3 3 Flüg. (man hört sehr hohe Oberläufe fliegen)

0 a o u ta - - - - - ta ta ta ta ta

Zungenstoß, kaum Ton
(Zunge gegen vorderen Gaumen pressen und
äußerst plosiv [t] bzw. [d] knallen lassen)

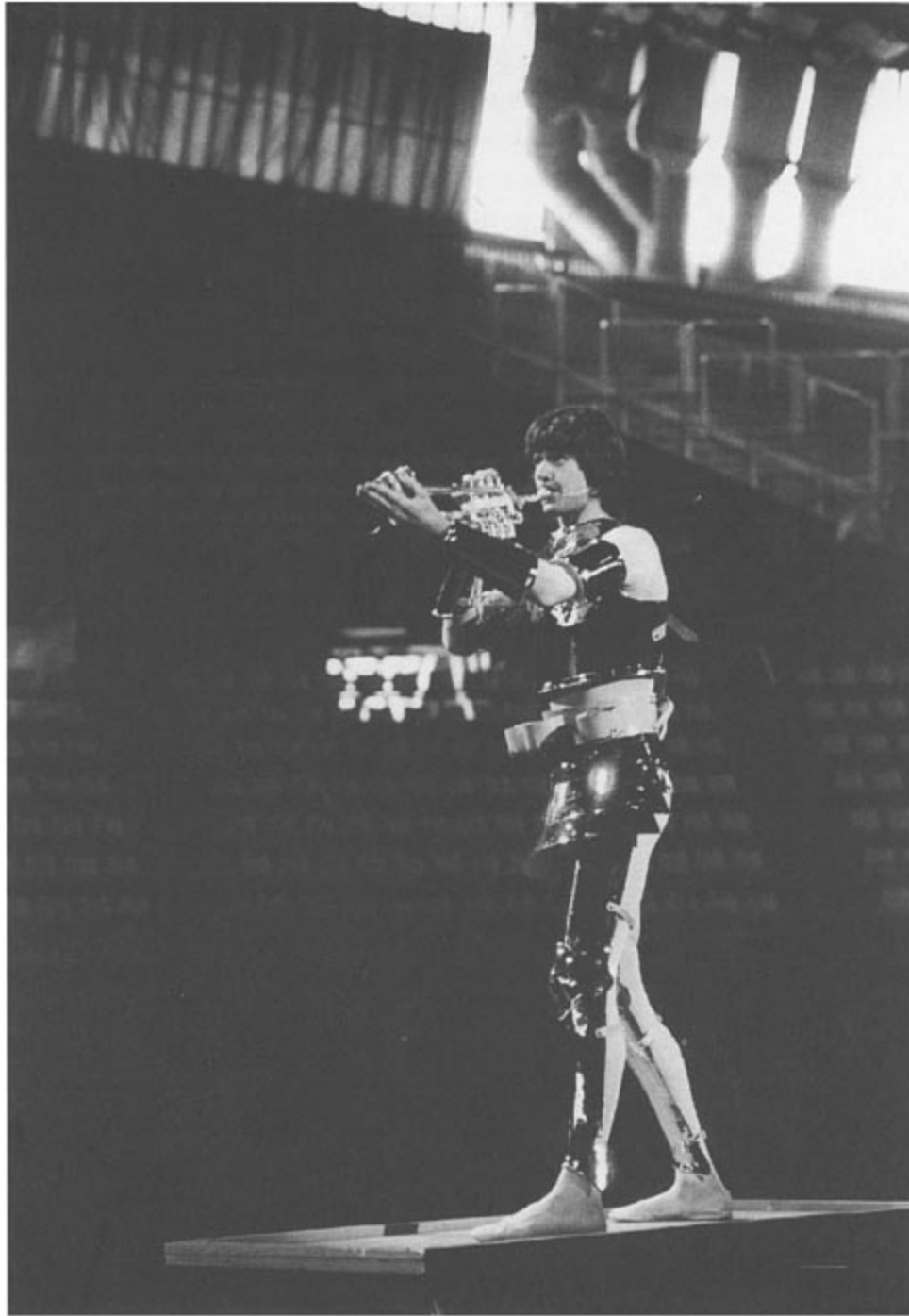


Figure 42 Markus Stockhausen (b. 1957) performing Stockhausen's SATURDAY from LIGHT.

When one surveys the extraordinary range of timbre modifications available to composers, one is struck by how little they have been used. Many influential composers avoid them. The reasons for this are, at least in part, practical. Multiphonics are intimate effects: they tend to sound like

flutter tonguing when heard in an ensemble – and of course they are not uniformly available to male and female players. Some techniques are elusive. For example, if one plays a very loud high note on the french horn and at the same time runs a dry thumb round the bell of the instrument, in the manner of a tambourine player trilling, an alarming twitter is produced that would no doubt have found its way onto many a composer's palette, were it not for the fact that very few people seem to be able to manage the trick. Many fine instrumentalists cannot trill convincingly, or find the slap tongue painful. A successful composer, by definition, has many performances and cannot be blamed for wanting to avoid difficulties that would arise as a result of asking for sounds that cannot be counted on to appear. It has also to be admitted that a composer with a good technique can achieve extraordinary things by the application of well-calculated conventional sounds. The English composer James Wood, who is much concerned with the expressive powers of microtones, is particularly successful in this respect. *Phaenomena* (1991) includes a passage several minutes long for Harmon-muted trombone, in which the player executes a mixture of precise quarter-tones and long notes that drift slowly away from the basic pitch. The effect is as finely inflected and expressive as speech, and is so well thought out that it requires on the part of the player neither an imaginative grasp nor sympathy with the composer's intentions in order to succeed ([Ex. 23](#)).

Ex. 23 James Wood, *Phaenomena* (239–54), 1991. [The directional symbols (such as the one after the first note of bar 239) instruct the player to drift away from the written pitch as soon as the note begins].



In other cases, a simple effect is more potent if only because it is more physically powerful; this is the case in *Atrées* by Xenakis, where a prolonged passage of very loud flutter-tongued low notes for trombone almost becomes a concrete device. The obsessive, widely spaced repetitions of a C (C₄) for trumpet in Heine Goebbels's brass quintet *Herakles II* (1993) achieve a similar impact.

In many cases, personal language simply bypasses the need for extended techniques. Giacinto Scelsi wrote sets of pieces for solo trumpet, horn and trombone which are concentrated, meditative works, often based on a single note, and which use quarter-tones freely. In the context of such static music, the shift of a quarter tone becomes a bold gesture and more extravagant displays would be out of place. In *Maknongan* (1966) for tuba (or double bass, bass saxophone, or bass voice) he makes few indications as to performance, beyond the instruction to play *cupo* or *chiaro*, and is content to explore details of sonority within a small frame. Peter Maxwell Davies, Harrison Birtwistle and others absorbed the dissonant vernacular of the music heard at Darmstadt, but used it as an imaginative language, not a

schematic one. Maxwell Davies wrote a trumpet sonata while an undergraduate, and has since produced a substantial concerto for the instrument and a double concerto with horn (*Strathclyde Concerto No.3*, 1993). In all three cases the use of the soloist is entirely conventional, as is also the case with the solo horn piece *Sea Eagle* (1982). The range required is wide, as is the flexibility within that range, but all the notes are conventionally blown. In the Trumpet Concerto he is no more specific in his muting requirements than writing *con sord!* The same is true of Birtwistle's *Grimethorpe Aria* (1973) for brass band and *Endless Parade* (1986) for trumpet and orchestra.

As the range of sounds elicited from brass has increased, the variety of instruments in general use has declined. To some extent, the standardisation of playing styles and instruments that I complained of in [Chapter 12](#) has helped the development of advanced techniques. The new instruments may be bland, but they are user-friendly and make it easier to play extremes of register and some of the more exotic sounds described above. It is curious, however, that composers in pursuit of new timbres have made such scant use of the alto trombone, the Wagner tuba and the bass trumpet, or even of the cornet. Birtwistle's *Ritual Fragment* (1990) contains a solo for bass trumpet and one is used in Henze's *Sonata per Otto Ottoni* (1987).⁸ But, in the main, composers have not explored far. Performers of the music of earlier generations have found a rich feast of sonorities in old instruments. There is no reason why the composers of our own day should not do so as well. It is no doubt a sanguine hope, but perhaps somebody will one day be persuaded to write a new concerto for ophicleide!

Glossary

Aïda trumpety, a straight valved trumpet made for use on stage.

Alphorn, wooden horn used in the Alps and other European regions. On the larger sizes, 3–5 metres long, a series of twelve or more notes can be sounded. The bore very closely approximates to a section of a cone. Modern alphorns generally have detachable mouthpieces.

Alta band, fifteenth-century band often of three or four in number and equally often consisting of shawms and trombones.

Althorn, brasswind instrument of intermediate bore diameter and with profile midway between those of a trumpet and a flugelhorn, played with a cupped mouthpiece. The word usually denotes such an instrument built in 6ft F or 7ft E_♭, (a tenor saxhorn) but has also been used for larger instruments.

Alto horn, American term for althorn.

Amor-Schall, an early keyed horn developed by Kölbel.

Antinode, see pressure antinode or velocity antinode.

Ballad horn, brasswind instrument of intermediate bore diameter and profile pitched in 8ft C, intended to facilitate the performance of untransposed vocal parts in domestic music-making with the usual fingering of valved brasswind instruments.

Baritone, the baritone saxhorn, member of the saxhorn family in 8ft C or 9ft B_♭ with narrower bore than the bass saxhorn of the same pitch (euphonium).

Bass horn, a bass brasswind instrument usually in 8ft C, virtually a serpent made of metal in the form of a letter V with a long curved crook inserted into one branch (q.v.).

Bass trumpet, trumpet with approximately the same range as a tenor trombone, usually in 8ft C or 9ft B_♭.

Basson russe, see Russian bassoon.

BB_♭ bass, contrabass tuba in 18ft B_♭.

Bell, the end of the instrument furthest from the mouthpiece.

Bersag horn, a bugle with (usually) a single valve made in different sizes for band use in Italy.

Bezel, a ring of metal, usually semicircular in cross-section, added to the outside edge of a brass instrument bell to provide rigidity. It is distinct from the round wire which fulfils the same function but is enclosed below the folded sheet metal of the garland (q.v.).

Blechblasinstrumente, Ger.: brasswind instruments.

Bombardon, a bass tuba, generally in 13ft E_b with three or four valves.

Bow, a part of the tubing of an instrument of approximately semicircular shape.

Branches, long, straight parts of the tubing of an instrument.

Brass band, a band in which all or most of the instruments are brass instruments. The British version has a specific instrumentation (see [Chapter 13](#)) but most other brass bands do not.

Brasswind, term generally used for instruments made from any material in which the tone-producing element is a column of air, one end of which (the mouthpiece) is placed against the player's lips and the other end of which (the bell) radiates sound.

Bugle, a brasswind instrument with approximately conical bore profile; in the USA, a doubly folded signalling instrument which is actually a natural trumpet in 5ft G.

Buisine, a term used in the late Middle Ages for a large horn or trumpet.

Bumper, English colloquialism. An extra player who supports the first trumpet, horn or trombone player in demanding concerts by playing louder passages.

Cavalry trumpet, a natural trumpet for signalling.

Cimbasso, word used to describe the lowest brass part in many Italian nineteenth-century opera scores.

Clapper key, a key on a cornopean (q.v.) covering a tone-hole; used for trills.

Clarino, It.: the upper register of a trumpet in which the partials lie close enough to allow a scale to be played.

Clarion, imprecise term which has at times been used for various signalling trumpets and bugles.

Clavicor or althorn, brasswind instrument of intermediate bore profile at alto or tenor pitch.

Clavitube, French term used in Halary's patent for the keyed bugle.

Coach horn, British late nineteenth-century straight horn of approximately conical bore profile.

Compensating valves, system of constructing brasswind instruments whereby the air passage for some notes is led through some of the valve pistons twice in order to give better intonation when valves are used in combination.

Contrabass trombone, trombone in 16ft C or 18ft B_1 , an octave below the tenor trombone, usually with a compass descending to E_1 . Slide and valve versions have been made, the former generally with a double slide to give the same slide positions as the tenor.

Co-operative regime, the acoustical phenomenon in which a number of the spectral components (q.v.) of a sustained sound on a brass instrument resonate with and are supported by the modes of vibration of the air column inside the tube.

Coquilles, the tubing inside piston valves which can form part of the windway.

Cor, Fr.: horn, french horn.

Cornet, valved posthorn.

Cornet à pistons, Fr.: cornet.

Cornett, lip-mouthpiece conical instrument with finger holes.

Cornetta, It.: cornet.

Cornettino, small cornett, generally pitched a fifth higher than the ordinary cornett.

Cornetto, It.: cornett.

Corno, It.: horn, french horn.

Cornocean, English name for early models of cornet.

Cornophone, valved brasswind instrument of approximately conical bore profile played with mouthpiece like that of french horn, patented by Fontaine Besson in 1890.

Cor-solo, natural french horn with fixed mouthpiece and alternative tuning-slides for playing in the keys used for the solo repertoire: G, F, E, E_b and D.

Coupler, loop of tubing inserted between a crook and an instrument such as a french horn for playing in a lower key than that of the crook alone.

Crook, loop of tubing for an instrument such as a french horn. Terminal crooks fit into the instrument (or a coupler) at one end and receive the mouthpiece (or a tuning bit) at the other. The choice of crook or shank (q.v.) determines the key in which the instrument will play.

Crucible, a ceramic vessel used for melting metal in a furnace.

Cuivre, Fr.: brasswind.

Cupel, a small ceramic vessel used in the purification of metals.

Demilune trumpet, a natural trumpet made in a crescent shape so that the player's hand can be placed in the bell to 'stop' notes as required.

Double horn, french horn capable of playing at either of two basic pitches, selected by a valve (generally the fourth). The basic three valves are equipped with two sets of valve loops and tuning-slides.

Double-tonguing, technique for playing very fast duplets (tu-ku, tu-ku).

Doubling, word used to describe the action of a player who routinely plays more than one instrument.

Duplex instrument, a valved instrument with an extra valve placed in the windway (after the usual three or four playing valves) which can divert the windway to a completely different bell.

Echo cornet, a duplex instrument (q.v.) with both a normal cornet bell and an alternative bell which gives a muted effect.

Euphonium, tenor tuba or bass saxhorn pitched in 9ft B₁ (sometimes 8ft C) with three or four valves, sometimes five; with wider bore than the baritone saxhorn of the same pitch.

Factitious note, a privileged note (q.v.).

Fanfare, in colloquial German, a natural trumpet for signalling and marching-band use.

Ferrule, a sleeve fitted over the joint between two sections of tubing.

Flatt trumpet, English slide trumpet of the late seventeenth century with the slide in the bow nearest to the player.

Flicorno, Italian brasswind instrument, the smaller sizes similar to flugel-horns, larger similar to tubas.

Flugelhorn, *Flügelhorn*, valved bugle.

Flutter-tonguing, effect used in modern music and jazz produced by quickly and repeatedly interrupting the flow of air through the lips.

Formant, a region of the spectrum where the components are consistently strong regardless of the exact fundamental frequency of the note being sounded.

French horn, brasswind instrument; now often called simply 'the Horn'; the old term 'french horn' is used to distinguish it from other horns.

Garland, an annular strip of metal fixed to the outside of the bell of some brass instruments at the rim.

Garnishing, a decorated ferrule (q.v.).

German silver, white bronze.

Glissando, on trombones a glissando is produced by moving the slide when sustaining a note. Less effective 'glissandos' are sometimes notated for valve instruments.

Gusset, a triangular section of metal inserted into the sheet metal of a bell before it is formed, to provide extra expansion and ease of forming.

Hand-horn, a natural horn designed for use with the player's hand placed in the bell and used to 'stop' notes as required.

Harmonic series, a series of numbers (especially frequencies) which are exact integer multiples of the lowest member (the fundamental); with brass instruments the frequencies of the components of a sustained sound form a harmonic series.

Harmonics, the term is sometimes loosely used for the fundamental frequencies of the series of notes which can be sounded by a player on a brass instrument with a given setting of any slide or valves. These, however, form only an approximation to a harmonic series.

Helicon, form of tuba with the tubing made in a wide coil to go round the player's body and rest on one shoulder.

hertz (Hz), unit of frequency, equivalent to one cycle per second.

Historic instruments, surviving specimens of older forms of instrument.

Historical instruments, modern instruments copied from or inspired by old models.

Horn, in broad classification of lip-vibrated aerophones into horns and trumpets, the term 'horn' is preferred for instruments made from animal horn or tusk, or with a shape derived from these but in other materials, and thus of predominantly conical bore profile such as the bugle. The term is often used without qualification for the french horn.

Hz, see hertz.

Inventionshorn, a french horn with a fixed mouthpipe and a number of tuning-slides of different tube lengths instead of terminal crook.

Inventionstrompete, a term first used by Wöggel to describe a half-moon shaped, hand-stopped trumpet; then used by Nessman and Weidinger to describe their keyed trumpets. In current use the term can designate a trumpet which is provided with an extra loop of tubing containing a 'U'-shaped tuning-slide.

Jagdhorn, Jägerhorn, Ger.: hunting horn.

Key, or tacquet, in piston valves, a small projection from the side of the piston which runs in a groove or 'keyway' on the inside of the valve casing and keeps the piston in the correct alignment.

Keyed brass, a generic term used to describe all vented cylindrical and conical brasses which use woodwind-style keys. These instruments include, but are not limited to, keyed trumpets, keyed bugles and ophicleides. Keyed serpents, bass horns and various post-ophicleide types can also be included in this family.

Keyed bugle, conical bore bugle, most commonly single-wound, with five to twelve woodwind-style keys.

Keyed trumpet, double wound, 2/3 cylindrical bore trumpet with three to five woodwind-style keys.

Klappe, Ger.: key.

Klappenflügelhorn, German term for keyed bugle.

Klappenhorn, German term for keyed bugle.

Knuckle, a small piece of tubing, usually angled, connecting the valve casing to other tubing.

Lip-trill, a trill achieved without moving a valve or slide. Such trills need not be between adjacent notes.

Lipping, the technique of adjusting the intonation of notes by modifying lip position and tension.

Lyre, a small sprung mechanism that can be fitted on an instrument to hold music when the player is marching.

Maillechort, Fr.: german silver.

Mandrel, a piece of steel of the exact shape required for the inside of a part of an instrument on which that part can be worked to bring it into its correct shape.

Master crook, one of a small number of terminal crooks which were used on some french horns in conjunction with a larger number of couplers (q.v.).

Mellophone, American: tenor cor or other large-belled alto or tenor instrument of intermediate bore profile.

Mode of vibration, the air inside a brass instrument can sustain standing waves (q.v.) at certain quite well-defined frequencies, known as the frequencies of the 'modes of vibration' of the air column.

Mouthpiece, the part of the brass instrument against which the player's lips are placed. The size and shape of the 'cup' or mouthpiece cavity are

important determinants of the instrument's intonation, tone-quality and ease of sound production. Mouthpieces for all except some signalling instruments and the mute cornett are detachable, and, to some extent, interchangeable between instruments.

Mouthpipe, the section of tubing of a brass instrument extending from the mouthpiece receiver to the next joint. In most instruments the mouthpipe receiver is tapered inwards to receive the mouthpiece, and the mouthpipe is of expanding bore profile to continue the expanding internal bore profile of the mouthpiece. The bore profile of the mouthpipe is an important determinant of the instrument's intonation, tone-quality and ease of sound production.

Mute, an object placed in the bell of an instrument which affects the radiation of sound from the instrument and modifies its tone-quality. French horn players are sometimes required to mute with their hand.

Mute cornett, straight wooden cornett with the mouthpiece turned out of the same piece of wood as the body.

Natural horn, a french horn without valves or other mechanical device for altering the tube length while playing.

Natural trumpet, a trumpet without slide, keys, valves or other mechanical device for altering the tube length while playing.

Neusilber, Ger.: german silver.

Node, see pressure node or velocity node.

Omnitonic horn, a natural horn with a mechanism for adjusting the tube length before playing so that it can be played with comparable facility in all keys.

Ophicleide, bass member of the keyed bugle family in the shape of a bassoon. Developed by Aste (Halary).

Orchestral horn, term sometimes used for the french horn.

Ottoni, It.: brasswind instruments.

Out of notes, kinds of playing which emphasise timbre, microtuning and/or space, at the expense of mean-tempered pitches and conventional instrumental sound and melodic delivery.

Overtone, a word sometimes used for the spectral components (q.v.) of a sustained sound higher than the fundamental. Confusion is sometimes introduced by using the term 'overtone' when wishing to identify specific members of the series. For clarity it is preferable to speak of harmonics –

the second harmonic is at twice the frequency of the fundamental, the third harmonic at three times, etc.

Partial, an ill-defined word sometimes used for the modes of vibration (q.v.) of an air column except the one at the lowest frequency, sometimes for the spectral components (q.v.) of a sustained sound higher than the fundamental, and sometimes for the series of notes that can be sounded on a brass instrument with a given setting of any slide or valves (except the pedal note – q.v.).

Pavilion, Fr.: bell.

Pea-shooter, English colloquialism for a narrow-bore (usually tenor) trombone of the type produced in Britain in the first half of the twentieth century.

Pedal notes, the pedal note is the lowest of the series of notes that can be sounded on a brass instrument with a given setting of any slide or valves.

Perinet valve, the most common form of piston valve.

Period instrument, see historical instruments.

Piffaro, It.: piper, but used in the sixteenth century to mean a wind player – particularly a shawm or cornett player.

'*Plug*', colloquial term used in Britain to describe the thumb valve on modern trombones; 'trigger' is also used.

Posaune, Ger.: trombone.

Posthorn, a small coiled or straight instrument with gently expanding, approximately conical bore profile.

Pressure antinode, a point in the air column where there is a local maximum of fluctuation in pressure during the production of a sustained sound. Pressure antinodes correspond to velocity nodes (q.v.). There is a pressure antinode in the mouthpiece of a brass instrument.

Pressure node, a point in the air column where there is no fluctuation in pressure during the production of a sustained sound. Pressure nodes correspond to velocity antinodes (q.v.). There is a pressure node in the region of the bell of a brass instrument.

Privileged note, a note not in the usual series of notes that can be sounded on a brass instrument with a given setting of any slide or valves, but which can nevertheless be produced by a player through the mechanism of a co-operative regime (q.v.).

Quinticlave, a small ophicleide pitched in 6ft F or 7ft E_b , a fifth below the keyed bugle.

Rozhok, Russian folk cornett with integral mouthpiece.

Russian bassoon, a form of serpent or bass horn with a 'U'-shaped section of tube fashioned in a single piece of wood like the butt of a bassoon.

Russian horn, one of a set of conical-bore natural instruments, used so that each instrument in the set sounds only one note, each player contributing this one note as required for the melody and accompaniment played by the band as a whole on the set of horns.

Sackbut, sixteenth- to eighteenth-century English name for the trombone; now often used to denote the earlier trombone models and their modern reproductions.

Saxhorn, family of brasswind instruments patented by Adolphe Sax in 1843, the smaller members with bore profile intermediate between conical and cylindrical, the bass and contrabass members with a larger bore somewhat more conical in profile; the tenor horn, althorn, baritone, euphonium and tuba more or less correspond to members of the family.

Saxotromba, brasswind instrument patented by Adolphe Sax in 1845 having a bore profile intermediate between the saxhorn and the trumpet or the trombone; made in a range of sizes similar to those of saxhorns but not as extensively used.

Schallstück, Ger.: bell.

Screaming, colloquial term for very high playing in jazz.

Serpent, side-hole lip-reed instrument.

Serpent Forveille, variety of the serpent made in the 1830s with brass body and wooden bell.

Shank, a straight piece of tubing for an instrument such as a cornet fitting into the instrument at one end and receiving the mouthpiece (or a tuning bit) at the other. The choice of shank or crook determines the key in which the instrument will play.

Shofar, Jewish lip-vibrated instrument made from a ram's horn.

Signifyin', a term from Afro-American critical theory, used in jazz studies to refer to the kinds of expression in which there is looseness, illogicality and multiplicity of means and effect. The term contrasts with 'signification', viewed as comprising more fixed and logical forms of expression.

Slide, on a trombone, the telescopic 'U'-shaped device for altering the sounding length of an instrument. See also tuning-slide.

Sousaphone, form of tuba with the tubing made in a wide coil to go round the player's body and rest on one shoulder and terminating in a large bell, 600mm. or more in diameter.

Spectral components, when a sustained sound is produced on a brass instrument, the air inside the instrument vibrates not only at the frequency of vibration of the player's lips, but also at exact integer multiples of this frequency. These are the spectral components of the sound, sometimes called 'overtones'.

Stadtpeifer, Ger.: used in the plural, town band broadly similar to waits (q.v.), or members of the same; used in the singular, member of such a town band.

Standing wave, a vibration state where sound waves travelling within the instrument and reflected at each end combine, so that at certain positions they cancel to create a pressure node (q.v.), while at others they add to create a pressure antinode (q.v.). A sustained sound on a brass instrument requires standing waves.

Stay, a component of folded or coiled brass instruments which strengthens their structure by rigidly connecting two parallel or nearly parallel sections of tube.

Stocking, an expansion of the end of the inner tube of a slide pair of a trombone, intended when lubricated to provide an airtight seal with low frictional resistance.

Tacquet, or key, in piston valves, a small projection from the side of the piston which runs in a groove or 'keyway' on the inside of the valve casing and keeps the piston in the correct alignment.

Tenor cor, tenor horn in 6ft F or 7ft E_b with large bell, coiled as a french horn; has been used as a substitute french horn mostly in bands.

Tenor horn, the tenor saxhorn, member of the saxhorn family in 6ft F or 7ft E_b .

Tenorbass Posaune, Ger.: a slide trombone in B_b , with thumb-valve for F capable of playing parts for both tenor and bass trombone.

Tenorhorn, Ger.: an instrument in 8ft C or 9ft B_b ; similar to a baritone or bass saxhorn (or euphonium).

Transient, the sound produced at the start, end, or at any point of change in a sustained sound. Starting transients are particularly important tonal characteristics.

Transposing instrument, an instrument for which music is conventionally written at a pitch other than that at which it sounds; some of the many instruments normally treated as transposing instruments are trumpets, horns and saxhorns.

Triple-tonguing, technique for playing very fast triplets (tu-tu-ku, tu-tu-ku).

Trombone, brasswind instrument characterised by a high proportion of its tubing being cylindrical; most commonly of tenor or bass tessitura.

Trompete, Ger.: trumpet.

Trompette, Fr.: trumpet.

Trompette à clef, French term for keyed trumpet, although it was sometimes used indiscriminately in the early nineteenth century for a keyed bugle.

Trumpet, in broad classification of lip-vibrated aerophones into horns and trumpets, the term 'trumpet' is preferred for instruments made from cane or wooden tubing, or with a shape derived from these but in other materials, and thus of predominantly cylindrical bore profile such as the trumpet and the trombone.

Tuba, the biggest and lowest brass orchestral instrument. Also a type of trumpet used by the Romans.

Tuning-slide, an airtight telescopic joint used to vary the length of the instrument and thus alter the pitch of the notes that can be sounded. Most brass instruments and some others incorporate one or more tuning-slides which are sufficiently stiff not to move in the course of performance. On some instruments such a slide can not only allow tuning with other instruments, but can also be extended to lower the pitch by one or more semitones, giving a different transposition.

Valve, a mechanical device for adding (and sometimes subtracting, in the case of an ascending valve), virtually instantaneously, a fixed length of tubing into the windway of an instrument.

Velocity antinode, a point in the air column where there is a local maximum of air movement during the production of a sustained sound. Velocity antinodes, also known as displacement antinodes, correspond to pressure nodes (q.v.). There is a velocity antinode in the region of the bell of a brass instrument.

Velocity node, a point in the air column where there is no periodic air movement during the production of a sustained sound. Velocity nodes, also known as displacement nodes, correspond to pressure antinodes (q.v.). There is a velocity node in the mouthpiece of a brass instrument. *Vent hole*,

a hole in the wall of a wind instrument. On brass instruments such as some valveless trumpets used to play parts written for natural trumpet, small vent holes are closed by the player's fingers, being opened one at a time to assist the production of certain notes.

Ventil, Ger.: valve.

Vienna horn, a valved french horn with three Vienna valves sometimes used in Austria for traditional repertoire.

Wagner tuba, an instrument in either 9ft B \flat , or 12ft F developed to meet Wagner's requirement for a saxhorn-like instrument playable by french horn players with their usual mouthpieces.

Waits, British civic band employed by cities. In the sixteenth and seventeenth centuries trombones and cornetts were prominent in them.

Waldhorn, Ger.: french horn.

Waterkey, key used to release water caused by the evaporation of a player's breath on the inner walls of an instrument.

Wedding parties, name by which some Indian brass bands are known.

Yard, of trumpets, one of the three long straight component tubes of a natural trumpet.

Zink, Ger.: cornett.

Zug, Ger.: slide.

A note on the measurement of brass instruments

We use the traditional convention to denote the nominal sizes of brass instruments. This serves to distinguish between one instrument and another of the same nominal pitch but of double or half the tube length. The actual compass of notes will depend on the particular instrument and the repertoire. For instance, a french horn in 12ft F will often play a part lying higher than a part for an ophicleide in 8ft C.

Note that this is a different conventional use of the word 'foot' from that used in specifying organ and harpischord stops, though both conventions stem from the useful coincidence that a conical or openended cylindrical pipe sounding a series of resonance mode frequencies approximating to a harmonic series based on the fundamental C₂ has a length of just about 8ft.

In the table below we show, for the more common conventional sizes, the actual length of a perfect cone sounding the corresponding series at A₄ = 440 Hz and some examples of instruments commonly built at that pitch.

The actual tube length of an instrument (ignoring valve loops etc.) is, in fact, some 5–15 per cent shorter than the equivalent cone length, depending on the exact bore profile. The actual length will also depend on the pitch standard at which the instrument is designed to be played.

Nominal size	Equivalent cone length	Common examples
2ft B _♭	0.74m	Piccolo trumpet
2 1/2ft A _♭	0.83m	Post horn
3ft F	0.99m	High F trumpet
3ft E _♭	1.11m	Soprano cornet
3 1/2ft D	1.18m	Bugle horn, orchestral trumpet
4ft C	1.32m	Orchestral trumpet
4 1/2ft B _♭ ,	1.48m	Bugle, cornet, flugelhorn, B _♭ , valve trumpet
5ft A	1.56m	Post horn
5ft A _♭ ,	1.67m	Cornet crooked in A _♭ ,
5ft G	1.76m	Keyed trumpet, American bugle
6ft F	1.98m	Slide trumpet, low F trumpet, coiled posthorn
7ft E _♭	2.22m	Alto trombone, tenor horn
7ft D	2.36m	Natural trumpet
8ft C	2.65m	Natural trumpet, serpent, ophicleide, high C tuba
9ft B _♭	2.97m	Tenor trombone, B _♭ , french horn, baritone, euphonium
10ft A _♭	3.33m	A _♭ , alphorn
11ft G	3.53m	G bass trombone
11ft G _♭	3.74m	G _♭ , alphorn

12ft F	3.96m	F french horn, F bass tuba
13ft E \flat ,	4.45m	French horn crooked in E \flat E \flat , bass tuba
14ft D	4.71m	Trompe de chasse, natural horn
16ft C	5.29m	Natural horn, low C bass tuba
18ft B \flat	5.94m	French horn crooked in B \flat basso, low B \flat bass tuba

Lengths calculated for a speed of sound in free air of 346 metres per second.

Notes

Introduction

1 Stanley Sadie (ed.), *The New Grove Dictionary of Music and Musicians*, 20 vols. (London, 1980).
2 *The Historic Brass Society Journal* is published annually from New York City. The Society also publishes an annual newsletter.

1. Lip-vibrated instruments of the ancient and non-western world

1 I would like to thank Rodger Blum, William Seigh, Ruth Solie and Trevor Herbert for reading and commenting on drafts of this chapter.
2 E. M. von Hornbostel and C. Sachs, ‘Classification of Musical Instruments’, in *Ethnomusicology: An Introduction*, ed. H. Myers (London, 1992), pp. 444–61. The article was originally published as ‘Systematik der Musikinstrumente’, *Zeitschrift für Ethnologie* 46 (1914), 553–90. This basic definition is broad enough to embrace even the highly unusual Chilean *nolkin*, a lip-vibrated instrument to be sure, but one that is sucked, not blown. See Jens Schneider, ‘The *Nolkin*: A Chilean Sucked Trumpet’, *The Galpin Society Journal* 46 (1993), 69–82.
3 G. Dournon, ‘Organology’, in *Ethnomusicology: An Introduction*, ed. H. Myers (London, 1992), p. 245. The classification numbers given in [Table 1](#) are from Dournon’s scheme, pp. 285–6. In transforming her scheme into tabular form, I have indented subcategories to add visual clarity.
4 These general observations come from an informal survey of *Instrument Grove* (for which many thanks go to my research assistant, Sarah Shimchick). While these statistics are extremely rough and mostly take no account of variant names for the same instrument or of the frequency with which a given instrument occurs, they are broadly illuminating. That 176 out of 256 African instruments come from four countries speaks more to reliance on four key sources: J. S. Laurenty, *Systématique des aerophones de l’Afrique central* (Tervuren, 1974); David W. Ames and Anthony V. King, *Glossary of Hausa Music and its Social Context* (Evanston, 1971); Margaret Trowell and Klaus P. Wachsmann, *Tribal Crafts of Uganda* (London, 1953), and Percival R. Kirby, *The Musical Instruments of the Native Races of South Africa* (2nd edition; Johannesburg, 1965).

Area	No.	Comments
Africa	256	includes Zaire (93), Nigeria (38), Uganda (29), South Africa (16)
Europe	81	—
South Asia	45	includes India, Nepal, Pakistan, Sri Lanka, Tibet

South America	16	–
Oceania	14	mostly conch-shell trumpets
Australia	12	mostly local names for didjeridu
East Asia	17	includes China (9), Japan (1), Korea (6), Mongolia (1) but at least 10 of the Chinese and Korean terms are variants/obsolete
South-east Asia	21	from Myanmar to Philippines, never more than 3 per country

- ⁵ C. Sachs, *The History of Musical Instruments* (New York, 1940), p. 280.
- ⁶ Birgit Kjellström, 'Lur (2)', *Instrument Grove*, vol. II, p. 548; 'Borija', *ibid.*, vol. I, p. 252; 'Taure', *ibid.*, vol. III, p. 534.
- ⁷ A. Baines, *Brass Instruments: Their History and Development* (London, 1976/R 1980), p. 37. See also Karl G. Izikowitz, *Musical and Other Sound Instruments of the South American Indians* (Göteborg, 1934), pp. 222–3, and Paul Collaer, *Music of the Americas: An Illustrated Music Ethnography of the Eskimo and American Indian Peoples* (New York, 1973), pp. 148–9.
- ⁸ R. Boonzajer, 'The Minahassa Bamboo Brass Bands', *Brass Bulletin* 77 (1992), 38–47.
- ⁹ Trowell and Wachsmann, *Tribal Crafts of Uganda*, p. 352; 'Imphalamphala', *Instrument Grove*, vol. II, p. 285.
- ¹⁰ Kjellström, 'Lur (2)', *Instrument Grove*, vol. II, p. 548; Trevor A. Jones, 'Didjeridu', *ibid.*, vol. I, pp. 565–6; Anthony Baines, 'Alphorn', *ibid.*, vol. I, p. 49; Gerhard Kubik and David K. Rycroft, 'Ndumbu', *ibid.*, vol. II, p. 755; Arvydas Karaška, 'Daudytė', *ibid.*, vol. I, p. 548; K. A. Gourlay, 'Arupepe', *ibid.*, vol. I, p. 80.
- ¹¹ Baines, *Brass Instruments*, p. 42. For a full description of the construction of metal mouthpieces for Japanese conch-shell trumpets, see Hajime Fukui, 'The Hora (Conch Trumpet) of Japan', *The Galpin Society Journal* 47 (1994), 54.
- ¹² Richard Moyle, *Tongan Music* (Auckland, 1987), p. 95.
- ¹³ Alastair Dick, 'Šankh', *Instrument Grove*, vol. III, pp. 289–90.
- ¹⁴ Don L. Smithers, 'A New Look at the Historical, Linguistic and Taxonomic Bases for the Evolution of Lip-Blown Instruments from Classical Antiquity until the End of the Middle Ages', *Historic Brass Society Journal* 1 (1989), 9. It is clear, however, that Roman terms in particular were not always stable over time. See Renato Meucci, 'Roman Military Instruments and the *Lituus*', *The Galpin Society Journal* 42 (1989), 85–97.
- ¹⁵ This theory appears to stem from Curt Sachs's *The History of Musical Instruments*, p. 280. It does not appear in the work of Sachs's predecessor Carl Engel, who discusses Arabic influence on western instruments – gittern, lute and rebec, in particular – without singling out the trumpet; see C. Engel, *Musical Instruments* (London, 1875), p. 56. Don Smithers disagrees with Sachs's theory, suggesting that although 'it has been fashionable to think of metal lip-blown instruments as having been introduced into Europe after the decline and fall of the Roman Empire ... such influences may well have worked the other way round, that the Muslim world did, in fact, take over the manufacture and use of trumpets from the Romans and their immediate successors' ('A New Look at... Lip-Blown Instruments', 3–5).

- 16 K. A. Gourlay, 'Long Trumpets of Northern Nigeria in History and Today', *African Music* 6/2 (1982), 48–72.
- 17 Mohd. Ghouse Nasuruddin, *The Malay Traditional Music* (Kuala Lumpur, 1992), pp. 162–74. The term *nobat* is related to the South Asian *naubat*, itself derived from the Persian and Central Asian *naqqārakhāna*, an ensemble used for royal, ceremonial, civic, or military music. See John Baily and Alastair Dick, 'Naqqārakhāna', *Instrument Grove*, vol. II, pp. 748–9.
- 18 Carol M. Babiracki, 'Narsīngā', *Instrument Grove*, vol. II, p. 749; Geneviève Dournon, 'Bānkiā', *ibid.*, vol. I, p. 155; Mireille Helffer, 'Dung-chen', *ibid.*, vol. I, p. 636.
- 19 According to the crusader Joinville, 'the sultan's doorkeepers lived in a little tent at the entrance to his quarters, together with his minstrels, whose chief instruments were horns, drums, and a species of tambourine. They made such a din with these at sunrise and sunset that while those who were near could hardly hear one another speak, the sound of them was clearly heard throughout all the camp' (Joinville and Villehardouin, *Chronicles of the Crusades*, trans. M. R. B. Shaw (London, 1963), p. 235).
- 20 Gourlay, 'Long Trumpets of Northern Nigeria', p. 55.
- 21 Mervyn McLean, 'Pū', *Instrument Grove*, vol. III, p. 156.
- 22 John Beattie, *Bunyoro: An African Kingdom* (New York, 1960), pp. 8–9.
- 23 S. Mbatia-Katana, 'Similarities of Musical Phenomena Over a Large Part of the African Continent as Evidenced by the Irambi and Empango Side-blown Trumpet Styles and Drum Rhythms', *African Urban Notes* 5/4 (1970), 25, 31; Trowell and Wachsmann, *Tribal Crafts of Uganda*, pp. 354–5.
- 24 The exceptions are few and far between. Our rough survey of *Instrument Grove* only turned up two lip-vibrated instruments specifically played by women or girls: the *tulnic*, a straight conical alphorn from the western Carpathian region of Transylvania, and the *aporo*, an end-blown tube that 'sounds not unlike a foghorn' found in the Karamojong region of Uganda. In nineteenth-century Canada, a tin tube around a metre in length was used to call field-workers home for meals. Sometimes played by women, this instrument was called a 'dinner horn'. 'Aporo', *Instrument Grove*, vol. I, p. 66; 'Tulnic', *ibid.*, vol. III, p. 674; 'Dinner horn', *ibid.*, vol. I, p. 570.
- 25 Sachs, *The History of Musical Instruments*, pp. 51–2.
- 26 Hence Joinville's description: 'The din this army made with its kettledrums and Saracen horns was terrifying to hear' (Joinville and Villehardouin, *Chronicles of the Crusades*, p. 201).
- 27 Ndumbu trumpets 'are kept in a river concealed from women and blown only at night for secret ceremonies by men and boys' (Gerhard Kubik and David K. Rycroft, 'Ndumbu', *Instrument Grove*, vol. II, p. 755). 'As in other Amazon areas, women are not allowed to set eyes on the *buburé*. It is stored under water to keep it out of sight of the women and also to preserve the bark more efficiently' (Collaer, *Music of the Americas*, p. 148).
- 28 Colin M. Turnbull, *The Forest People* (New York, n. d.), pp. 80–2. Although the *molimo* trumpet was crucial to the *molimo* ceremony, Turnbull was disappointed to find that the BaMbuti valued practicality over sentimentality or 'authenticity'. 'I do not know what I had expected, but I knew a little about *molimo* trumpets and that they were sometimes made out of bamboo. I suppose I had expected an object elaborately carved, decorated with patterns full of ritual significance and symbolism, something sacred, to be revered, the very sight or touch of which might be thought of as dangerous ... But now I saw that the instrument... was a length of metal drainpipe' (p. 75).
- 29 K. A. Gourlay, *Sound-Producing Instruments in Traditional Society: A Study of Esoteric Instruments and Their Role in Male-Female Relations* (Port Moresby and Canberra, 1975), p. 117.
- 30 'Alphorn', *Instrument Grove*, vol. I, p. 48; 'Āzrags', *ibid.*, vol. I, p. 92; 'Eng'ombe', *ibid.*, vol. I, p. 708; 'Tapáe', *ibid.*, vol. III, p. 525.
- 31 Turnbull, *The Forest People*, p. 92; 'Horagai', *Instrument Grove*, vol. II, p. 231; 'Davui', *ibid.*, vol. I, p. 550.

3. Design, technology and manufacture before 1800

- 1 See for example A. Baines, *Brass Instruments: Their History and Development* (London, 1976), pp. 94–107; D. Smithers, *The Music and History of the Baroque Trumpet Before 1721* (Carbondale, 1988), pp. 26–49; E. H. Tarr, *The Trumpet* (London, 1988), pp. 53–62; and D. Altenburg, *Untersuchungen zur Geschichte der Trompete* (Regensburg, 1975), pp. 250–61.
- 2 P. Downey, 'The Renaissance Slide Trumpet', *Early Music* 12, no. 1 (1984), 26–33.
- 3 Downey, 'Slide Trumpet', and W. Wörthmüller, 'Die Instrumente der Nürnberger Trompeten- und Posaunenmacher', *Mitteilungen des Vereins für Geschichte der Stadt Nürnberg*, 46 (1955), 378.
- 4 Smithers, *Music and History*, p. 335, and F. Galpin, *Old English Instruments of Music* (London, 1932), p. 202.
- 5 A. Baines, 'James Talbot's Manuscript', *The Galpin Society Journal* 1 (1948), 9–26.
- 6 The original slide of the Veit instrument (Staatliches Institut für Musikforschung – Preussischer Kulturbesitz, Berlin, No. 639) was lost during the Second World War, and has been replaced by a reproduction. The doubleslide instrument from the collection of the Münchener Stadtmuseum is illustrated by E. Tarr in the *New Grove Dictionary of Music*, vol. III, p. 404.
- 7 H. G. Fischer, 'The Tenor Sackbut of Anton Schnitzer the Elder at Nice', *Historic Brass Society Journal* 1 (1989), 73.
- 8 R. Barclay, *The Art of the Trumpet-maker* (Oxford, 1992), p. 23, and Wörthmüller, 'Die Instrumente', 383–4.
- 9 Various renditions of Hausmann's illustration appear in D. Smithers, 'Bach, Reiche and the Leipzig Collegia Musica', *Historic Brass Society Journal* 2 (1990), 1–51.
- 10 See for example A. Baines, *European and American Musical Instruments* (New York, 1966), p. 132.
- 11 London Museum, accession number 61.20, on loan from HM the Queen.
- 12 Musikinstrumenten-museum der Karl-Marx-Universität, Leipzig, #1835.
- 13 However, this may be more received wisdom than demonstrable fact. The reader is referred to a recent article which deals with this subject in detail and shows that no tuning system really favours the out-of-tune harmonics: T. Collins, 'So How Many Holes is a Baroque Trumpet Supposed to Have?', *Historic Brass Society Newsletter* 9 (1996), 11–15.
- 14 J. M. Dawkins, *Zinc and Spelter* (Oxford, 1950), p. 12.
- 15 See for example L. Ercker, *Beschreibung allefürnemsten mineralischen Ertztund Bergwercksarten* (*Treatise on Ores and Assaying*) (1580), trans. A. G. Sisco and C. S. Smith (Chicago, 1951); and C. Weigel, *Abbildung der gemein nützlichen Hauptstände* (Regensburg, 1698).
- 16 G. Agricola, *De re metallica* (1556), trans. H. C. Hoover and L. H. Hoover (New York, 1950), p. 487.
- 17 J. Gimpel, *The Medieval Machine* (London, 1977), p. 66.
- 18 H.-U. Haedeke, *Metalwork* (New York, 1970), p. 28.
- 19 J. N. Ball, *Merchants and Merchandise* (London, 1977), pp. 106–10.
- 20 Cited in A. Baines, *Brass Instruments*, p. 104.
- 21 Wörthmüller, 'Die Instrumente', 212.
- 22 Now in the Germanisches Nationalmuseum, Nuremberg, #MI-170.
- 23 J. E. Altenburg, *Versuch einer Anleitung zur heroisch-musikalischen Trompeterund Pauker-Kunst* (Halle, 1795), trans. E. H. Tarr (Carbondale, 1974), p. 9.
- 24 G. Lawson and G. Egan, 'Medieval Trumpet from the City of London', *The Galpin Society Journal* 41 (1988), 63–6, and G. Lawson, 'Medieval Trumpet from the City of London, II', *The Galpin Society Journal* 44 (1991), 150–4.
- 25 G. J. van der Heide, 'Reconstructie van een bijzonders Italiaanse trompet van de vindplatte Scheurrak SO1', *Vis en visvangst*, eds. R. Reinders and M. Bierma (Gronigen, 1994), pp. 107–14.
- 26 The Pfeiffer instrument is now lost.
- 27 Barclay, *The Art*, p. 97.

- 28 J. S. Halle, *Werkstätte der heutigen Künste, Band III* (Brandenburg and Leipzig, 1764), p. 372.
- 29 Altenburg, *Versuch*, p. 9.
- 30 J. G. F. Klein, *Beschreibung der Metall-Lothe und Löthungen* (Berlin, 1760).
- 31 Conservatoire Supérieur de Musique, Paris, #E.754.
- 32 Barclay, *The Art*, p. 96.
- 33 E. Fontana, 'The Manufacture of Ivory Cornetti', *The Galpin Society Journal* 36 (1983), 29–36.
- 34 E. Tarr, 'Ein Katalog erhaltener Zinken', *Basler Jahrbuch für historische Musikpraxis* 5 (1981), 11–262.
- 35 F. Farrington, 'The Dissection of a Serpent', *The Galpin Society Journal* 22 (1969), 81–96, and P. Bate, 'A *Serpent d'Église*: Notes on some Structural Details', *The Galpin Society Journal* 29 (1976), 47–50.

4. *Brass instruments in art music in the Middle Ages*

- 1 H. G. Farmer, *The Oriental Musical Influence* (reprint, New York, 1964); F. W. Galpin, *Old English Instruments of Music*, rev. edition, ed. Thurston Dart (London, 1965), pp. 147–57; C. Sachs, *The History of Musical Instruments* (New York, 1940).
- 2 E. A. Bowles, 'Eastern Influences on the Use of Trumpets and Drums During the Middle Ages', *Annuario Musical* 26 (1972), 3–28; and E. H. Tarr, *The Trumpet* (London, 1988), pp. 35–9.
- 3 D. L. Smithers, 'A New Look at the Historical, Linguistic and Taxonomic Bases for the Evolution of Lip-Blown Instruments from Classical Antiquity until the End of the Middle Ages', *Historic Brass Society Journal* 1 (1989), 3–64.
- 4 A. Baines, *Brass Instruments: Their History and Development*, 3rd edition (New York, 1981), p. 73. Tarr also points out the possible continuity of a European tradition, providing an excellent colour plate (*The Trumpet*, pp. 38–9, and colour plate 3).
- 5 Baines, *Brass Instruments*, p. 73.
- 6 Osvaldo Gambassi, *Il Concerto Palatino della signoria di Bologna* (Florence, 1989), pp. 589–92. Bologna, in fact, expanded to a group of eight trumpeters in 1286, although it is uncertain whether these players functioned consistently as an ensemble. The Bologna statutes of 1288 indicate that individual trumpeters were assigned to locations in various towers throughout the city serving as a kind of signalling and communication system (Gambassi, pp. 78–9). This was probably the situation in Florence and other Italian cities, which had similar numbers of trumpeter watchmen. In any case, iconographical sources suggest that a pair of trumpets was the norm for more elaborate performance conditions such as banquets and processions.
- 7 See Bowles, 'Eastern Influences', 14–23.
- 8 A. Baines, *Woodwind Instruments* (New York, 1957), pp. 230–1.
- 9 *Ibid.*, p. 232.
- 10 Tarr, *The Trumpet*, p. 49, following Heyde, gives an example.
- 11 On the development of the necessary skills for bending of tubing see Tarr, *The Trumpet*, pp. 51–3.
- 12 At this time trumpeters split into two important categories, those of natural trumpets, and those who performed on instruments equipped with a slide (this second category will be discussed shortly). The natural trumpets were sometimes identified as 'war trumpets' ('trompettes de guerre'), and larger forms of the 'nakers', the kettledrums, were often added. See Bowles, 'Eastern Influences', 24–8. The kettledrums lie outside this discussion, but from about 1480 onward they were an integral section within many trumpet ensembles.
- 13 Baines, *Brass Instruments*, p. 91.
- 14 *Ibid.*, p. 85; see also Tarr, *The Trumpet*, pp. 58–60.
- 15 Baines, *Brass Instruments*, pp. 90–1.

- 16 J. Marix, *Histoire de la musique et des musiciens de la cour de Bourgogne sous le règne de Philippe le Bon (1420–1467)* (Geneva, 1939), pp. 72–3; K. Polk, *German Instrumental Music of the Late Middle Ages* (Cambridge, 1992), p. 49.
- 17 Tarr, *The Trumpet*, p. 60.
- 18 Baines, *Brass Instruments*, p. 85.
- 19 Polk, *German Instrumental Music*, p. 60. For more detail on the development of shawm ensembles, see pp. 60–70. See also H. Myers, ‘Slide Trumpet Madness: Fact or Fiction’, *Early Music* 17 (1989), 383–5.
- 20 P. Downey, ‘The Renaissance Slide Trumpet: Fact or Fiction?’, *Early Music* 12 (1984), 26–33.
- 21 R. Duffin, ‘The *trompette des menestrels* in the 15th-Century *alta capella*’, *Early Music* 17 (1989), 397–402, and H. Myers, ‘Slide Trumpet Madness’, 383–9.
- 22 K. Polk, ‘The Trombone in Archival Documents – 1350–1500’, *International Trombone Association Journal* 15 (1987), 24–31.
- 23 For a discussion of the ensembles in Deventer see Polk, *German Instrumental Music*, pp. 62–3.
- 24 Lille, Archives Municipales, Account No. 16150, 1408, folio 44 verso, lists Maillet for the first time. For a mention of him as a ‘jouer de trompette’, see, for example, Account No. 16162, 1418, folio 49 verso. The northern French city of Lille was at this time considered a part of Flanders, and although it remained French-speaking, its economic and cultural ties were to the north.
- 25 D. Leech-Wilkinson, ‘Il libro de appunti di un suonatori di tromba del quindicesimo secolo’, *Rivista italiana di musicologia* 16 (1981), 16–19. The manuscript is also discussed by L. Welker, ‘“Alta Capella” zur Ensemblepraxis der Blasinstrumente im 15. Jahrhundert’, *Basler Jahrbuch für historische Musikpraxis* 7 (1983), 159–60.
- 26 On the slide trumpet and the role of contratenor as discussed by Tinctoris, see Duffin, ‘The *trompette des menestrels*’, 400.
- 27 L. Lockwood, *Music in Renaissance Ferrara 1400–1500: The Creation of a Musical Centre in the Fifteenth Century* (Cambridge, MA, 1984), pp. 269–77.
- 28 On the careers of the Schubingers see Polk, *German Instrumental Music*, pp. 76–8.
- 29 H. M. Brown, *A Florentine Chansonnier from the Time of Lorenzo the Magnificent*, 2 vols., (Chicago 1983), is an edition of the Florence manuscript; see vol. 1, pp. 126–9, on the Glogauer manuscript and the German pieces.
- 30 On sacred pieces performed in the Low Countries and the tradition of evening services, the *Lof*, performed there, see R. Strohm, *Music in Medieval Bruges* (Oxford, 1985), pp. 87, 144–5; see also Polk, *German Instrumental Music*, pp. 76–7.

5. *The cornett*

- 1 According to Galpin, probably the first mention of the cornett in English literature (from the fourteenth-century poem *Octavian Imperator*).
- 2 For a controversy regarding the etymology of the German name ‘Zink’ see Petra Leonards, ‘Einige Gedanken zur Terminologie und Frühgeschichte des Zinken’, *Basler Jahrbuch für historische Musikpraxis* 5 (1981), 361–75.
- 3 The principal ones are: Paris, Bibliothèque Nationale, MS Cat. 11550; Cambridge Univ. Library, MS Ff. I. 23; London, British Museum, MS Harl. 603; London, British Museum, Tib. C. vi.
- 4 It is first encountered in a prologue to the psalter by Eusebius of Caesarea (lived c.260–340).
- 5 Especially a twelfth-century miniature in the Trier Domschatz showing a cornett played by a lion.
- 6 Nuremberg, Germanisches Nationalmuseum, Cod. 2776; Vienna, Oesterreichische Nationalbibl. MS 51 (in a twelfth-century Ms of Boethius’ *De musica* ...); Munich, Staatsbibl., Clm 935, c. pict. 114; London, British Museum, MS Royal 14 B.V.

- 7 Georg Karstadt, 'Zur Geschichte des Zinken und seiner Verwendung in der Musik des 16.-18. Jahrhunderts', *Archiv für Musikforschung* 4 (1937), 393.
- 8 '... sounded well with the singers.' Taken from a description by a Flemish chronicler of the playing of Augustein Schubinger in a Mass in Toledo. Cited in Karstadt, 'Geschichte des Zinken', 416.
- 9 Keith Polk, 'Augustein Schubinger and the Zinck: Innovation in Performance Practice', *Historic Brass Society Journal* 1 (1989), 83–92. See also K. Polk, *German Instrumental Music of the Late Middle Ages* (Cambridge University Press, 1992), p. 72.
- 10 Armando Fiabane, 'Contributi alla conoscenza del cornetto', *Heinrich Schütz e il suo tempo*, ed. Giancarlo Rostirolla (Rome, 1981), pp. 329–40.
- 11 This phrase ('that lascivious cornett') appears in the autobiography of Benvenuto Cellini, who himself claims to have been a superb cornett player.
- 12 See the title page of Arnolt Schlick's *Spiegel der Orgelmacker und Organisten* (Mainz, 1511); the title page of the *Weissköig* of Hans Burgkmair (1516) and an illustration of Augustein Schubinger himself from the *Triumphs of Maximilian* (1517).
- 13 Sebastian Virdung, *Musica getutscht und ausgezogen ...* (Basle, 1511), and Martin Agricola, *Musica instrumentalis deudsch ...* (Wittenberg, 1529).
- 14 They both appear to be curved – one of them clearly 'S'-shaped with flat sides, the other very slightly curved and round – but it is possible that the latter is meant to be straight, thus illustrating the two principal forms of cornetts at the time: curved and faceted, straight and round.
- 15 Florence, Uffizi Galleries, No. 443 F.r.
- 16 Carlo Vitali, 'L'esame di assunzione di un musico palatino a Bologna nella prima metà del 600', *Il Carrobbio* 4 (1978), 423.
- 17 E. H. Tarr, 'Ein Katalog erhaltener Zinken', *Basler Jahrbuch für historische Musikpraxis* 5 (1981), 11–262.
- 18 Though the Concerto Palatino also included eight trumpeters and two players of plucked instruments, first a harp and lute, later two lutes. Osvaldo Gambassi, *Il Concerto Palatino della signoria di Bologna* (Florence, 1989), pp. 3–32.
- 19 Remo Giazotto, *La musica a Genova* (Genoa, 1951), p. 274.
- 20 Regensburg Hs. A.R. 775 & 777. For a list of the pieces specifying cornett see Michael Collver and Bruce Dickey, *A Catalog of Music for the Cornett* (Bloomington, 1995).
- 21 Karstadt, 'Geschichte des Zinken', 416.
- 22 Hans-Joachim Nösselt, *Ein ältest Orchester* (Munich, 1980), pp. 17–40.
- 23 Friend Overton, *Der Zink* (Mainz, 1981), p. 49.
- 24 Anthony Newcomb, *The Madrigal at Ferrara 1579–1597* (Princeton NJ, 1980), p. 33.
- 25 *Descrizione de la felicissima entrata del sereniss. D. Ferdinando ...* (Florence, 1588), p. 100.
- 26 Howard Mayer Brown, 'A Cook's Tour of Ferrara in 1529', *Rivista Italiana di Musicologia* 10 (1975), 216–41.
- 27 Massimo Troiano, *Dialoghi di Massimo Troiano ..., libro secondo* (Venice, 1569), p. 66v.
- 28 Jessie Ann Owens, 'La cappella musicale della basilica del Santo: alcune forme di mecenatismo', in O. Mischiatì and P. Russo (eds.), *Le cappelle musicali nell'Italia della controriforma* (Florence, 1993), pp. 251–63.
- 29 Noel O'Regan, 'The Performance of Roman Sacred Polychoral Music in the Late Sixteenth and Early Seventeenth Centuries: Evidence from Archival Sources', *Performance Practice Review* 8 (1995), 107–46.
- 30 For a detailed discussion and catalogue of the surviving music for cornett see Collver and Dickey, *Catalog*.
- 31 Trevor Herbert, 'The Sackbut in England in the Seventeenth and Eighteenth Centuries', *Early Music* 18, 4 (1990), 609–16.
- 32 Gambassi, *Concerto Palatino*, p. 29.
- 33 Joseph Friedrich Bernhard Caspar Majer, *Museum musicum* (Schwäbisch-Hall, 1732), pp. 36–7.

- 34 Johan Daniel Berlin, *Musikalske Elementer* (Trondheim, 1744). English translation by P. Leonhards, E. H. Tarr and B. Volle in *Basler Jahrbuch für historische Musikpraxis* 5 (1981).
- 35 Nikolaj Berg, *Den første prøve for Begyndere udi Instrumental-kunsten* (Christiansand, 1782). English translation by P. Leonhards, E. H. Tarr and B. Volle in *Basler Jahrbuch für historische Musikpraxis* 5 (1981).
- 36 Georges Kastner, *Danses des morts* (Paris, 1852), p. 213.

6. ‘Sackbut’: the early trombone

- 1 I am grateful to Helen Barlow, Stewart Carter, Richard Cheetham, Keith Polk and Arnold Myers for advice which they kindly gave me when I was preparing this chapter.
- 2 Francis Galpin, ‘The Sackbut: Its Evolution and History’, *Proceedings of The Musical Association* 33 (1906–7), 1–25. The Musical Association is the name by which The Royal Musical Association was previously known.
- 3 The sackbut is mentioned three times in [Chapter 3](#) of the Book of Daniel. The error comes from a mistranslation of the Vulgate which gives ‘sackbut’ for the Hebrew word ‘sambuca’, a type of angle harp. The ‘Geneva’ translation (1560) was the first to translate it as sackbut.
- 4 Alexander McGratten has done a detailed investigation of the use of trumpets by the Scottish court in the sixteenth century. I am most grateful to him for providing me with this information.
- 5 A. J. G. Mackay (ed.), *The History and Chronicles of Scotland*, I (Edinburgh, 1899), p. 379.
- 6 ‘The Custom Book of St Omer’, Stoneyhurst College, MS Arch. CII 19.
- 7 See Keith Polk, ‘Innovation in Instrumental Music 1450–1510: The Role of German Performers within European Culture’, in John Kmetz (ed.), *Music in the German Renaissance: Sources, Styles, Contexts* (Cambridge, 1994), p. 210.
- 8 R. Eitner, ‘Brief von Jorg Neuschel in Nürnberg nebst einigen anderen. (Im besitz des kgl. geh. Archives in Königsberg i/Pr)’, *Monatshefte für Musick-Geschichte* 9, Jahrgang 1877, No. 7 (Berlin), 149: ‘Aber das will ich thun E. F. G. zu Eren machen 5 grosse busonen, die zu samen seyn [stimmen], das eyne Myttel busone ...’
- 9 Michael Praetorius, *Syntagma musicum* (Wolfenbüttel, 1619).
- 10 Talbot was professor of Hebrew at Cambridge University. His manuscript, which is now kept in the library of Christ Church College, Oxford (Och. Music MS 1187), seems to be informed by acquaintance with several contemporary players. A transcription of this part of the manuscript is given in *The Galpin Society Journal* 1 (1948).
- 11 Matters relating to the physical nature of Renaissance trombones are dealt with authoritatively in Henry George Fischer, *The Renaissance Sackbut and its Use Today* (New York, 1984). Fischer also gives a helpful overview of some of the controversies and legacies of error that the subject has attracted.
- 12 Marin Mersenne, *Harmonie universelle* (1635), trans. Roger E. Chapman (The Hague, 1957).
- 13 *Il dolcimelo* is incomplete and unpublished. It was probably compiled around 1590.
- 14 Fischer, *The Renaissance Sackbut*, p. 2.
- 15 Mersenne, *Harmonie universelle*, p. 343.
- 16 See Tim Carter, *Music in Late Renaissance and Early Baroque Italy* (London, 1992), p. 163.
- 17 Mersenne, *Harmonie universelle*, p. 343.
- 18 Praetorius, *Syntagma musicum*, III/VI.
- 19 *Ibid.*, II/V.
- 20 Carter, *Music in Late Renaissance*, p. 164.
- 21 See L. Lockwood, *Music in Renaissance Ferrara 1400–1505: The Creation of a Musical Centre in the Fifteenth Century* (Oxford, 1984), pp. 140–1. Trombone players at the Ferrarese court appear to have been grouped with the *piffari* rather than with the trumpeters.

- 22 See Carter, *Music in Late Renaissance*, Ch. 10.
- 23 See David Lasocki with Roger Prior, *The Bassanos: Venetian Musicians and Instrument Makers in England, 1531–1665* (Aldershot, 1995).
- 24 A. Bernáldez, *Historia de los Reyes Católicos D. Fernando y Doña Isabel*, ed. F. de Gabriel y Ruiz de Apocaca (Seville, 1870), I, p. 95, quoted in Kenneth Kreitner, ‘Minstrels in Spanish Churches, 1400–1600’, *Early Music* 20, no. 4 (November 1992), 534.
- 25 Quoted in Kreitner, ‘Minstrels in Spanish Churches’, 536.
- 26 ‘The Custom Book of St Omer’.
- 27 See Trevor Herbert, ‘The Sackbut and Pre-Reformation English Church Music’, *Historic Brass Society Journal* 5 (1993), 146–58.
- 28 The assumption that these pieces were played at the coronation is drawn from a nineteenth-century (?) annotation on the autograph manuscript (Lbl. Add. MS 17801).
- 29 John S. Manifold, *Music in English Drama: From Shakespeare to Purcell* (London, 1956), p. 45.
- 30 J. G. Albrechtsberger, *Collected Writings on Thorough-bass, Harmony and Composition* (Vienna, 1790), trans. Sabilla Novello (London, 1855), p. 240.
- 31 See Stewart Carter, ‘Trombone Obbligatos in Viennese Oratorios of the Baroque’, *Historic Brass Society Journal* 2 (1990), 52–77. Also, for solo repertoire, see C. Robert Wigness, *The Soloistic Use of the Trombone in Eighteenth-Century Vienna* (Nashville, 1978).
- 32 Quoted in David Whitwell, *The Baroque Wind Band and Wind Ensemble* (Northridge, 1983), p. 65.
- 33 C. S. Terry, *Bach’s Orchestra* (London, 1932/R1972), p. 41.
- 34 See Trevor Herbert, ‘The Sackbut in England in the Seventeenth and Eighteenth Centuries’, *Early Music* 18, no. 4 (November 1990), 609–16.

7. *The trumpet before 1800*

- 1 The earliest known case was in 1416, when the city of Basle only installed Friderich Winsberg as trumpeter contingent on a possible objection by ‘Sygmund, the Roman king’; Constance was allowed to employ trumpeters in 1417, followed by Nuremberg (1431), Augsburg and Ulm (1434). See E. H. Tarr, *The Trumpet* (London, 1988), pp. 67–8. Johann Ernst Altenburg, in his famous *Versuch einer Anleitung zur heroisch-musikalischen Trompeter- und Pauker-Kunst* (Halle, 1795), pp. 22, 29, got his dates mixed up. Sabine Žak, *Musik als ‘Ehr und Zier’* (Neuss, 1979), was the first to question his dates and come up with the proper ones. See also my notes and corrections to the Altenburg treatise in ‘1995 – An Anniversary Year for Trumpeters’, *International Trumpet Guild Journal* 20/1 (September 1995), 74–82, here 76.
- 2 Ibid., 68.
- 3 The notebooks of Thomsen and Lübeck were first published in Georg Schünemann (ed.), *Trompeterfanfaren, Sonaten und Feldstücke* (Kassel, 1936) (*Das Erbe deutscher Musik*, 1/7), but in a faulty transcription. For a better transcription, see P. Downey, ‘The Trumpet and its Role in Music of the Renaissance and Early Baroque’, 3 vols. (Ph.D. thesis, The Queen’s University of Belfast, 1983). Bendinelli’s *Tutta l’arte della Trombetta* (1614) was published in facsimile, E. H. Tarr (ed.) (Kassel, 1975) (*Documenta musicologica* II/V).
- 4 For a good discussion of the various formal schemes of trumpet sonatas, see Downey, ‘The Trumpet and its Role’, I, pp. 84–7.
- 5 Ibid., I, p. 105.
- 6 See Tarr, *The Trumpet*, p. 74.
- 7 This mechanical musical instrument, now belonging to the Kunsthistorisches Museum in Vienna, was made by the Augsburg clockmaker Hans Schlottheim (1544/7–1625/6) for Bendinelli’s master, Wilhelm V of Bavaria. The complete piece, the composer of which is unknown, has been

edited by the author as *Aufzug des Augsburger Trompeterautomaten von 1582* (Cologne, 1992, No. HM 109 001). See this for further information. Bendinelli, too, is known to have made such automats himself.

- 8 Downey, 'The Trumpet and its Role', I, p. 115.
- 9 Ibid., pp. 115–16.
- 10 Ibid., II, pp. 295–310, for transcriptions of all four versions of *Fit porta Christi*.
- 11 Not Frankfurt, as indicated on the cover. See Iginio Conforzi, 'Girolamo Fantini, "monarch of the trumpet": new light on his works', *Historic Brass Society Journal* 6 (1994), 32–60, esp. 33–4.
- 12 Bendinelli and Fantini include *chiamatas*, and Fantini also an unassociated *prima chiamata di guerra*: the term *Ruf* (actually *Rüf*, probably a misspelling) came from Altenburg, *Versuch einer Anleitung*, p. 89.
- 13 See P. Downey and E. H. Tarr, 'Chiamata', *The New Grove Dictionary of Music and Musicians* (7th edn, in preparation).
- 14 Tarr, *The Trumpet*, pp. 95–7. Concerning the 1653 version, see D. Smithers, 'The Habsburg Imperial Trompeter and Heerpaucker Privileges [sic] of 1653', *The Galpin Society Journal* 24 (1971), 84–95.
- 15 *Syntagma musicum* (Wolfenbüttel, 1619: *De organographia*), II, p. 170. The original wording of the passage in question: 'dass fünff / sechs oder sieben Trommeter ... / an einem sondern Ort / nahe bey der Kirchen gestellet werden: damit / wann sie in der Kirchen stehen / der starcke Schall und Hall der Trommeter / die gantze Music nicht vberschreye vnd vbertäube...'
- 16 See F. W. Riedel, *Kirchenmusik am Hofe Karls VI. (1711–1740)* (Munich–Salzburg, 1977), p. 173.
- 17 Dating, and mention of the Magnificat, by Steven Saunders, 'The Hapsburg Court of Ferdinand II and the *Messa, Magnificat et Jubilate Deo a sette chori concertati con le trombe* (1621) of Giovanni Valentini', *Journal of the American Musicological Society* 44 (1991), 359–403, here 385.
- 18 From *Messa, Magnificat et Jubilate Deo*; see Saunders, 'The Hapsburg Court', 378; Riedel, *Kirchenmusik*, p. 211.
- 19 See Downey, 'The Trumpet and its Role', I, pp. 138–41.
- 20 See Riedel, *Kirchenmusik*, p. 62; also A. Peter Brown, 'Caldara's Trumpet Music for the Imperial Celebrations of Charles VI and Elisabeth Christine', in Brian W. Pritchard (ed.), *Antonio Caldara: Essays on His Life and Times* (Aldershot, 1987), p. 4.
- 21 Riedel, *Kirchenmusik*, pp. 210–11.
- 22 Ibid., p. 211.
- 23 See E. H. Tarr (ed.), Giuseppe Aldrovandini, *Tre Concerti per due Trombe* (Coburg, 1992), appendix to preface, p. 4.
- 24 See Tarr, *The Trumpet*, pp. 122–3.
- 25 *The Gentleman's Journal*, 5 January 1692, quoted in Andrew Pinnock and Bruce Wood, 'A Counterblast on English Trumpets', *Early Music*, 19, No. 3 (August 1991), 437.
- 26 Godfrey Keller, Foreword to *Six Sonatas* (London 1699 or 1700), the first three being for trumpet, strings and continuo; further quotations in Tarr, *The Trumpet*, p. 135.
- 27 See Peter Holman, 'The Trumpet Sonata in England', *Early Music* 4 (October 1976), 424–9, and Tarr, *The Trumpet*, pp. 135–6.
- 28 From *The Gentleman's Journal*, 5 January 1692, quoted in Pinnock and Wood, 'A Counterblast', 437.
- 29 Brown, 'Caldara's Trumpet Music', pp. 5–7.
- 30 See Riedel, *Kirchenmusik*, p. 11, and, for the sources of court protocol, pp. 14–20.
- 31 With very few exceptions, such as the birth of an heir. See Brown, 'Caldara's Trumpet Music', pp. 4–5.
- 32 Tarr, *The Trumpet*, p. 119.
- 33 Edited by E. H. Tarr (Coburg, 1990). A. Peter Brown has brought much information and many tantalising musical examples to light, although he missed the F₆ in *Adriano in Siria*; and in

- Pritchard's study of 1987 two other valuable articles, by Hisako Serizawa ('The Overtures to Caldara's Secular Dramatic Compositions, 1716–1736', pp. 77–114) and Eleanor Selfridge-Field ('The Viennese Court Orchestra at the Time of Caldara', pp. 115–52), shed much light on Caldara's music and his trumpeters, but much still remains to be done in this area, especially regarding Predieri and Reutter. The author is grateful to Leo Kappel, Vienna, for a detailed typescript index of the use of trumpets in Caldara's operas.
- 34 Tarr, *The Trumpet*, p. 114.
 - 35 See Don Smithers, 'Gottfried Reiches Ansehen und sein Einfluß auf die Musik Johann Sebastian Bachs', *Bach-Jahrbuch* (1987), 113–50. In this article, the author also attaches too much importance, in my opinion, to Reiche's gifts at 'lipping' – a technique which every Baroque trumpeter had to master to a certain degree.
 - 36 All this information derives from Hans-Joachim Schulze and Christoph Wolff, *Bach-Compendium* (BC), Vokalwerke, Teil I-IV (Leipzig, 1985–9), an indispensable reference work.
 - 37 New edition in preparation by the author for the Haas-Verlag, Cologne.
 - 38 Edition in preparation by the author for the Haas-Verlag, Cologne.
 - 39 An indispensable reference work on Handel is Walter Eisen and Margret Eisen, *Händel-Handbuch*, 4 vols. (Leipzig, 1985). In vol. IV there is an account of the première of *Rinaldo*, from *The Spectator* (6 March 1711), which includes the following observation about the sparrows (p. 50): 'there have been so many Flights of them let loose in this Opera, that it is feared the House will never get rid of them; and that in other Plays they may make their Entrance in very wrong and improper Scenes ... besides the Inconveniences which the Heads of the Audience may sometimes suffer from them'.
 - 40 See Scott Sorenson and John Webb, 'The Harpers and the Trumpet', *The Galpin Society Journal* 39 (1986), 35–57; and James Arthur Brownlow, Jr, 'The Last Trumpet: A Survey of the History and Literature of the English Slide Trumpet' (DMA treatise, University of Texas at Austin, May 1994; published in 1996 in book form by the Pendragon Press).
 - 41 See E. H. Tarr and Bruce Dickey, *Articulation in Early Wind Music, 1500–1800: A Source Book* (in preparation); also Tarr, 'The Playing Technique of the Baroque Trumpet', *The Trumpet*, pp. 85–93.
 - 42 Taken over in slightly expanded form from Tarr, *The Trumpet*, pp. 141–3.
 - 43 Albert Hiller, article in preparation for *Historic Brass Society Journal*.
 - 44 Vera Schwarz (ed.), *Der junge Haydn* (Graz, 1972) (*Bericht der internationalen Arbeitstagung des Instituts für Aufführungspraxis der Hochschule für Musik... in Graz*), p. 213.
 - 45 Nos. 1822–3 and 1820–1; see Herbert Heyde, *Trompeten, Posaunen, Tuben* (Leipzig, 1980), pp. 120–1, ill. on plate 8.
 - 46 See Tarr, 'The Romantic Trumpet', I, *Historic Brass Society Journal* 5 (1993), 219. No studies have been published to date on this ubiquitous type of trumpet, although a diploma study for the Schola Cantorum Basiliensis by Roland Callmar is in progress. Most of them seem to date from the early nineteenth century.
 - 47 See Heyde, *Trompeten, Posaunen, Tuben*, p. 126; Reine Dahlqvist, 'Bidrag till trumpetten och trumpetspetsens historia från 1500-talet till mitten av 1800-talet', 2 vols. (Ph.D. diss., University of Gothenburg, 1988), I, p. 38; Tarr, 'The Romantic Trumpet', I, 220–1.
 - 48 Tarr, 'The Romantic Trumpet', I, 221; also, note 30, 242–3.
 - 49 Ibid., 219–20 and note 77, 246.
 - 50 See Reine Dahlqvist, *The Keyed Trumpet and its Greatest Virtuoso, Anton Weidinger* (Nashville, 1975), and Andreas Lindner, 'Anton Weidinger (1766–1852)' (Master's thesis, University of Vienna, 1993). Dahlqvist and Lindner were the first to discover that Weidinger had been born in 1766, and not in 1767, as can be read in every reference work.
 - 51 See Eric Halfpenny, 'William Shaw's "Harmonic Trumpet"', *The Galpin Society Journal* 13 (1960), 7–13.

8. The horn in the Baroque and Classical periods

- 1 Peter Damm, '300 Jahre Waldhorn', *Brass Bulletin* 31 (1980), 23–5.
- 2 Anthony Baines, *Brass Instruments: Their History and Development* (New York, 1981), pp. 137–42, 149–51.
- 3 Herbert Heyde, 'Zwischen Hörnern und Jägertrompeten', *Brass Bulletin* 55 (1986), 51–2.
- 4 Reginald Morley-Pegge, *The French Horn: Some Notes on the Evolution of the Instrument and its Technique*, 2nd edn (London, 1973), p. 17.
- 5 Altmann Kellner, *Musikgeschichte des Stiftes Kremsmünster* (Kassel, 1956), p. 296.
- 6 Johann Mattheson, *Das neu-eröffnete Orchestre* (Hamburg, 1713), pp. 267–8.
- 7 Joseph Friedrich Bernhard Caspar Majer, *Museum musicum* (Schwäbisch-Hall, 1732), p. 41, and *Neu-eröffneter theorisch- und praktischer Music-Saal* (Nuremberg, 1741), p. 23; Johann Philipp Eisel, *Musicus autodidaktos* (Erfurt, 1738), p. 74; *Kurzgefasstes musicalisches Lexicon* (Chemnitz, 1749), pp. 421–2.
- 8 Horace Fitzpatrick, *The Horn and Horn-Playing and the Austro-Bohemian Tradition from 1680 to 1830* (London, 1970), pp. 31–49.
- 9 Jacob Simon (ed.), *Handel: A Celebration of his Life and Times* (London, 1985), pp. 282–3.
- 10 Damm, '300 Jahre', 29.
- 11 Klaus Haller, *Partituranordnung und Musikalischer Satz* (Tutzing, 1970), pp. 175–6.
- 12 Thomas Hiebert, 'Early Examples of Mixed-Keyed Horns and Trumpets in Works of C. Graupner', *Historic Brass Society Journal* 6 (1994), 231–43.
- 13 Thomas Hiebert, 'A Case for Horn in D basso in the Early 18th Century and its Effect on Horn and Trumpet Combinations', *Perspectives in Brass Scholarship: Proceedings of the International Historic Brass Symposium, Amherst, 1995* (New York, 1997).
- 14 Reine Dahlqvist, 'Corno and Corno da caccia: Horn Terminology, Horn Pitches, and High Horn Parts', *Basler Jahrbuch für Historische Musikpraxis* 15 (1991), 35–80.
- 15 Thomas Hiebert, 'Old and New Roles for the Horn in J. F. Fasch's Hunt Concerto', *The Horn Call Annual* 8 (1996), 15–27.
- 16 Peter Damm, 'Zur Ausführung des "Corne da Caccia" im Quoniam der Missa h-Moll von J. S. Bach', *Bach-Jahrbuch* (1984), 91–105.
- 17 Fitzpatrick, *Horn*, pp. 76, 102, 105–7.
- 18 Thomas Hiebert, 'Virtuosity, Experimentation, and Innovation in Horn Writing from Early 18th-Century Dresden', *Historic Brass Society Journal* 4 (1992), 123–7, 152–6.
- 19 E.g. *New Instructions for the French Horn* (London, c. 1772–9).
- 20 Morley-Pegge, *French Horn*, p. 90.
- 21 Hiebert, 'Virtuosity', 127–9, 159.
- 22 Ernst Ludwig Gerber, *Lexicon* (1790–2) II, p. 551.
- 23 Andrew Kearns, 'Clarino Horn, Handhorn and Virtuosity in the Late Eighteenth-Century Horn Concerto', *The Horn Call Annual* 3 (1991), 9–10.
- 24 Gerber, *Lexicon* I, p. 439.
- 25 Paul Bryan, 'The Horn in the Works of Mozart and Haydn: Some Observations and Comparisons', *The Haydn Yearbook* 9 (1975), 222–8.
- 26 Graham Sadler, 'Rameau and the Orchestra', *Proceedings of the Royal Musical Association* 108 (1982), 61–2.
- 27 Morley-Pegge, *French Horn*, pp. 150–2, 89.
- 28 Daniel Hertz, 'Leutgeb and the 1762 Horn Concertos of Joseph and Johann Michael Haydn', *Mozart Jahrbuch* (1987–8), 59–64.
- 29 Sterling Murray, 'The Double Horn Concerto: A Specialty of the Oettingen-Wallerstein Court', *The Journal of Musicology* 4/4 (1985–6), 512–19.
- 30 Fitzpatrick, *Horn*, pp. 201–2, 174.
- 31 *Ibid.*, p. 169.

- 32 Charles Burney in Abraham Rees, *Cyclopaedia* (1819), s.v. 'Horn'.
- 33 Fitzpatrick, *Horn*, p. 169.
- 34 Ibid., p. 188.
- 35 Morley-Pegge, *French Horn*, pp. 96, 103.

10. Keyed brass

- 1 Edward H. Tarr, *The Trumpet*, translated from *Die Trompete* (1977) by S. E. Plank and Edward Tarr (Portland, OR 1984), pp. 149–51.
- 2 Rowland Wright, *Dictionnaire des instruments de musique* (London, 1941), p. 164, as quoted in Reine Dahlqvist, *The Keyed Trumpet and its Greatest Virtuoso, Anton Weidinger*, Brass Research Series: No. 1 (Nashville, 1975), p. 22 (n. 17).
- 3 Christian Friedrich Daniel Schubart, *Idéen zu einer Ästhetik der Tonkunst* (Vienna, 1806). Schubart died 10 October 1791.
- 4 Tarr, *The Trumpet*, p. 149.
- 5 Andreas Nemetz, *Allgemeine Trompeten-Schule, verfasst von Andr. Nemetz Posaunist im K. K. Hofopern-Theater in Wein. 17tes Werk* (Vienna, 1823), as quoted in Friedrich Anzenberger, 'Method Books for Keyed Trumpet in the 19th Century: An Annotated Bibliography', *Historic Brass Society Journal* 6 (1994), 5.
- 6 The definitive study on the keyed trumpet is Dahlqvist, *The Keyed Trumpet*. Much of this material was drawn from Dahlqvist's study.
- 7 *Allgemeine musikalische Zeitung* carried accounts from 1802 until 1820 of Weidinger's performances. See Dahlqvist, *The Keyed Trumpet*.
- 8 The list of keyed trumpet tutors is:

Giuseppe Araldi, *Methodo per tromba a chiavi et a macchina di Giuseppe Araldi Prima Tromba dell'I.R. Teatro alla Scala e dal Medesimo dedicato all'Ill.mo Sig. Conte Renato Boromeo* (Milan, c.1835).

Bonifazio Asioli, *Transunto dei principjelementari di musica compilati dal celebre M. B. Asioli, e breve metodo per tromba con chiavi* (Milan, 1825). Andreas Nemetz, *Allgemeine Trompeten-Schule, verfasst von Andr. Nemetz Posaunist im K. K. Hofopern-Theater in Wein. 17tes Werk* (Vienna, 1823). Roy and Muller, *R. Cocks and Co's Series of Modern Tutors for Wind Instruments, with New and Complete Scales... No. 9 Roy and Muller's Tutor for the Keyed and Valve Trumpet, with Airs and Duets* (London, 1839). Eugène Roy, *Méthode de trompette sans clefs et avec clefs divisée en deux parties ...* (Mainz, 1824).

Henry Prentiss, *Prentiss' Complete Preceptor, for the Cornopean, Bugle Horn, and Keyed Bugle also for the Plain and Key'd Trumpet with scales for the five Different Trumpets in D–E flat F–G and C. Also a complete set of exercises for the different Instruments and the Infantry calls for Bugle. Boston, Published by Henry Prentiss. 33 Court St. (Boston, c.1840, reprint Nashville, 1980).*

- 9 Much of the material presented here is condensed from my *The Keyed Bugle* (Meuchen, NJ, and London, 1993). I have documented specific quotations here, but extensive documentation can be found in *The Keyed Bugle*.
- 10 As quoted in Francis N. Mayer, 'Early Band Music in the United States', *Music Educators National Conference Journal*, (February–March 1959), 41.
- 11 J. Tranor, *The Death of Willis*, music by Francis Johnson (Philadelphia, 1830), title page.
- 12 Trevor Herbert, *Concert Notes to Music from Cyfarthfa Castle* (Monmouth, 1995), p. 1.

- 13 Jean Hilaire Aste (Halary), *Brevet d'invention et de perfectionnement de dix ans, pour des instruments de musique à vent et à clef* (Paris, 24 mars 1821; D'Addition, 16 août 1822).
- 14 For coverage of the precursors to the ophicleide and other pre-tuba brasses, see Clifford Bevan, *The Tuba Family* (New York, 1978), and [Chapter 11](#) in this volume.
- 15 For an excellent account of an ophicleidist's career see Stephen J. Weston, *Samuel Hughes – Ophicleidist* (Edinburgh, 1986).
- 16 Complete titles to these selected methods are:
 Anon., *Chromatic Scale for Ophicleide* (London, n.d.).
 Anon., *Méthode pour ophicleide, à neuf, dix et onze clés* (Paris, n.d.).
 F. Berr and Caussin, *Méthode complète d'ophicléide* (Paris, n.d.).
 Caussin, *Solfège-Méthode pour ophicléide-basse* (Paris, n.d.).
 P. Clodomir, *Méthode élémentaire pour Ophicléide* (Paris, n.d.).
 V. Cornette, *Méthode d'ophicléide* (Paris, n.d.).
 Th. Garnier, *Méthode élémentaire et facile d'ophicleide à pistons ou à cylindres* (Paris, n.d.).
 A. Héral, *Méthode d'ophicléide, contenant les principes de musique, ceux de l'instrument, les gammes, 24 leçons, 12 duos* (Lyons, n.d.).
 J. G. Kastner, *Méthode élémentaire pour l'ophicléide* (Paris, n.d.).
 Schiltz, *Tutor for the Ophicléide (Bass and Alto)*, No. 12 of R. Cocks & Co.'s
 Modern Tutors for Wind Instruments (London, 1853).
 Steiger, *Méthode élémentaire et graduée d'ophicleide...* (Paris, n.d.).

11. The low brass

- 1 E. A. K. Ridley, *Wind Instruments of European Art Music* (London, 1974), p. 29.
- 2 See Beaver Island (Michigan) Band of 1910 in M. Hindle Hazen and R. Hazen, *The Music Men* (Washington, DC, 1987), p. 102.
- 3 The uncorroborated source of this claim is J. Leboeuf, *Mémoires concernant l'histoire ecclésiastique et civile d'Auxerre*, 2 vols. (Paris, 1743), Vol. I, p. 643.
- 4 L. Spohr (trans. anon.), *Autobiography*, 2 vols. (London, 1865, 1878), Vol. I, p. 258; *The Harmonicon* (London, August 1825), p. 140.
- 5 Printed in full (trans. V. Lawson) in C. Bevan, *The Tuba Family* (London/New York, 1978), pp. 201–11.
- 6 A. Vessella, *Studi d'istrumentazione per banda*, 2 vols. (Milan, 1897), p. 348.
- 7 Quoted in F. Abbiatti, *Giuseppe Verdi*, 4 vols. (Milan, 1959), Vol. III, p. 526.
- 8 C. Bevan, 'The Saxtuba and Organological Vituperation', *The Galpin Society Journal* 43 (March 1990), 135–46.

12. Brass in the modern orchestra

- 1 For an account of Costa's influential 'Disposition of the Orchestra' see C. Ehrlich, *First Philharmonic* (Oxford, 1995), p. 73.
- 2 Paris version 1776 in the Bärenreiter complete edition, p. 303.
- 3 H. Berlioz, *The Memoirs*, trans. David Cairns (London, 1969), p. 319.
- 4 The Brahms alterations to Schubert are discussed by Abbado and Mollo in their notes to the Abbado complete Schubert cycle (Hamburg, 1988).
- 5 Quoted by F. W. Galpin in 'The Sackbut: its Evolution and History', *Proceedings of the Musical Association* 33 (1906–7), 1–25.

- 6 William Parke, *Musical Memoirs: An Account of the General State of Music in England from the First Commemoration of Handel in 1784 to the Year 1830* (London, 1830).
- 7 *The Harmonicon*, May 1829, p. 126.
- 8 This episode is entertainingly described in Cynthia A. Hoover, 'A Trumpet Battle at Niblo's Pleasure Garden', *Musical Quarterly* 55, No. 3 (1969), 384–95.
- 9 Playbill in archives of Royal Opera House, Covent Garden.
- 10 *The Times*, 16 June 1860.
- 11 J. B. Arban, *Cornet Method* (London, 1860).
- 12 For a description of Sax's band competition see Horwood, *Adolphe Sax* (Baldock, 1983).
- 13 Henry Mayhew, *London Labour and the London Poor* (London, 1851–2), pp. 173–4.
- 14 Cyril Ehrlich discusses the growth in musical employment at length in *The Music Profession in England Since the Eighteenth Century* (Oxford, 1985).
- 15 See Parke, *Musical Memoirs*, p. 269.
- 16 See *First Philharmonic*.
- 17 Correspondence between the Society and players is kept in British Library 'loan 48' (correspondence books). For a full account of the dispute see Ehrlich, *First Philharmonic*, p. 107. See also Michael Musgrave, *The Musical Life of the Crystal Palace* (Cambridge, 1995).
- 18 The dismal treatment of some German court musicians is described by C. H. Mahling, in Walter Salmen (ed.), *Der Sozialstatus des Berufsmusikers vom 17. bis 19. Jahrhundert* (Kassel, 1971), translated as *The Social Status of the Professional Musician from the Middle Ages to the Nineteenth Century* (New York, 1983), pp. 219–64.
- 19 Adam Carse, *The Life of Jullien* (Cambridge, 1950).
- 20 *Household Words*, No. 1 (May 1850), 161.
- 21 The musicians' contracts for Covent Garden's 1818 and 1819 seasons are in the British Library add. Ms 29, 365.
- 22 He died on a piano-tuning tour in Kent. (RSM members' files.)
- 23 H. Berlioz, *The Memoirs*, p. 320.
- 24 Chords of resonance are discussed at length in Messiaen's *Technique de mon langage musicale* (Paris, 1944; Eng. trans., 1957) and admirably summarised in Robert Sherlaw Johnson, *Messiaen* (London, 1975).
- 25 It has in recent years found friends in Hans Werner Henze and Harrison Birtwistle. See [Chapter 18](#).
- 26 'Neroism is in the Air', [Chapter 6](#) of Barbara M. Tuchman, *The Proud Tower – A Portrait of the World Before the War 1890–1914* (New York, 1966), pp. 291–347, is a masterly account of the place of Strauss, Wedekind and others in pre-war European society.
- 27 Romain Rolland, *Correspondance: Fragments de Journal*. No. 3 in *Cahiers Romain Rolland* (Paris, 1951).
- 28 The trombonist Raymond Vauchant claimed to have persuaded Ravel to transpose *Bolero* down a tone for the sake of the players. There is no corroborative evidence to support the story.
- 29 Antonio Zanolini, *Biografia di Gioachino Rossini* (Bologna, 1875), pp. 1–4.
- 30 Nikolai Rimsky-Korsakov, *Principles of Orchestration*, trans. Edward Agate (Paris, 1922).
- 31 Solomon Volkov, *Testimony: The Memoirs of Shostakovich* (New York, 1979).
- 32 He revised the piece for a smaller but still generous orchestra in 1928.
- 33 Though one of the principal makers is now Japanese!
- 34 For an abundant demonstration of the mind-set that prevails in such organisations, see the letters page of *The Trombonist* (Autumn 1995), 33–5, which discusses the advisability of admitting tuba players to the British Trombone Society.
- 35 Pierre Boulez, 'Technology and the Composer', *The Times Literary Supplement*, 6 May 1976.

13. *Brass bands and other vernacular brass traditions*

- 1 I am most grateful for advice received from Helen Barlow, Richard Middleton, Arnold Myers and Margaret Sarkissian when I was preparing this chapter.
- 2 Moravian communities, whose Church originated in Bohemia, settled in Pennsylvania and North Carolina in the eighteenth century. They used brass instruments to accompany worship.
- 3 There were, of course, precursors to brass bands: village bands, church bands and so on. But brass instruments had no significance in them, and in most of the cases that I have investigated where a brass band has been established in a place with a long history of a different type of band, I have found that the brass band came into being through an entirely independent route. This phenomenon is the cause of so many towns claiming to have had ‘the first brass band’.
- 4 There were also wind and string players who played in church bands around 1800, but it is doubtful whether art-music skills were common, and it is highly unlikely that many brass players can be counted in their number.
- 5 See Geoffrey Best, *Mid-Victorian Britain 1852–75* (London, 1979).
- 6 Cyril Ehrlich, *The Music Profession in Britain Since the Eighteenth Century: A Social History* (Oxford, 1985), Ch. V.
- 7 Wally Horwood, *Adolphe Sax – His Life and Legacy* (Baldock, 1983), p. 63.
- 8 Anonymous, ‘A Midland Tour – Wolverhampton’, *The Leisure Hour – A Family Journal of Instruction and Recreation* (3 August 1872), 494–5.
- 9 Algernon Rose, *Talks with Bandsmen: A Popular Handbook for Brass Instrumentalists* (London, 1895/R 1995), p. 305.
- 10 Jackson’s autobiography is handwritten and unpublished. Information concerning Enderby Jackson is obtained from primary sources held in private collections including documents held by his descendants. I am grateful for having had access to this material. Though it is true that Jackson developed the modern-type commercial contest, it is certainly not true that he conceived the idea of them. His claim that agricultural shows provided the stimulus for the idea is also questionable. The first contest for which we have good information (at which Jackson himself played) was held at Burton Constable in 1845.
- 11 Jackson’s ‘autobiography’: there is some confusion here, as Jackson’s papers are not always consistent. He mentions these events as taking place in 1855 and 1856. The first Belle Vue contest was in 1853 and it seems that it was the first contest to which he was referring. The autobiography was written towards the end of Jackson’s life, and I have assumed that on this matter he made an error.
- 12 For an overview of the brass band movement in Britain see Trevor Herbert (ed.), *Bands: The Brass Band Movement in the 19th and 20th Centuries* (Milton Keynes, 1991), and Arthur R. Taylor, *Brass Bands* (St Albans, 1979).
- 13 It is assumed that parts were written out in treble clef for didactic reasons. Trombone parts are sometimes published in tenor clef, but read as if they are in treble clef with a B_1 transposition. Bass trombone parts have always been in bass clef, as were other low parts in the nineteenth century.
- 14 Percussion instruments have always been used for marching and concerts but have not always been allowed in contests.
- 15 The practice of adapting operatic arias for dance music was not exclusively a brass band phenomenon, but brass bands did favour transcriptions of the adaptations.
- 16 For a discussion of American brass bands, see Margaret Hindle Hazen and Robert M. Hazen, *The Music Men: An Illustrated History of Brass Bands in America, 1800–1920* (Washington, 1987), and Raoul F. Camus, *Military Music of the American Revolution* (Westerville, 1975).
- 17 For the Volunteer bands, see Herbert, *Bands*, [Chapter 1](#).
- 18 ‘We do here express our desire that as many of our ... soldiers generally, both male and female ... shall learn to play some suitable instrument’, *The War Cry*, 10 March 1880.
- 19 For information on American women brass band players see Hazen and Hazen, *The Music Men*.

- 20 See Kauko Karjalainen, *Suomalainen Torviseitsikko: Historia ja pernteen jatkuminen* (Tampere, 1995).
- 21 The University of Amsterdam, Department of Visual Anthropology, has conducted an important research project on brass bands, under the title *Frozen Brass* (The Netherlands, Pan Records). This project has produced a number of important recordings and publications including a CD on Bulgarian brass bands. I am most grateful to the director of the project, Dr Rob Boonzajer Flaes, for providing me with information about it.
- 22 One of the interesting consequences of the widespread popularity of vernacular brass and military bands in the nineteenth century is that the word 'band' came to be used to describe a form of music making which is distinct from mainstream high-art practices. This has prevailed through to modern times, when, formally, the word 'band' is used to describe a popular or vernacular group, and 'serious' or art-music groups are 'ensembles', 'quintets' and so on. The exception to this practice is when brass or wind bands are used within large-scale orchestral or operatic works. Often such devices are employed to imitate distant vernacular bands for dramatic purposes.
- 23 Quoted in B. Boon, *Sing the Happy Song: A History of Salvation Army Vocal Music* (London, 1978), p. 5.
- 24 Quoted in Carolyn Bryant, *And the Band Played On 1776–1976* (Washington, 1975), p. 5.
- 25 See Duncan Bythell, 'The Brass Band in Australia: The Transplantation of British Popular Culture, 1850–1950', in Herbert, *Bands*, pp. 145–64.
- 26 See Ernst Heins, 'Kroncong and Tanjidor – Two Cases of Urban Folk Music in Jakarta', *Asian Music* 7/1 (1975), 28.
- 27 See Stephen H. Martin, 'Brass Bands and the Beni Phenomenon in Urban East Africa', *Africa Music*, 7/1 (1991), 72–81.
- 28 See John Collins, 'The Early History of West African Highlife Music', *Popular Music* 8/2 (1989), 221–30.
- 29 Rob Boonzajer Flaes, Liner notes for *Frozen Brass #1: Asia* Pan 2020CD (The Netherlands, 1993), p. 5.
- 30 See Gregory D. Booth, 'Brass Bands: Tradition, Change and the Mass Media in Indian Wedding Music', *Ethnomusicology* 34, No. 2 (1990), 245–62.
- 31 Heins, 'Kroncong and Tanjidor', 28.
- 32 This phenomenon is exemplified in the series of recordings released under the *Frozen Brass* project.
- 33 An excellent, succinct account of Armstrong's life and work is given in *The New Grove Dictionary of American Music* Vol I, pp. 67–71.
- 34 *The Times*, 8 July 1971.

14. *Playing, learning and teaching brass*

- 1 E.H. Tarr, *The Trumpet* (Portland, OR, 1988), p. 46.
- 2 Keith Polk, 'Patronage and Innovation in Instrumental Music of the 15th Century', *Historic Brass Society Journal* 3 (1991), 151–78.
- 3 Howard Mayor Brown, *Embellishing Sixteenth-Century Music* (London, 1976).
- 4 Francesco Rognoni, *Selva de varii passaggi*, 1592, Arnaldo Forini (ed.), facsimile edition, critical commentary by Guglielmo Barblan (Bologna, 1983).
- 5 Cesare Bendinelli, *Tutta l'arte della Trombetta*, MS 1614, facsimile (Kassel, 1975).
- 6 A helpful overview of publications relevant to the trombone in the eighteenth century is given in David M. Guion, *The Trombone: Its History and Music, 1697–1811* (New York, 1988). Also research conducted by Howard Weiner has cast new light on early literature for the instrument; see

- for example 'André Braun's *Gamme et méthode pour les trombones*: The Earliest Modern Trombone Method Rediscovered', *Historic Brass Society Journal* 5 (1993), 288–308.
- 7 See Weiner, 'André Braun'.
 - 8 See Guion, *The Trombone*, pp. 92–118.
 - 9 Edward H. Tarr, 'The Romantic Trumpet, Part Two', *Historic Brass Society Journal* 6 (1994), 110–215.
 - 10 See Friedrich Anzenberger, 'Ein Überblick über die Trompeten und Kornettschulen in Frankreich, England, Italien, Deutschland und Österreich von ca. 1800 bis 1880' ('A survey of method books for trumpet and cornet in France, England, Italy, Germany and Austria between c.1800 and c.1880'), (Ph.D. thesis, University of Vienna, 1989).
 - 11 Paul Plunkett, *Technical and Musical Studies for the Baroque Trumpet* (Herrenbert-Kuppigen, 1995); Jeremy L. West with Susan Smith, *How to Play the Cornett* (London, 1995); Ralph Dudgeon, *The Keyed Bugler's Companion: A Method for the B flat and E flat Keyed Bugle* (Homer, New York, 1987).
 - 12 Research into the teaching of the trombone at the Paris Conservatoire has been conducted by Mr Benny Sluchin, who has kindly provided this information.
 - 13 Charles Colin, *Lip Flexibilities from the Charles Colin Complete Modern Method for Trumpet or Cornet*, 3 vols. (New York, 1975).
 - 14 Carmine Caruso, *Musical Calisthenics for Brass* (Hollywood, CA, 1979). The back-cover blurb is interesting: 'A must guide for the brass student and teacher relating to the total physical output that goes into playing any brass instrument. The same technique athletes use to develop their physical control as applied to musicians.'
 - 15 Claude Gordon, *Systematic Approach to Daily Practice* (New York, 1965).
 - 16 See also Mary Rasmussen, *A Teacher's Guide to the Literature of Brass Instruments* (Durham, NH, 1968); Clifford Bevan, *The Tuba Family* (London, 1978); Barton Cummings, *The Contemporary Tuba* (New London, n. d.); Don Little, *Practical Hints on Playing the Tuba* (Melville, New York, 1984); J. Mason, *Tuba Handbook* (Toronto, n. d.); R. W. Morris, *Tuba Music Guide* (Evanston, IL, 1973).
 - 17 Roger W. Spaulding, *Double High C in 37 Weeks* (Hollywood, CA, 1963).
 - 18 James Stamp, *Warm-ups & Studies* (Bulle, 1978).
 - 19 Further discussion can be found in Maurice Porter, *The Embouchure* (London, 1967). Facial muscle detail can be seen in Henry Gray, *Anatomy, Descriptive and Surgical* (New York, 1977).
 - 20 See Philip Farkas, *The Art of Brass Playing* (Bloomington, IN, 1962), pp. 25–31.
 - 21 For buzzing in daily practice see Irving Bush, *Artistic Trumpet Technique and Study* (Hollywood, CA, 1962).
 - 22 For Jacobs's philosophy see Kevin Kelly, 'The Dynamics of Breathing: A Medical/Musical Analysis with Arnold Jacobs and David Cugell, MD', *The Instrumentalist* (December 1983), 6–12. Also M. D. Stewart, *Arnold Jacobs, Legacy of a Master* (Northfield, IL, 1987).
 - 23 For a readable and technically accurate account of the breathing process, see Julius Comroe, *Physiology of Respiration* (Chicago, 1965).
 - 24 See Frederick Matthias Alexander, *The Use of the Self: Its Conscious Direction in Relation to Diagnosis, Functioning and the Control of Reaction* (London, 1932).
 - 25 For example, Herbert L. Clarke, *Technical Studies* (New York, 1912).
 - 26 Allen Vizutti, *The Allen Vizutti Trumpet Method*, 3 vols. (Van Nuys, CA, 1990).

15. The post-classical horn

- 1 Howard Mayer Brown and Stanley Sadie (eds.), *Performance Practice: Music After 1600* (London, 1989; New York, 1990), p. 418.

- 2 Edouard E. Blitz, *Considération sur l'art du chef d'orchestre* (Leipzig, 1887), cited in D. Koury, *Orchestral Performance Practices in the Nineteenth Century: Size, Proportions and Seating* (Michigan, 1981, 1986), p. 93.
- 3 Hector Berlioz, *The Memoirs of Hector Berlioz, Member of the French Institute, including his Travels in Italy, Germany, Russia and England (1803–65)*, trans. and ed. D. Cairns (London, 1969: R1970), p. 388.
- 4 Bayan Northcott, 'The Horn Blower', *The Independent* (Sat. 18 May 1991), 31.
- 5 Kurt Janetzky and Bernard Brüchle, *The Horn*, trans J. Chater (London, 1988), p. 101.
- 6 G. Schuller, *Horn Technique* (Oxford, 1962), p. 86.
- 7 Richard Strauss (ed. and enlarged), *Instrumentationslehre von Hector Berlioz* (Leipzig, 1905), p. 270.
- 8 Barry Tuckwell, *Horn* (London, 1983), pp. 142–3.
- 9 This work provides a good example of players influencing the evolution of a work, even at rehearsal stage. What started as a single horn concerto to be played by Michael Thompson with an off-stage echo effect by Phillip Eastop evolved effectively into a double horn concerto, with Phillip Eastop echoing the stage from a position in the middle of the audience, with considerable rearrangement of the original score.
- 10 Tuckwell, *Horn*, p. 197.

16. *Jazz, improvisation and brass*

- 1 I acknowledge with pleasure specific and helpful advice about this article from Hazel Smith and John Wallace; and also from Torbjorn Hultmark and Trevor Herbert.
- 2 See E. Jost, *Free Jazz* (English edition) (Graz, 1974); D. Bailey, *Improvisation: Its Nature and Practice in Music* (Ashbourne, 1980, republished Prentice Hall; revised edition British Library), (this book also formed the basis of a series of British Broadcasting Corporation films (1991) directed by J. Marre); R. T. Dean, *Creative Improvisation: Jazz, Contemporary Music and Beyond* (Milton Keynes, 1989); Dean, *New Structures in Jazz and Improvised Music since 1960* (Milton Keynes, 1992); Dean (ed.), *Eleven Views of Music Improvisation* (Sydney, 1992); P. F. Berliner, *Thinking in Jazz: The Infinite Art of Improvisation* (Chicago 1994); E. Prevost, *No Sound is Innocent* (Matching Tye, UK, 1995); H. Smith and R. T. Dean, *Improvisation, Hypermedia and the Arts since 1945* (London, 1996).
- 3 J. Corbett, 'Writing around Free Improvisation', in K. Gabbard (ed.), *Jazz among the Discourses* (Durham, NH, 1995), pp. 217–40.
- 4 See Dean, *New Structures*; also G. Schuller, *Early Jazz* (New York 1968).
- 5 See Dean, *New Structures*.
- 6 K. Gabbard, 'Signifyin(g) the Phallus: Mo' Better Blues and Representations of the Jazz Trumpet', in Gabbard (ed.), *Representing Jazz* (Durham, NH, 1995), pp. 104–30.
- 7 Ibid.
- 8 E. Lott, 'Double V, Double-Time: Bebop's Politics of Style', in Gabbard (ed.), *Jazz among the Discourses*, pp. 243–55.
- 9 Prevost, *No Sound is Innocent*.
- 10 See Dean, *Creative Improvisation* and *New Structures*.
- 11 J. Denley, 'Improvisation: The Entanglement of Awareness and Physicality', *Sounds Australian* 32 (1991–2), 25–9; and Denley, *Dark Matter* (Sydney: Tall Poppies TP008, 1992).
- 12 R. T. Dean, *Destructures V* (London: Mosaic Records GCM 781, 1979).
- 13 See I. Carr, *Miles Davis: A Critical Biography* (London, 1982); H. Brofsky, 'Miles Davis and My Funny Valentine: The Evolution of a Solo', *Black Music Research Journal* (1983), 23–45; R.

- Walser, "'Out of Notes': Signification, Interpretation and the Problem of Miles Davis', in Gabbard (ed.), *Jazz among the Discourses*, pp. 165–88.
- 14 See Jost, *Free Jazz*; and Dean, *Creative Improvisation and New Structures*.
- 15 Walser, "'Out of Notes"'.
- 16 See Walser, "'Out of Notes"' , and B. Bergstein, 'Miles Davis and Karlheinz Stockhausen: A Reciprocal Relationship', *Musical Quarterly* 76 (1992), 502.
- 17 H. L. Gates, *The Signifying Monkey: A Theory of Afro-American Literary Criticism* (New York, 1988).
- 18 See Walser, "'Out of Notes"' .
- 19 See, for instance, I. Hassan, 'The Question of Postmodernism', *Bucknell Review* 25 (2) (1980), 117–26; F. Jameson, 'Postmodernism or the Cultural Logic of Late Capitalism', *New Left Review* 146 (1984), 53–92; and N. Kaye, *Postmodernism and Performance* (London, 1994).
- 20 See Dean, *New Structures*.
- 21 Ibid.
- 22 See I. Carr, *Miles Davis: A Critical Biography*.
- 23 *The Complete Live at the Plugged Nickel 1965* (CBS 66956–66963) and the CBS album *My Funny Valentine* (recorded live at Philharmonic Hall, New York, 1964).
- 24 See Dean, *New Structures*.
- 25 Second set (Disc 2 of the series).
- 26 Second set (Disc 5).
- 27 See Dean, *New Structures*.
- 28 D. Morrill, 'Trumpet Algorithms for Computer Composition', *Computer Music Journal* 1 (1977), 46–52; and C. Roads, *The Computer Music Tutorial* (Cambridge, MA, 1996).
- 29 See Smith and Dean, *Improvisation, Hypermedia and the Arts*; and R. Rowe, *Interactive Music Systems: Machine Listening and Composing* (Cambridge, MA, 1993).
- 30 G. Lewis, *Voyager* (Tokyo: Avan 014, 1994).
- 31 M. Puckette and D. Zicarelli, *MAX – An Interactive Graphic Programming Environment* (Menlo Park: Opcode Systems, 1990).
- 32 P. Toivainen, 'Modelling the Target-note Technique of Bebop Style Jazz Improvisation: An Artificial Neural Network Approach', *Music Perception* 12 (1995), 399–413.
- 33 Corbett, 'Writing around Free Improvisation'.
- 34 See H. Mandel, 'Eternal Traveller', *The Wire* 142 (1995), 26–9.
- 35 See Gabbard (ed.), *Representing Jazz and Jazz among the Discourses*.
- 36 Gabbard, 'Signifyin(g) the Phallus', in *Representing Jazz*.

17. Brass solo and chamber music from 1800

- 1 H. C. Robbins Landon, *Haydn: Chronicle and Works – The Years of 'The Creation' 1796–1800* (London, 1977), pp. 234–5.
- 2 An instrument invented by E. F. Chladni in 1790. Reine Dahlqvist, *The Keyed Trumpet and its Greatest Virtuoso, Anton Weidinger*, Brass Research Series: No. 1 (Nashville, 1975), pp. 13–14.
- 3 Exact date uncertain. Dated 1827–40 by Edward H. Tarr, 'The Romantic Trumpet Part II', *Historic Brass Society Journal* 6 (1994), 122.
- 4 Tarr, 'The Romantic Trumpet Part II', 114–23.
- 5 Michael Lewis, 'Solo Trombone Performances at the Gewandhaus in the Nineteenth Century', *International Trombone Association Journal* 20, No. 3 (Summer 1992) 27–32.
- 6 Recorded on CD by the London Gabrieli Brass Ensemble, director Christopher Larkin. *Original Nineteenth Century Music for Brass: Cherubini, Beethoven, Dvorak, Lachner, David, Sibelius, Rimsky-Korsakov* (London: Hyperion Records, 1991).

- 7 A supposition originating in David Cairns, 'Berlioz, the Cornet and the *Symphonie Fantastique*', *Berlioz Society Bulletin* 47 (July 1964), 2–6.
- 8 Trevor Herbert, 'Nineteenth-Century Bands: The Making of a Movement', in Herbert (ed.), *Bands: The Brass Band Movement in the Nineteenth and Twentieth Centuries* (Milton Keynes, 1991), p. 16.
- 9 Cyril Ehrlich, *First Philharmonic – A History of the Royal Philharmonic Society* (Oxford, 1995), p. 69.
- 10 Jean-Pierre Mathez, *Joseph Jean-Baptiste Laurent Arban (1825–1889), Portrait d'un musicien français du XIXe siècle* (Moudon, 1977), pp. 26–7.
- 11 André M. Smith, 'Victor Vladimirovich Ewald (1860–1935) Civil Engineer & Musician', *International Trumpet Guild Journal* 18, No. 2 (December 1993), 5–20; No. 3 (February 1994), 4–23.
- 12 Scott Sorenson and John Webb, 'The Harpers and the Trumpet', *The Galpin Society Journal* 39 (September 1986), 35–57.
- 13 Rosario Macaluso, 'L'école liégeoise de trompette, 3^e partie', *Brass Bulletin* 90 (February 1995), 12–13.
- 14 George Bernard Shaw: 'I believe that a taste for brass instruments is hereditary', quoted by Clifford Bevan, *The Tuba Family* (London, 1978), p. 97.
- 15 Chronicled in Glenn Bridges, *Pioneers in Brass*, (Detroit, 1965).
- 16 Birtwistle, conversation with the author, 10 June 1996.

18. Frontiers or byways? Brass instruments in avant-garde music

- 1 A similar point is made in [Chapter 12](#) – see pp. 169–70.
- 2 Again, see [Chapter 12](#), p. 170.
- 3 Luciano Berio, 'Aspetti di artigianato formale', in *Incontri Musicali* No. 1 (Milan, 1956), 55.
- 4 For a detailed description of quarter-tone techniques, see articles by Wills and Miller in the *Society for the Promotion of New Music Microtonality Manual* (London, 1991).
- 5 During rehearsals for the first performance of Nono's *Prometeo* I asked the composer what exactly was required in a passage of this sort. He replied 'Teknik ist Scheiss', a curious phrase for a Venetian to use, and turned away. I could only conclude that the process of trying was more important to him than a specific effect.
- 6 Jan W. Mortenson in a paper delivered at the Third Colloquium of the Confédération Internationale de Musique Électroacoustique, Stockholm, 1986.
- 7 The 'metatrumpet' is played on Impett's recording 'Ladder of Escape 7' on the Attacca label, Babel 9476. The record, which also includes the Scelsi, Berio and Harvey pieces mentioned in this chapter, is indispensable listening for anybody interested in the subject.
- 8 Cf. [Chapter 12](#), n. 25.

Select bibliography

A number of bibliographies of literature related to brass have been published. The most wide-ranging is the *Brass Bibliography* edited by Mark J. Fasman (Bloomington and Indianapolis, 1990), but though this is a helpful handbook, it was far from comprehensive even when it was published. Other more specialist bibliographies include Michael Collver and Bruce Dickey's *A Catalog of Music for the Cornett*, and *The Tuba Source Book*, compiled and edited by R. Winston Morris and Edward R. Goldstein. The most comprehensive and accurate bibliography of historic brass scholarship and performance practice is that compiled by David Lasocki and published annually (since 1990) in *The Historic Brass Society Journal*. We have not included information about on-line bibliography facilities or interest lists, but these are now commonly available and easily accessible.

- Abbiatti, F., *Giuseppe Verdi*, 4 vols. (Milan, 1959).
- Agricola, G., *De natura fossilium* (1546), (trans.) M. C. Bandy and J. A. Bandy, The Geological Society of America, Special Paper 63, 1955.
- De re metallica* (1556), (trans.) H. C. Hoover and L. H. Hoover (New York, 1950).
- Agricola, Martin, *Musica instrumentalis deudsch...* (Wittenberg, 1529. Diplomatic reprint Leipzig, 1896).
- Albrechtsberger, J. G., *Collected Writings on Thorough-Bass, Harmony and Composition* (Vienna, 1790), (trans.) Sabilla Novello (London, 1855).
- Altenburg, J. E., *Versuch einer Anleitung zur heroisch-musikalischen Trompeter- und Pauker-Kunst* (Halle, 1795), (trans.) E. H. Tarr (Nashville, 1974).
- Ames, David W., and King, Anthony V., *Glossary of Hausa Music and its Social Context* (Evanston, 1971).
- Amman, J., and Sachs, H., *Ständebuch (Book of Trades)* (1568), facsimile edition with introduction by B. Rifkin (New York, 1973).
- Anon., *Chromatic Scale for Ophicleide* (London, n.d.).
- Anon., *Méthode pour ophicléide, à neuf, dix et onze clés* (Paris, n.d.).
- Anon., *New Instructions for the French Horn* (London, c. 1772–9).
- Anon., 'A Midland tour – Wolverhampton', in *The Leisure Hour – A Family Journal of Instruction and Recreation* (3 August 1872), 494–5.
- Anzenberger, Friedrich, 'Method Books for Keyed Trumpet in the 19th Century: An Annotated Bibliography', *Historic Brass Society Journal* 6 (1994), 1–10.
- 'Method Books for Trumpet and Cornet Using Stopped Notes in the 19th Century: An Annotated Bibliography', *Historic Brass Society Journal* 7 (1995), 1–11.
- Araldi, Giuseppe, *Methodo per tromba a chiavi et a macchina di Giuseppe Araldi prima tromba dell'I.R. Teatro alla Scala e dal Medesimo dedicato all'ill.mo Sig. Conte Renato Boromeo* (Milan, c. 1835).
- Asioli, Bonifazio, *Transunto dei principjelementari di musica compilati dal celebre M. B. Asioli, e breve metodo per tromba con chiavi* (Milan, 1825).
- Aste, Jean Hilaire (Halary), *Brevet d'invention et de perfectionnement de dix ans, pour des instruments de musique à vent et à clef* (Paris, 24 mars 1821; D'Addition, 16 août 1822).
- Bach, Vincent, *Embouchure and Mouthpiece Manual* (Mount Vernon, NY, 1954).

- Bahnert, H., Herzberg, T., and Schramm, H., *Metallblasinstrumente*, 2nd edn (Wilhelmshaven, 1986).
- Bailey, D., *Improvisation: Its Nature and Practice in Music* (Ashbourne, 1980).
- Baines, A., 'James Talbot's Manuscript', *The Galpin Society Journal* 1 (1948), 9–26.
Brass Instruments: Their History and Development (London, 1976/R 1980; London/New York, 1981).
- Barbour, J. M., 'Unusual Brass Notation in the Eighteenth Century', *Brass Quarterly* 2/4 (1959), 139–46.
Trumpets, Horns and Music (Lansing, 1964).
- Barclay, Robert, 'Ethics in the Conservation and Restoration of Brass Instruments', *Historic Brass Society Journal* 1 (1989), 75–81.
The Art of the Trumpet-maker (Oxford, 1992).
- Bate, P., *The Trumpet and Trombone* (London/New York, 1966).
- Bauguess, B., 'The Historical Brass Movement', *Brass Ink: The Newsletter of Brass Society, Inc.* 1, no. 2 (December 1990), 1–3.
- Benade, A. H., 'The Physics of Brasses', in *The Physics of Music* (readings from *Scientific American*), (San Francisco, 1978), pp. 44–55.
- Bendinelli, C., *Tutta l'arte della trombetta* (1614), facsimile edition, (ed.) E. H. Tarr, (Kassel, 1975) (*Documenta musicologica* II/V).
- Berg, Nikolaj, *Den første prøve for Begyndere udi Instrumental-kunsten* (Christiansand, 1782), (trans.) P. Leonhards, E. H. Tarr and B. Volle, *Basler Jahrbuch für historische Musikpraxis* 5 (1981).
- Bergstein, B., 'Miles Davis and Karlheinz Stockhausen: A Reciprocal Relationship', *Musical Quarterly* 76 (1992), 502–25.
- Berlin, Johan Daniel, *Musikalske Elementer* (Trondheim, 1744), (trans.) P. Leonhards, E. H. Tarr and B. Volle, *Basler Jahrbuch für historische Musikpraxis* 5 (1981).
- Berliner, P. F., *Thinking in Jazz: The Infinite Art of Improvisation* (Chicago, 1994).
- Berlioz, Hector, *Voyage musical en Allemagne et en Italie* (Paris, 1844/R 1970, Farnborough).
Treatise on Orchestration, (trans.) M. C. Clarke (London, 1858).
The Memoirs of Hector Berlioz, Member of the French Institute, Including his Travels in Italy, Germany, Russia and England (1803–65), (trans. and ed.) D. Cairns (London, 1969/R 1970).
- Berr, F., and Caussin, *Méthode complète d'ophicléide* (Paris, c.1837).
- Bevan, C., *The Tuba Family* (London/New York, 1978).
 'The Saxtuba and Organological Vituperation', *The Galpin Society Journal* 43 (March 1990), 135–46.
- Bickley, D., 'The Trumpet shall Sound: some reasons that suggest why Berlioz altered the part for *trompette à pistons* in his Overture *Waverley*', *Historic Brass Society Journal* 6 (1994), 61–83.
- Biringuccio, V., *Pirotechnia* (1540), (trans.) C. S. Smith (Boston, 1966).
- Bismantova, Bartolomeo, *Compendio musicale* (manuscript, 1677), facsimile edition (Florence, 1978); partial English and German translation and commentary by B. Dickey, P. Leonhards and E. H. Tarr in 'The Discussion of Wind Instruments in B. Bismantova's *Compendio musicale* (1677)', *Basler Jahrbuch für historische Musikpraxis* 2 (1978), 143–87.
- Blackburn, B. J., 'Music and Festivals at the Court of Leo X: A Venetian View', *Early Music History* 11 (1992), 1–37.
- Blandford, W. F. H., 'The Fourth Horn in the Choral Symphony', *Musical Times* 66 (1925), 28–32, 124–9, 221–3.
 'Bach's Horn Parts', *Musical Times* 77 (1936), 748–50, 837.
 'Handel's Horn and Trombone Parts', *Musical Times* 80 (1939), 697–9, 746–7, 794.
- Blitz, E. E., *Consideration sur l'art du chef d'orchestre* (Leipzig, 1887).

- Boer, B. H. van, 'Some Observations on Bach's Use of the Horn', *The Horn Call Annual* 1 (1989), 59–83.
- 'Corrigenda to "Some Observations on Bach's Use of the Horn"', *The Horn Call Annual* 2 (1990), 91–6, 105–13.
- Boon, B., *Sing the Happy Song: A History of Salvation Army Vocal Music* (London, 1978).
- Booth, G. D., 'Brass Bands: Tradition, Change and the Mass Media in Indian Wedding Music', *Ethnomusicology* 34, No. 2 (1990), 245–62.
- Bridges, G., *Pioneers in Brass* (Detroit, 1965).
- Brofsky, H., 'Miles Davis and My Funny Valentine: The Evolution of a Solo', *Black Music Research Journal* (1983), 23–45.
- Brown, H. M., *Embellishing Sixteenth-Century Music* (London, 1976).
- Brown, H. M., and Sadie, S., (eds.), *Performance Practice: Music After 1600* (London, 1989; revised New York, 1990).
- Brownlow, Jr, J. A., *The Last Trumpet: A Survey of the History and Literature of the English Slide Trumpet* (New York, 1996).
- Brüchle, B., *Horn Bibliographie*, 3 vols. (Wilhelmshaven, 1970/R 1975/R 1983).
- Brüchle, B., and Janetzky, K., *Kulturgeschichte des Horns, A Pictorial History of the Horn* (trans.) C. Baumann (Tutzing, 1976).
- Bryan, P. R., 'Haydn's Hornists', *Haydn-Studien* 3/1 (1973), 52–9.
- 'The Horn in the Works of Mozart and Haydn: Some Observations and Comparisons', *The Haydn Yearbook* 9 (1975), 189–255.
- 'Carl Franz, Eighteenth-Century Virtuoso: A Reappraisal', *Alta Musica* 4 (Tutzing, 1977), 67–73.
- 'Haydn's Alto Horn: Their Effect and the Question of Authenticity', in J. P. Larsen, H. Stewer and J. Webster (eds.), *Haydn Studies* (New York, 1981), pp. 190–2.
- Bryant, C., *And the Band Played On 1776–1976* (Washington, DC, 1975).
- Burrows, D., 'Handel, the Dead March and a Newly Identified Trombone Movement', *Early Music* 18, No. 3 (August 1990), 408–16.
- Byrne, M., 'William Bull, John Stevenson and the Harris Family', *The Galpin Society Journal* 45 (March 1992), 67–77.
- Cairns, D., 'Berlioz, the Cornet and the *Symphonie Fantastique*', *Berlioz Society Bulletin* 47 (July 1964), 2–6.
- Campbell, D. M., 'Cornett Acoustics: Some Experimental Studies', *The Galpin Society Journal* 49 (1996), 180–96.
- Campbell, D. M., and Greated, C., *The Musician's Guide to Acoustics* (London, 1987).
- Camus, Raoul F., *Military Music of the American Revolution* (Westerville, OH., 1975).
- Carr, I., *Miles Davis: A Critical Biography* (London, 1982).
- Carr, I., Fairweather, D., and Priestley, B., *Jazz: The Essential Companion* (London, 1987).
- Carse, Adam, *Musical Wind Instruments* (London, 1939/R 1973, New York).
- The Orchestra* (London, 1949).
- The Life of Jullien* (Cambridge, 1950).
- Carter, G. F., *Principles of Physical and Chemical Metallurgy* (Ohio, 1979).
- Carter, Stewart, 'Trombone Obbligatos in Viennese Oratorios of the Baroque', *Historic Brass Society Journal* 2 (1990), 52–77.
- Carter, T., *Music in Late Renaissance and Early Baroque Italy* (London, 1992).
- Caussin, *Solfège-Méthode pour ophicléide-basse* (Paris, n.d.).
- Cellini, B., *Treatise on Goldsmithing* (1568), (trans.) C. R. Ashbee (New York, 1967).
- Cipolla, F. J., and Hunsberger, D., *The Wind Ensemble and its Repertoire* (Rochester, New York, 1994).
- Clodomir, P., *Méthode élémentaire pour ophicléide* (Paris, n.d.).

- Coar, B., *The French Horn* (DeKalb, 1947).
- A Critical Study of the Nineteenth Century Horn Virtuosi in France* (DeKalb, 1952).
- Collaer, Paul, *Music of the Americas: An Illustrated Music Ethnography of the Eskimo and American Indian Peoples* (New York, 1973).
- Collins, J., 'The Early History of West African Highlife Music', *Popular Music* 8/2 (1989), 221–30.
- Collver, M., and Dickey, B., *A Catalog of Music for the Cornett* (Bloomington, 1995).
- Conforzi, I., 'Girolamo Fantini, "Monarch of the Trumpet": New Light on his Works', *Historic Brass Society Journal* 6 (1994), 32–60.
- Cornette, V., *Méthode d'ophidéide* (Paris, n.d.).
- Dahlqvist, R., *The Keyed Trumpet and its Greatest Virtuoso, Anton Weidinger*, Brass Research Series: No. 1 (Nashville, 1975).
- 'Some Notes on the Early Valve', *The Galpin Society Journal* 33 (1980), 111–24.
- 'Bidrag till trumpetten och trumpetspetsens historia från 1500-talet till mitten av 1800-talet', 2 vols. (Ph.D. diss., University of Gothenburg, 1988).
- 'Corno and Corno da caccia: Horn Terminology, Horn Pitches, and High Horn Parts', *Basler Jahrbuch für Historische Musikpraxis* 15 (1991), 35–80.
- 'Pitches of German, French and English trumpets in the 17th and 18th Centuries', *Historic Brass Society Journal* 15 (1993), 29–41.
- 'Gottfried Reiche's Instrument: A Problem of Classification', *Historic Brass Society Journal* 5 (1993), 174–91.
- Dalla Casa, Girolamo, *Il vero modo di diminuir...* (Venice, 1584), facsimile edition with a preface by Giuseppe Vecchi (Bologna, 1970).
- Damm, P., '300 Jahre Waldhorn', *Brass Bulletin* 31 (1980), 19–33; 32 (1980), 19–41.
- 'Zur Ausführung des "Corne da Caccia" im Quoniam der Missa h-Moll von J. S. Bach', *Bach-Jahrbuch* (1984), 91–105.
- 'Hat J. S. Bach die Partie des "Corne da Caccia" der Messe h-Moll BWV 232 für Gottfried Reiche komponiert?', *Brass Bulletin* 56 (1986), 61–73; 57 (1986), 67–79; 58 (1987), 63–9.
- 'Das Horn in der Mitte des 18. Jahrhunderts zwischen Clarinblas- und Stopftechnik', *Studien zur Aufführungspraxis und Interpretation von Instrumentalmusik des 18. Jahrhunderts* 29 (Blankenburg/Harz, 1986), 11–29.
- 'Zum Thema: Das Corno da caccia bei Johann Sebastian Bach', *Johann Sebastian Bachs historischer Ort*, *Bach Studien* 10 (1991), 233–42.
- Dauprat, Louis-François, *Méthode de cor-alto et cor-basse* (Paris, 1824/R 1994 in Eng. trans.).
- Dean, R. T., *Creative Improvisation: Jazz, Contemporary Music and Beyond* (Milton Keynes, 1989).
- New Structures in Jazz and Improvised Music since 1960* (Milton Keynes, 1992). (ed.), *Eleven Views of Music Improvisation* (Sydney, 1992).
- Del Mar, N., *Anatomy of the Orchestra* (London, 1981).
- Denley, J., 'Improvisation: The Entanglement of Awareness and Physicality', *Sounds Australian* 32 (1991–2), 25–9.
- Dickey, B., 'A Brief Note on Ghizzolo and Mortaro', *Historic Brass Society Newsletter* 4 (Summer 1992), 4–14.
- 'The *Apparato musicale* (1613) of Amante Franzoni', *Historic Brass Society Newsletter* 5 (1993), 21–8.
- Diderot, D., and d'Alembert, J. le R., *Encyclopédie* (Paris, 1751–72), facsimile reproduction (Paris, 1965).
- Doernberg, Erwin, *The Life and Symphonies of Anton Bruckner* (London, 1960).
- Domnich, Heinrich, *Méthode de premier et de second cor* (Paris, 1807/R 1974; Fr., Eng. and Ger. edn, 1985).

- Downey, P., 'The Trumpet and its Role in Music of the Renaissance and Early Baroque', 3 vols. (Ph.D. thesis, The Queen's University of Belfast, 1983).
- 'The Renaissance Slide Trumpet: Fact or Fiction?' *Early Music* 12, No. 1 (February 1984), 26–33.
- 'The Danish Trumpet Ensemble at the Court of King Christian III – Some Notes on its Instruments and its Music', *Dansk Årbog for Musikforskning* 19 (1988–9), 7–17.
- 'Adam Drese's 1648 Funeral Music and the Invention of the Slide Trumpet', in Gerard Gillen and Harry White (eds.), *Musicology in Ireland*, Irish Musical Studies 1 (Blackrock, Co. Dublin, 1990), pp. 200–17.
- 'Lip-Blown Instruments of Ireland Before the Norman Invasion', *Historic Brass Society Journal* 5 (1993), 75–91.
- 'Trumpet Style in 17th-Century France and the Music of *Les Trompettes du Roy*', *Historic Brass Society Journal* 7 (1995), 67–99.
- Dudgeon, R. T., 'Keyed Bugle Method Books: Documents of Transition in 19th-Century Brass Instrument Performance Practice and Aesthetics in England', *Historic Brass Society Journal* 2 (1990), 112–22.
- The Keyed Bugle* (Meuchen, NJ and London, 1993).
- Duffin, Ross W., 'The *trompette des menestrels* in the 15th-century *alta capella*', *Early Music* 17, No. 3 (August 1989), 397–402.
- Dullat, G., *Metallblasinstrumentenbau: Entwicklungsstufen und Technologie* (Frankfurt am Main, 1989).
- Duvernoy, Frédéric, *Méthode pour le cor* (Paris, 1802/R 1972/R 1987 with Eng. trans.).
- Ebers, John, *Seven Years of the King's Theatre* (London, 1829).
- Ehrlich, Cyril, *The Music Profession in England Since the Eighteenth Century: A Social History* (Oxford, 1985).
- First Philharmonic – A History of the Royal Philharmonic Society* (Oxford, 1995).
- Eisen, W., and Eisen, M., *Händel-Handbuch*, 4 vols. (Leipzig, 1985).
- Eliason, R. E., 'Early American Valves for Brass Instruments', *The Galpin Society Journal* 23 (1970), 86–96.
- Ercker, L., *Beschreibung allerfürnemsten mineralischen Ertzt und Bergwercksarten (Treatise on Ores and Assaying)* (1580), (trans.) A. G. Sisco and C. S. Smith (Chicago, 1951).
- Fantini, G., *Modo per imparare a sonare di tromba* (Frankfurt [sic, although probably published in Florence], 1638), facsimile edition (Milan, 1934).
- Farmer, H. G., *Memoirs of the Royal Artillery Band* (London, 1904).
- The Rise and Development of Military Music* (London, 1912/R 1970).
- Fischer, H. G., *The Renaissance Sackbut and its Use Today* (New York, 1984).
- Fitzpatrick, H., 'Notes on the Vienna Horn', *The Galpin Society Journal* 14 (1961), 49–51.
- 'Some Historical Notes on the Horn in Germany and Austria', *The Galpin Society Journal* 16 (1963), 33–48.
- 'The Waldhorn and its Associations in Bach's Time', *Royal Musical Association Research Chronicle* 3 (1963), 51–4.
- 'The Valveless Horn in Modern Performances of Eighteenth-Century Music', *Royal Music Association Proceedings* 90–1 (1963–5), 45–60.
- 'An Eighteenth-Century School of Horn-Makers in Bohemia', *The Galpin Society Journal* 17 (1964), 77–88.
- 'Blasinstrumente in Mozarts Instrumentalmusik, das Waldhorn der Mozartzeit und seine geschichtliche Grundlage', *Mozart-Jahrbuch* (1968–70), 21–7.
- The Horn and Horn Playing and the Austro-Bohemian Tradition from 1680 to 1830* (London, 1970).
- 'Waldhorntechnik um die Jahrhundertmitte', in V. Schwarz (ed.), *Der Junge Haydn* (Graz, 1972), pp. 221–30.

- Flachs, W., *Das Jagdhorn: seine Geschichte von der Steinzeit bis zur Gegenwart* (Zug, 1994).
- Fletcher, N. H., and Rossing, T. D., *The Physics of Musical Instruments* (New York/London, 1991).
- Flick, J. J., *Vollständige theoretische und praktische Geschichte der Erfindungen* (Basel, 1798).
- Forsyth, C., *Orchestration* (London, 1914).
- Francoeur, Louis Joseph, *Diapason général de tous les instruments à vent* (Paris, 1772/R 1972; new edition augmented by Choron, entitled *Traité générale*, 1812).
- Fröhlich, F. J., *Vollständige theoretisch-practische Musikschule* (Bonn, 1811).
- Fukui, Hajime, 'The *Hora* (Conch Trumpet) of Japan', *The Galpin Society Journal* 47 (1994), 47–62.
- Gabbard, K. (ed.), *Representing Jazz* (Durham, NH, 1995).
- (ed.), *Jazz among the Discourses* (Durham, NH, 1995).
- Gallay, Jacques-François, *Méthode pour le cor* (Paris, c. 1845).
- Galpin, F. W., 'The Sackbut: Its Evolution and History', *Proceedings of The Musical Association*, 33 (1906–7), 1–25.
- Old English Instruments of Music*, (London, 1910/R 1932/rev. T. Dart 1965).
- Garnier, Th., *Méthode élémentaire et facile d'ophicléide à pistons ou à cylindres* (Paris, n.d.).
- Gates, H. L., *The Signifying Monkey: A Theory of Afro-American Literary Criticism* (New York, 1988).
- Gehot, Joseph, *Complete Instructions for Every Musical Instrument* (London, c. 1790).
- Gordon, R. B., 'Metallography of Brass in a 16th-Century Astrolabe', *Journal of the Historical Metallurgy Society* 20,2 (1986), 93–6.
- Gosch, W., 'Trumpet and Horn Music in 18th-Century Weissenfels', (trans.) E. Tarr, *Journal of the International Trumpet Guild* 17/1 (1992), 24–30.
- Gourlay, K. A., *Sound-Producing Instruments in Traditional Society: A Study of Esoteric Instruments and Their Role in Male-Female Relations* (Port Moresby and Canberra, 1975).
- 'Long Trumpets of Northern Nigeria in History and Today', *African Music* 6/2 (1982), 48–72.
- Gregory, R., *The Horn* (London, 1961).
- The Trombone* (New York/London, 1973).
- Guion, David M., *The Trombone: Its History and Music, 1697–1811* (New York, 1988).
- Güttler, L., 'Das "corno da caccia" als Diskantinstrument bei J. S. Bach', *Studien zur Aufführungspraxis und Interpretation von Instrumentalmusik des 18. Jahrhunderts* 19 (Blankenburg/Harz, 1982), 67–9.
- 'Das "Corno da Caccia" und seine Verwendung bei J. S. Bach', *Johann Sebastian Bachs historischer Ort*, *Bach Studien* 10 (1991), 216–31.
- Hachenberg, K., 'Brass in Central European Instrument-making from the 16th through the 18th Centuries', *Historic Brass Society Journal* 4 (1992), 229–52.
- Haedeke, H.-U., *Metalwork* (New York, 1970).
- Haine, M., and de Keyser, I., *Catalogue des Instruments Sax au Musée Instrumental de Bruxelles* (Brussels, 1980).
- Hakelberg, D., 'A Medieval Wind Instrument from Schlettwein, Thuringia', *Historic Brass Society Journal* 7 (1995), 185–96.
- Halfpenny, Eric, 'William Shaw's "Harmonic Trumpet"', *The Galpin Society Journal* 13 (1960), 7–13.
- Halle, J. S., *Werkstätte der heutigen Künste, Band III* (Brandenburg and Leipzig, 1764).
- Haller, K., *Partituranordnung und Musikalischer Satz* (Tutzing, 1970).
- Hampel, Anton Joseph, 'Lection pro cornui' (Dresden, c.1762; MS lost).
- Hampel, Anton, and Punto, Giovanni, *Seule et vraie méthode pour apprendre facilement les éléments des premier et seconde cors aux jeune élèves* (Paris, 1798–9/R 1986/ Fr., Ger. and Czech edn 1986).
- Harmonicon, The* (London, August 1825; July 1830).

- Harper, Thomas, *Instructions for the Trumpet*, facsimile of the 1837 edition, with commentary on the life of Harper by John Webb and Scott Sorenson; foreword by John Webb (Homer, New York, 1988).
- Hasse, M. T., *Vorzüglichsten Künste...* (Königsberg, 1792).
- Hazen, M. H., and Hazen, R. M., *The Music Men: An Illustrated History of Brass Bands in America, 1800–1920* (Washington, DC, 1987).
- Heartz, D., 'The Hunting Chorus in Haydn's *Jahreszeiten* and the "Airs de Chasse" in the *Encyclopédie*', *Eighteenth-Century Studies* 9/4 (1976), 523–39.
- 'Leutgeb and the 1762 Horn Concertos of Joseph and Johann Michael Haydn', *Mozart-Jahrbuch* (1987–8), 59–64.
- Heater, E. M., 'Early Hunting Horn Calls and their Transmission', *Historic Brass Society Journal* 7 (1995), 123–41.
- Heide, G. J. van der, 'Reconstructie van een bijzonders Italiaanse trompet van de vindplatte Scheurak SO1', in R. Reinders and M. Bierma (eds.), *Vis en visvangst* (Gronigen, 1994).
- Heins, E., 'Kroncong and Tanjidor – Two Cases of Urban Folk Music in Jakarta', *Asian Music*, 7/1 (1975), 20–32.
- Héral, A., *Méthode d'ophicléide, contenant les principes de musique, ceux de l'instrument, les gammes, 24 leçons, 12 duos* (Lyons, n.d.).
- Herbert, Trevor, 'The Trombone in Britain before 1800', 2 vols. (Ph.D. thesis, The Open University, 1984).
- 'The Virtuosi of Merthyr', *Llafur: The Journal of Welsh Labour History* (August 1988), 60–9.
- 'Instruments of the Cyfarthfa Band' (with Arnold Myers), *The Galpin Society Journal* (1988), 2–10.
- 'The Sackbut in England in the Seventeenth and Eighteenth Centuries', *Early Music* 18, No. 4 (November 1990), 609–16.
- 'The Repertory of a Victorian Provincial Brass Band', *Popular Music* 9, No. 1 (1990), 117–32.
- (ed.) *Bands: The Brass Band Movement in the Nineteenth and Twentieth Centuries* (Milton Keynes, 1991).
- 'A Lament for Sam Hughes: The Last Ophicleidist', *Planet: The Welsh Internationalist* (Aberystwyth, July 1991), 66–75.
- 'Victorian Brass Bands: The Establishment of a Working-Class Musical Tradition', *Historic Brass Society Journal* 4 (1992), 1–11.
- 'The Sackbut and Pre-Reformation English Church Music', *Historic Brass Society Journal* 5 (1993), 146–58.
- 'Late Victorian Welsh Bands and Cymmrodorion Attitudes / Bandiau Cymreig y Cyfnod Fictoraidd Diweddar: Chwaeth, Pencampwriaeth ac Agweddau'r Cymmrodorion', *Welsh Music History* 1 (eds.) John Harper and Wyn Thomas, (Cardiff, 1996), 92–103.
- Heyde, H., *Trompeten, Posaunen, Tuben* (Leipzig, 1980).
- 'Zwischen Hörnern und Jägertrompeten', *Brass Bulletin* 55 (1986), 42–56.
- 'Blasinstrumente und Bläser der Dresdener Hofkapelle in der Zeit des Fux-Schülers Johann Dismas Zelenka (1710–1745)', in *Johann Joseph Fux und die barocke Bläsertradition* (Tutzing, 1987), pp. 39–63.
- Das Ventilblasinstrument* (Leipzig, 1987).
- 'Instrumentenkundliches über Horn und Trompete bei Johann Sebastian Bach', *Johann Sebastian Bachs historischer Ort*, Bach Studien 10 (1991), 250–65.
- 'Brass Instrument Making in Berlin from the 17th to the 20th Century: A Survey', *Historic Brass Society Journal* 3 (1991), 43–7.
- 'A Business Correspondence from Johann Wilhelm Haas in the Year 1719', *Historic Brass Society Journal* 4 (1992), 45–56.

- 'The Early Berlin Valve and an Unsigned Tuba at the Shrine to Music Museum', *Journal of the American Musical Instrument Society* 20 (1994), 54–64.
- Hiebert, T., 'The Horn in Early Eighteenth-Century Dresden: The Players and their Repertory' (D.M.A. thesis, University of Wisconsin-Madison, 1989).
- 'A Discography of Instrumental Compositions for Natural Horn from the Baroque', *The Horn Call* 23, No. 1 (October 1992), 25–30.
- 'Virtuosity, Experimentation, and Innovation in Horn Writing from Early 18th-Century Dresden', *Historic Brass Society Journal* 4 (1992), 112–59.
- 'Early Examples of Mixed-Keyed Horns and Trumpets in Works of C. Graupner', *Historic Brass Society Journal* 6 (1994), 231–43.
- 'Old and New Roles for the Horn in J. F. Fasch's Hunt Concerto', *The Horn Call Annual* 8 (1996), 15–27.
- 'A Case for Horn in D basso in the Early 18th Century and its Effect on Horn and Trumpet Combinations,' in *Perspectives in Brass Scholarship: Proceedings of the International Historic Brass Symposium, Amherst, 1995* (New York, 1997).
- Holman, P., 'The Trumpet Sonata in England', *Early Music* 4 (October 1976), 424–9.
- Holyoke, Samuel, *Instrumental Assistant; Vol. II containing a selection of Duettos, Rondos and Marches: with Instructions for the French-Horn and Bassoon* (Exeter, NH, 1807).
- Hoover, Cynthia A., 'A Trumpet Battle at Niblo's Pleasure Garden', *Musical Quarterly* 55, No. 3 (1969), 384–95.
- Hornbostel, E. M. von, and Sachs, C., 'Classification of Musical Instruments', in H. Myers (ed.), *Ethnomusicology: An Introduction*, (London, 1992), pp. 444–61.
- Horniman Museum (pub.), *Wind Instruments of European Art Music* (London, 1974).
- Horwood, Wally, *Adolphe Sax- His Life and Legacy* (Baldock, 1983).
- Hyde, J., *A New and Complete Preceptor for the Trumpet and Bugle Horn* (place unknown, c. 1798).
- Izikowitz, Karl G., *Musical and Other Sound Instruments of the South American Indians* (Gothenburg, 1934).
- Janetzky, K., and Bröchle, B., *Das Horn: Eine kleine Chronik seines Werdens und Wirkens* (Stuttgart, 1977), (trans.) James Chater, *The Horn* (London, 1988).
- Jooste, F., 'The Primary Influences on South African Wind Music of the Seventeenth and Eighteenth Centuries', *Journal of Band Research* 26, No. 2 (Spring 1991), 54–65.
- Jost, E., *Free Jazz* (English edn) (Graz, 1974).
- Karjalainen, Kauko, *Suomalainen Torviseitsikko: Historia ja pernteen jatkuminen* (Tampere, 1995).
- Karstädt, G., 'Zur Geschichte des Zinken und seiner Verwendung in der Musik des 16.–18. Jahrhunderts', *Archiv für Musikforschung* 4 (1937), 385–432.
- Lasst lustig die Hörner erschallen!* (Hamburg, 1964).
- Kastner, J. G., *Méthode élémentaire pour l'ophicléide* (Paris, n.d.).
- Kearns, A., 'Clarino Horn, Handhorn and Virtuosity in the Late Eighteenth-Century Horn Concerto', *The Horn Call Annual* 3 (1991), 2–30.
- Kenyon de Pascual, B., 'Museo de la Música in Barcelona', *Brass Bulletin* 70 (1990), 78–84.
- 'The Ophicleide in Spain, with an Appendix on Some 19th-Century Brass Tutors in Spain', *Historic Brass Society Journal* 7 (1995), 142–8.
- Kernfeld, B. (ed.), *The New Grove Dictionary of Jazz* (London, 1988).
- Kirby, Percival R., *The Musical Instruments of the Native Races of South Africa*, 2nd edn (Johannesburg, 1965).
- Kirk, D., 'Cornetti and Performing Pitch of Choirs in Northern Italy and England', *The Early Brass Journal* 4 (July 1988), 3–10.
- 'A Survey of Modern Cornetto Makers and their Work', *Historic Brass Society Newsletter* 1 (Summer 1989), 5–8.
- Klein, J. G. F., *Beschreibung der Metall-Lothe und Löthungen* (Berlin, 1760).

- Koch, H. O., *Sonderformen der Blasinstrumente in der deutschen Musik vom späten 17. bis zur Mitte des 18. Jahrhunderts* (Heidelberg, 1980).
- Koury, D., *Orchestral Performance Practices in the Nineteenth Century: Size, Proportions and Seating* (Michigan, 1981/R 1986).
- Krebs, Stanley Dale, *Soviet Composers and the Development of Soviet Music* (London, 1970).
- Kreitner, K., 'Minstrels in Spanish Churches, 1400–1600', *Early Music* 20, No. 4 (November 1992), 532–46.
- Krey, J., 'Zur Entstehungsgeschichte des ersten Brandenburgischen Konzerts', *Festschrift Heinrich Bessler* (Leipzig, 1961), pp. 337–42.
- Krünitz, J. G., *Ökonomisch-technologische Encyklopädie* (Berlin, 1802).
- Lasocki, D., 'A Bibliography of Writings about Historic Brass Instruments, 1988–89', *Historic Brass Society Journal* 2 (1990), 190–202. [First of a series which appears annually in the *HBSJ*.]
- Lasocki, D., with Prior, R., *The Bassanos: Venetian Musicians and Instrument Makers in England, 1531–1665* (Aldershot, 1995).
- Laurenty, J. S., *Systématique des aerophones de l'Afrique central* (Tervuren, 1974).
- Leboeuf, J., *Mémoires concernant l'histoire ecclésiastique et civile d'Auxerre*, 2 vols. (Paris, 1743).
- Lewis, M., 'Solo Trombone Performances at the Gewandhaus in the Nineteenth Century', *ITA Journal* 20, No.3 (Summer 1992), 27–32.
- Lienhard, D., 'Das Naturhorn in Paris', *Basler Jahrbuch für Historische Musikpraxis* 15 (1991), 81–115.
- Lindner, A., 'Anton Weidinger (1766–1852)' (Master's thesis, University of Vienna, 1993).
- Lockwood, L., *Music in Renaissance Ferrara 1400–1505: The Creation of a Musical Centre in the Fifteenth Century* (Cambridge, MA/Oxford, 1984).
- Lomas, M. J., 'Amateur Brass and Wind Bands in Southern England Between the Late Eighteenth Century and circa 1900', 2 vols. (Ph.D. thesis, The Open University, 1990).
- 'Secular Civilian Amateur Wind Bands in Southern England in the Late Eighteenth and Early Nineteenth Centuries', *The Galpin Society Journal* 45 (March 1992), 78–98.
- Macaluso, R., 'L'école liègeoise de trompette, 3^e partie', *Brass Bulletin* 90 (February 1995), 12–13.
- MacCracken, T. G., 'Die Verwendung der Blechblasinstrumente bei J. S. Bach unter besonderer Berücksichtigung der Tromba da tirarsi', *Bach-Jahrbuch* (1984), 59–89.
- 'Further Observations on Bach's Use of the Horn: A Reply to Bertil H. van Boer, Jr', *The Horn Call Annual* 2 (1990), 97–104.
- Majer, J. F. B. C., *Museum musicum* (Schwäbisch-Hall, 1732).
- Mandel, H., 'Eternal Traveller', *The Wire* 142 (1995), 26–9.
- Manifold, J. S., *Music in English Drama: From Shakespeare to Purcell* (London, 1956).
- Martin, S. H., 'Brass Bands and the Beni Phenomenon in Urban East Africa', *Africa Music* 7/1 (1991), 72–81.
- Maryon, H., *Metalwork and Enamelling* (New York, 1971).
- Mathez, J.-P., *Joseph Jean-Baptiste Laurent Arban (1825–1889), Portrait d'un musicien français du XIXe siècle* (Moudon, 1977).
- Mayer, Francis N., 'Early Band Music in the United States', *Music Educators National Conference Journal* (February-March 1959).
- Mbati-Katana, S., 'Similarities of Musical Phenomena Over a Large Part of the African Continent as Evidenced by the Irambi and Empango Side-blown Trumpet Styles and Drum Rhythms', *African Urban Notes* 5/4 (1970).
- McGrattan, A., 'The Trumpet in Funeral Ceremonies in Scotland and England During the 17th Century', *Historic Brass Society Journal* 7 (1995), 168–84.
- Mersenne, M., *Harmonie universelle* (1635), (trans.) Roger E. Chapman (The Hague, 1957).
- Meucci, R., 'Il cimbasso e gli strumenti affini nell'ottocento italiano', *Studi Verdiani* 5 (Parma, 1988–9), 109–37.

- Meyer, J., *Acoustics and the Performance of Music* (Frankfurt am Main, 1978).
- Mitchell, Donald, *The Language of Modern Music* (London, 1963).
- Morley-Pegge, Reginald, *The French Horn: Some Notes on the Evolution of the Instrument and its Technique*, 2nd edn (London, 1973).
- Morrill, D., 'Trumpet Algorithms for Computer Composition', *Computer Music Journal* 1 (1977), 46–52.
- Morris, R. W., and Goldstein, E. R., *The Tuba Source Book* (Bloomington, IN, 1996).
- Murray, Sterling E., 'The Double Horn Concerto: A Specialty of the Oettingen-Wallerstein Court', *The Journal of Musicology* 4/4 (Fall 1985–6), 507–34.
- Myers, A. (ed.), *Historic Musical Instruments in the Edinburgh University Collection: Catalogue of the Edinburgh University Collection of Historic Musical Instruments*, II, Part H, Fascicle i: Horns and bugles (Edinburgh, 1992; 2nd edn 1997); Fascicle ii: Cornets and tubas (Edinburgh, 1994); Fascicle iii: Trumpets and trombones (Edinburgh, 1993); Fascicle iv: Small mouthpieces for brass instruments (Edinburgh, 1995); Fascicle v: Large mouthpieces for brass instruments (Edinburgh, 1995).
- Myers, A., and Tones, F., 'PCB Cornets and Webster Trumpets: Rudall Carte's Patent Conical Bore Brasswind', *Historic Brass Society Journal* 7 (1995), 107–22.
- Nemetz, Andreas, *Allgemeine Trompeten-Schule, verfasst von Andr. Nemetz Posaunist im K. K. Hofopern-Theater in Wein. 17tes Werk* (Vienna, 1823).
- Nödl, K., *Metallblasinstrumentenbau* (Frankfurt am Main, 1970).
- Nussbaum, J., 'An Interview with Cornetto Virtuoso Bruce Dickey', *Historic Brass Society Newsletter* 4 (Summer 1992), 17–21.
- Parke, William, *Musical Memoirs: An Account of the General State of Music in England from the First Commemoration of Handel in 1784, to the Year 1830* (London, 1830).
- Paul, E., 'Das Horn in seiner Entwicklung vom Natur – zum Ventilinstrumente' (diss., University of Vienna, 1932).
- 'Das Horn als Signalinstrument einst und heute', *Salzburger Museum Carolino Augusteum, Jahresschrift* 22 (Salzburg, 1976), 37–60.
- Piersig, Fritz, *Die Einführung des Hornes in die Kunstmusik und seine Verwendung bis zum Tode Joh. Seb. Bachs* (diss., Halle-Wittenburg; Halle, 1927).
- Pilkova, Zdeňka, 'The Horn in Bohemian Sources of the 18th Century', in J. Trojan and M. Vach (eds.), *The Horn in the Past and Present of Czech Music* (Prague, 1983), pp. 66–72.
- Pinnock, A., and Wood, B., 'A Counterblast on English Trumpets', *Early Music* 19, No. 3 (August 1991), 437–43.
- Polk, K., 'Augustein Schubinger and the Zinck: Innovation in Performance Practice', *Historic Brass Society Journal* 1 (1989), 83–92.
- 'The Trombone, the Slide Trumpet and the Ensemble Tradition of the Early Renaissance', *Early Music* 17, No. 3 (August 1989), 389–97.
- 'The Schubingers of Augsburg: Innovation in Renaissance Instrumental Music', in Friedhelm Brusniak and Horst Leuchtmann (eds.), *Quaestiones in musica: Festschrift für Franz Drautwurst zum 65. Geburtstag* (Tutzing, 1989), pp. 495–503.
- German Instrumental Music of the Late Middle Ages* (Cambridge, 1992).
- 'Innovation in instrumental music 1450–1510: the role of German performers within European culture', in John Kmetz (ed.), *Music in the German Renaissance: Sources, Styles, Contexts* (Cambridge, 1994), pp. 202–14.
- Praetorius, M., *Syntagma musicum*, 3 vols. (Wittenberg/Wolfenbüttel, 1614–20). Facs. reprint (vols. I–III) (Kassel, 1958/9).
- Prentiss, Henry, *Prentiss' Complete Preceptor, for the Cornopean, Bugle Horn, and Keyed Bugle also for the Plain and Key'd Trumpet with scales for the five Different Trumpets in D–E flat F–G and*

- C. *Also a complete set of exercises for the different Instruments and the Infantry calls for Bugle.* Boston, Published by Henry Prentiss. 33 Court St. (Boston, c. 1840, reprint Nashville, 1980).
- Prevost, E., *No Sound is Innocent* (Matching Tye, UK, 1995).
- Pritchard, Brian W. (ed.), *Antonio Caldara: Essays on His Life and Times* (Aldershot, 1987).
- Punto, Giovanni, *Etude ou exercice journalier ouvrage periodique pour le cor* (Paris, c. 1796).
- Rasmussen, M., 'The Manuscript Katalog Wenster Litteratur I/1–17b (Universitetsbiblioteket, Lund). A Contribution to the History of the Baroque Horn Concerto', *Brass Quarterly* 5 (1962), 135–52.
- A Teacher's Guide to the Literature of Brass Instruments* (Durham, NH, 1968).
- Raum, J. R., 'The Alto Trombone in the 18th Century Sacred Chamber Music from the Abbeys of Gottweig and Melk, Austria', I, *Brass Bulletin* 72 (1990), 36–41; II, *Brass Bulletin* 73 (1991), 38–43; III, *Brass Bulletin* 74 (1991), 58–65.
- Riedel, F. W., *Kirchenmusik am Hofe Karls VI. (1711–1740)* (Munich-Salzburg, 1977).
- Rimsky-Korsakov, Nikolai, *Principles of Orchestration*, (trans.) Edward Agate (Paris, 1922).
- Ringer, A., 'The Chasse as a Musical Topic of the 18th Century', *Journal of the American Musicological Society* 6/2 (1953), 148–59.
- Robbins Landon, H. C., *Haydn: Chronicle and Works – The Years of 'The Creation' 1796–1800* (London, 1977).
- Roeser, Valentin, *Essai d'instruction à l'usage de ceux qui composent pour la clarinette et le cor* (Paris, 1764 and 1798/R 1972).
- Rose, Algernon, *Talks with Bandsmen: A Popular Handbook for Brass Instrumentalists* (London, 1895/R 1995 with an introduction by Arnold Myers).
- Roy, Eugène, *Méthode de trompette sans clefs et avec clefs divisée en deux parties...* (Mainz, 1824).
- Roy and Muller, R. *Cocks and Co's Series of Modern Tutors for Wind Instruments, with New and Complete Scales... No. 9 Roy and Muller's Tutor for the Keyed and Valve Trumpet, with Airs and Duets* (London, 1839).
- Sachs, Curt, *The History of Musical Instruments* (New York, 1940).
- Sadie, Stanley (ed.), *The New Grove Dictionary of Musical Instruments* (London, 1984).
- Salmen, W. (ed.), *Der Sozialstatus des Berufsmusikers vom 17. bis 19. Jahrhundert* (Kassel, 1971), published in English as *The Social Status of the Professional Musician from the Middle Ages to the Nineteenth Century* (New York, 1983).
- Saunders, Steven, 'The Hapsburg Court of Ferdinand II and the *Messa, Magnificat et Iubilate Deo a sette chori concertati con le trombe* (1621) of Giovanni Valentini', *Journal of the American Musicological Society* 44 (1991), 359–403.
- Schütz, *Tutor for the Ophicleide (Bass and Alto)*, No. 12 of R. Cocks & Co's *Modern Tutors for Wind Instruments* (London, 1853).
- Schubart, Christian Friedrich Daniel, *Idéen zu einer Ästhetik der Tonkunst* (Vienna, 1806).
- Schuller, G., *Horn Technique* (Oxford, 1962/R 1992).
- Early Jazz* (New York, 1968).
- Schulze, Hans-Joachim and Wolff, Christoph, *Bach-Compendium (BC), Vokalwerke, Teil I-IV* (Leipzig, 1985–9).
- Schünemann, G. (ed.), *Trompeterfanfaren, Sonaten und Feldstücke* (Kassel, 1936) (*Das Erbe deutscher Musik*, I/7).
- Schwarz, Vera (ed.), *Der junge Haydn* (Graz, 1972), (*Bericht der internationalen Arbeitstagung des Instituts für Aufführungspraxis der Hochschule für Musik... in Graz*).
- Sehnal, J., 'Anfänge des Waldhorn in Mähren', in J. Trojan and M. Vach (eds.), *The Horn in the Past and Present of Czech Music* (Prague, 1983), pp. 33–8.
- Smith, A. M., 'Victor Vladimirovich Ewald (1860–1935) Civil Engineer & Musician', *International Trumpet Guild Journal* 18, No. 2 (December 1993), 5–20; No. 3 (February 1994), 4–23.

- Smith, C. S., and Forbes, R. J., 'Metallurgy and Assaying', *A History of Technology – Vol. III* (various editors), (Oxford, 1957).
- Smith, H., and Dean, R. T., *Improvisation, Hypermedia and the Arts since 1945* (London, 1996).
- Smithers, Don L., 'The Trumpets of J. W. Haas', *The Galpin Society Journal* 18 (1965), 23–41.
- 'The Habsburg Imperial Trompeter and Heerpaucker Privileges [sic] of 1653', *The Galpin Society Journal* 24 (1971), 84–95.
- The Music and History of the Baroque Trumpet before 1721*, (New York/London, 1973).
- 'Gottfried Reiches Ansehen und sein Einfluß auf die Musik Johann Sebastian Bachs', *Bach-Jahrbuch* (1987), 113–50.
- The Music and History of the Baroque Trumpet Before 1721*, 2nd edn (Carbondale and Edwardsville/Buren, The Netherlands, 1988).
- 'A New Look at the Historical, Linguistic and Taxonomic Bases for the Evolution of Lip-Blown Instruments from Classical Antiquity until the End of the Middle Ages', *Historic Brass Society Journal* 1 (1989), 3–64.
- 'Mozart's Orchestral Brass', *Early Music* 20, No. 2 (May 1992), 254–65.
- Smithers, D. L., Wogram, K., and Bowsher, J., 'Playing the Baroque Trumpet', *Scientific American* 254, 4 (1986), 108–15.
- Sorenson, Scott, and Webb, John, 'The Harpers and the Trumpet', *The Galpin Society Journal* 39 (1986), 35–57.
- Steiger, *Méthode élémentaire et graduée d'ophidéide...* (Paris, n.d.).
- Tarr, E. H., *The Trumpet*, translated from *Die Trompete* (1977) by S. E. Plank and E. H. Tarr (Portland, Oregon, 1984/R 1988; London, 1988).
- 'Ein Katalog erhaltener Zinken', *Basler Jahrbuch für historische Musikpraxis* 5 (1981), 11–262.
- 'Handel Horn Duo Located in South America', *Brass Bulletin* 49 (1985), 41–4. (ed.), Giuseppe Aldrovandini, *Tre concerti per due trombe* (Coburg, 1992).
- 'The Romantic Trumpet', *Historic Brass Society Journal* 5 (1993), 213–61, and *Historic Brass Society Journal* 6 (1994), 110–215.
- '1995 – An Anniversary Year for Trumpeters', *International Trumpet Guild Journal* 20/1 (September 1995), 74–82.
- Taylor, Arthur R., *Brass Bands* (St Albans, 1979).
- Terry, C. S., *Bach's Orchestra* (London, 1932/R 1972).
- Thompson, B. E., 'A History of the Early Sources of Mozart Horn Concertos K. 412/514, K. 417, K. 447, and K. 495', *The Horn Call Annual* 1 (1989), 2–19.
- Toivainen, P., 'Modelling the Target-note Technique of Bebop Style Jazz Improvisation: An Artificial Neural Network Approach', *Music Perception* 12 (1995), 399–413.
- Tomes, F., 'Flat Trumpet Experiments', *The Galpin Society Journal* 43 (1990), 164–5.
- Trowell, Margaret, and Wachsmann, Klaus P., *Tribal Crafts of Uganda* (London, 1953).
- Tuchmann, Barbara M., *The Proud Tower – A Portrait of the World Before the War 1890–1914* (New York, 1966).
- Tuckwell, B., *Horn* (London, 1983).
- Tylecote, R. F., *A History of Metallurgy* (London, 1976).
- Tyson, A., 'Mozart's D-Major Horn Concerto: Questions of Date and Authenticity', in *Mozart: Studies of the Autograph Scores* (Cambridge, 1987), pp. 246–61.
- 'Mozart's Horn Concertos: New Datings and the Identification of Handwriting', *Mozart Jahrbuch* (1987–8), 121–5.
- Vandenbroeck, Othon, *Traité générale de tous les instruments à vents à l'usage des compositeurs* (Paris, c.1794/R 1974).
- Nouvelle méthode et raisonnée pour pour apprendre à donner du cor* (Paris, 1797).
- Vessella, A., *Studi d'istrumentazione per banda*, 2 vols. (Milan, 1897).

- Virdung, Sebastian, *Musica getutscht und ausgezogen ...* (Basle, 1511), facsimile edition (Bärenreiter, 1931).
- Waterhouse, W., *The New Langwill Index: A Dictionary of Musical Wind-Instrument Makers and Inventors* (London, 1993).
- Webb, J., 'The Flat Trumpet in Perspective', *The Galpin Society Journal* 46 (March 1993), 154–60.
- Weigel, C., *Abbildung der gemein nützlichen Hauptstände* (Regensburg, 1698).
- Weiner, H., 'Giovanni Martino Cesare and his Editors', *Historic Brass Society Journal* 3 (1991), 56–64.
- 'Andreas Nemetz's Neueste Posaun-Schule: An Early Viennese Trombone Method', *Historic Brass Society Journal* 7 (1995), 12–35.
- Weston, Stephen J., *Samuel Hughes – Ophicleidist* (Edinburgh, 1986).
- Whittall, Arnold, *Music Since the First World War* (London, 1977).
- Whitwell, D., *The Baroque Wind Band and Wind Ensemble* (Northridge, 1983).
- Wick, Denis, *Trombone Technique* (London, 1971).
- Widholm, G., 'Akustik und spieltechnische Besonderheiten des Wiener Horns', in Gregor Widholm and Michael Nagy (eds.), *Das Instrumentalspiel: Beiträge zur Akustik der Musikinstrumente... Bericht vom Internationalen Symposium, Wien, 12–14 April 1988* (Vienna, 1989), pp. 157–84.
- Wigness, C. R., *The Soloistic Use of the Trombone in Eighteenth-Century Vienna* (Nashville, 1978).
- Winch, *The Compleat Tutor for the French Horn* (London, c. 1746). Republished in *The Compleat Tutor for the French Horn* (London, c.1756) and in *Instructions for the French Horn (The Muse's Delight or Apollo's Cabinet)* (Liverpool, 1757).
- Wörthmüller, W., 'Die Nürnberger Trompeten- und Posaunenmacher des 17. und 18. Jarhunderts', *Mitteilungen des Vereins für Geschichte der Stadt Nürnberg* 45 (1954), 208–325.
- 'Die Instrumente der Nürnberger Trompeten- und Posaunenmacher', *Mitteilungen des Vereins für Geschichte der Stadt Nürnberg* 46 (1955), 372–480.
- Wright, Denis, *Scoring for Brass Band* (Coine, 1935).
- Wright, F. (ed.), *Brass Today* (London, 1957).
- Žak, S., *Musik als 'Ehr und Zier'* (Neuss, 1979).
- Zanolini, Antonio, *Biografia di Gioachino Rossini* (Paris, 1836, rev. Bologna, 1875).

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