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A Brief History of Piston-valved Cornets[1]

Niles Eldredge

The bewildering array of cornet design over the past 175 years or so has defied simple description, categorization, and classification. Yet major themes in cornet design readily emerge on closer study—and while no straightforward classification of cornets is possible,[2] historical analysis of the sequence of major design changes does have the effect of reducing the welter of cornet variation to a manageably simpler picture than heretofore available.

I shall restrict my analysis to B♭ soprano brasswinds of approximately 4 1/2 feet in length, equipped either with the earlier Stölzel valves, or with the succeeding Périnet valves—mentioning cornets pitched higher (especially in E♭, but also in C where designs differ from those in B♭), as well as in lower pitches, only in passing.[3] Likewise, I consider only "mainstream" instruments most commonly used by amateur and virtuoso professional alike—but excluding such instruments as "echo bell" and "pocket" cornets. Finally, in confining my gaze to cornets, and thereby excluding trumpets and fluegelhorns (again, except in passing), we immediately confront the question: What, exactly, is a cornet?

What Is a cornet?

Conventional wisdom has it that a cornet is a soprano brasswind of some 4 1/2 feet of tubing that (1) has, at least ideally, approximately 2/3 of its length in conical shape, 1/3 cylindrical (the reverse being said to be optimal for trumpets[4]); (2) tubing coiled in two complete 360° turns (typically 1 1/2 such turns to the "leadpipe" section between mouthpiece and valves, and a final 180° turn after the bell tubing exits the first valve); thus cornets are usually shorter than Périnet-valved trumpets, which retain the much older single 360°-turn design of most natural trumpets; and (3) a deep, funnel-shaped cup mouthpiece—more similar to a horn, than to a trumpet, mouthpiece.

Carse, Baines,[5] and many others have commented that, whatever their differences at their origin may have been, cornets have long since ceased to be effectively different in timbre from trumpets, due at least in part to the adoption by most cornetists of the shallower, bowl-shaped trumpet-cup mouthpiece. Yet historical consensus has always had it that the cornet was initially derived from the valveless post-horn, and thus was at least in the beginning to be seen as a member in good standing of the horn family,[6] whereas valved trumpets were derived entirely separately—by simply fitting two or three valves to a natural trumpet.

Thus the problem of the design history[7] of the modern B-flat cornet can be put in the following way: What were the steps that led from the earliest valved cornets that took them effectively out of the realm of the horn family into being, for all practical purposes, variant versions of trumpets? (Figure 1). And were those changes in design the result of (1) engineering improvements (i.e. acoustical or otherwise), (2) a reflection in changes of musical style and/or player's demands, (3) a reflection of wider socio-economic factors, or (4) attributable solely to the vagaries of stylistic and marketing whim? Interestingly, all four categories of explanation appear to have played their role in cornet design history.

Figure 1.
Muck "Citation" B♭ trumpet [serial no. 2549; bell length: 19" (48.26 cm.); restoration by Frank Griesemann] and B♭ cornet [serial no. 2040; bell length 15¾" (40 cm.)], photographed side by side for comparison; 1950s. 1A: View from the right side, illustrating especially relative lengths, number of turns to the leadpipe, disposition of tuning slide, and relative size of appropriate (contemporary Bach Corporation) mouthpieces. 1B: View from the left side; note especially position of intervalve tubing (so-called "coquilles"), by then long-since the valve configuration standard of the industry. Author's coll.

The basic "anatomical" landmarks of a typical late-nineteenth-century cornet are specified in Figure 2 (see also Figure 5). In England, the Stölzel-valved *cornet à pistons* was commonly called the "cornopean," though at first the term was generally reserved for instruments equipped with a "MacFarlane" clapper key on the bell, used for trilling effects. The term "cornopean" has long since come to be a shorthand synonym of "Stölzel-valved *cornet à pistons*" on both sides of the Atlantic, while the term "cornet" has come to be equated with Périnet-valved instruments.

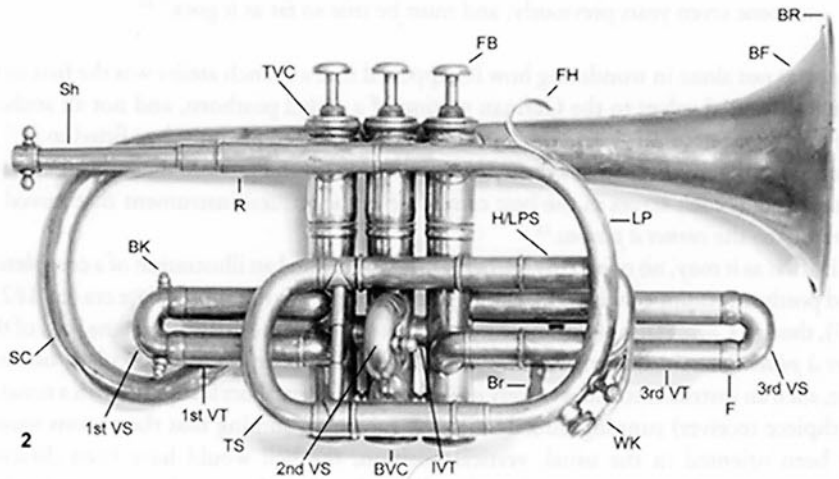


Figure 2.

Besson (Paris) "Soliste" model single-waterkey cornet [serial no. 77523; ca. 1911; bell length 13" (ca. 33 cm.); author's coll.]. View from right side illustrating main features of cornet "anatomy": 1st VS—first valve slide; 1st VT—first valve tube; 2nd VS—second valve slide; 3rd VS—third valve slide; 3rd VT—third valve tube; BF—bell flare; BK—bow knob; BR—bell rim; Br—brace; BVC—bottom valve cap; F—ferrule; FB—finger button; FH—finger hook; H/L PS—high/low pitch slide; IVT—intervalve tube; LP—leadpipe; R—receiver (shank); SC—shepherd's crook (rear bell bow); Sh—shank; TS—tuning slide; TVC—top valve cap; WK—waterkey

In the beginning: the earliest piston-valved cornets

With the advent of industrial technology in the early nineteenth century, the ability to construct a valve capable of redirecting windway passages with a minimal amount of leakage had finally been developed.[8] Baines, Carse, Dullat, Haine and De Keyser, Heyde, Kampmann, Mahillon, Myers, and others have discussed the history of the many valve types that appeared soon after the technologies had been developed.[9] At long last, chromaticism of soprano brasswinds had been attained—as hand stopping methods, key systems (keyed, or Royal Kent, bugles) and slides produced less satisfactory results—despite the mastery of these instruments by some early virtuosos.

The precise origin of the piston-valved cornet has, until recently, been the subject of uncertainty and some dispute. Baines' account is perhaps typical:

> Forestier's *Méthode pour le Cornet à Pistons* contains a historical introduction contributed by Dauprat above the date 1834 saying that "it occurred to Halary to apply the valve system as perfected by Meifred to the *Post-horn des Allemands*, known in our military bands by the name *petit cornet*.... The statement refers to some seven years previously, and must be true so far as it goes."[10]

Baines was not alone in wondering how it happened that a French atelier was the first to fit German-invented valves to the German version of a coiled posthorn, and not all authors agree that it was necessarily a *German* posthorn that first had piston valves fitted to it,[11] as Carse reports that the French *cornet simple* was indeed in use in France in the early nineteenth century, and as such serves as the best candidate as the natural instrument that served as "ancestor" to the *cornet à pistons*.[12]

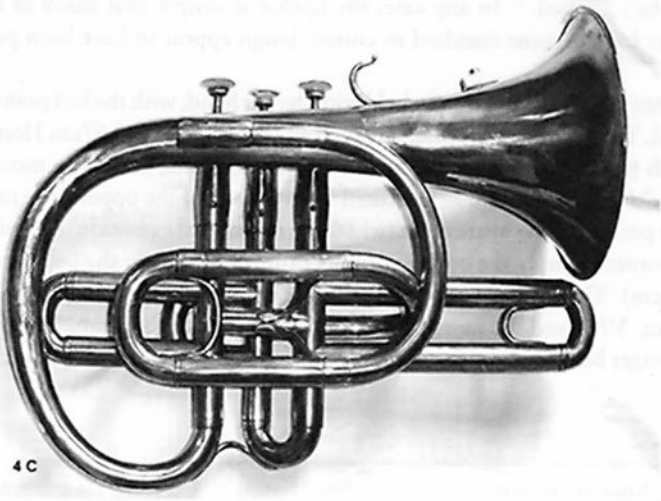
Be that as it may, no one to my knowledge has published an illustration of a completely coiled posthorn equipped with Stölzel valves and dating from the appropriate era (ca. 1825-1840), though Carse claims (without citation) that "some of the early specimens [i.e., of the *cornet à pistons*] retain the original circular form."[13] To retain the true circular posthorn shape, such an instrument almost surely must have had a very short leadpipe (with a tunable mouthpiece receiver) running directly into the valves;[14] assuming that the pistons would have been oriented in the usual, vertical position, the bell would have been directed downwards or to the rear: acceptable and traditional in French horns, but presumably less desirable in a soprano instrument where hand stopping and muffled tones are neither traditional nor particularly acceptable. To be sure, the posthorn solo of Mahler's Third Symphony, impossible to play on a natural horn, is often performed on a three-valved (usually rotary valves with direct mechanical linkage) circular posthorn, but this instrument clearly had a separate (and arguably later) appearance than the piston-valved cornet in France.

Various authors[15] have presented slightly conflicting versions of this "origin myth" of the two-valved *cornet à pistons* (Figure 3). It is only recently that Myers and Parks have been able to narrow down at least the time of appearance (if not the inventor) of the earliest cornets as ca. 1825, confirming at the same time that two-valved *cornets à pistons* did indeed precede the three-valved version (Figure 4) by some four years as has been commonly presumed. Myers and Parks cite the opening statement of Périnet's "French Patent 4149 of 1829 on a three-valved cornet"; in translation, the passage reads: "The so-called piston cornet, known for about four years, only had two valves in the beginning; since then, a third has been added."[16]

Figure 3A, B.
Right and left side views of two-Stölzel-valved cornet ("cornopean") by Labbaye; no serial number; between 1825-1848; bell length 10½" (ca. 26.67 cm). Note external pins (*vis*) especially visible on left side of instrument. Author's coll.

Figure 4.

Three three-Stölzel-valved *cornet à pistons*. 4A, B: Collin (Paris), no serial no., ?1830s. Short model (10 ½"—26.67 cm.); note especially "knot" convolution of distal end of third valve tube. Author's coll. 4C. Early (1842-1845) Besson (Paris) model, without front droop, leadpipe entering the second valve; bell length 11" (ca. 27.94 cm.); Delile coll.; 4D: Courtois (Paris); ?early 1850s; no serial no.; bell length 11" (ca. 27.94 cm.); note false tubing imparting symmetrical profile in restoring front "droop"; also, note the lack of external pins—an early use of the internal system for maintaining valve support and orientation. Author's coll.; restoration by Robb Stewart. Left sides of the Besson and Courtois instruments configured as in the Collin instrument.



4C

4D

In short, the earliest known surviving *cornets à piston* do not look at all like coiled posthorns simply equipped with two Stölzel valves—i.e., like a miniature version of a "French" horn. Instead, the earliest surviving piston-valved soprano brasswinds all have the bell directed forward, much as they do today, and have done throughout their long history. Baines usefully points out that at least one German maker (Schott) was offering a (valveless) posthorn *en forme de trompette*—perhaps a clue to the shape of the posthorn to which piston

valves were first applied. [17] In any case, the upshot is simply that many of the essential elements that have become standard in cornet design appear to have been present at the outset.

The instrument is designed to be held with the left hand, with the bell pointing forward (see Figure 5). Two-valved cornopeans are typically some 10 1/2" (26.67cm.) long, measured as bell length (measured from bell rim to rear bell bow, i.e., excluding mouthpiece and shanks); 6 1/4" (15.87cm) deep, as measured from the top of the upper valve caps vertically to the lowest portion of the instrument (whether a downward extension of windway tubing, or, in later cornets, simply the bottom of the bottom valve caps); the bell flare is typically 5 1/4" (13.33cm). Three-valved cornopeans, while commonly retaining the relatively wide bell flare of ca. 5 1/4", and the same 6 1/4" depth, show greater variation,: towards narrower bell flares, longer bells, and deeper bodies. Additionally, some earlier "pocket" models are known.

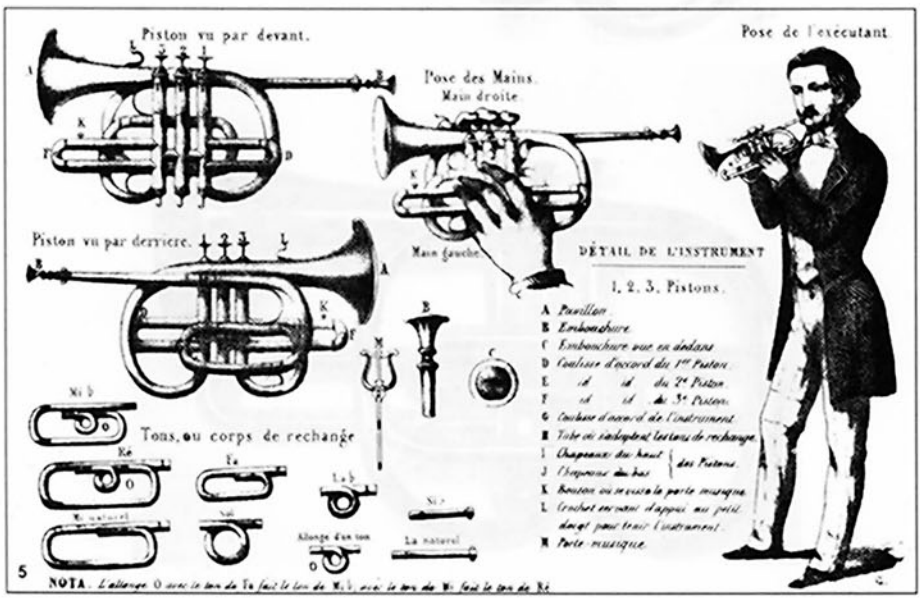


Figure 5.
"Figures démonstratives de la méthode de cornet de A. Brulon." Ca. 1865-1878.
The "Périnet cornopean" shown is virtually identical to those depicted in Figures 6, 7. Note, in addition to the manner of grasping the instrument, the numerous shanks for changing pitch, the horn-like mouthpiece—and the labeling of various parts of the instrument. Reprinted in *Larigot* 26 (December 2000): 31 and reproduced here by permission and with thanks to Bruno Kampmann and Jacques Cools.

The mouthpiece—deep and conical, rather like that of a true horn—is fitted into a removable shank; the shank in turn is fitted into a receiver, which in turn is connected with the "leadpipe" tube which typically continues to run forward, then turns downward and is reflected back to form the first turn; the second, smaller 180° turn is formed as the tubing is reflected upward and forward again—the site of the tuning slide crook. Beyond the tuning slide, the leadpipe tubing runs forward, then curves downward to form a deep loop before entering the bottom of the second Stölzel valve. A short tube connects the two valves (which, in the interest of economy of manufacture, are usually identical). The windway leaves the bottom of the first valve, and is reflected up and back in a graceful curve (the forerunner to the "shepherd's crook" of later nineteenth-century cornets) before running forward and expanding into the terminal bell flare at the front of the instrument.

The first-valve tubing (lowering the pitch a full step when the first piston is depressed) is directed straight back, while the half-step crook of the second valve is directed forward. Thus the typical early two-valve cornopean has a balanced, nearly symmetrical appearance, one that superficially may recall its supposed curved, coiled post-horn ancestry, but one which, nonetheless, deviates significantly from it: once again, these early two-valved *cornets à pistons* do not resemble the miniature French-horn configuration that one would assume would have been the result of simply adding valves to a coiled natural posthorn.[18]

Both leadpipe and bell were positioned to the right of the valves from the perspective of the player. Though later Stölzel-valved cornets were to assume a longer shape and, significantly, came to be constructed with the bell to the *left* of the valve assemblies, these innovations were actually first achieved in early Périnet-valved cornet design, and applied retroactively to cornopeans. For reasons discussed below, cornets with the bell and leadpipe to the right—the original design—came to be known as the "French model" (*modèle français*), while later cornets with the bell to the left of the valves were known as the "English model" (*modèle anglais*).[19]

The springs of the valves of most early cornets were housed in the upper part of the chamber. Screw pins (Fr. *vis*), inserted from the left side of the valve, passed through a slot in the inner spring housing, through the spring itself (at or near its bottom), exiting the slot on the opposite side of the housing, and screwing securely into the valve casing on the right side of the instrument (again, from the player's perspective). These pins prevented the valve from rotating, thus keeping the porting aligned properly, and served simultaneously to keep the valve in its upright ("open") position until depressed by the player.

With the addition of the third valve, options for the construction of the windway immediately presented themselves.[20] The basic overall dimensions of the instrument remained the same (see above). The third valve was literally that: an additional valve governing a tube that lowered the pitch $1^1/_2$ steps, added beyond (from the player's perspective, i.e., in the direction of the bell flare) the existing valves. This longer tube immediately presented problems in the removal of its tuning slide: in many designs, the third valve slide came perilously close to intersecting the edge of the typically rather wide bell flare (often $5^1/_4$"), and any slight damage to the bell or third valve tubing could easily hamper removal of the third valve slide. Makers solved this problem primarily by changing the

direction of the distal end of the third valve tube,[21] by literally forming it into a convoluted knot (Figure 4A, B), or by narrowing the bell flare (to 5" or even slightly less). This topological problem involving long third valve tubes and bell flares was to persist in the design of later, Périnet-valved cornets, and to inspire still other solutions.

Also, with the addition of the third valve, the second valve tube had to be reconfigured—and the solution generally was to reflect it at a sharp angle backwards, still on the left side of the valve assembly. Inasmuch as the instrument is designed to be grasped with the left hand, the second valve tube could not in any case project out directly from the valve—and presumably to facilitate a more nearly posterior direction to the second valve loop, most three-valve cornopeans of the 1830s-1850s had the second valve offset, deflected to the left of the plane of the first and third valves.[22]

Addition of the third valve presented some additional design options to these early *cornets à pistons*. In many of the three-valved cornopeans of the period 1830-60, the leadpipe entered the bottom of the third valve, after completing the symmetrical loop that held the tuning slide (Figure 4A, B). The windway then passed back to the second valve via a simple porting tube, and thence back to the first valve through a curved tube connecting the bottoms of the second and first valves. There no longer being the option of the bell to exit from the bottom of the first valve (as had been the case in the two-valved forerunner design), the bell now had to exit from the side of the first valve (usually near the bottom on the right side). These instruments tended to retain the length, depth, and bell flare width dimensions of the two-valved models.

Another common cornopean design of this period (Figure 4C) eliminated the front "droop" completely. As early as ca. 1845, Besson constructed an instrument with the leadpipe passing through the upper and lower branches of the third valve tubing, entering the offset second valve rather than the third valve; the windway then passed back to the third valve via a curved tube connecting the bottom of the valves. From the third valve the windway passed to the first valve via a direct porting tube (to the right of the offset second valve), the bell exiting from the bottom of the first valve. This configuration, coupled with the smaller bell flare, contrived to give the instrument a trumpet-like look that presages the more elongated designs of later cornets. Indeed, cornopeans of this design tended to be longer (up to 11"), deeper (7") and with narrower bell flares. Several makers, including Antoine Courtois and Gustave Besson, adopted the same droopless configuration of the leadpipe before it entered the second valve, but nevertheless retained the conventional, deep-droop look of the leadpipe by adding a section of false tubing (Figure 4D).[23]

Moreover, two different configurations of leadpipe are known from the earliest three-valved "cornopeans." One was the already familiar design seen on the two-valved and three-valved instruments, as described above in its various versions. Often slender braces (sometimes suggesting musical motifs; cf. the Périnet-valved cornet of Figure 9) ran between the upper portion of the leadpipe and the top tube of the tuning slide crook; and again from the bottom tube of the tuning slide crook to the deep droop of the leadpipe just before it entered the third valve. Similar braces sometimes ran from the top tube of the first valve tubing to the bell; these braces often were present in the earliest-designed Périnet-valved cornets.

But there is another way to configure a leadpipe that offers the same opportunity for one or more crooks (at least one for tuning): this is the so-called (reverse) "S" configuration, so familiar in much later phases of cornet design history. Here the leadpipe, after running forward, is reflected downward into a much shallower curve (at this stage in cornet history, apparently never with a removable crook), then running backward horizontally, and then downward again to form the site of the tuning crook, the tubing then running forward again before entering the third valve. The third turn of the leadpipe thus pointed forward, and lay horizontally or at an angle before the pipe reversed and entered the third valve, sometimes retaining a distinctive "droop," as in the other, by then already conventional, leadpipe design. Thus the S-shaped leadpipe that became so popular on American Périnet-valved instruments in the first decade of the twentieth century was already in place in cornet design at least by the 1840s, if not somewhat earlier. Inasmuch as Périnet-valved cornets were already in production in the 1840s (see below), however, it is impossible at this point to decide whether the S-leadpipe was originally invented for cornopeans—or was retrospectively fitted to Stölzel-valved instruments after first being designed for Périnet-valved cornets.

Addition of the third valve (opening onto a tube that lowers the tone by one and one-half steps), of course, provided the full chromaticism unattainable in the lower register of two-valved instruments—where the valve system lowers the open tone by one half, one, or (when used together) one and one-half steps.[24] There can be no question that the Stölzel (and other early competing systems) valve system constituted a true acoustical design advance over other, non-valve methods in achieving chromaticism. Similarly, addition of a third valve so soon after the invention of the two-valved *cornet à pistons* was a rapid and definite advance. Interestingly, the two-valved cornet seems to have remained in production at least throughout the 1830s, and, as Myers and Parks have pointed out, an inexpensive two-Stölzel-valved instrument was still being offered by Gautrot Ainé & Cie as late as 1867—marketed as a *cornet de poste*.[25]

Though I have as yet found no definite contemporary statement to the effect that Stölzel-valved cornets were mechanically less than satisfactory, it is worth noting that perhaps the majority of critics (apparently following the lead of Hector Berlioz) consistently pronounced the sound of the *cornet à pistons* as "vulgar" or "coarse." Though there are several possible musicological and sociological explanations for this persistent derogation of the cornet, it is also possible that the early Stölzel-valved cornets were in fact not as effective mechanically as later—especially Périnet-valved—instruments proved to be.

The Stölzel valve differs from the Périnet valve primarily in that the path of the windway of the instrument travels along the length of the inside of the Stölzel valve for some distance, entering or exiting the valve through the bottom in all but some of the last-produced Stölzel-valved cornets. This meant, of course, that the internal diameter of the Stölzel valve had to be the same as the "bore size" (the internal diameter of the windway of the instrument as it enters and exits the valve system, as well as in the tubing associated with each of the valves), making a Stölzel-valve necessarily much narrower than a Périnet-valve (where the windway simply transits the valve in porting tubes).

Authors have always assumed that the Périnet valve replaced the earlier Stölzel valve since the former was obviously superior—somehow more efficient—than the latter. For example, Baines writes, "With the Périnet valve, fitted to the best French cornets from the mid 1840s, the instrument acquired the classic format with three reversals of the tube before this enters the third valve. The cornet became heavier to hold but more solid in sound thanks to the improved valves."[26] It is anecdotally the case that period cornopeans leak on average worse than most near-contemporary Périnet-valved cornets do, though most speculation as to why Périnet-valved cornets sound better than Stölzel-valved instruments has centered on the sharp right-angle turn of the windway as it enters or exits the Stölzel valve.[27] As emerges later in this paper, many of the subsequent design changes encountered in the history of the Périnet-valved instruments have to do with minimizing bends and deflections in the windway, especially at or near the valves.

However, properly restored Stölzel-valved *cornets à pistons* demonstrate (at least to my satisfaction) that high tonal quality (integrity of sound as well as intonation) can be achieved with a well-made Stölzel-valved instrument. I am therefore inclined to agree with brass expert Robb Stewart, who doubts that Stölzel valves inherently leak more than Périnet valves due simply to their design. Rather, Stewart suggests, the lighter construction of piston and casing is the culprit, as Stölzel-valves too tightly fitted will seize up in the casing "with only a small amount of squeezing on the left hand."[28] This suggests that Stölzel-valves were prone to leakage simply because they could not be as tightly fitted as Périnet valves. If this line of reasoning is generally correct, it may also explain why these instruments were designed to be grasped, not around the valves per se, but in a more relaxed fashion, and in part by the bottom loops of the first and/or third valves, or by the loop of faux tubing to the third valve in those instruments where the leadpipe entered the side of the second valve (see Figure 5).[29] More than aesthetics may have been afoot in the deep-droop design of the original cornopeans and their immediate Périnet-valved successors.

The Périnet valve and the early days of the modern cornet

To my knowledge, no three-valved cornets attributable to François Périnet survive.[30] Yet, as we have seen, it was Périnet whose application in 1829 for a patent to add a third (Stölzel) valve to a cornet gives us the firmest reckoning on the origin of both two- and three-valved *cornets à pistons.* And it was of course this same man who patented a decade later the valve design that bears his name. Though modern trumpets and cornets (not to mention other piston-valved brasswinds) are commonly said to utilize an "improved" version of the valve design first patented by Périnet in 1839,[31] it is unclear what the nature of the subsequent improvements over the original design might have been—apart, that is, from modifications in windway passage through the valves developed by Besson and other makers, as discussed below.

The oldest surviving Périnet-valved cornet yet identified and dated with certainty was built by none another than Adolphe Sax[32] in 1842, not long after his arrival in Paris (Figure 6A, B). The instrument, astonishingly, looks at first glance just like a cornopean. Recall that Périnet valves do not transmit the windway through the length of the tube: thus it is

physically impossible for the windway to exit or enter through the bottom of a Périnet valve. Yet Sax's Périnet-valved cornet—and many others built right up to ca.1860[33]—have the appearance (especially from the right-hand side) that the windways are virtually the same as on a standard three-valved Stölzel-valved instrument. This is nothing short of an optical illusion, with the effect that a purchaser of a cornet in France in the 1840s and 1850s (and perhaps beyond) seemingly had the option to select an instrument with *either* Stölzel or Périnet valves, the instrument being otherwise virtually identical.

Figure 6.
Earliest known Périnet-valved cornet—ca. 1842. Adolphe Sax, serial no. 1056; bell length ca. 11.8" (300 cm.). Bruno Kampmann coll.

Rather as the earliest cars looked like buckboards with an internal combustion (or steam, electric, or still other design) engine substituted for the original horse, the initial substitution of the Périnet for the Stölzel valve on the *cornet à pistons* occasioned no new design (Figure 7). Even though some very late use of the Stölzel-valve eliminated the flow through the bottom of the valve as a means of directing the windway (meaning that the Stölzel valve per se did not absolutely require that the windway exit or enter through the bottom of the valve), nonetheless the fact that the windway was precluded from doing the same in the Périnet valve actually offered design configurations of the windway not, apparently, thought desirable (if possible) to early designers of Stölzel-valved cornets. As we shall see, these possibilities were soon discovered and exploited by French makers.

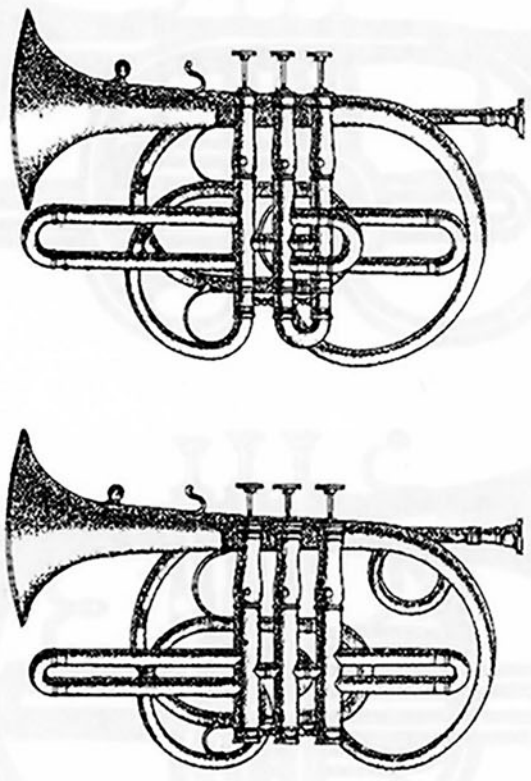


Figure 7.
Husson & Buthod (1848-1857) catalogue illustration of similar Stölzel-valved and Périnet-valved cornets. Courtesy of Al Rice (Fiske Museum).

But not right away—and this is interesting: Why were the earliest Périnet cornets virtual "spitting images" of their otherwise outmoded Stölzel-valved (and for a short time contemporary) predecessors? Especially intriguing is the labyrinthine relationship that the Belgian Adolphe Sax had with the native Parisian makers. Horwood in particular has recounted the details of Adolphe Sax' larger-than life—and especially his ups and downs *vis à vis* his competitors, the native Parisian instrument manufacturers.[34] Lawsuits, death threats (and even an apparent assassination attempt) are legendary, and none other than Gustave Besson (see below) is said to have quit his native France for England, after putting the company in his wife Florentine's name to avoid reprisals as the result of his being party to what was ultimately a failed lawsuit against Sax.[35]

This raises the questions: Were the Périnet-valved cornopean-like cornets designed in the manner of Sax' instrument, from the concerns of E. Courtois, A. Courtois, Halary, Henry and Martin, and undoubtedly others, simple, outright copies? Alternatively, were some independently designed? Or were they, like saxhorns, made under explicit license from Sax?[36] Though the few extant instruments—and the lack of any written documentation—precludes any definitive judgment, it is quite possible that Sax was the first to apply Périnet valves to the *cornet à pistons*, and the closely similar instruments made by other makers may well prove to be examples of the copying in which Sax repeatedly claimed his rivals engaged.

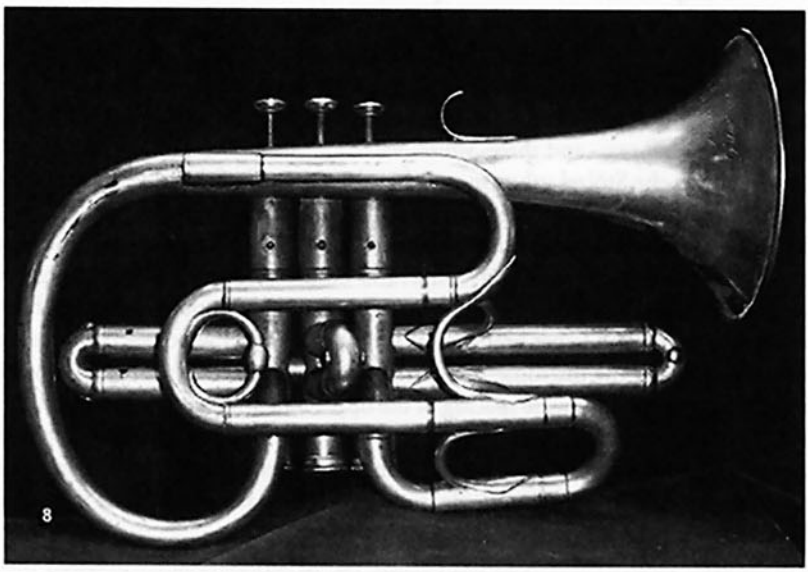


Figure 8.
Sax Périnet-valved cornet with S-shaped leadpipe; serial no. 18529. Frank Hosticka coll.

Survival of several instruments[37] reveals that Sax also was making a Périnet-valved cornet with the S-configuration of the leadpipe (Figure 8) at least by the late 1840s. There is no evidence that any other maker was doing so—and indeed I have been unable to locate any definitive evidence that any maker other than Sax was making Périnet-valved cornets much before ca. 1850. All the important Parisian makers to emerge in the 1840s—including *inter alia* but especially Besson, A. Courtois, and Gautrot—appear to have been using the Stölzel valve predominantly, if not exclusively, through the first third or so of the decade of the 1850s.

Thus the Périnet valve did not drive the Stölzel valve to immediate oblivion—perhaps partly explaining why cornets with Périnet valves mimicked the older Stölzel-valved models so assiduously. French makers only began to utilize the Périnet over the Stölzel valve in the mid-1850s, when the firms of Antoine Courtois and Gustave Besson gained ascendancy in the markets of France and Great Britain.

The early, deep-bodied, cornopean-like Périnet-valved cornets retained several features from their Stölzel-valved predecessors. Some still had the pins (*vis*) aligning the valves, though later examples utilized simple "keys" on the side of the top of the valve for lateral alignment, while vertical orientation was supplied by a washer; still others utilized the three-pin system on the washer supporting the top-sprung valves.[38] These latter two methods quickly became the industry-standard replacement of the external transverse pins first introduced in the earliest cornets. Likewise, the ferrule sometimes (though not invariably) covering the seam of the intervalve tubing in two- and three-valve cornopeans persisted in some of these deep-bodied "Périnet cornopeans," and, indeed, in later models produced into the early 1860s. The Sax instrument (Figure 6A, B), for example, has both pins and such ferrules.

More significant, perhaps, is the persistence in these early deep-bodied cornopean-like Périnet-valved cornets of the exact same system of intervalve tubing *vis à vis* position of valve tubes standard in all two- and three-Stölzel-valved *cornet à pistons.* Because passage of air lengthwise within the Stölzel valves meant that the side wall of the valve absolutely had to cut off the air column from the lower valve tube when the valve was in the open (undepressed) position, the upper and lower segments of the valve tubing had to be separated rather far apart from one another.[39] Intervalve connecting tubes and leadpipe or bell connections to the valves were always midway between these upper and lower branches. Moreover, the upper and lower branches of all the valve tubes were exactly in line for the two or three valves of the instrument, contributing to the symmetrical appearance of the Stölzel-valved cornets. This wide spacing of the upper and lower sections of the valve tubes had the further effect of forcing early makers to keep the tubing of the middle valve on the left side of the instrument, further necessitating the offset valves noted above; evidently, there was simply insufficient room to place a wide second valve slide on the right side, as it would collide with the tuning slide.[40]

All the deep-bodied cornopean-like Périnet-valved cornets retained precisely this same valve-tubing configuration *vis à vis* the intervalve tubes and leadpipe/bell connections, though makers beginning as early as Sax (Figure 6) immediately brought the upper and

lower branches of the valve tubes closer together.[41] Indeed, A. Courtois, arguably the premier maker of Périnet-valved cornets in the years 1855-1900, retained this configuration on all its instruments to the very end of the nineteenth century.

There was a further consequence to the narrowing of the space between the upper and lower sections of valve tubing: beginning with the Sax instrument (Figure 6), makers of Périnet-valved cornets were able to place the short second valve tubing on the right side of the instrument, thereby obviating the necessity of offsetting the alignment of the valves and, perhaps not coincidentally, providing a somewhat surer, more secure grip of the instrument. As far as can be determined, no Périnet-valved cornets (or trumpets) with offset valves were produced until the twentieth century.[42] Further, later nineteenth-century cornopeans, when the second valve tubing had been switched to the right side retrospectively, also always had in-line valves.

Thereafter—by the mid-1850s—cornet design "evolution" took several different directions, best followed, perhaps, by examining the effects of the Great Exhibitions (i.e. London, 1851; Paris, 1855) on the industry, the resonance in terms of manufacture, marketing, and purchasing preference between France and England, and the emergence of Antoine Courtois and Gustave Besson as industry leaders.

Courtois, Besson, and the Great Exhibitions: emergence of the classic Victorian cornet

The geographic dichotomy in both manufacture and use of piston- and rotary-valved soprano brasswinds, still so evident in the world today, has been in place since the inception of these instruments: "cornets" (i.e. in the very loose sense of 4½-foot-long, conical-to-intermediate-tapered valved brasswinds) have with rare exception been equipped with rotary valves with direct mechanical linkage in Germany, Austria, Italy, eastern Europe, and Russia, while tubular pistons were the valves of choice in France, Belgium, and England. In the United States, rotary valves with the unique string linkage—plus imported instruments with Vienna valves, and rotary valves with mechanical linkage—predominated up through the Civil War, with the manufacture of Périnet-valved instruments commencing in the late 1860s (Boston Musical Instrument Manufactory, e.g.), and becoming the valve of choice in the 1870s and thereafter. To be sure, Sax offered soprano brasswinds with *Berlinerpumpen* (soprano "saxhorns," most similar to valved bugles, i.e., fluegelhorns). In Germany, Périnet-valved horns appear not to have been used with any regularity until the twentieth century, when musical preferences changed and the worldwide success of Périnet-valved trumpets prompted their production (*Jazz Trompete*), though never as a replacement of the traditional rotary-valved cornets and trumpets.

The action in the 1850s, insofar as the originally French *cornet à pistons* was concerned, was focused, then, in France and, increasingly, in England. The famous Distin family of brasswind performers played a role in early cornet history, initially performing on and importing to their native England the instruments of Adolphe Sax.[43] The Distins were among the first to import French-made brasswinds to England, a practice that quickly led to important design innovations in cornets.

The Industrial Revolution was in high gear by the 1850s, with steam harnessed in factories and consequent improvements not only in brass instrument manufacture, but also in the production of uniform quality of brass and other metals themselves.[44] The Great Exhibition of 1851 featured a number of makers of European musical instruments. But it was the Paris Exhibition of 1855 that seems to have cemented the reputations especially of A. Courtois and G. Besson, who were among those receiving the most coveted medals—emblazoned thereafter on the bell of nearly every Courtois cornet manufactured up to at least 1900.

Figure 9A, B.
Gautrot *modèle français* Périnet-valved cornet; bell length 13.5" (34.3 cm.); no serial number, ?1850s. Author's coll.

Only three elements were needed to complete the basic story of the development of what became the standard Victorian cornet: (1) elongation of the cornet into the standard 13.5" instrument, a shallower, slimmer-looking model than the cornopean-like earliest Périnet-valved cornets; (2) development of the modern Périnet-valve porting design; and (3) placement of the bell to the left side of the valve assembly.

No definitive evidence for elongation of the Périnet-valved cornet prior to 1850 is as yet forthcoming. A curious page illustrating "various models of *cornets à pistons* made by Gautrot from 1828 to 1847," published in 1912 by Couesnon et Cie (Gautrot's successor)[45] in an advertising document, shows an elongated Périnet-valved *modèle français* cornet, with pins, of a style known to have been manufactured by A. Sax and A. Courtois in the 1850s.[46] The Gautrot instrument (Figure 9A, B), while still offered for sale in 1867, most likely was produced in the 1850s. Besson, meanwhile, patented two elongate models in the years 1854 and 1855. Still being marketed at the end of the century, these two models featured perhaps the earliest fully documentable changes in the porting of the Périnet valves. Besson's 1854 model (Figure 10A, B), for example, has the intervalve tubing aligned with the lower branches of the first and third valve tubes, instead of between the upper and lower branches of the valve tubes, the norm that had been "inherited" from the days of the Stölzel valve.

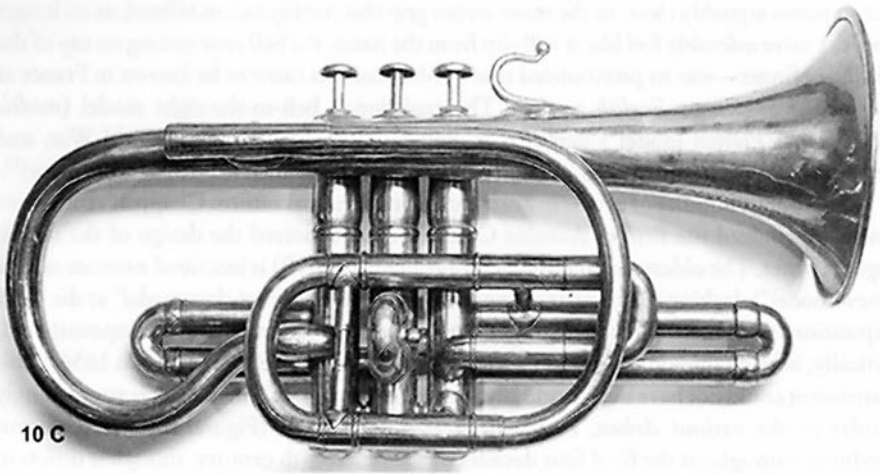
Besson's 1855 model (Figure 10C, D) features two further innovations in the valve porting system: the intervalve tubes are "knuckled out" (*perce pleine*, or "full bore"), and are additionally offset with respect to one another. This design change reflects, in the analysis of nineteenth-century commentators,[47] attempts to improve the flow of the windway by removing as many angles and turns as possible. Though these early designs of the windway were eventually to disappear, the Besson design of the early 1870s (and possibly of the late 1860s, though not patented until 1874) has long since become the standard industry design of virtually all trumpets and cornets; I return to this topic immediately below.

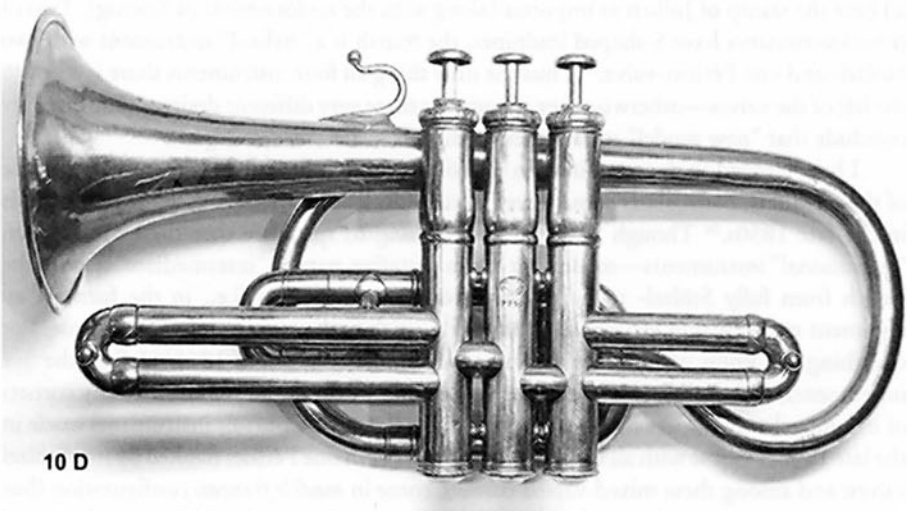
These early longer-bell cornets are difficult to grasp with the left hand. The early, deep-bodied, cornopean-like Périnet-valved cornets provided a firm, comfortable grasp low on the valve assembly—even more than their Stölzel-valved predecessors, which after all had the second valve slide projecting to the left. With a lengthening and, critically, shallowing of the instrument, it is difficult to grasp the valves of a French-model cornet using all four non-thumb fingers of the left hand. This appears to be the reason behind the advent of the placement of the bell to the left of the valve assembly, no later than 1855.

The French orchestra leader Jullien was a key figure in promoting the cornets of A. Courtois in England; Jullien opened a music store at 214 Regents Street in London in 1845.[48] One of the earliest cornet virtuosos, Hermann Koenig, was in Jullien's orchestra. From at least the early 1850s, Jullien began selling cornopeans and, later, Périnet-valved cornets (plus the "hybrid" mixed Périnet- and Stölzel-valved cornets—see below), all bearing the endorsement of Herr Koenig.

Jullien's store passed to the hands of Alfred Hammond, and by 1862 had been passed along again to Samuel Arthur Chappell[49]; Chappell continued to import and promote Courtois cornets assiduously until his retirement from the business in 1901. According to Rose[50] (p. 173), Chappell later in life said it was Courtois who first placed the bell of the

Figure 10.
Two early Besson (Paris) *modèle français* cornet models.
10A, B: 1854 patent model; serial no. 4193 (92 rue d'Angoulême series), early 1870s; bell length 13" (33 cm.); Author's coll.





10C, D: 1855 patent model, serial no. 7244 (92 rue d'Angoulême series), early 1870s; bell length 13" (33 cm.); Author's coll. The main differences are in the intervalve tubing patterns (Figures 10B, D), hence internal valve construction. The 1854 (10A, B) intervalve tubing is said to be *perce droite* (i.e. "straight," or "direct bore"), while the 1855 model (10C, D) is *perce pleine*, or "full bore"—the "knuckled out" shape of most modern instruments.

cornet on the left side of the valve assembly. The immediate popularity of this configuration—due, it seems arguably clear, to the more secure grip this configuration offered, as no longer does the valve assembly feel like it will slip from the hand, the bell now resting on top of the left index finger—was so pronounced that left-bell cornets came to be known in France as the *modèle anglais* or *English model*.[51] The traditional, bell-to-the-right model (*modèle français*, or "French model") persisted in France until after the First World War, and apparently remained the model of choice in France at least until the 1870s (see below)[52].

There are a number of extant instruments that appear to confirm Chappell's statement that it was indeed the firm of Antoine Courtois that pioneered the design of the *modèle anglais* cornet. The oldest (serial number A712; Figure 11A, B) is inscribed *nouveau modèle* ("new model"); lacking the circular stamp commemorating a "first class medal" at the 1855 Exposition, equipped with shell finger touch buttons (as in many cornopeans) and, critically, bearing the address of "21 rue du Caire," which they left sometime in 1856,[53] this instrument could not have been made any later than early 1856. This cornet is astonishingly similar to the various *Arban*, *Levy's*, *Arbuckle*, etc. models (Figure 12) that Courtois produced throughout the final four decades of the nineteenth century, though it differs in details primarily of configuration of the first and third valve tubes.[54] Critically, the other three "new model" Courtois instruments known have the term written directly in English; all bear the stamp of Jullien as importer (along with the endorsement of Koenig). Two of these instruments have S-shaped leadpipes; the fourth is a "hybrid" instrument with two Stölzel- and one Périnet-valve.[55] Thus the only thing all four instruments share is a bell to the left of the valves—otherwise they encompass three very different designs. One can only conclude that "new model" means "bell to the left"—i.e., *modèle anglais*.

I have alluded to the combination of Stölzel with Périnet valves (Figure 13) on some of these cornets, particularly some three instruments known to survive, made by Courtois in the late 1850s.[56] Though it would be tempting to speculate that these are, in fact, "transitional" instruments—made, that is, as a tentative, partial, "intermediate" stage in the switch from fully Stölzel- to fully Périnet-valved instruments (i.e., in the form of an argument traditional in evolutionary biology)—such is almost certainly not the case. For one thing, we know of fully Périnet-valved instruments as old as 1841/42 (i.e., the Sax instrument); and though it is negative evidence that we do not as yet know of any cornets of this mixed-valve aspect that are that old, the mélange of Courtois instruments made in the late 1850s—some with all Périnet valves, others with one Périnet flanked by two Stölzel valves; and among these mixed-valved cornets, some in *modèle français* configuration (but at least one a *modèle anglais*) and some with the by now thoroughly old-fashioned external pins (*vis*), others with three-pinned washers guiding the valves—paints a vivid picture of a company (i.e., Courtois) providing virtually all permutations and combinations to the marketplace, most likely in the hope of finding what would sell the best. Rather than constituting a transitional design intermediary, the cornets of mixed-valve type of the 1850s more likely represent a marketing transition—an effort to woo diehard Stölzel-valve devotees over to what had, in effect, already become the industry standard: the Périnet valve. It is striking how effectively this hybrid valve design recaptures the simplicity of line of the original *two*-valved cornopean.

Figure 11.
Oldest known *modèle anglais* cornet; Antoine Courtois *nouveau modèle*, 21 rue du Caire, Paris; A712, ca. 1855. Bell length 12" (ca. 30½ cm.); finger hook not original; note cornopean-like shell finger buttons, configuration of intervalve tubing, and presence of ferrules on intervalve tubes—all cornopean retentions; presence of internal three-pin valve support system (hence absence of external valve pins—see text) and presence of double waterkey are among earliest examples yet recorded. Author's coll.

Figure 12.
Antoine Courtois, 88 rue de Marais, Paris, double-waterkey cornets.
12A: *Arbuckle* model, serial no. 15548 (late 1880s);
bell length: 12½ " (ca. 31¾ cm.); author's coll., restored by Frank Griesemann;
12B: *Arban* Model, serial no. 19108 (early 1890s); bell length: 12½ " (ca. 31¾ cm.);
author's coll. Left side of instruments similar to Figure 11B.

It is fascinating that, by the latest 1850s/early 1860s, Courtois settled in on two *modèle anglais*, strictly Périnet-valved models. They soon dropped their S-shaped leadpipe (i.e., for their B♭-A instruments; they retained this configuration on one of their soprano E♭ models), and made the closely similar *Koenig/Levy's/Arbuckle/Emerson* and *Arban* models (Figure 12).[57] Interestingly, Courtois appears to have sold *modèle anglais* models in France as well as in England, as surviving Courtois *modèle français* cornets are exceedingly rare.

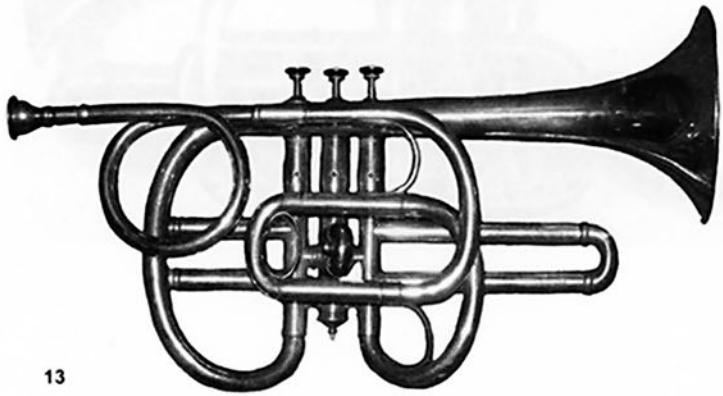


Figure 13.
Antoine Courtois (rue du Caire, Paris) *modèle français* cornet with two Stölzel and a medial Périnet valve; serial no. A242 (early 1850s). Fiske Museum B238.

Besson, meanwhile, apparently did not produce a *modèle anglais* until the late 1860s/early 1870s. The single water key (optional on cheaper models) was located on the bottom of the first 180° bend. Their earliest such model (Figure 14A, B) is in effect a shepherd's crook, removable leadpipe version of what has survived as the standard, modern cornet design: the leadpipe has three turns, with a backward-facing tuning slide and a second slide for high/low pitch changes that faces forward, before the windway enters the third valve; intervalve tubing is exactly as in modern cornets, except that in the earliest Bessons, it is not bowed out (*perce pleine; perce pleine* was added to this basic configuration by the Paris branch, in their *Concertiste* model patented in 1888). In switching the bell from the right to the left side, Besson followed Courtois in placing the bell exit from the first valve to the left side of the first valve tubing. The intervalve tube between the 1st and 2nd valves lay midway between the upper and lower branches of both the 1st and 2nd valve slides; the tubing between the 2nd and 3rd valves was lower, and aligned with the bottom branches of both the 2nd and 3rd valve tubes. This design—identical to the Besson 1874 patent for a slightly differently configured cornet—was quickly adopted throughout most of the industry, and remains the configuration used today in virtually all soprano cornets and trumpets (see, e.g., Figure 1).

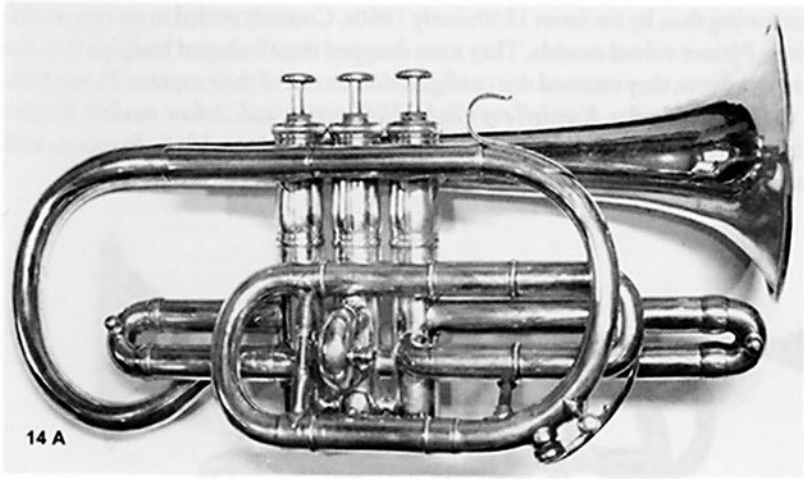


Figure 14.
Besson *Desideratum* (London nomenclature!) *modèle anglais* cornet—forerunner of Besson's (Paris) *Concertiste* model, and thence the modern cornet. Paris (92 rue d'Angoulême), serial no. 7125 (early 1870s); bell length 12½" (ca. 32.4 cm.); restoration by Frank Griesemann; authors coll.

There were, of course, other models by other makers, but few instruments survive to lend substance to catalogue descriptions and illustrations. Many makers produced their variant versions of Courtois single-lever double-water-key and Besson single-water-key models, sometimes referring to them (not always accurately!) as their "Courtois" and "Besson" models. Some copies of Besson designs (usually, though not necessarily, cheaper instruments) eliminated the second, high/low pitch slide, and often had a soldered joint connecting the first and third 180° bends of the leadpipe. When the English firms of Hawkes and Son, Higham, and Boosey and Company (who bought out Henry Distin in 1868) began manufacturing their own high-quality instruments, their models were patterned closely after especially Courtois, but also Besson. These models had evidently become established in the cornet-purchasing public's mind as the standard, in both form and quality, so that little deviation from the standard few designs was apparently possible up through to the end of the century.

Similarly, when musicians in the United States began to abandon string-action rotary models in favor of Périnet-valved instruments, manufacturers such as Lehnert, Fiske, Conn, Boston Musical Instrument Manufactory, Standard Band Instrument Company, Missenharter, etc. likewise produced more-or-less faithful copies of Courtois and Besson instruments. To be sure, Conn's (Elkhart, Indiana) *Four-in-One* instrument[58] of the late 1870s had many non-conventional design aspects to the windway, presaging further experimentation and innovation by this company in the early 1880s, and then again, intensely, in the first one-and-a-half decades of the twentieth century (see below). But shortly after dissolving his partnership with DuPont in 1879,[59] Conn produced a short run of close Besson and Courtois copies—before turning to his series of *Wonder* cornets (Figure 15A-C), which in effect were Courtois double-water-key copies with a change in the configuration of the intervalve tubing.

Likewise, Boston Musical Instrument Manufactory's famed *Two Star* and *Three Star* cornets were, with their double water keys, essentially Courtois-like, but utilized the Besson "stepped down" intervalve tubing configuration in *perce droite* format (Figure 16A-C). It was a "mix and match" of components, but no one on either side of the Atlantic deviated all that much from the basic designs developed by Courtois and Besson for the last three decades of the nineteenth century.

The low-production maker John Heald of Springfield, Massachusetts may have been the last of the U.S. manufacturers to produce double-water-key, removable-shanked cornets (Figure 16D). Today his cornets are highly prized, with many collectors/players finding them among the best (some think *the* best) cornets ever made, by any maker, of any age, on either side of the Atlantic.

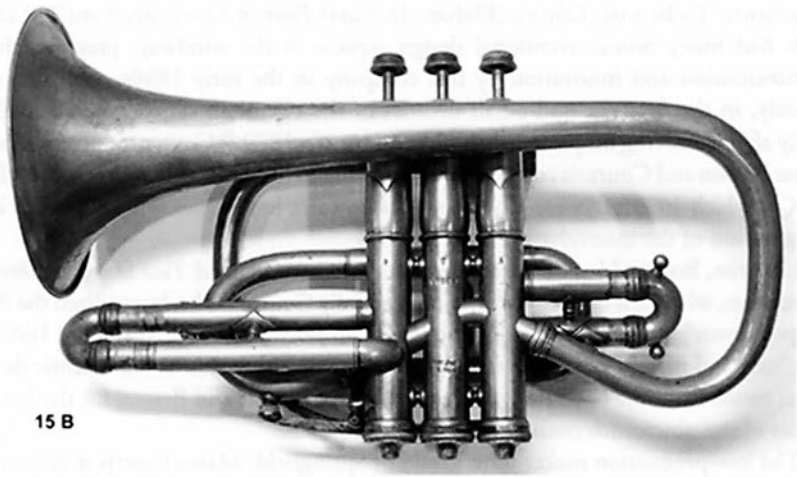
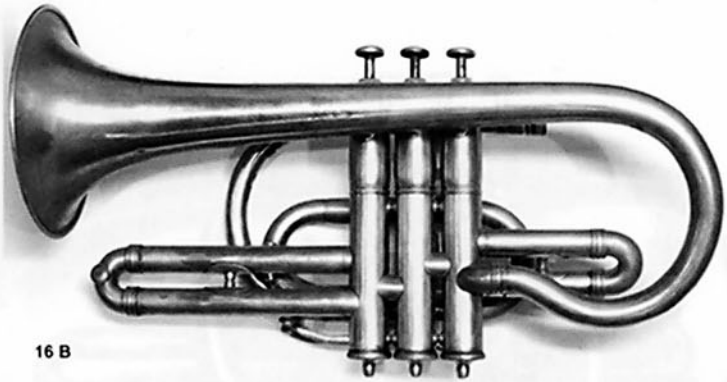


Figure 15.

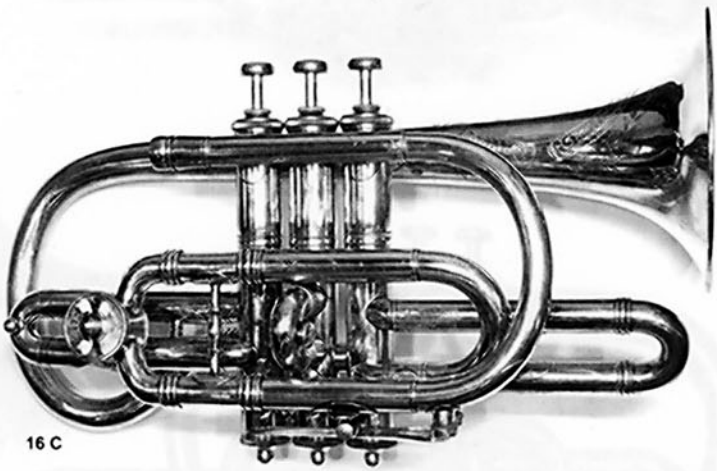
Conn *Wonder*, first and second models, both stamped "Elkhart & Worcester." 15A, B: Conn *Wonder* # 1, serial no. 17509 (ca. 1889); bell length 12" (ca. 30.5 cm.); in C/B♭/A—with score marks on valve slides for appropriate pitch tuning lengths; note intervalve tubing (15B); author's coll.; 15C: Conn *Wonder* # 2, serial no. 54113 (ca. 1899); bell length 13" (ca. 33 cm.); B♭/A only; author's coll. Note modifications in intervalve tubing. These two Conn *Wonders* resemble the differences between the Courtois *Arbuckle* (also *Levy's*, etc.) and *Arban* models (see Figure 12), in that a major difference between the two models from both Conn and Courtois depends largely upon whether or not the leadpipe passes through the upper and lower branches of the third valve tube. Though not by any means exact replicas of the Courtois cornets, these two double-waterkey Conn *Wonders* were clearly inspired by, and meant to compete with, the Courtois designs.

Figure 16.

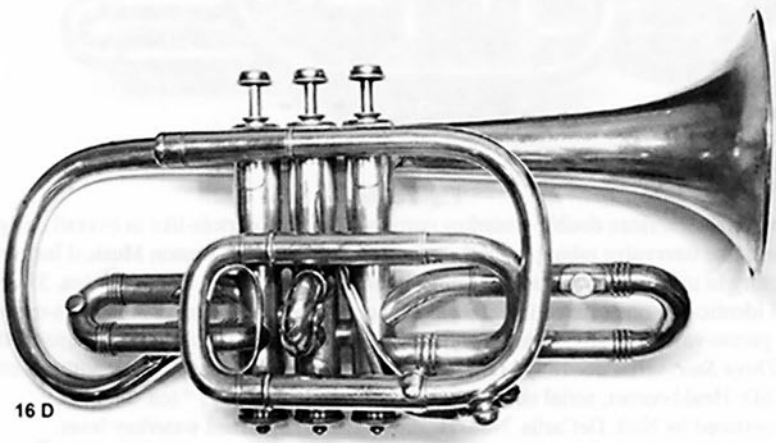
Three premier American double-waterkey cornets. Though Courtois-like in overall design, note Besson-like intervalve tubing in all three instruments. 16A, B: Boston Musical Instrument Manufactory in nickel silver; no model name, no serial number; bell length 13" (ca. 33 cm.); model identical to one offered in 1869 catalogue, thus among the older American-made Périnet piston-valve designs; author's coll. 16C: Boston Musical Instrument Company, the famous *Three Star*, serial no. 18344 (ca. 1908), bell length 12⅝" (ca. 32 cm.); author's coll.; 16D: Heald cornet, serial no. 2306 (?1890s); bell length 13½ " (ca. 34.3 cm.); restored by Nick DeCarlis. Note Heald's patented upturned waterkey lever.



16 B



16 C



16 D

Millennial designs

In the 1890s some makers on both sides of the Atlantic started to produce single-water-key, Besson *Concertiste* (= English Besson *Desideratum*) style cornets—retaining the removable shank system for the leadpipe, but substituting, for the usual interchangeable high/low pitch slides at the second crook, a slide equipped with a calibrated stop rod for changing the nominal pitch of the instrument (generally from B-flat to A,[60] without necessitating removal of the shank. Conn's *American Model Orchestra Cornet* and the aptly named *Fin-de-siècle* ("End of the Century") model of the Association Générale des Ouvriers Réunis in Paris were early examples of such instruments (Figure 17A, B).

Figure 17.

Two early *Fin-de-Siècle* model cornets designed in the 1890s—both retaining removable shanks. 17A: Association Générale des Ouvriers Réunis B♭/A cornet; close-up of tuning slide and pitch-change slide equipped with stop rod. No serial no., ca. 1905. Distance between waterkey and rear of tuning slide ca. 8½" (ca. 21.6 cm.); author's coll. 17B: Conn *American Model Orchestra* cornet; serial no. 24040 (ca. 1892), bell length 13" (ca. 33 cm.); instrument restored by Frank Griesemann; author's coll. Valve slide and pitch tuning slide (equipped with stop rod) with pitch positions scored on tubing; pitch slide stop rod not original.

As noted above, most Périnet-valved cornets produced in the last three decades of the nineteenth century no longer came routinely equipped with a full set of shanks to lower the pitch to F and lower. With a mechanism for a quick change of a B-flat instrument to A (or from C to B-flat) newly invented, makers were now free to abandon the removable shank system entirely in favor of a "fixed leadpipe"—i.e., where the mouthpiece receiver is soldered to the leadpipe proper, often with additional bracing to the valves. Though it is impossible at this point to determine which maker first produced fixed-leadpipe cornets,[61] they were especially—and immediately—popular in the United States, where the old-fashioned removable-shank-system cornets virtually became extinct in the earliest years of the twentieth century.[62] New American makers such as Holton (Chicago, then Elkhorn, Wisconsin), York (Grand Rapids, Michigan) and White (as "King" [Cleveland] produced fixed-leadpipe, *fin-de-siècle*-style cornets (Figure 18) among their earliest models, while Buescher (Elkhart) opted to retain the removable shank on their entry into the field. European makers—especially firms such as Bohland and Fuchs from Graslitz—were quick to send copies to the American market. These cornets resembled their *Concertiste* predecessors in all but the fixed-leadpipe/quick-pull-to-A mechanism, retaining, for example, the shepherd's crook. But they tended to be slightly longer than their predecessors: 13½-14" (ca. 34.3-35.5 cm.), continuing a trend noticeable in the very last of the Conn (14½") and Boston (13") double-water-key cornets.

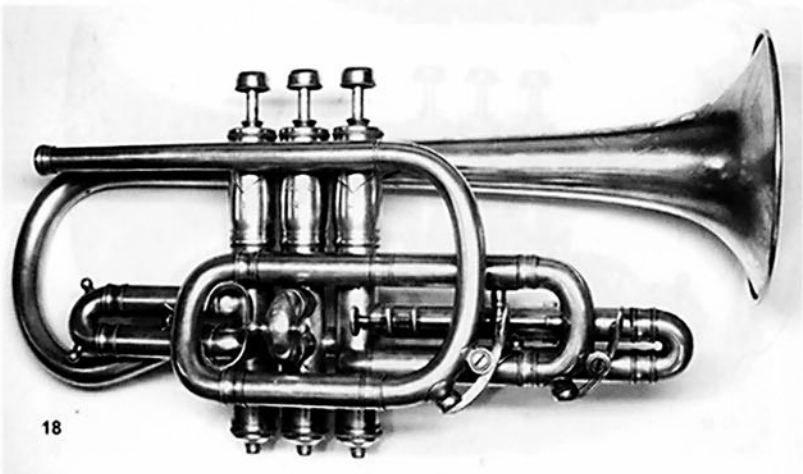


Figure 18.
A typical American fixed-leadpipe *Fin-de-Siècle* model of the early twentieth century; J.W. York & Sons "Professional," serial no. 20348 (ca. 1907—John Swain, unpublished research); bell length 13½" (ca. 34.3 cm.); author's coll. York at times marketed virtually the same instrument under the model name *Monarch*, and further manufactured these instruments for sale by other concerns (e.g. Wurlitzer).

A case can perhaps be made that fixed leadpipes represent an improvement in acoustical design, for the simple reason that the ends of the shanks, as well as the leadpipe receivers for the shanks, are easily and often dented out-of-round, and are thus a not uncommon source of leaks. Elimination of such a weak link would therefore seem to constitute an improvement in acoustical design, as further suggested by its immediate acceptance in the form of the fixed leadpipe *fin-de-siècle* and, almost immediately thereafter, in the spate of additional configurations in the United States. But against this line of reasoning lies the obdurate fact that, though such instruments were available (e.g., by Boosey and Co. in 1910, and in a slightly different configuration by Besson, London, perhaps even earlier), short, shepherd's-crook cornets with removable shanks, most notably the single-water-key Besson *Concertiste*-style cornets, remained the instruments of choice in Great Britain at least until the early days of World War II.[63] Likewise, in Belgium and France, short shepherd's crook *modèle anglais Concertiste*-style cornets with removable shanks remained the norm, with such firms as the tradition-minded Couesnon company still producing such instruments in the 1950s. To be sure, Couesnon and Besson (both Paris and London) produced fixed-leadpipe cornets (of various different configurations) for the American market, but production for the European market heavily favored the traditional style left over from the previous century, at least until after World War II.

If an acoustical argument, then, cannot be defended as the prime cause for the switch to fixed-leadpipe configuration in the United States, the next most likely explanation is simply the change of century itself. Conn advertising associated with its various models (see below) was rife with words like "new" and, especially, "improved." It is very much as if the new century awakened a desire for modernity. In the United States, at least, not only were the Conn *Wonder* and the dual-water-key Boston *Three Star* soon to go: so were imports of the classic Courtois *Levy's/Arbuckle* and *Arban* models, and all their imitators (Couesnon, for example, plus other makers from eastern Europe).[64] Out with the old double water keys, removable shanks, bottom valve caps with elongate drip spouts. The old Bessons, with their single water keys and smooth-bottom valve caps (prototypes for virtually all such caps to the present day) survived, though the London branch, from 1895/96 under separate, British ownership, had quickly added fixed leadpipes to its models, especially, it seems, for export to the U.S. For although a few single-lever double-water-keyed cornets have survived from the early twentieth century (though few from prominent makers), and although various makers have, from time to time, achieved the triple purpose of (1) tuning, (2) key (i.e., nominal pitch change, e.g., B♭ to A), and (3) high/low pitch adjustment, all with a single valve slide, the two single-waterkey, double-slide Besson designs were "pre-adapted" to the fixed-leadpipe, second-slide A-change. Thus there arguably is a functional, mechanical reason for the persistence of Besson designs, and the extinction of Courtois designs, into the twentieth century.

And, at least in the United States, in with the new. The trend to increased length continued immediately. Conn (the *Perfected Wonder* and later, similar models) and Buescher both started building cornets with the old reverse S-shape configuration to the fixed leadpipes within a few years of the century's turn (Figure 19). Many other makers,

domestic and foreign, followed suit; S-shaped leadpipe cornets were perhaps the dominant model of the decade 1910-20, and continued to be sold well into the 1920s, if not longer. These instruments (i.e., those built in B♭) had shallower shepherd's crooks and hence even longer bells, reaching, in some cases, 17" (over 43 cm.). In Conns, the first crook, facing forward, was apparently meant to be used for tuning, as the larger, second slide, still facing to the rear, was equipped with the stop-rod quick-to-A mechanism; however the situation was reversed in the Bueschers: there, the first slide, facing forward, was equipped with the A-change stop rod. And though Buescher for a time experimented with a tube connecting the third with the first valve air passages (the bell exiting the second valve), the leadpipe in these S-shaped instruments otherwise still entered the third valve.[65] Standard Band, H. N. White ("King"), and Martin also built S-leadpipe cornets, as did Couesnon and a number of eastern European manufacturers—most likely mainly, or perhaps even solely, for export to the United States.

But then all hell broke loose—as far, that is, as American cornet design was concerned. In the period between the turn of the century up at least until the entry of the United States into World War I in 1917, the leading manufacturers indulged in what was probably the most intense period of design foment in the entire history of cornets. Most of these instruments were elongated, almost trumpet-like instruments; some dispensed with the shepherd's crook entirely. And they were further "united" by odd, experimental configurations of the airways in and around the bell, often coupled with a wide assortment of never-before-

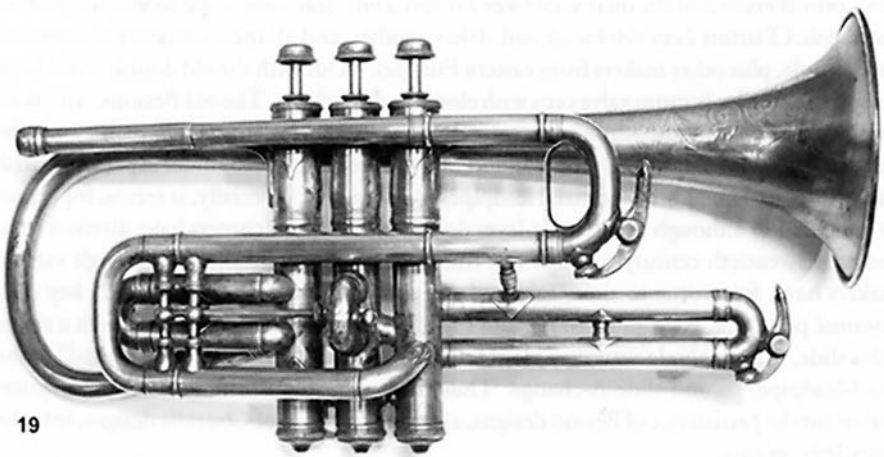


Figure 19.
Typical American S-leadpipe long-bell cornet. Conn *Perfected Wonder*, serial no. 91660 (ca. 1905); bell length 14½" (ca. 36.8 cm.).

seen configurations of the leadpipe and/or bell. According to patents and advertising, most of these "improvements" were made in the name of enhanced efficiency in airflow in and around the valve section. Interestingly, all these models were short-lived, calling into question exactly how much improved efficiency was actually attained. Indeed, from the rate of slight modifications even within some models (especially the two distinctly different Conn *ConnQuerors* and the two equally different Conn *Wonderphones*—a pattern of almost constant tinkering), production of these unusual configurations both within single firms—and of course among competing firms—more likely represents foment in stylish exterior design than any real mechanical/acoustical improvements. Especially with the Conns, there is a distinct sense of planned obsolescence on a year-by-year basis throughout the first decade of the twentieth century.

Among the earliest to be produced was the Conn *ConnQueror*, a model name that actually encompassed two very distinct cornet designs produced seriatim from about 1902-03, then 1904 to ca. 1910[66] (Figure 20A-D). The only features in common between these two *ConnQuerors* were the presence of a quick-change-to-A slide on a crook that ran between two of the valves, and the presence of a fixed leadpipe with forward-directed main tuning slide (i.e., like a modern B♭ Périnet-valved trumpet), the leadpipe connecting to the second valve.[67] In the first *ConnQueror* (typically some 13_", or 34.3 cm., in bell length), the airflow then proceeded from the second valve to the first valve by a conspicuous loop (i.e., not a simple direct intervalve tube) running on the left side of the instrument; the air column left the first valve in a long tunable crook (with quick change to A), symmetrically placed below the main tuning slide loop of the leadpipe, returning to the third valve, and then exiting to the bell.

In the second *ConnQueror* (bell length typically 15", or 38 cm.), the air column left the second valve on the left side of the instrument and ran backwards, forming a quick-to-A change (sometimes equipped with an extending bridge to change from C to B-flat), then running forward to connect with the third valve; the air flow continued through a bridging tube between the third and first valves on the right side of the instrument, continuing out the first valve into the bell.

Interestingly, Conn had produced cornets with a similar experimental design in the early 1880s—an unnamed model with removable shank, with the leadpipe running to the *first* valve, the air column then running by a curved bridge tube on the left side to the third valve, thence into a forward-directed tube on the right side (with bridge for C-B-flat-A pitches), connecting back into the second valve, from which the bell exits on the left side.[68] Thus in a sense the *ConnQuerors* represent a resumption of design tinkering with air flow that Conn had been experimenting with early on in his production years. Instruments similar to the *ConnQuerors*, i.e., with quick-change slides on loops running between two of the three valves—were also produced by the Martin Band Instrument Company and by at least one British firm, Rudall Carte.

Conn's two *Wonderphone* models, produced seriatim from ca. 1907-ca. 1910 (*Wonderphone* # 1 to 1908; *Wonderphone* # 2-1908-1910), share only the fact that both are bell-tuning models (Figure 21A-D). In *Wonderphone* # 1 (bell length ca. 13½", or 34.3 cm.),

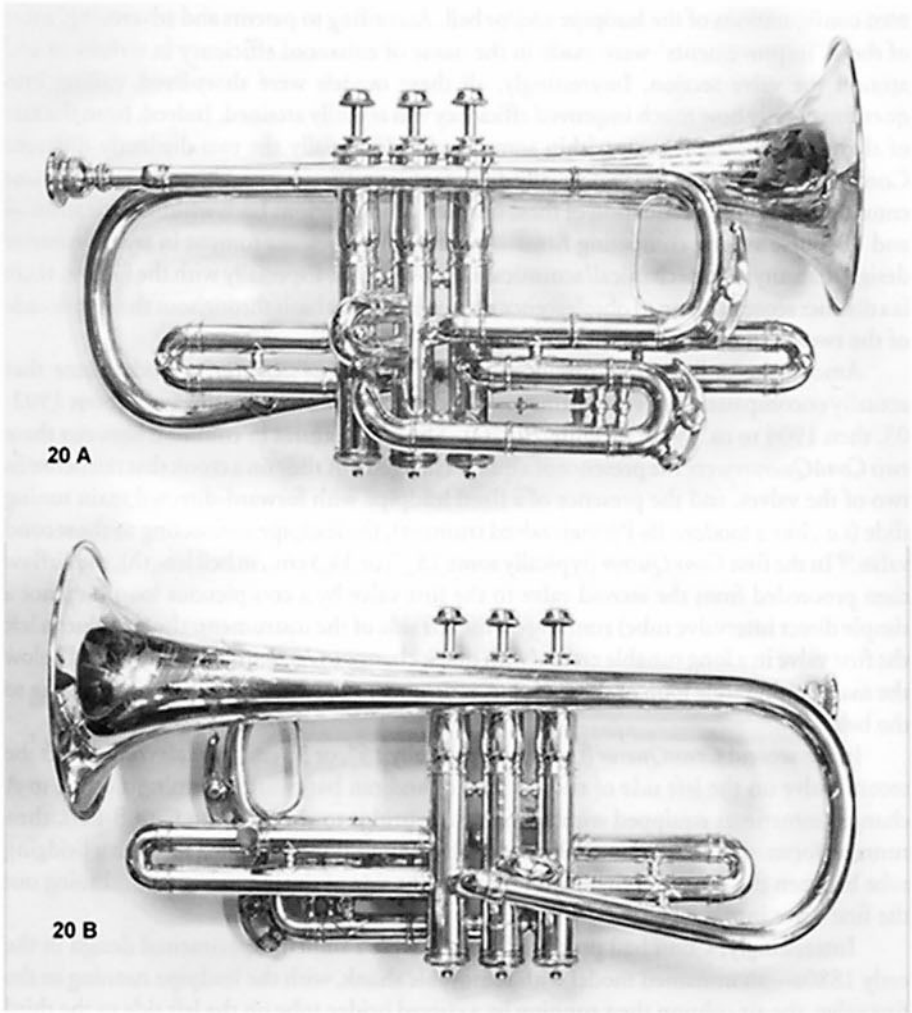


Figure 20.
The two Conn *ConnQueror* models. DeCarlis coll.; restoration and photographs by Nick DeCarlis.
20A, B: *ConnQueror* #1; serial no. 77755 (ca. 1903); bell length 13½" (ca. 34.3 cm.);
20C, D: *ConnQueror* #2, serial no. 92292 (ca. 1905); bell length 13" (ca. 33 cm.);
"Vocal" model, i.e. C/B♭/A

20 C

20 D

the fixed leadpipe is drawn back into a narrow loop with quick-to-A slide, before running forward into the first valve; thereafter, intervalve tubing directs the air from first to second, thence to the third valve; the bell exits the third valve and runs forward and is reflected downward into a tuning slide; the bell then runs back and is deflected upwards in a deep, non-shepherd's crook rear bell bow. *Wonderphone* #2 (bell length ca. 15", or ca. 38 cm.), in contrast, had the leadpipe deflected downwards into a tuning slide equipped with quick-to-A stop rod (some instruments lack a slide in this position) and then connecting to the third

valve; intervalve tubing conducts the air column eventually to the first valve, where the bell exits and runs forward into a main tuning slide (often with pitch-change bridging), before being deflected back to the rear bell bow, as in *Wonderphone* #1. Conn and Dupont had, in the 1870s, produced some bell-tuning cornets (essentially a *modèle anglais* version of a bell-tuning model produced by Besson in both Paris and London); interestingly, later Conn bell-tuning models (such as the 26A of the 1930s) and the *ConnQuest* and other models of the 1950s/60s were essentially built on the same plan as *Wonderphone* #1—without, however, the slide on the leadpipe.

Figure 21.
The two Conn *Wonderphone* models. DeCarlis coll.; restoration and photographs by Nick DeCarlis.
21A-B: *Wonderphone* #1; serial no. 103155 (ca. 1907); bell length 11¼" (ca. 28.6 cm.);
21C-D: *Wonderphone* #2; serial no. 115234 (ca. 1909); bell length 14½" (ca. 36.8 cm.).

But Conn was not the only player in this game of high cornet design experimentation in the first decade of the twentieth century. H.N. White, for example, made two very different instruments both marketed as the *Perfecto* (Figure 22A-C). *Perfecto* #1 (bell length 15¾", or ca. 37.4 cm.), had a fixed leadpipe with main tuning slide, entering the third valve after a single 180° turn; the air then left the third valve in a forward-running crook equipped with change-to-A stop rod, then doubled back into the third valve! (The Conn *ConnQuerors,* the Martin, and the Rudall Carte instruments, all had the air leaving one valve and entering another in these special quick-change loops). Thereafter the air column flows back to the first valve then out to a demi-shepherd's crook—a setup, in other words, exactly like a B♭ trumpet.

Perfecto #2 (bell length 15¾", or ca. 40 cm.) is also configured like a trumpet, with the main tuning slide facing forward on the leadpipe; the quick-to-A is accomplished by an additional full bend in the bell, equipped with quick-to-A slide and water key (which must have leaked a lot on the player's clothing!).

21 C

21 D

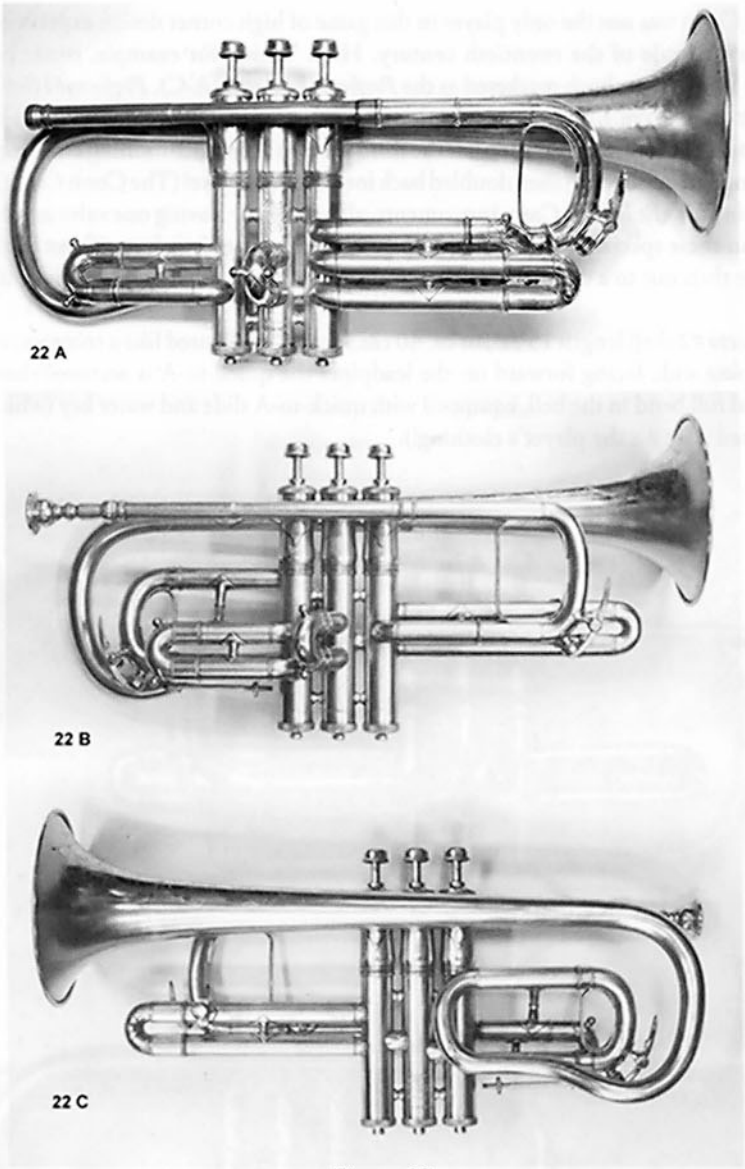


Figure 22.
The two King *Perfecto* models. 22A: *Perfecto* #1; serial no. 8099 (undated); bell length 15¼" (ca. 38¾ cm.); though not visible in this photograph, this is the model where the extra windway tubing (i.e., between the third valve tubing and the main tuning slide) exits, then re-enters, the third valve; it is equipped with a stop rod for quick-change-to-A; author's coll. 22B, C: *Perfecto* #2, serial no. 14517 (not dated); bell length 14 3/4 " (ca. 37½ cm.). DeCarlis coll., restoration and photographs by Nick DeCarlis.

Buescher, in a addition to its two S-leadpipe long-bell models, also produced two versions of its famous *Epoch system*, consisting of instruments with valves with unequal length and unusual air flow; they also produced a bell-tuning model reminiscent of Conn *Wonderphones*, where the deep forward curve of the leadpipe was equipped with a tuning slide before entering the first valve; the air column, however, was then connected to the third valve by the same bridge tube of their early S-leadpipe models, thence back to the second valve and into the forward-directed bell, with tuning slide, that was then deflected back as in the Conn *Wonderphones*.

Meanwhile, Holton apparently pioneered a style of long-bell cornets—variably termed the *New Proportion* (a name first used for their *fin-de-siècle* model!), the *Revelation* (not, apparently, ever stamped as such on the bell), and then finally the famous *Holton-Clarke*—that were essentially modified S-leadpipe designs, with the extra loop now placed entirely in front of the third valve (as had been in fact the case with the King *Perfecto* #1). These and all other cornets mentioned henceforth have the original configuration of (1) three full turns to the leadpipe, the leadpipe entering the third valve, and the bell exiting the first valve, with no unusual intervalve tubing, crooks, etc. The long-bell Holton instruments in question were built from at least 1911 into the 1930s; all were variations of the same basic design (Figure 23).The *Revelation* was a full 16 3/4 inches (42.5 cm.) long, with no trace of a shepherd's crook; tuning and quick change to A were accomplished on the same forward-directed slide. The *Holton-Clarke* model was similar, but, in the version equipped with a shepherd's crook, was only 15" (38 cm.) long. Boston Musical Instrument Co., Standard Band Instrument Co., and H.N. White all produced versions of this design so closely associated with Holton, as did F.E. Olds somewhat later (i.e., the Olds *Special*).

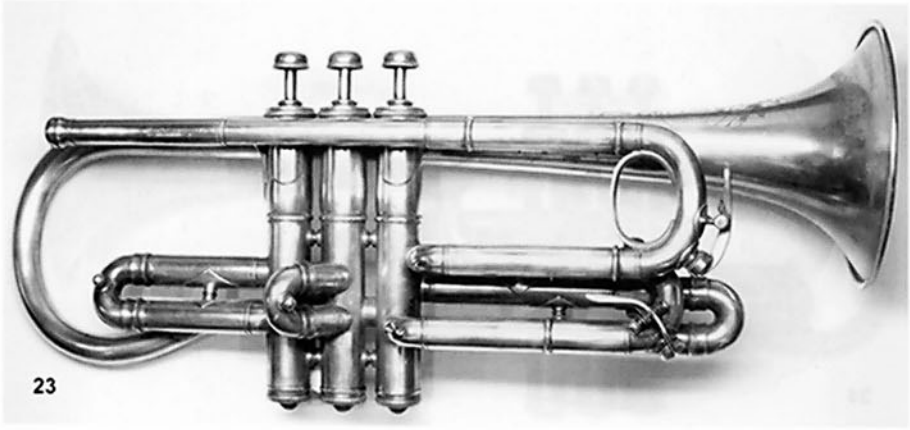


Figure 23.
Holton *New Proportion* (long-bell model), serial no. 25801 (ca. 1914); bell length 15 1/2" (ca. 39.4 cm.); author's coll.

York, too, made a widely copied long-bell instrument, the *Perfectone* (bell length ca. 16½", or 42cm)—another "modified S," with the extra turn (with the quick-to-A stop rod) placed symmetrically against the valve casing (Figure 24). This design was current sometime before 1913; it was copied by Bohland and Fuchs and other European makers.

Three long-bell cornet designs were especially important, as they not only attained popularity when first marketed prior to World War I, but also because they became the dominant surviving cornets of the 1920s up through the 1960s, one of them (the long-bell *Concertiste*) surviving to the present time as long since the *de facto* standard cornet model (Figure 1).

This latter model, with its Besson-designed valve assembly and simple three-turn "wrap" dating back to the early 1870s, is effectively a long-bell (i.e. non-shepherd's-crook) *fin-de-siècle* without the second slide with stop rod for quick change to A. Some makers in the 'teens and '20s (e.g., E. A. Couturier [through York, later on his own], Gronert [Elkhart], Besson [London], and Buescher) offered cornets of this simple wrap, but with rotary-valve change-to-A on the leadpipe. Martin may have produced a long-bell cornet of this type, without a quick-change-to-A, by 1921. Otherwise, Vincent Bach (who brought his Besson *Concertiste* with him when he emigrated to the United States in 1914[69]) appears to have been among the first to drop the quick-change altogether. Bach began making simple long-bell *Concertiste*-style cornets (i.e., like the Muck cornet of Figure 1) in ca. 1926 (Bix Beiderbecke played this model, after having played the Conn *New Wonder*/80A); by the 1930s other makers had joined in (Blessing's *Super Artist*, and, somewhat later, the Martin *Committee*, being well-known examples). These instruments, without shepherd's crooks and with fixed leadpipes, were simply longer, brighter versions of the Besson design going back to the earliest 1870s. Musical styles and usages had changed away from using cornets and trumpets

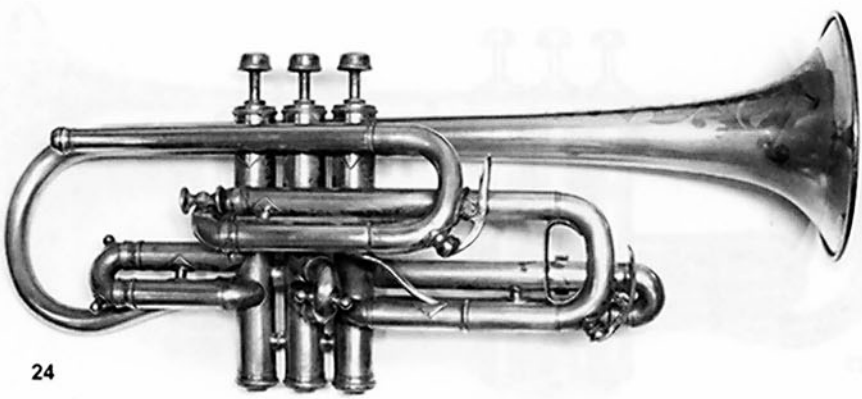


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Figure 24.
J.W. York & Sons *Perfectone* model; serial no. 49775 (ca. 1915; J. Swain, unpublished); bell length 16½" (ca. 42 cm.); author's coll.

pitched in A, and certainly by the time the International Standard Pitch (A=440) was adopted in 1939, there was no longer any need for separate slides (or valves governing tubing loops), either to change or to adjust pitch;[70] rather, a single, simple tuning slide sufficed.

But there were two other models that were also pre-eminent, with tremendous staying power, appealing to the relatively few holdouts for cornets in the post-trumpet takeover days of the 1920s and beyond (Figure 25A, B). Both were invented ca. 1915, and both, like their diverse congeners described above, were a bit unconventional in their design. The renowned *King Master* (Figure 25A), for example, had the leadpipe running back opposite the lower valve section, and then reflected into a turn around the back of the valve (site of the tuning slide), and then running forward to the third valve; the windway is otherwise a normal cornet/trumpet configuration. Without a shepherd's crook, an early example has a 16" long bell; it has a tight bell and plays rather brightly. Consistently popular, the *Master* model was manufactured well into the 1960s, and perhaps later. It was imitated at various times by Buescher and Conn.

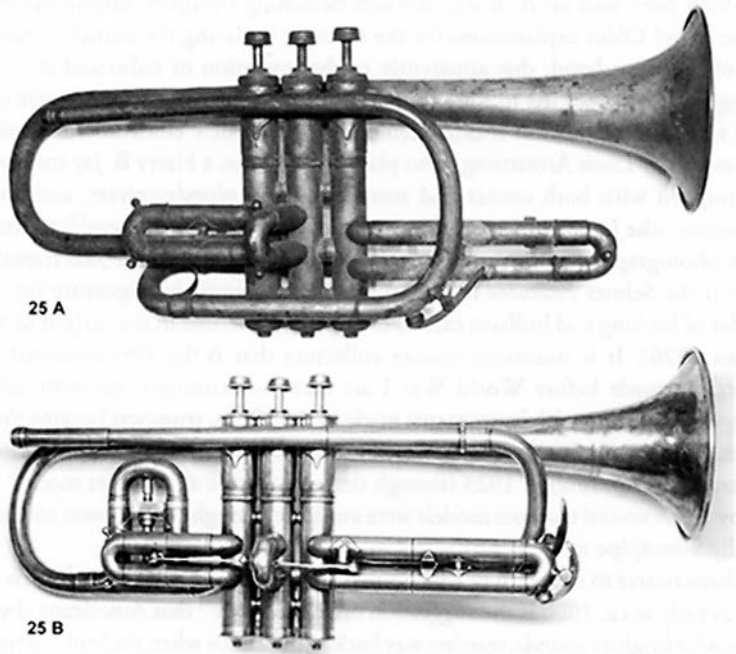

Figure 25.

Two long-ranging (i.e. mid-teens to ca. 1960s) long-bell cornet models; author's coll.
25A. H.N. White *King Master*; serial no. 26386 (undated early example); bell length 15¾" (ca. 40 cm.).
25B. Conn *New Wonder*, serial no. 137114 (ca. 1915); bell length 16¾" (ca. 42½ cm.). Note "linkage" system for extending lengths of all three valve slides the appropriate amount when the main slide (in this case, the quick-to-A slide) is pulled, as tuning is by micrometer dial on the extra bell loop.

Conn's *New Wonder, Victor New Wonder,* or 80A (with variant versions, such as the slimmer, more trumpet-like 8A of the 1930s—Figure 25B) was unusual primarily because of its hump-shaped loop on the lower section of the bell just to the rear of the first valve. With a micrometer wheel, the instrument was intended as a bell-tuner, though there was also a forward-directed slide on the leadpipe that was, at least through the 1920s, equipped with a stop rod for quick-to-A; some of the earlier instruments also were equipped with a linkage system that adjusted valve slides when the change was made between B♭ and A. Bell lengths varied somewhat, but 16 3/4" was common in the 1920s. Never to my knowledge copied by anyone else,[71] this model was sold at least through the 1960s; older ones in good repair are the favorites of many modern players in the traditional jazz idiom.

No question about it: cornets were getting longer as the new century wore on. They were also, by all reports and assessments of surviving instruments, becoming brighter.[72] As is well known, the ratio of cornets to B♭ trumpets flipped dramatically sometime in the mid-1920s. But it is quite clear that cornets, at least in the United States, had for a long time prior to the 1920s been well on their way towards becoming trumpets, raising the immediate question: Why? Older explanations for the trumpet replacing the cornet—including the demise of the town band, due apparently to the invention of radio and the rise of the recording industry—has led to the speculation that brighter instruments were called for, perhaps for simple acoustical reasons demanded by the new electronic technology. The famous switch by Louis Armstrong (who played, for a time, a Harry B. Jay instrument that came equipped with both cornet and trumpet tuning pipes/receivers, and appropriate mouthpieces—the Jay was an appropriate hybrid, transition instrument[73]) to trumpet (he has been photographed with, variously, a Buescher 10-22 and Conn 58B trumpet before settling on the Selmer *Balanced* model trumpet that became his signature for the entire remainder of his long and brilliant career) took place sometime in the early-mid 1920s (no later than 1926). It is notorious among collectors that B-flat Périnet-valved trumpets demonstrably made before World War I are rare-to-uncommon on both sides of the Atlantic, while starting with instruments made in the 1920s, trumpets became much more common, and soon outnumbered cornets. The Sears Roebuck catalogue appears not to have carried trumpets up through 1923 (though they did feature a "trumpet model" cornet in 1923); by 1927, several trumpet models were available, though cornets were still prominent (especially S-leadpipe models).

Perhaps nearer to the truth of why cornets started to look and sound like B♭ trumpets starting as early as ca. 1900 is the suggestion of H.M. Lewis[74] that Americans always had a preference for brighter sounds, starting way back in the 1800s when the lead instrument was an E♭ soprano cornet. Additionally, the possibility exists that a preference for B♭ Périnet-valved trumpets was being developed in at least some orchestras prior to World War I, thus suggesting the further possibility that cornets were becoming more and more trumpet-like, as if fighting a sort of "rearguard" action against trumpet encroachment that was to turn out to be ineluctable in any case.

In favor of this interpretation (but, admittedly, lacking the requisite information to support it unequivocally), is the well-known historical separation in the origin, literatures, and uses of trumpets vs. cornets from the days even preceding the invention of valves. Consider the following phrase from the famous letter from Herbert L. Clarke to Elden Benge in 1921, in which Clarke tells Benge to stick to the cornet because the trumpet "is only a foreign fad for the present time, and is only used properly in large orchestras of 60 or more, for dynamic effects, and was never intended as a solo instrument. I never heard of a real soloist playing before the public on a Trumpet. One cannot play a decent song even, properly, on it, and it has sprung up in the last few years like 'jaz' music, which is the nearest Hell, or the Devil, in music. It pollutes the art of Music."[75] This is quite an onus to place on the "regal and noble" trumpet; and in any case, one must agree with H.M. Lewis and John Wallace[76] that, in the United States, by the time Clarke pecked those words out on his typewriter, his own instrument was a lot closer to the trumpet than the Conns and Bostons he had begun on in the late nineteenth century, though he undoubtedly continued to use a proper, funnel-cupped cornet mouthpiece[77]. The cornet had long since effectively evolved itself out of existence—again, especially in the United States.

But one final note of caution must be raised in any analysis of the increasing length ("trumpetization") and brightness of sound in American cornets in the first two decades of the twentieth century. It is generally agreed that the most important determinant of the tonal qualities of a brasswind instrument is the shape of the oral cavity of the player. Next in line, however, is the shape of the cup of the mouthpiece (width of cup, as well). A 1915 King *Master*, with its tight bell, plays very bright with a trumpet-cup cornet mouthpiece, but is much more mellow and dark when fitted with an old-fashioned funnel-cupped cornet mouthpiece. The third and least important of the three variables determining tonal quality is the resonator, i.e., the instrument itself. Manufacturers were still equipping cornets with funnel-shaped mouthpieces in the 1910s-20s (though shallow mouthpieces for cornets survive back to the preceding century—there was always a variation in preferred sound!). Just how "bright" these longer-belled, more trumpet-*looking* cornets actually sounded, then, is a matter that needs more investigation.

The rise of the B♭ Périnet-valved trumpet also marked the end of any further innovation in cornet design. Cornets continued to be used by players who preferred a more compact instrument, though jazz players such as Rex Stewart played with a sound at least as bright as their fellow trumpeters. Cornets retained a reputation among many teachers that their still somewhat more compact length, plus whatever conicity the windway retained, made them easier instruments for beginning students. And though band and orchestra arrangements still called for separate trumpet and cornet parts, the two were considered interchangeable, and though musicians (from students through professionals) could in general feel comfortable adopting either instrument, most of course played B♭ trumpets.

Thus the 1950s Muck[78] emulation (Figure 1) of a Bach long-bell, fixed-leadpipe, non-shepherd's-crook cornet—itself a lineal descendant of Besson cornets dating from the earliest 1870s—had been in place at least since the mid 1920s. However, many trumpetized

designs were still being manufactured in the 1930s, including models (many of them in the cheaper, "student" lines) that had an extra turn in either the leadpipe or the lower part of the bell as it exits the first valve.

But the height of "cornet" emulation of trumpet design has to be the thoroughly professional models produced by Conn in the 1930s-60s. In the 40A (cornet mouthpiece) and the 40B (trumpet mouthpiece) rimless *Vocabells*, and later in the *Connstellations* of the '50s and '60s, there was little, and sometimes literally no, difference in external design between the "A" (i.e., cornet) and "B" (trumpet). One took a cornet mouthpiece and had a more tapered leadpipe than the other; both had .438" bores in each of these two examples. The *Connstellation* trumpet-style cornet was advertised as the very brightest of the series of cornets Conn was offering in the 1950s/'60s; they also produced a more traditional *Concertiste*-style, fixed-leadpipe cornet, also called a *Connstellation*, with a bore size in excess of .480".

Since the 1980s, a wave of design nostalgia has gripped the industry, with the shorter style shepherd's-crook cornets, albeit with fixed leadpipe, making a strong comeback. Though highly subjective, the opinion of most players/listeners is that the dark sound of the old cornets is seldom achieved in these newer instruments, though some appear to come closer than others in this respect. The Monette Corporation, in addition to producing a shepherd's-crook short model, has, meanwhile, produced a long-bell cornet with a "drooping" first turn and similar shepherd's-crook droop to the rear bell branch. Though possessing no more turns to the tubing than a B♭ trumpet, and equipped to receive a wider-than-normal shanked mouthpiece *sui generis* to the instrument, the instrument is sold as a cornet (in either C or B♭) because of the long, French-horn-like taper to the leadpipe (there is no tuning slide—tuning effected by an adjustable mouthpiece receiver, much like a fluegelhorn or older E♭ soprano cornet). The instrument does produce a darker, softer sound than a trumpet.

John Wallace[79] has called for a return to the darker sound of the older cornets. He correctly observes that fluegelhorns have in large measure taken up the slack when mellower sonorities are called for. In my view, fluegelhorns (if used, at any rate, with proper funnel-shaped mouthpieces) lack the focus offered by cornets, which are true intermediates between trumpets and flugelhorns in tonal qualities.

Questions remain: How traditional in tonal quality—i.e., beyond mere appearance—did European cornets remain while the American instruments were busy evolving themselves out of existence? And what were the true reasons for the progressive trumpetization of the cornet in America?

Finally, as noted at the outset, no single system of classification of the myriad cornet designs suggest itself, nor is it in theory even possible to formulate such a classification. Division into short-bell and long-bell models, for example, ignores the differences developed in far earlier cornet leadpipe configurations. But pinpointing the sequence of design innovations through time at least provides some simplification of the details of cornet design history.

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NOTES

[1] Preliminary versions of this paper were presented at the joint Historic Brass Society (HBS) and American Musical Instrument Society (AMIS) meeting in Toronto in November, 2000, and at the AMIS meeting in Asheville, North Carolina in May, 2001 (Abstract, with illustrations: Niles Eldredge, "The French Connection," HTTP://www.vintagecornets.com). I would like to thank in particular Jeffrey Nussbaum (President, HBS) and Laurence Libin (AMIS) for giving me the opportunity to develop these thoughts on cornet history. I also thank Géry Dumoulin, Rick Flynn, Kenneth Fung, Roy Hempley, Bruno Kampmann, Sabine Klaus, Doug Lehrer, H.M. Lewis, Arnold Myers, Jeff Nussbaum, Dave Pinardi, Al Rice, Rick Schwartz, Robb Stewart, and two reviewers for comments on an earlier version of this manuscript.

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Finally, I dedicate this paper to the memory of my good friend and colleague, Patrick Delile, of Paris.

[2] I have recently concluded (Niles Eldredge, "Biological and Material Cultural Evolution: Are There Any True Parallels?" in *Evolution, Culture and Behavior*, eds. F. Tonneau and N. Thompson, *Perspectives in Ethology* 13 [2000]: 113-53; and "Memes in Material Cultural Evolution: A Case History," [in preparation]) that, because of the mode of inheritance of material cultural information—including "lateral transfer" coming from teaching, copying and outright theft of design—no material cultural system (e.g. "automobiles," "computers," "musical instruments," etc.) can be expected to yield a single valid classification, or even a classification likely to be deemed preferable or optimal by a majority of users. Rather, any such system—certainly including cornets—may be classified in a number of equally valid (yet potentially equally dissatisfying) ways. This contrasts with classifications based on biological evolutionary history, which in principle, at least, yield a single classification reflecting the nested sets of taxa (biological groupings) of the branching evolutionary ("phylogenetic") tree.

[3] Early nineteenth-century cornets, while commonly pitched in B♭ (though lack of true pitch standards in those days makes this designation exiguous), were routinely equipped with as many as eight shanks (Fr.: *tons*, the removable mouthpiece-receiving tube of varying shapes and lengths) that lowered the

pitch down as low as alto D; the lower shanks disappeared first, and later nineteenth-century cornets usually had B♭, A, and A♭ shanks only, although companies such as Couesnon offered a full system down to F into the twentieth century (cf. Anthony Baines, *Brass Instruments: Their History and Development* [London: Faber & Faber, 1976/1980], p. 227); the entire pitch-altering removable shank system disappeared shortly after 1900 in the United States (see text), but persisted in Europe, in many places as the preferred arrangement, at least until World War II; Couesnon was still offering cornets with *tons* in the 1950s, and replicas are currently being produced in India.

[4] Sharp et al. (David B. Sharp, Arnold Myers, and D. Murray Campbell, "Using Pulse Reflectometry to Compare the Evolution of the Cornet and Trumpet in the 19th and 20th Centuries," *Proceedings of the International Symposium on Musical Acoustics, Edinburgh, 19-22 August 1997,* ed. A. Myers [*Proceedings of the Institute of Acoustics* 19 (5), 1997], pp. 541-48) have convincingly demonstrated that cornets, from their earliest day, often had proportionally more cylindrical tubing than this often-stated ideal, for which reason Myers (Arnold Myers, "Preface," *Post-horns, Cornets and Ballad Horns,* vol. 2, part H, fascicle vii [new edition], *Historical Musical Instruments in the Edinburgh University Collections,* ed. A. Myers, [Edinburgh: Edinburgh University Collection of Historic Musical Instruments, 2000], pp. 3-4) classifies *all* cornets (i.e., not merely the later, "trumpetized" instruments of the twentieth century) as "intermediate brasswinds."

[5] Adam Carse, *Musical Wind Instruments* (New York: Da Capo Press, 1965); Baines, *Brass Instruments.*

[6] Indeed, according to Carse (*Musical Wind Instruments,* p. 246), most if not all of the earliest cornetists were horn players.

[7] By "design," I refer primarily to external configurational changes as well as such readily observable internal features as valve type. I consider internal shape of the tube, important though it may be, only in passing, and do not analyze "bore size" (i.e. diameter of the windway as it passes through the valves) at all, as there is no consistent pattern in the history of cornets (or of trumpets, for that matter) in this regard.

[8] See Arnold Myers, "Design, Technology and Manufacture since 1880," *The Cambridge Companion to Brass Instruments,* eds. T. Herbert and J. Wallace (Cambridge: Cambridge University Press, 1997), pp. 115-30.

[9] Baines, *Brass Instruments*; Carse, *Musical Wind Instruments*; Günter Dullat, *Metallblasinstrumentenbau* (Frankfurt: Erwin Bochinsky, 1989); Malou Haine and Ignace De Keyser, *Catalogue des Instruments Sax au Musée Instrumental de Bruxelles* (Brussels: Musée Instrumental Bruxelles, 1980); Herbert Heyde, *Das Ventilblasintrument* (Wiesbaden: Breitkopf & Härtel, 1987); Bruno Kampmann, *Collection d'instruments de musique à vent,* vol. 1 (Paris: Association des Collecteurs d'Instruments à Vent, 1986); Bruno Kampmann, "Les Systèmes de Pistons des Instruments de Musique à Vent," *Larigot* no. 3 (October 1988): 15-18; Victor-Charles Mahillon, *Catalogue descriptif & analytique du Musée instrumental du Conservatoire Royal de Bruxelles précédé d'un essai de classification méthodique de tous les instruments anciens et modernes* (5 vols.; Gand: C. Annoot-Braeckman, 1880-1922), vol. 1 (1880; reprint of 2nd ed. of 1893, Brussels: Les Amis de la Musique, 1978); Myers, "Design, Technology and Manufacture since 1880."

[10] Baines, *Brass Instruments,* p. 226.

[11] See Richard Schwartz, *The Cornet Compendium: The History and Development of the Nineteenth-Century Cornet* (privately published, 2000), p. 10. (http://www.angelfire.com/music2/thecornetcompendium), for an acoustical argument supporting the notion that it was the German posthorn, capable of producing four registers of sound, rather than the French version, said to have been limited to three registers, that was indeed the instrument that became the valved cornet.

[12] Carse, *Musical Wind Instruments,* p. 244.

[13] Ibid., p. 245.

[14] Albert Hiller (*Das grosse Buch vom Posthorn* [Wilhelmshaven: Heinrichshofens Verlag, 1985], p. 285) illustrates two early semi-chromatic posthorns (one each from ca. 1830 and ca. 1840); both are fitted with clapper keys rather than valves, and both retain the circular shape of the natural posthorn.

[15] See, e.g., Edward Tarr, "The Romantic Trumpet." *Historic Brass Society Journal* 5 (1993): 213-60; for discussion, see Schwartz, *Cornet Compendium,* p. 7.

[16] Arnold Myers and Raymond Parks ("Introduction," *Post-horns, Cornets and Ballad Horns,* p. 6 [Edinburgh: Edinburgh University Collection of Historic Musical Instruments, 2000]), provide the original French: "Le cornet dit à piston, connu depuis quatre ans environ, n'avait, dans son origine, que deux pistons; depuis, on en avait ajouté un troisième."

Interestingly, in her entry on "cornets," Sybil Marcuse (*Musical Instruments: A Comprehensive Dictionary* [New York: Doubleday, 1964], p. 127) reports that "The cornet is a descendant of the old coiled post horn; at the beginning of the 19th c. this was provided with crooks and a tuning slide, and around 1825 it was fitted with 2 valves by Halary (Jean Hilaire Asté) of Paris.... In 1829 Étienne-François Périnet added the third valve"—clear evidence that research by either Marcuse or some other brass historians had already uncovered this information, though it had not been incorporated into subsequent accounts.

[17] Baines, *Brass Instruments,* pp. 171, 226.

[18] Early makers of the two-valved cornet—mostly French, mostly Parisians—include Halary (Asté, the purported inventor), Collin, Darche, David, Guichard, Labbaye, Périnet, and Rivet, as well as the Belgian Charles Joseph Sax; many of the surviving instruments are unsigned.

[19] The earliest use of the terms *modèle français* and *modèle anglais* I have seen is in the Belgian Import Patent 35077 of 1874, issued to Mme. F. Besson, based on her Paris-issued patent for the *Nouvelle Étoile* model, also in 1874. While the *Nouvelle Étoile* patent primarily concerned the configuration of the windway through the valves, drawings were also furnished to illustrate that the bell could be placed on either side of the valve assembly, referred to in the text as *modèle français and modèle anglais.* Both *modèles* were in regular production in Paris for a few years prior to the patent date of 1874. I am very grateful to M. Jacques Cools for providing me with a copy of the Besson 1874 patent.

[20] Makers known to have produced early three-valved cornopeans (i.e., Stölzel-valved *cornets à pistons*) include Pace and Köhler in England, in addition to the French makers Besson, Antoine Courtois, Auguste Courtois, Gautrot, and Guichard (who may have been among the more prolific of the makers), as well as the Belgian-born Parisian maker Adolphe Sax. Many surviving instruments, often with a highly distinctive "knot" at the end of the third valve tube, are signed by dealers rather than makers: e.g., Metzler (London), Collin (Paris) (see Figure 4a, b), Moitessier (Montpelier), etc. (though some of these latter were supposed to have been makers as well, the identity of these instruments suggests a single, common maker).

[21] E.g., some cornopeans by Köhler; see Carse, *Musical Wind Instruments,* Pl. XXII, A.

[22] Interestingly, however, some manufacturers years later reintroduced offset valves (e.g., the Olds *Recording* model cornets and trumpets of the 1950s and '60s, where once again the second valve was offset to the left). A similar configuration was patented in 1938 by an inventor named Davis (see Jim Kennedy and Kathy Murter, eds., *The Patent History of Brasswinds* [privately published, 2001]). Inasmuch as the second valve tube had long since been relocated to the right side of the valve in these Périnet-valved instruments, the functional reason for the offset valves was simply that the middle digit of the human hand is longer than both the forefinger and fourth finger, suggesting retrospectively that such a function could hardly have escaped the notice of the designers of the early three-valved cornets.

[23] These two seem to have been the most common three-valved cornopean windway designs, judging

from surviving instruments. Other designs are of course known. Köhler, for example, manufactured a cornopean where the leadpipe entered the first valve, the bell exiting from the bottom of the third valve, as seen, for example, on an instrument on display at the Victoria and Albert Museum in London.

Stölzel-valved *cornets à pistons* with the leadpipe entering directly into the side of the third valve later became commonplace—after the second valve tube was relocated to the right side of the instrument sometime, no later than the early 1860s—when cornopeans became the cheaper-grade cornets available. In these instruments, the valves are in-line, and came in either *modèle français* or *modèle anglais* configurations.

[24] This order of valve placement was retained unchanged when Périnet valves were introduced, and of course remains standard today in all cornets and trumpets (and in lower brass as well) regardless of valve type. The late Joe Utley compiled a database of surviving instruments (predominantly German) with the first and second valve tubes in effect reversed, i.e., the first lowering the pitch a semitone, the second a full step (Joe Utley, "First Valve-1/2-Tone Brass Instruments," paper presented at the meeting of the American Musical Instrument Society, Washington, D.C., 1997; and at the 13th Early Brass Festival, Bloomington, Indiana, July 1997; Sabine Klaus, pers. comm). Though Besson & Co. (London) was still offering such instruments (marketed as "Irish" models) early in the twentieth century, I have so far encountered only one Stölzel-valved *cornet à pistons* with this configuration of the valve tubing.

Though in some European makers' instruments the third valve lowered the tone a full two steps, I have yet to encounter this arrangement in piston-valved cornets.

[25] Myers and Parks, "Introduction"; Gautrot Ainé & Cie, *Catalogue des Instruments de Musique,* 1867, reprinted 1999, *Larigot* no. 10 Spécial. It must be remembered, as well, that "bugles" continue to the present day to be built as natural horns, or with one, two or (recently, in the United States at least) three valves (Périnet these days), the valved instruments being used in the numerous "drum and bugle corps."

[26] Baines, *Brass Instruments,* p. 228.

[27] See, e.g., Mahillon, *Catalogue descriptif,* p. 285, for such a comment.

[28] Robb Stewart, pers. comm., e-mail 8 July 2001.

[29] See also reproductions of Sax' advertising in Haine and De Keyser, *Catalogue des Instruments Sax,* and in Wally Horwood, *Adolphe Sax 1814-1894,* revised edition (Herts: Egon Publishers, 1983). Period illustrations of players holding their instruments in this manner include one of Hermann Koenig, arguably the first commercially successful cornet virtuoso, reprinted in Adam Carse, *The Life of Jullien* (Cambridge: W. Heffer and Sons, Ltd., 1951), p. 43. Interestingly, an apparently photographic (self?)-portrait of a young Alexander Graham Bell (b. 1847) grasping a cornopean in this fashion is in the Grosvenor Collection of the Library of Congress.

[30] See also Myers, "Design, Technology and Manufacture," p. 122. A two-Stölzel-valved cornopean by Périnet is listed as missing from the collections of the Musical Instrument Museum in Brussels. Fortunately, an illustration of this instrument was provided by Victor Mahillon in Vol. 5 (1922), p. 133 of his *Catalogue descriptif,* and is reprinted by Dumoulin in the present number of this journal.

[31] E.g., F. W. Galpin, *A Textbook of European Musical Instruments. Their Origin, History and Character* (London: Williams & Norgate, 1937).

[32] The instrument bears the serial no. 1056 on the bell, and is, according to its owner Bruno Kampmann (pers. comm.), one of the oldest known instruments of any type made by Adolphe Sax after his arrival in Paris in 1842.

[33] And apparently even beyond—see the advertisement of Husson & Buthod, ca. 1860, reproduced as Figure 7.

[34] Horwood, *Adolphe Sax*.

[35] See William Waterhouse, *The New Langwill Index: A Dictionary of Musical Wind-Instrument Makers and Inventors* (London: Tony Bingham, 1993) p. 29.

"F. Besson" is still conventionally assumed to mean "Fontaine Besson"—the said Fontaine having married Gustave and Florentine Besson's daughter Marthe and entered the family business for some time in the 1880s and 1890s (Waterhouse, *New Langwill*, p. 29). Yet "F. Besson" appears on bell stamps on Parisian Besson instruments as early as the 1850s, and surely reflects the fact that Besson, in "1858 in order to escape paying Sax damages incurred in a lawsuit, first transferring his assets to his wife quit Paris for London..., leaving her as proprietor" (ibid., p. 29). Besson's wife's maiden surname was Ridoux (originally inferred from an entry in ibid., p. 30, but now fully substantiated in the Belgian/French patent of 1874 issued to "Mme Besson née Florentine Ridoux"; see note 19)—this is in agreement with the fact that Besson bells in both Paris and London were stamped "FR" until the late 1880s in London and the mid-1890s in Paris; data and interpretation from Eldredge (Niles Eldredge, "A Database of Besson Soprano Brasswinds: 1845-1960," in prep.).

[36] Though Waterhouse (*New Langwill*, p. 348) especially mentions that Gautrot and A. Courtois made horns designed and licensed by Sax, there is no evidence as yet to support the contention that Sax cornet designs were licensed to other makers. Arnold Myers (pers. comm.) makes the useful observation that known examples of Sax-designed instruments produced by other makers under license bear a facsimile of the Sax monogram.

[37] One is in a private collection in New York. At least two more are in the collections of the Musical Instrument Museum in Brussels (see Géry Dumoulin, *Cornets à Pistons, Cornetten, Cornets*, [Brussels: Musée des Instruments de Musique, 2001; Booklet 10]; Haine and De Keyser, *Catalogue des Instruments Sax*). Horwood (*Adolphe Sax*, pp. 30, 31, 78, 128 and, perhaps especially clearly, 151), reprints drawings and advertising sheets from Sax's career. The handbill from ca. 1850 (ibid., p. 151) shows (1) a French-model Stölzel-valved cornet, with the windway entering the bottom of the third valve, the bell exiting from the side of the first valve; (2) an S-shaped leadpipe instrument, albeit a "hybrid" with two Stölzel valves and a central Périnet valve (see text and compare with Figure 8, an otherwise identical, fully Périnet-valved instrument; this instrument is also shown being grasped by the left hand of a player very much in the manner depicted in Figure 5); and (3) the early Périnet-valved model shown here in Figure 6.

[38] Gautrot was offering a choice of pins vs. the later methods of valve alignment in their models as late as 1867. Interestingly, Gautrot also offered a French-model Périnet-valved cornet with an upper ("baluster") assembly that was threaded on the bottom for screwing into the lower section of the valve casing. This feature, together with the "treble-clef" like composite bracings on the instrument (Figure 9), is reminiscent of a deep-bodied cornopean-like Périnet-valved instrument by E. Courtois in the Utley collection at America's Shrine to Music Museum (catalogue no. 6815). The Courtois cornet A712 (Figure 11), dated 1854/1855, and the Courtois cornopean of Figure 4d of approximately the same age are among the oldest examples known to me of an internal multi-pinned (two or three) washer system enclosed in a housing surrounding the spring in the upper section of the valve.

[39] I thank Robb Stewart (pers. comm.) for his very helpful comments on this and other comparative aspects of valve design in brass wind instruments.

[40] However, at least one maker (Muller of Lyons) found a way to bring the second valve tube to the right, with an ingenious and seemingly wholly original design. Much later, cheaper Stölzel-valved instruments did indeed emulate Périnet-valved instruments, in transferring the second-valve tubing to the right side of the instrument, evidently accomplished through a slight widening of the space between the upper and lower branches of the main tuning-slide tubing.

[41] The modern instrument maker David G. Monette—in examining a range of nineteenth-century cornets—once observed (pers. comm.) that wide spacing of upper and lower branches of valve tubes contributes to timbre and intonation problems, possibly suggesting an acoustical reason why early makers of Périnet-valved cornets quickly turned to narrower construction of valve tubes. However, two of the premier makers of Périnet-valved cornets of the nineteenth century—A. Courtois and the Boston Musical Instrument Manufactory, as well as others, produced models reverting to a rather wide spacing between upper and lower branches of the valve tubes.

[42] See n. 22.

[43] Horwood (*Adolphe Sax*) provides an interesting account of the relation between the Distins and Adolphe Sax, each side claiming to have been the reason for the other's success. One of the sons, Henry, of course went on to great fame as a manufacturer of brasswinds—first in London, then in New York, Philadelphia (working for J.W. Pepper before once again striking out on his own), and, culminating a long and productive life, in Williamsport, Pennsylvania. Distin cornets produced in all the venues for over a half century are close copies of Courtois instruments—except at the very end when, in Williamsport, he began (as did Courtois for the first time) to produce a very popular Besson design—adopted as the most common design by his successor in 1908, Brua C. Keefer.

[44] Myers, "Design, Technology and Manufacture."

[45] Reprinted in *Larigot* no. 6 (1989): 7.

[46] These are extremely interesting instruments. Three are by Adolphe Sax, each with S-shaped leadpipes, two of which are in the Brussels Musical Instrument Museum of Brussels; see Haine and De Keyser, *Catalogues des Instruments Sax*, p. 100, for description and illustration of serial no. 8923, made ca. 1850). A very similar instrument by Courtois is in the collections of the Royal College of Music, London. All are *modèle français* with pins, showing a "pinching" of the valves slides as they meet the valve casings. Like all cornopeans, and many subsequent Périnet-valved cornets (especially, e.g., those by Courtois), the intervalve tubes are in-line and halfway between the upper and lower valve tube connections. But most striking is the fact that the entrance of the leadpipe to the third valve, as well as the exit of the bell from the first valve, are *also* in-line with the intervalve tubes. Mme. F. Besson states in her 1874 patent that this "straight bore" (i.e. *perce droite*) configuration, "long known as the Besson system," is one of the earliest of Besson designs—a highly improbable assertion, as no evidence so far has emerged that the Besson firm ever used this particular valve design. But there can be no doubt that this configuration was among the earlier of the valve systems used on Périnet-valved cornets. Examples are known of the sporadic persistence of this design into the twentieth century.

[47] E.g., Mahillon, *Catalogue descriptif* (1880); Eugene Dupont, "Letters of Patent No. 249323, Nov. 8, 1881," in *The Patent History of Brasswinds;* Constant Pierre, *Les Facteurs d'Instruments de Musique* (Paris: E. Sagot, 1893; reprint, Geneva: Minkoff, 1971); the Besson Patent of 1874.

[48] Waterhouse, *New Langwill Index*, p. 197.

[49] Ibid.

[50] Algernon S. Rose, *Talks with Bandsmen* (London: William Rider and Son, Ltd., 1895; reprint, London, Tony Bingham, 1996), p. 173.

[51] The London branch of the Besson firm referred to instruments with the bell to the left of the valves as "reversed bell," rather than as "English model." See also above, n. 19.

[52] The Parisian branch of the Besson firm did not start making *modèle anglais* cornets until the 1870s (arguably, though not yet certainly established, after the London branch had conceded to fashion and came forth with its own *modèle anglais* cornet). This early model (the *Desideratum*—see Figure 14a, b), patented in 1874 and manufactured for fifteen to twenty years on both sides of the Channel, is the oldest known model cornet with the modern system of intervalve tubing—though manufactured in

perce droite ("straight bore") rather than the knuckled-out style (*perce pleine*) that is the overwhelming configuration of modern cornets and trumpets. Interestingly, the justifiably famous French Besson trumpets made between the two World Wars (and even later) never had the *perce pleine* of some of their cornets.

[53] Waterhouse, *New Langwill Index*, p. 74.

[54] For detailed drawings of Courtois and Besson *modèle anglais* cornets (as well as other maker's models), see Eldredge, "French Connection" and "Biological and Material Cultural Evolution."

[55] The four "new model" Courtois cornets known to me include A712 (author's collection—*nouveau modèle*), one in the Musical Instrument Collection of the University of Edinburgh, one at the Royal College of Music (London), and one in a private collection.

[56] These instruments include one in the collection of the Fiske Museum (Claremont Colleges), one in a private collection, and one illustrated by Carse, *Musical Wind Instruments*, plate XXII, D. Once again, Sax seems to have been in the lead, as Horwood (*Adolphe Sax*, pp. 151 and 160) reproduces a ca. 1850 Sax advertisement showing a hand gripping a cornet with two Stölzel valves and a (middle) Périnet valve.

[57] The *Levy's/Arbuckle/Emerson* models were externally identical, differing (according to catalogue copy from the 1880s) only in bore size (small, medium and large, respectively); the *Arban* model (never stamped on the bell with that name) was medium bore, and differed from the others mainly in that the leadpipe passed between the upper and lower branches of the inclined third valve tubing. Earlier models (i.e., 1860s, early 1870s) sometimes applied the names of these cornetists differently—e.g. calling what was later advertised as the *Arban* model a *Levy's* model.

[58] See Margaret D. Banks, *Elkhart's Brass Roots* (Vermilion: The Shrine to Music Museum, 1994).

[59] Ibid., p. 2.

[60] Note that this "key" change is not at all the same as the change from "high" to "low" pitch that reflects the vagaries and multiplicities of pitch standards at different times and places in cornet history.

[61] I.e., in the United States at the end of the nineteenth century. Fixed-leadpipe models were made from time to time by various European makers much earlier in the nineteenth century.

[62] Conn's last *Wonders*, produced (with longer bells) in Elkhart, Indiana through ca. 1903, plus the last of the famed Boston *Three Stars* (produced now by the Boston Musical Instrument Company—a name change that occurred in 1902, according to unpublished data of Robb Stewart), some of which also had elongated bells, were among the last of the removable-shanked, traditional cornets to be produced in the United States, along with those of John Heald, as already noted.

[63] Arnold Myers, pers. comm.

[64] Indeed, it appears that Courtois stopped making its classic cornets for sale anywhere, turning instead to copies of Besson models not long after the turn of the century. On the other hand, Boosey & Co. made their *Acme* model cornets—essentially Courtois *Levy/Arbuckle* copies with a different intervalve tubing configuration—at least until ca. 1920.

[65] This is the model for which Buescher received a patent in 1906 (see Kennedy and Murter, *Patent History*) for an S-shaped leadpipe cornet with three slides: the first for quick-to-A, the second for tuning, the third (on a crook extending forward on the bottom) for high/low pitch changes (though Buescher says in the patent text that the slides for any of these purposes can be, in effect, interchanged—i.e., they need not occur in the order drawn).

[66] Dates based on Eldredge, unpublished data, and Conn 1910 advertising.

[67] The *ConnQuerors*, as well as the Conn *Wonderphones* and some of the other makers' models briefly discussed in this section, were produced in various bore sizes, pitches (i.e., C-B♭-A as well as B♭-A) and, in some, models that were either in Low Pitch or both High and Low Pitch, thus accounting for

variations in bell length and other dimensions not documented further in this paper.

[68] See Banks, *Elkhart's Brass Roots*, p. 21, for an illustration of this model.

[69] See Andre M. Smith, "The Life and Work of Vincent Bach (1890-1976): 1941-1976 (and Beyond)," *Journal of the International Trumpet Guild* 19/3 (1995): 4-34, for an illustration (Figure 11) and discussion (p. 21) of Vincent Bach's cornet.

[70] However, makers such as the Vincent Bach Corporation (New York) continued to offer slides and rotary-valve options for A-change as special orders, at least until the 1940s (Roy Hempley, pers. comm.).

[71] A contemporaneous long-bell cornet by Boosey & Co., however, does have a hump-shaped loop to the bell tubing in this position, but did not come equipped with a tuning mechanism in that position.

[72] H.M. Lewis has performed the nearest thing to an independent "experiment" demonstrating the increasing brightness in sound of cornets from the 1880s-1930s (H. M. Lewis, "How the Cornet Became a Trumpet—The Instruments and Music of a Transitional Period in American Music: 1880-1925," *ITG Journal* 16/1 (September 1991): 17-26 (where a copy of Clarke's letter to Benge is reproduced); also lecture demonstration, ITG 2001 Conference, Evansville, Indiana; reported by A. Molitierno. *ITG Journal* 26/1 (October 2001): 23; and pers. comm., e-mails to author, 11/2001). In his 2001 presentation, Lewis used a J.W. York and Sons #11 mouthpiece (except on the Bach, where he used a Bach Mt. Vernon #1 mouthpiece with a 23 throat) as he demonstrated to his (and presumably the audience's) satisfaction that the sound indeed became brighter in a series of cornets including a York *Monarch* large bore, a Conn 1898 *Wonder*, a Conn *New Invention* (a 1911 successor to the *Perfected Wonder* reversed-S model), a York *Improved* Model 43 (another reversed-S-leadpipe instrument), a Conn *New Wonder* (1915), a Holton *New Proportion/Couturier* (1913), and lastly a New York Bach (1930) long-bell model. Because evaluations of "brightness" are subjective (unless defined narrowly and measured acoustically in a laboratory, of course), it is good to have an independent demonstration of the claim, anecdotally acknowledged by many for years, of the increasing brightness of cornets around the turn of the nineteenth/twentieth centuries.

It is also striking that, in the same issue of the *ITG Journal* reporting Lewis' demonstration, John Wallace, in his master class, similarly remarks that the sound of the cornet became more "brilliant" over time.

[73] I am grateful to Nick DeCarlis for his insights on the significance of Harry B. Jay instruments as "transitional" between cornets and trumpets.

[74] H.M. Lewis, pers. comm.

[75] See Lewis; "How the Cornet Became a Trumpet," for a printed source of this letter.

[76] See ibid.

[77] I have found no evidence that Clarke ever abandoned his deep-cup, oddly scalloped-rim, mouthpiece, however "trumpetized" the Holton-*Clarkes* and other cornets had become by 1921.

[78] The Muck *Citation* cornets and trumpets (Figure 1) used the same valve assembly (as did those of Bach and other manufacturers); copies of Bach *Stradivarius* models (themselves copies of Bessons), parts for the Muck instruments were manufactured in the old York factory in Grand Rapids, Michigan, which had been bought in 1940 by the Carl Fischer Corporation of New York. The instruments were assembled at the Carl Fischer premises in New York by Mario Marcone (Marcone, pers. comm.), as by the 1950s Carl Fischer had a controlling interest in the Rudy Muck company.

[79] Comment attributed to John Wallace in his master class at the 2001 ITG Conference, Evansville, Indiana, as reported by Arthur Molitierno. *ITG Journal* 26/1 (2001): 28.