CHAPTER 8
THE AMERICAN MANDOLIN

The head of the Statue of Liberty on display in a park in Paris, 1878. Photograph by Albert Fernique, and courtesy of the Library of Congress.
(It has little to do directly with mandolins, other than the statue was being constructed in Paris during the Paris Exposition and is such a fascinating image.)

One of the sensations at the *Exposition Universelle* held in Paris during the second half of 1878 was a group of Spanish bandurria and guitar players, known variously as *The Spanish Students* ,the *Figaro Spanish Students*, or *Estudantina Figaro*[33]. Following a very successful season during the Exposition they were booked for an American tour and arrived in New York City on 2 January, 1880, where *The New York Times* reported the arrival of 15 musicians, with nine mandolins (actually bandurrias), five guitars and a violin. They first performed in Boston as part of a variety show called *Humpty Dumpty* for most of January which then opened at Booth's Theatre in New York in early February with a season through until the end of March.

They played a mix of light classical music, with a repertoire of 150 pieces that included Spanish and Polish dance music as well as Mozart and Beethoven, according to a letter written to *The Cadenza* in 1901 by G. Henry Picard[33], director of Picard's Bandurria Orchestra in Boston. He also mentioned that they played almost entirely from memory, as most of the group did not read music and had to be taught each part, including the dynamics, by ear.

It did not take long for copy-cat ensembles to appear. There was an advertisement published in New York for *Humpty Dumpty* in March 1880 describing the group as the *"only and original Spanish Students"* suggesting that there could

already have been competition at another theatre. This was probably a group of mandolin players drawn from the Italian community in New York and led by Carlos Curti[34].

It is not certain what the original Spanish Students did after the New York engagement, but it is likely that they spent several months touring the US. They (or at a least another group of the same name) played in Mexico City in 1882 and extended the tour up the West Coast to San Francisco. By 1885 they were in South America, after which they seem to have disbanded.

Despite the fact that they were not playing mandolins at all, the Spanish Students sparked an interest in small plucked stringed instruments, and a number of opportunistic Italian mandolin groups, such as Curti's, were performing and touring with the same kind of repertoire of popular tunes and light classics. At the height of the mandolin craze 20 years later numerous articles appeared in the music magazines and in instructional methods of the period describing the early years of the mandolin in the USA and Canada. These writings often seem to be contradictory, and perhaps confused the original Students with other ensembles who performed under the same name.

By the 1880s the five-string gut-strung banjo had become a fashionable social instrument of the middle class, with 'banjo clubs' popular all over the eastern and mid-western United States. Banjo makers such as S.S. Stewart had introduced five string banjos of various sizes, string lengths and tunings by the middle of the decade to encourage

A promotional postcard for The Spanish Students, printed in New York, 1880.
Image courtesy Roberto Martínez del Río - Museo International del Estudante

the playing of ensemble music. There was copious music published for solo banjo or banjo and guitar duets. Through this period the mandolin playing successors of the Spanish Students gradually built a wider interest in the mandolin, although the instruments were sparsely available and almost all imported. The mandolin gradually infiltrated the banjo clubs and by the 1890s popular interest in the mandolin was growing. Scott Hambly quotes the 1891 Montgomery Ward catalogue stating that mandolin sales had more than doubled in the previous year. Their cheapest model was imported, but the two higher grade models were American made.

The exact date of the first North American made mandolin will probably remain a matter for conjecture, although there are several contenders. One such was Joseph Bohmann (1848-1928) of Chicago. He was an immigrant from Central Europe, trained as a violin maker and set up business in the USA around 1876. No slouch at self promotion he described himself as *"The Worlds Greatest Musical Instrument Manufacturer"*. In his 1899 catalogue the claim was made that he had made the first American mandolin, but confused the matter by claiming that it was for one of the Spanish Students and that *"The students thought that no such instrument could be made anywhere else in the world but in Spain; whereupon I made to order the first mandolin ever made in America…"*. Bohmann historian Bruce Hammond suspects that this first instrument, or instruments, was in fact made for Carlo Curti's group of Italian Spanish Students. We can only wonder what he actually built.

By 1887 Lyon & Healy included mandolins in their catalogue and within a few years most of the major manufacturers and wholesalers added them as well. What they were supplying were bowlback instruments following the Italian

Joseph Bohmann and his children, pictured in his 1899 catalogue. Image courtesy Gregg Miner

model, albeit with some local modifications in the way they were put together. Guitar building techniques were adapted with necks often built separately from the body and attached with a dovetail or a dowel join instead of being part of the body structure. The neck was a single piece of timber, usually mahogany, and simply varnished as an alternative to veneering.

Constructing a bowlback mandolin is a complicated process. The bowl is made of a number of staves (anywhere from seven to more than forty) each individually bent, shaped and glued to a shaped form. To make one properly is a time consuming process that requires a number of specific skills. As most of the mandolin makers were also building guitars it can not have been a great leap to think about making mandolins in the same way, using just two pieces of wood for the sides and two more for the back. New York City

wholesalers Charles Bruno & Son were offering an 'American made' flat back mandolin by 1889, so it must have occurred to someone quite early on, as mandolins were becoming more popular.

From a front on view most early flatbacks looked much like bowlback instruments, with an oval soundhole and canted soundboard. They tended to be at the cheaper end of the market and remained a rarity until the second decade of the 2)th century. The first serious attempt to market a flat mandolin was by Elias Howe with the Howe-Orme range of guitar bodied mandolin orchestra instruments. These did not use a canted soundboard for structural integrity, but a longitudinal ridge pressed into the soundboard halves. The Howe-Orme mandolins started a wider interest in guitar bodied mandolins, and will be covered in a later chapter.

A Lyon & Healy American Conservatory mandolin from the early 1890s with the characteristic narrow, triangular body. Image courtesy National Museum of Music, USD

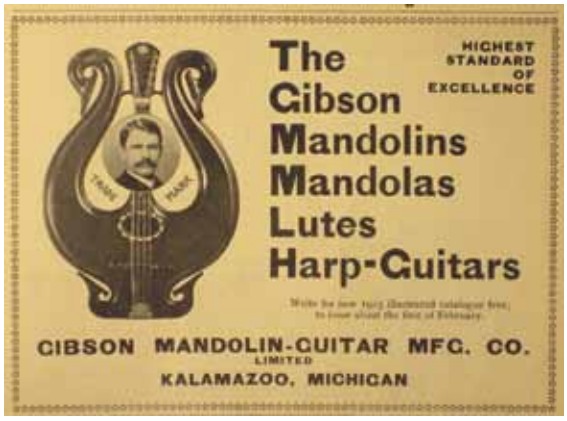
The ideas of Orville Gibson of Kalamazoo, Michigan, were the catalyst for a major change in the way mandolins were thought about. Gibson considered that bending thin slats of wood and gluing it to arched braces was the wrong approach. His idea was that the two sides of the instrument would be cut from two pieces of solid timber and the soundboard and back would be carved, somewhat in the manner of a violin, from similar planks. Gibson's ideas, especially about the sides, did not last long in a production environment after a group of local businessmen set up the Gibson Mandolin-Guitar Manufacturing Co in 1902. However, it proved to the mandolin buying public that they did not have to be made in the Italian manner and allowed a greater freedom in design and the way they could be made. Gibson's other big change was to increase the scale length by about one fret, from 33cm/13" to 35.2cm/13 7/8". This put more string tension onto the instrument, which the carved arch soundboard construction could cope with, and made a louder and different sounding instrument. The Gibson advertising copywriters inevitably pronounced this innovation superior to all others.

Gibson and other manufacturers also produced instruments for mandolin orchestras, which had developed in parallel to those in Europe at almost exactly the same time in the late 1890s. For the first 15 years or so of the 20th century mandolin clubs

proliferated around the country, offering a social and cultural outlet for the emerging industrial middle class, especially in the north-east and mid-west of the USA.

The rest of the industry was slow to adopt the flat mandolin, with or without carved plates, other than the guitar bodied mandolins from several manufacturers. It was not until around 1910 that more started to appear, and not until 1913-1914 that the major manufacturers all added flat mandolins in various shapes and designs. Through the next decade the flat models gradually displaced bowlback instruments as the dominant form and by the early 1920s the bowlback mandolin was almost extinct. Production focussed on flat instruments of one kind or another although the pre-eminence of the mandolin had faded.

What having the instantly recognisable and very different Gibsons on the market did do was allow for much more experimentation in mandolin design. Simpler flatback instruments using a canted



The first advertisement in The Cadenza for the Gibson Mandolin-Guitar Manufacturing Co, January 1903.

soundboard became more acceptable, especially at the lower end of the market as an alternative to a bowl body. New ideas for the mandolin such as Gibson's longer scale length met with hesitant acceptance. Lyon & Healy brought out a carved mandolin with a 35cm/13¾" scale in 1917, but when the model was revamped in 1921 the string length was reduced back to 33cm/13". Many of the cheaper

Howe-Orme advertisement from an 1897 Cadenza. The bright yellow paper is what the magazine used for the covers.

A magazine advertisement for the original Regal company, 1900.

canted soundboard mandolins stayed at 33cm/13" and the longer scale only became standard when carved or pressed arch soundboards became the norm at the cheaper end of the market from major manufacturers such as Kay and Harmony.

While guitars and banjos were locked into their traditional shapes, there was more flexibility in the mandolin market. While a simple teardrop shape was still common, there were many variations on that simple idea which ranged from subtle points on the body to the eccentricity of the Regal reverse scroll design.

THE AMERICAN MUSIC INDUSTRY A CENTURY AGO

The mandolin in North America did not, of course, exist in isolation. The making and marketing of mandolins, along with guitars and banjos, was but a part of an industry that grew massively in the last two decades of the 19th century.

In the early 1880s what production there was of fretted instruments was by small factories or workshops such as those of C.F. Martin or Joseph Bohmann, producing perhaps a few hundred instruments a year. Just about everything else was imported from Europe by a number of importers and wholesalers, which had often developed from music publishing houses, such as Oliver Ditson & Co. who had seen the opportunity to supply the means by which their sheet music could be played.

By 1900 production in the USA had been industrialised and instruments were produced in large mechanised factories by the tens of thousands. The music industry was a complex, interlocking combination of manufacturers, wholesalers and retailers, some all three at once, others dealing just with one aspect of the business. Over the next 30-40 years brands came and went, as companies prospered, went broke or were bought by other companies. Musical tastes and interests shifted as well, always underpinned by the enduring popularity of the guitar. Five string banjos became the fashion in the 1870s, replaced by mandolins through the 1890s. In the second decade of the new century Hawaiian music became popular with the ukulele and steel guitar followed by the return of the banjo, in the new four string variety, making a resurgence in the 1920s and the new syncopated jazz music.

What the buying public saw was a vast array of differently labelled mandolins, guitars and banjos from numerous catalogues, all inevitably extolling the quality of manufacture. Wholesalers such as Lyon & Healy from Chicago, Charles Bruno & Son in New York or Rudolf Wurlitzer of Cincinnati produced catalogues as did the direct mail order retailers Sears Roebuck and Montgomery Ward.

There were three main centres of the industry; New York, Boston and Chicago, although many other cities had manufacturers of one sort or another. Dave Bradford's[35] informative documentation of the guitar in 19th century USA refers to a section from the 1900 census which listed 84 companies making musical instruments, not counting piano and organ builders. Illinois alone had 27 companies and produced 40% of guitars, banjos and mandolins made in the US with the majority of them made by Lyon & Healy and Harmony. Another 15% came from the Oscar Schmidt plant in New Jersey. Bradford's information suggests a total of around 160,000 guitars, mandolins and banjos were made in 1900.

In terms of total industry in the USA, this was still considered small business. Again taking the piano and organ manufacturers out of the picture, in 1904 the industry employed only 4500 people directly with a total capital base of less than $4 million[36]. This also includes makers of such things as accordions, brass and percussion instruments. The industry grew steadily through the 1910s and 1920s and by 1929 there were 160,000 guitars, 140,000 ukuleles, 80,000 banjos and 30,000 mandolins produced that year. At the same time the number of companies involved shrank by 60%, but the workforce remained much the same as smaller companies went out of business or were bought out by larger competitors[37].

In New York, Boston and Chicago there were complicated and, from the viewpoint of a century later, wonderfully convoluted relationships in terms of who built what for whom and the brands they were sold under. Lyon & Healy built some of their own instruments, especially the Washburn line of mandolins and guitars, but probably used other manufacturers at various times in their

A distinctively American collar around the rib/neck join on a Tomaso brand mandolin, made by John Brandt in Chicago for William Lewis & Co. .
Image courtesy National Music Museum, USD, Cat No. 3853

history, especially for the cheaper lines, as well as building instruments for other wholesalers. Distributors such as Bruno & Son either imported or had their various lines of instruments made for them by manufacturers and labelled with various Bruno owned brand names. The manufacturers themselves varied from the small shops such as Bohmann and the Larson brothers, both in Chicago, producing relatively small numbers of better quality instruments up to the huge factories of Lyon & Healy, Regal, Harmony and Kay in Chicago and others such as Oscar Schmidt in New Jersey. The shear complexity of the business makes research a challenge for an historian.

THE MANDOLIN ORCHESTRA

The banjo craze of the 1880s had produced a new variety of banjo sizes, encouraging the formation of banjo orchestras with more variety of tonal colour. The S.S. Stewart company of Philadelphia introduced the *banjeaurine* around 1885, with a string length of 45-48cm/18-19" and tuned a fourth above a regular banjo, essentially a standard banjo with a five fret shorter neck. This was followed a couple of years later by the *cello banjo* which used a 40cm/16"rim and a 74cm/29"scale, tuned an octave below the standard tuning and the *piccolo banjo*, usually with a smaller head and tuned an octave above standard. Other manufacturers brought out their own versions, Fairbanks making a 36cm/14" pot with a 71cm/28" string length cello banjo[38].

By the 1890s when mandolins were becoming more popular, the American public were used to the idea of orchestras comprised of more or less one family of instruments, though often with various additions depending on what was locally available. At the core of the banjo and mandolin club movement was the idea of group music making, so orchestras based around mandolins were a natural progression. The question arose as to what instruments should be used.

The Waldo Club, of Saginaw, Michigan, depicted in The Cadenza, September 1896 with the first Waldo mandola and mandocello.

There had been bigger Neapolitan and Roman mandolins in the 18th century, with string lengths 50% or so longer than the usual 33cm/13" and tuned either a 5th or an octave lower as well as the still larger mandolone with a 55cm/22"scale and extra bass courses. With the resurgence of the mandolin in the 1880s in Italy came larger versions, though evidence is scanty for anything else other than Raffaele Calace's *liuto cantabile*, a 61cm/24"scale, five course instrument tuned C-G-d-a-e'. The liuto, generally referred to as a 'lute' in journals such as *The Cadenza* over the next decade or so, was a *mandocello* with an extra high string and was used as both a solo and ensemble instrument. Certainly through the 1890s there is more evidence of development of both c-g-d'-a' and octave tuned instruments as well as lutes and four course mandocellos.

The term *mandola* had, in the late 17th and early 18th centuries referred to a small lute tuned in fourths and what was a larger (and probably earlier) version of the small gut string mandolino. It was reinvented in the late 19th century (or perhaps had never gone out of use in Italy) to describe a large mandolin tuned an octave lower and *mandoliola* used for a similar sized instrument with viola tuning. The use of mandoliola has almost disappeared and these days mandola can, often confusingly, refer to either a viola or octave tuned instrument, depending on which side of the Atlantic the instrument lives and what style of music is played on it. In North America *mandola* almost invariably refers to a viola tuned instrument, with a string length of 40-46cm/16-18". In Europe a similar sized instrument is usually tuned as an octave mandolin and known as an *octave mandola*. Viola tuned instruments are called a *tenor mandola* and are likely to be instruments built in the Roman style of Luigi Embergher. Octave tuned instruments are more likely Neapolitan style instruments or the modern German model developed by Seiffert.

Early photographic evidence of some sort of mandola in the USA is a publicity photograph for a quartet known as The Mexican Serenaders (aka The Imperial Quartet) taken around 1890[39]. The four moustachioed gentlemen, who include instrument manufacturer William A. Cole, have a guitar, two bowlback mandolins and a bowlback

One of Harry Flower's MayFlower mandolins, made in Chicago c.1904.
Image courtesy Alex Robinson

mandola which would appear to have around an 46cm/18" scale. That was about the time that Cole had dissolved his partnership with A.C. Fairbanks and wassetting up in business on his own. It might be too early for Cole's own line of Imperial mandolins, built using his patented method of constructing the bowl. Whatever its origin, here is a mandola in a group setting, just as the mandolin craze was taking off.

Washburn included a mandola in their 1892 catalogue, the Style 89, with 19 alternating maple and rosewood ribs and priced at $50, which put it in the middle of Lyon & Healy's mandolin range at the time.

A patriotic cover for The Cadenza, July 1904.

The first known American made mandolin family of mandolin, mandola and mandocello were the Waldo instruments, introduced in 1896 by a two page advertising feature in *The Cadenza*[40]. It would seem that 1896 was the point at which the mandolin displaced the banjo as the instrument of choice. The editorial in *The Cadenza* of September that year (Vol3, No1) solemnly informed the readership that the 'banjo craze' was over and over the next few years there was much discussion on the appropriate makeup of mandolin based orchestras, and which style of mandola should be used.

An example was an article written by the wonderfully named G.G. Glenn Turiff, conductor of the Aberdeen Mandolin Band in Scotland. In the July-August 1896 edition of *The Cadenza* he announced he preferred the tenor mandola and liuto. He also had a preference for chromatic ocarinas over flageolets, thought the use of an Hungarian cimbalom would be good and liked wire-strung rather than gut-strung guitars. These he referred to as a mandolin-guitar.

By the next year both Howe-Orme of Boston, Massachusetts and Francis O. Gutman of Cleveland, Ohio were offering mandolin family instruments. In addition to their mandolins, Howe-Orme's guitar bodied instruments were advertised as mandolas in tenor, octave and 'cello models, covering all three tunings and avoiding the debate about which mandola was preferable or desirable. What was unusual about the Howe-Orme line was the remarkably short string lengths used. The tenor mandola had a 38cm/15"scale, the octave 43.2cm/17" and the strings on the 'cello less than 50.8cm/20" from nut to bridge.

Gutman's F.O.G. Brand offered mandolas and mandocellos in addition to mandolins and guitars, but with no mention in the advertising about

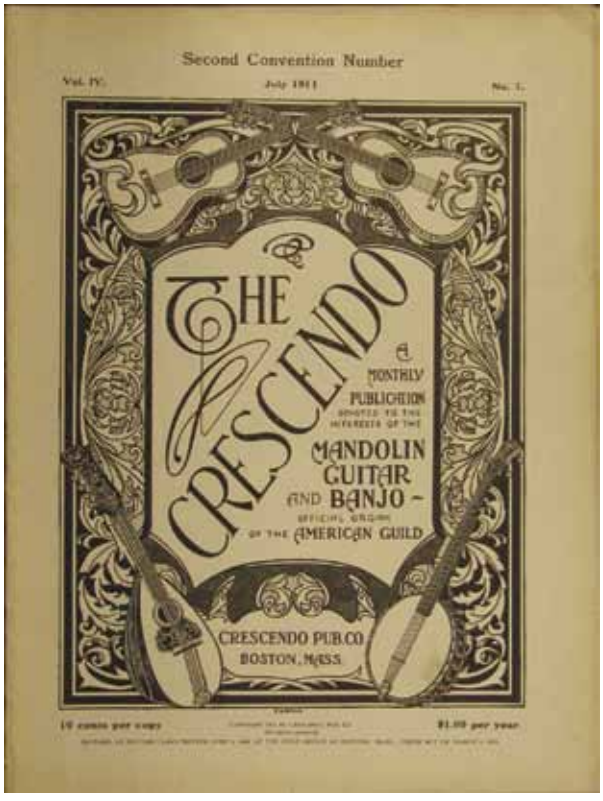
which style of mandola was available. Gutman was primarily a teacher and publisher of mandolin orchestra music, and little is known about why he ventured into instrument manufacture. Few if any of Gutman's instruments seem to have survived, so it is hard to know much about them in terms of their construction. It is likely that Gutman had them built to his specifications, especially as there were few other mandolas and mandocellos available to use as a model, and we can only imagine that he had some ideas of his own about them. A photograph of Gutman's Arion Mandolin Orchestra from that period gives few clues other than to show a couple of standard looking bowlback mandolins and a mandola with front mounted tuners as used often by Weymann in Philadelphia. Gutman himself is shown holding a large bodied six-string guitar. Later in the decade Gutman offered the Royal and Wonder Royal lines of instruments.

Certainly Gibson had no doubts about the mandola. When they started to offer mandolas and mandocellos in their early catalogues from 1903 there was no confusion. Mandolas were tuned as a viola and that is what they sold. There is one extant Gibson octave mandola from 1904, using a mandocello body and a 54cm/21.4" scale neck with a 12th fret body join at the binding crosspiece, but there is no evidence as to why it was built. Perhaps as an experiment to see how it fitted with the rest of the Gibson line as this was still a time where both tenor and octave tuned mandolas were being offered and orchestral parts available for both. Over the next few years, and perhaps due to some extent to Gibson's active marketing, the tenor mandola became the standard and the octave mandola almost outlawed.

F.O. Gutman's Arion Mandolin Orchestra of Cleveland, Ohio. Gutman is seated at the front holding the guitar, with what may well be the only picture of a FOG mandola over his right shoulder. The Cadenza, Sept 1899.

In May 1908 the American Guild of Banjoists, Mandolinists and Guitarists held its Seventh Annual Convention in Washington, D.C. and a unanimous vote decided that:

"Last year the Guild voted to recommend to publishers of Mandolin music to publish music for the Tenor Mandola and Mando-cello. This has been done by nearly everyone of the publishers of this class of music in the country and the status of the two Mandolas was practically settled, but this year the Guild goes a little further by declaring that the Tenor Mandola and Mando-cello are the proper Mandolas to use in Mandolin Clubs or Mandolin Orchestras.



A typical cover of the Crescendo, which used the same design for its first 20 years, while The Cadenza changed its look quite regularly.

…It is hoped that in a few years all clubs or orchestras will use either the Tenor Mandola or Mando-cello or both of them, in place of the Octave Mandola which, while it served its purpose for a time, has outlived its usefulness."

The Guild had been formed in the first years of the century, driven by Clarence L. Partee, music publisher and editor of *The Cadenza*, with the intent of offering formal accreditation to teachers of banjos, mandolins and guitars. Membership was aimed at teachers, music publishers and manufacturers of instruments and accessories. *The Cadenza* had started out in 1894 as a bi-monthly journal focusing on the growing banjo-mandolin-guitar movement. Partee was originally based in Kansas City, but had relocated to New York City in 1900. For the first few years of the Guild *The Cadenza* was the official organ of the organization. When Partee sold the journal to Walter Jacobs, another music publisher from Boston, a new journal, *The Crescendo*, was set up by yet another rival publisher, Herbert F. Odell, who was able to make his magazine the Guild's mouthpiece, doubtless to Jacobs' annoyance.

BOWLBACK ADVENTURES - NEW WAYS OF MAKING MANDOLINS

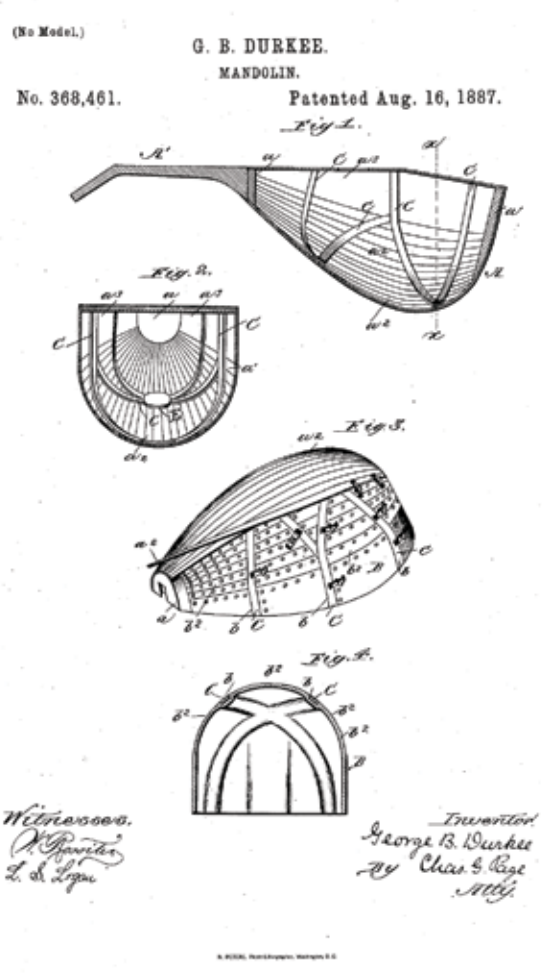
Through the 1890s the demand for mandolins grew. Lyon & Healy claimed to have made 7000 in 1894 and that figure is likely to have doubled by 1900. The American manufacturers started out making Neapolitan style bowlback mandolins, but it did not take long until American ingenuity started coming up with new and wonderful ideas for the instrument. Michael Holmes has researched all the patents granted in the USA for acoustic fretted stringed instruments between 1831 and 1949 and there are dozens of mandolin related patents listed from 1887 onwards. Patent applications make fascinating reading. The mandolin patents almost without exception promise improvements in tone, sweetness, volume, power or resonance, often several of these qualities at once.

The first mandolin related patent is for a banjo-mandolin, granted to John Farris, of Hartford, Connecticut, in April 1885 for what he called a Banjolin. His main claims to novelty were a bridge that extended the full width of the body and a soundpost that sat between the dowel stick and the bottom of the bridge. This, he considered, gave the instrument a *"firmness and fineness of tone to which the banjo is a stranger."*

Several of the earlier American mandolin manufacturers were concerned by what they saw an an inherent weakness in bowl bodies made of multiple strips of timber, and there are a number of improvements patented for making a stronger bowl that was less likely to split or distort. The earliest mandolin specific patent (No.368461) was for a way of constructing the bowl bodies. This was granted to George B. Durkee (1835-1913), the

A very serious group of Gibson players in 1909, as pictured in a 1909 edition of The Cadenza with three mandolins, a mandola, mandocello, a Style U harp-guitar and a Style 0 guitar.

factory superintendent for Lyon & Healy in Chicago in May 1887. He was concerned that simply gluing the longitudinal ribs of mandolins together and re-enforcing that with paper or cloth was not strong enough. His patent was for a method where there were transverse grooves cut into the solid mould on which the bowl was constructed. Strips of wood were laid into these grooves and then the ribs glued onto, both to adjacent ribs but also the built-in framework supplied by the pre-positioned strips. Threaded holes in the mould also allowed the use of small clamps to hold everything in place while the glued dried. *(Diagram below)*


(No Model.)

G. B. DURKEE.

MANDOLIN.

No. 368,461. Patented Aug. 16, 1887.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses.

Inventor

George B. Durkee

By Chas. G. Page

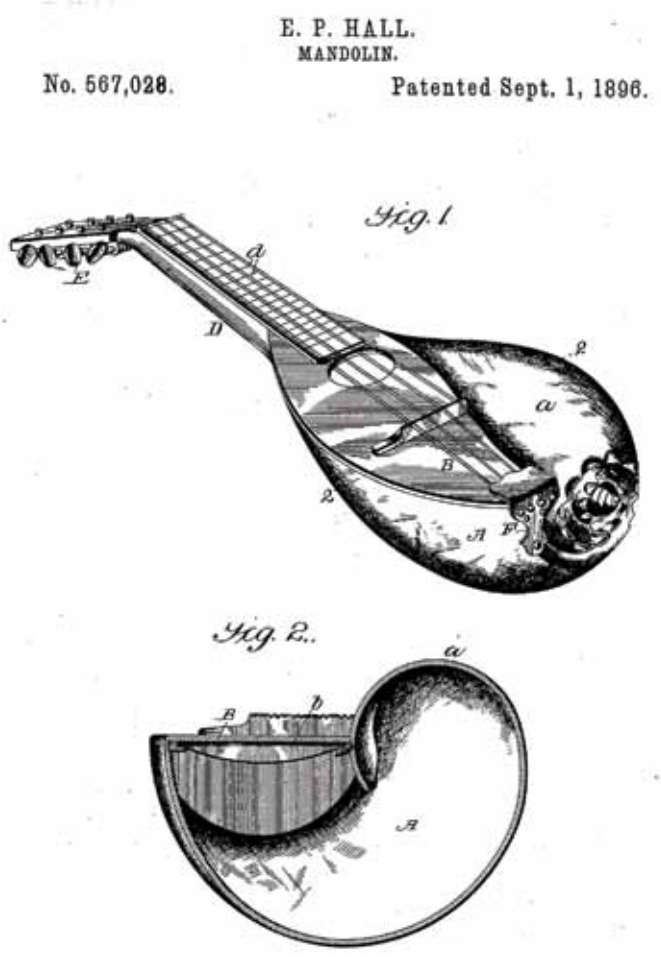
Atty.

Durkee was granted numerous patents, mostly assigned to Lyon & Healy, for a whole range of improvements to musical instruments and the machinery to make them. It might well have been his development of the pedal tuning system for concert harps that led Lyon & Healy away from fretted instrument to concentrate on harp manufacture. His daughter Jennie became a celebrated concert guitar player and Durkee himself would make a most interesting biographical subject. He was one of a group of wonderfully talented engineers who were the basis of the manufacturing end of the American music industry.

In 1896 Benjamin Rethy proposed a mandolin bowl (Patent 573357) which would be made by laminating two sheets of veneer, with the grain at 90° and then covered with an outer layer of strips of veneer woven like a basket. He doesn't goes into any detail as to how these might be manufactured with any efficiency. Perhaps the most optimistic is Patent 1004905, awarded to Federico Rigo of Newark, New Jersey in 1911 for his idea of moulding the entire bowl from untanned goat skin. The skin would be stretched, while wet, over a mould and varnished when dry to stiffen it. A wooden rim would be attached to which the soundboard and neck could be fixed and Riga claimed that the body would be "so durable as to be practically indestructible in ordinary usage". Riga's idea had been preceded in 1904 by Walter Voorhees of Saginaw, Michigan who had proposed a rawhide outer skin to a staved mandolin body. His patent (No. 755086) worked on the idea that the wet rawhide, the same material as drum or banjo heads, would be stretched over the mandolin bowl and as it shrunk when drying would draw the bowl more tightly together.

Lacquered goat skin aside, Edward Hall's 1896 patent (No. 567028) for using a large marine shell as the mandolin body must rate as one of the most fanciful. He helpfully pointed out that the body would be unaffected by water and could be polished very effectively.

One practical change to the method of manufacture was the use of dovetail neck attachments. Italian instruments almost always used an extension of the neck itself as the gluing surface for the ribs and soundboard. The Americans, coming from a background of guitar making where the neck was built separately, quickly adapted that approach for the mandolin. The neck had a dovetail tenon at the body end, which fitted to a matching rebate in the neck block. The necks themselves were usually made from a single piece of mahogany, in contrast to the Italian style of a neck made from poplar with a separate attached head from a harder timber. On Italian instruments the neck shaft and sometimes the head were veneered with ebony, or something stained to look like it. The American makers also introduced a veneer strip over the ends of the ribs were they met the neck. This was made from the same timber as the decorative banding along the top of the body, visually tying together both ends of the body, as well as hiding any imperfections in the joins of the ribs at the neck end.


E. P. HALL.
MANDOLIN.
No. 567,028. Patented Sept. 1, 1896.
Fig. 1
Fig. 2.

ALUMINIUM: MERRILL AND HUTCHINS

Neil Merrill's aluminium mandolin was an ingenious approach to making the instrument. Aluminium was the new wonder material of the age, and the Aluminum Musical Instrument Company sold a variety of instruments between 1896 and 1898 using aluminium bodies with wooden soundboards and necks. Merrill, from Oshkosh, Wisconsin, was granted a patent (No. 559301) for aluminium bodies in April 1896, which was assigned to the New York based Aluminum Musical Instrument Company.

An advertisement for Hutchins mandolins from the Music Trades Review in 1897.

Merrill had no factory, so he contracted out the manufacture of the instruments. The C.W. Hutchins Manufacturing Co. of Springfield, Massachusetts made the aluminium bodies while the Barrows Music Co. of Saginaw, Michigan (the makers of Waldo mandolins) made the necks and soundboards then fitted them to the bodies. The Hutchins company was set up in late 1896 specifically to make aluminium instruments, and Charles Hutchins also had a patent for an aluminium mandolin. His application had been made a couple of months after Merrill's, but granted a couple of months before Merrill received his.

The body and neck of Hutchins' instruments were formed from one piece of metal and an aluminium soundboard attached to that. An interesting innovation was a fingerboard which was attached to the hollow neck by two screws. By shimming the fingerboard the action could be lowered or raised as required. They were available in a plain aluminium finish or painted black with floral designs etched onto the soundboard.

Merrill's original patent was rather vague on the precise way the wooden soundboard was to be attached to the body. It refers to an "attaching-strip" on the underside of the soundboard and "fastenings" that could be passed through the sides of the bowl. There seems to have been a couple of different ways it was done on the finished instruments (perhaps from different companies doing the assembling), but the most successful was a series of dovetail shaped slots around the edge of the bowl into which were inserted matching pieces of wood. A lining strip was glued to the wooden pieces and the soundboard to that. A decorative strip around the top of the body hid the ends of the wooden dovetails. The neck attachment was a bit more haphazard, being glued into a recess at the end of the body and re-enforced with screws. It did seem to work quite

well and there are quite a few of Merrill mandolins still playable. From the front, a Merrill looks much like any other bowlback mandolin, but the aluminium bowl, often engraved with vines and flowers makes it very different from the back.

Merrill's business ventures did not last very long. Within a few months both Hutchings and Barrow had taken him to court for non-payment of their accounts. Merrill would seem to have had a stockpile of aluminium bodies so Erland Anderberg in Mt Vernon, NY assembled a second batch of instruments in 1897 and did not get paid either. Anderberg sued in 1898 and the Aluminum Musical Instrument Company was out of business. Holmes does mention aluminium bodied violins made in the early 1930s by a company with the same name in Michigan, so someone kept the company going to some extent at least.

An aspect of all this which isn't fully explained is that Hutchins was selling his all aluminium instruments at the same time as making the bowls for Merrill. The failure of Merrill's Aluminium Musical Instrument Co. might well have led to Hutchins' failure as well. Or maybe the aluminium instruments just did not catch on.

(There should also be an explaination of the inconsistencies in spelling. The British/Australian spelling is aluminium, pronounced al-u-mini-um. In the USA it is spelt aluminum and pronounced al-u-min-um.)

A Merrill mandolin in its case, showing the engraving on the body. The black strip along the side hides the ends of the wooden dovetail blocks that allows the soundboard to be attached.
Image courtesy Christian Steinbrecher

VARNISH

Wooden musical instruments are usually finished with a protective coating of some kind. In the violin world is it an oil based varnish that is the standard. These varnishes are made by thickening organic oils (such as linseed or walnut) and then cooking the oil with oxidised resins and various colouring agents. The varnish dries slowly by exposure to ultra-violet light and the mysterious, alchemical nature of its production has fascinated violin scholars for centuries. By the end of the 19th century commercial quantities of phenolic oil-based varnish were available. These were natural resins dissolved in turpentine and a drying oil and still took days, if not weeks, to fully harden. This was an obvious disadvantage in a high volume factory environment where it would be impractical to have hundreds of instruments hanging around, slowly drying.

The simpler alternative was a spirit varnish, which in its simplest is shellac dissolved in alcohol. Shellac is a resin excreted by the lac beetle found in north-east India and scraped off the trees it feeds on. The resin is heated to a thick liquid and filtered to remove impurities before being dried into a flat sheet which is then broken up into flakes. These flakes dissolve readily in ethanol and can then be brushed or rubbed (French polished) onto timber surfaces. Small quantities of other resins can be added to alter the hardness or flexibility of the coating. The alcohol solvent evaporates and hardens the varnish within minutes, rather than days, making spirit varnishes much more attractive to high volume musical instrument production. The disadvantage is that a shellac finish can be more fragile and inclined to damage from water or alcohol. The Gibson company developed an interesting hybrid use of these varnishes for their Master Model instruments, such as the F-5 mandolin in the 1920s. After staining, the instruments were coated in an oil varnish, allowed to dry and then a top coat of French polished spirit varnish applied over the top to allow the instruments to be handles more quickly.

CELLULOID AND LACQUER

The story of the American mandolin is inextricably mixed up with that of the plastics industry and the various forms of nitrated cellulose or pyroxylin. These are better known as celluloid and nitro-cellulose lacquer and transformed the industrial production of mandolins and other stringed instruments.

In the 1830s it was discovered that natural fibres such as wood or cotton could be dissolved in nitric acid. Once this had dried out it became highly combustible, but problematically unstable, explosive cellulose nitrate. It was not until the late 1840s that a more stable form was made, and while this 'guncotton' was still too dangerous to be used widely it could be used as the basis for other compounds. When dissolved in a mix of alcohol and ether it became Collodion which became used in wet-plate photography and also as a flexible skin covering used by printers to keep ink off their fingers. It was found that a blob of this liquid Collodion dried to leave a hard but flexible residue.

Industrial chemist and metallurgist Alexander Parkes of Birmingham, England, patented his process for making what he modestly called Parkesine in 1856 and exhibited a variety of objects made from this dried and coloured Collodion at the Great London Exposition of 1862. An attempt was made by Parkes to go into commercial production in 1866 but this failed within a couple of years and Parkes went back off to pursue other interests.

One aspect of the process which was not fully developed by Parkes was the use of camphor as a plasticiser in the process, although he would seem to have experimented with it. This allowed warmed and softened Parkesine to be more easily moulded and allowed a greater range of uses. The published histories get a bit murky here about who worked out the addition of camphor. An associate of Parkes, Daniel Spill, took over the business in England and marketed the Parkesine/camphor mix as Xylonite. In the US, John Wesley Hyatt obtained the local rights to Parkes' patents, also added camphor and sold his product as Celluloid. Several years of trans-Atlantic court cases were settled in the 1880s when a judge ruled that both were able to sell their products.

The initial uses were as an ivory replacement in making billiard balls and as false teeth, but as it could be coloured with dies it became available in an almost limitless range of colours and patterns. It could be made in a cream colour with a graining effect that mimicked elephant ivory and could easily be moulded into knife handles and hairbrushes. It could also be cut into thin flexible strips which could be glued on the edges of mandolins and guitars as bindings instead of having to bend and fit pieces of timber. Swirls of brown and red dies made a credible imitation of tortoise shell and thin sheets of this could be used as scratchplates on the soundboards, or again used as binding material.

The high point of celluloid history has to be pearloid, where a combination of fillers and dies in the celluloid produced a swirling and lustrous pearl effect which could be made in almost any colour. It could be used as scratchplates, fretboard veneers or head overlays, sometimes all at once in differently coloured sheets. There are a few examples of sheet pearloid used to cover the entire back and sides of instruments. Pearloid became

About as much celluloid as can be used on one neck. A Bacon & Day Sultana banjo-mandolin.
Image courtesy Lowell Levinger

known, somewhat disparagingly, as Mother-of-Toilet-Seat as such use became common. (I did find a pearloid toilet seat in a New Hampshire hardware store in 1984, and have often regretted not buying it.)

By the early 20th century the DuPont company had become a major player in the pyroxylin industry. The major use of these substances was as explosives - dynamite, gelignite and such explosives are all variants. They published a monthly magazine from 1913 full of fascinating articles on Practical Explosives Efficiency and a regular column on Farming with Dynamite. DuPont also made their version of Celluloid (which had become the generic term) as Py-ra-lin as well as paints and coatings for a whole variety of industrial and domestic uses.

In the early 1920s as the car industry grew massively in the post-World War 1 years, manufacturers were looking for a faster way to paint vehicles, as the only practical method was slow drying oil based paints. There had been pyroxylin based lacquers available before this, used as protective coating on brasswork and the like, but these were not durable enough for outdoor use. DuPont brought out Duco lacquer in 1923 which could be coloured, sprayed onto a car's bodywork and the vehicle driven away a few hours later.

DuPont's new lacquer was quickly adapted for musical instruments and adopted by Gibson as the last of the 5 Series instruments was being built at the end of 1924. Within a few years it had become the industry standard high-gloss finish. The disadvantage was that around 85% of the sprayed

A "clown-barf" celluloid scratchplate on a 1930s Regal mandolin.
Image courtesy National Music Museum, USD

on lacquer was a solvent of one sort or another and evaporated. This meant that multiple coats needed to be applied to build up enough thickness for a high gloss buffed finish. It was not until the 1960s that two-part polyester and polyurethane finishes started to become available. These hardened by a catalytic process, and required only a single application which formed an impervious coating over the instrument, usually thicker than necessary.

The world of wood finishing technologies is constantly changing and evolving. The solvents used in nitro-cellulose lacquers are unpleasant and unhealthy compounds and the use of these lacquers has been phased out since the 1990s. Large guitar builders such as Taylor Guitars have pioneered the use of lacquer cured almost instantaneously by concentrated ultra-violet light. These can be applied in one coat and buffed out within an hour. Various attempts have been made to produce water based acrylic lacquers with various degrees of success. The small scale mandolin and guitar builder has a wide range of options which include solvent and water based lacquers, alkyd oil varnishes, shellac and drying oils, all of which have their adherents and promoters.

A 1930s Stella Koa wood mandolin with pearloid head overlay, fingerboard and scratchplate. As an added delight the purfling is gold-glitter Lucite.
Image courtesy Alex Robinson

Mignon.