musical

Makers of woodwind instruments are on the lookout for a new source of
search has concentrated on the tropical species of Latin America, Africa
Washington, had the visionary idea of looking to Australia for this new
believes he may have found what he is looking for in the unique timbers

T I M B E R S

timber to supply a significant international market. So far, much of the and Asia. But Felix Skowronek, Professor of Flute at the University of source. After nearly ten years of research with flute head-joints, he of the Western Australian Goldfields. BY FELIX SKOWRONEK AND IAN KEALLEY

The sweet, melodious tones of the flute are popularly associated with idyllic outdoor settings. Perhaps this is because, in Greek mythology, the flute was the favoured instrument of Pan, the god of Nature. The thin, whispery quality of the reed flute that Pan played is a long way from the bright, intense, and versatile range of sounds we now associate with the concert flute. But the bucolic origins are still there, echoing faintly behind the trills and flourishes of our modern-day virtuosos.

For the uninitiated, it often comes as a surprise to learn that the modern flute, clad in its armour of silver, gold, or platinum, is a member of the woodwind family of instruments. But until this century, all flutes were made of wood, with the metal version becoming the norm only since about 1920. In Great Britain, wood flutes continue to be made to this day, but only by the handful compared with the numbers turned out up to about 1950.

The wooden tradition, however, is not disappearing. Far from it. There is still an abiding respect among flautists for the sonoric capabilities and the overall aesthetics of wood as a medium, and in recent years there has been a resurgence in demand for the wooden product. There has been some experimentation with synthetic materials, but precious woods will always have a fascination and value as a natural and time-honoured source of beauty and function.

Not many timbers around the world have the density and mass necessary to produce the brilliant tone we have come to expect from the modern instrument. Supplies of the traditional flute-making timbers—the African blackwood and the West Indian ebony—are nowadays in doubt. African blackwood is still available commercially, but it is harder to obtain now than it was in the hey-day of the wooden flute, and it is of poorer quality. West Indian ebony is simply not available. Around the world, the search is on for materials to replace these classic woods.

Many of the slow-growing timbers of the Goldfields are showing great potential for the fashioning of 'head-joints' (i.e., mouthpieces) which can be fitted onto the metal body of the flute, creating a hybrid instrument capable of whole new dimensions of sound quality. With the support of the Goldfields Specialty Timber Industry Group—through the Goldfields regional office of the Department of Conservation and Land Management (CALM)—researchers based at the University of Washington,

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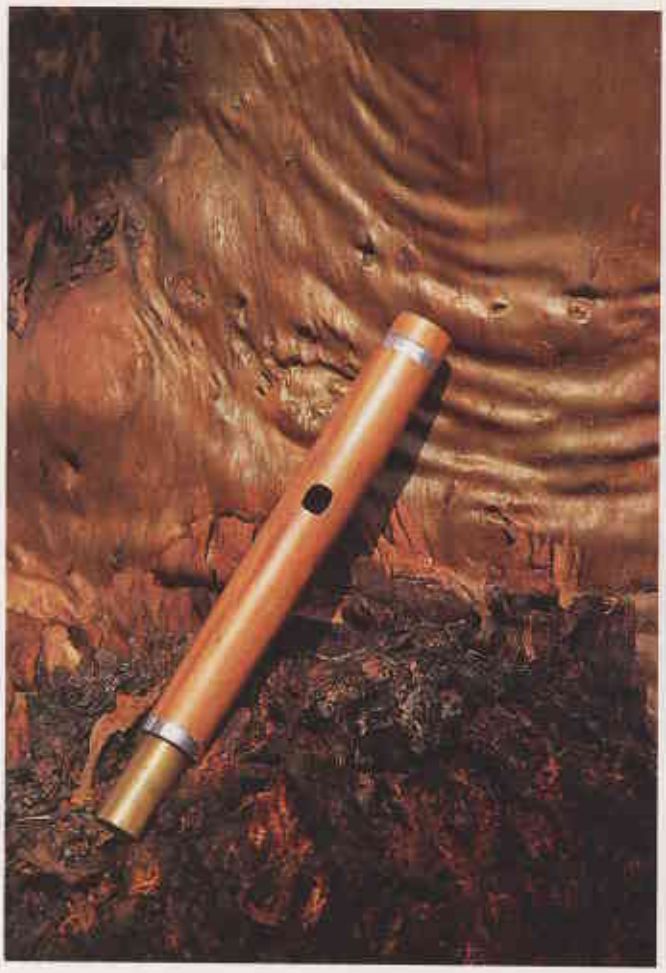
An array of Goldfields timber head-joints illustrates an attractive range of colours and grains.
Photo – Felix Skowronek
Insets: Barks from Goldfields species—gimlet, merrit, mulga, Webster's mallee.

Below: From the raw materials to the finished product: an elegant gimlet head-joint against gimlet bark.

Below right: A typical Goldfields woodland scene: a 90-year-old regrowth thicket of mixed species that could provide materials for world-class musical instruments.

Bottom: Although its range extends across Australia, the mulga of the Goldfields has harder, heavier and finer grain than its Eastern states counterparts.



Left: The woodlands of the Goldfields are taller, denser and more extensive than many people realise.

Below (from left to right): Potential musical instrument timbers in their natural settings—salmon gum, Goldfields blackbutt, boree.

Seattle, have sampled a range of species to this purpose, yielding some very interesting possibilities for certain timbers to create the flutes of the future.

WHAT'S IN A HEAD-JOINT?

The head-joint is the tone-generating element for the flute. Its special importance as part of the entire instrument was long recognised, but has only recently been separated from the construction of the entire instrument. But the head-joint is the key to instrument's sound qualities.

Its manufacture is relatively simple: a tapered-bore length of tube of definite dimensions, with an 'embouchure-hole' (i.e. blow-hole) carved into the tube at a certain point. Unlike the rest of the flute, there are no moving mechanical parts involved.

The rest of the instrument, in contrast, consists of a sophisticated and delicate system of keys, rods and springs by which the various tone holes in the body and foot are stopped in order to determine the different notes to be played. The dimensions of the body and foot joints of the flute remain much as they were more than a hundred years ago, and the mechanics are standard to manufacturers the world over.

The head-joint, however, carries one feature that has resisted standardisation and thus has remained at the last frontier of flute making: namely, the dimensions and carving of the all-important embouchure-hole. While a set of basic dimensions and wall-angles has been loosely adhered to for the last century or so, details have varied widely, from almost-round holes to oval or rectangular, in the quest for the ideal balance between maximum tone and volume, as well as ease of articulation.

In the last 10–15 years, the manufacture of head-joints has become so specialised that a growing industry has emerged in the custom-making of flute head-joints. It is not at all unusual nowadays for a performer to be playing a flute with a head-joint made by someone other than the original manufacturer of the instrument.

But head-joint-making, for all its recent successes, is still an inexact science. Every flautist's facial muscular structure is different, and indeed, different flautists can sound vastly different using the same head-joint. And the embouchure-hole is not the only factor. The material of which the head-joint is made also makes a considerable difference to the sound of the instrument. And here again, there is a degree of inexactitude that could drive the technicians mad, if it were not for the beautiful music which can result.

One of the Goldfields' most memorable landscapes: gimlet trees with an understorey of pearl bluebush (*Maireana sedifolia*) and saltbush (*Atriplex* sp.).

Below left: Merritt is well suited for producing a baroque sound quality.

Below right: Giant mallee is one of several red heartwood species that have provided the hardest materials for head-joint making.

MAKING THE DIFFERENCE

Although the average listener may not discern them all, the flute is capable of an astonishing range of tone qualities to suit different musical styles. For example, a professional musician might describe 'modern' sounds as hard, firm, brilliant, projecting; 'romantic' as broad, mellow, full; 'baroque' as soft, dulcet, open; 'jazz' as hard, loud, airy; or 'folk' as thin, airy, hollow or haunting. A skilled player can achieve most of these qualities on a single 'modern' metal or wooden head-joint, but to do so requires adjustments to the embouchure (mouth position)—making it artificial to the player's natural style—and the head-joint design.

In the sampling of Goldfields timbers, the intriguing possibility is emerging that certain tonal characteristics might be 'built-in' to particular species, regardless of the measurements and cut of the embouchure-hole. This is contradictory to a popular scientific theory that an instrument's tone is not affected by the material from which it is made. But this is an area where subjectivity must reign, for what a performer 'feels' in the response of his or her instrument presides over any judgement, and it remains a tantalising idea that flautists of the future may be able to change head-joints every time they change musical styles.

THE SCIENCE OF SOUND

Over the years, a number of scientific experiments have failed to convince performers that the materials from which flutes are made have less effect on the tone of the instrument than factors such as measurements and vibrations. Scientific fact in this instance carries little meaning. Performers are, after all, the ones actually playing the instruments, and what they feel determines their attitudes about materials. Among the metals of choice for the flute, silver is thought of as bright and projecting; gold, mellow and full; and platinum, hard and brilliant. Wood, thought of as being mellow or soft in quality, perhaps akin somewhat to gold, actually tends to combine elements of all the others, though is generally more resistant and harder to blow.

So what does this all mean as far as wood and flute tone is concerned? Generally, it is assumed that the harder and denser the material, the brighter and fuller the tone. The 'inventor' of the modern flute, Theolbald Boehm, observed in the mid-19th century that very hard wood produced a more brilliant, ringing sound. If any attempt is to be made to use wood to make a modern flute, the heaviest and densest specimens are likely to be most successful.

WHAT THE GOLDFIELDS OFFERS

Regular *LANDSCOPE* readers will know about the remarkable density of Goldfields timbers (see 'Western Australia's Desert Forest', *LANDSCOPE*, Winter 1995). Most species from this arid region sink in water. These are obviously not the best timbers for making floats. But

for flutes, they could well be ideal.

An amazing array of hard, heavy, fine-grained timbers grow here, which compare favourably against similar species elsewhere in Australia. Of the three eucalypt heartwood-colour groups of red, brown, and green, the reds have provided the hardest materials for head joint making, notably giant mallee (*Eucalyptus oleosa*), red morrel (*E. longicornis*), salmon gum (*E. salmonophloia*), and redwood (*E. transcontinentalis*). The latter three are endemic to the Goldfields and adjacent Wheatbelt.

The mulga (*Acacia aneura*) of the Goldfields appears to be harder, heavier and finer-grained than anywhere else in Australia, and has so far stood out as prime head-joint material. Also among the acacias, western myall (*A. papyrocarpa*) differs markedly in hardness and density from the lighter weight eastern myall (*A. pendula*), found in Queensland and New South Wales. Likewise, the closely related black oak (*Casuarina pauper*) of the Goldfields and Queensland's *C. cristata* appear to be one and the same tree from outward appearance. However, the heartwood of the Queensland tree is beige, while the Goldfields species is a dark chocolate brown, and is an almost uncanny look-alike for the prized West Indian ebony it seeks to replace.

To describe this field of research as exciting would be an understatement. Experimenting with these little-known hardwood species, on the edge of new developments with flute head-joint design and woodwind instrument manufacture, is a constant process of discovery and joy. Thanks to the good folks in Kalgoorlie-Boulder who have made all this possible, and under whose watchful eye the precious resource will be carefully managed, we may well be listening to and enjoying a lot of music in the future whose origins can be traced back to the Goldfields. And the Goldfields may take the credit for bringing the flute back closer to nature once again.

A KEY TO THE BAROQUE QUANDARY

Today's flautists face a dilemma when they undertake to play Baroque-era music. It has been a subject of intense debate since baroque music began enjoying a resurgence in popularity, some 25 years ago.

This historic period, roughly coincident with the life of the great composer Johann Sebastian Bach (1685–1750), saw an enormous amount of music written for the flute. The flute of that time, however, was an almost completely different instrument from the 'modern' or Boehm-system flute, invented in the 19th century. The baroque flute had only six open finger holes and one mechanical key. It had a much thinner, smaller sound than today's instrument and, as a limitation of its crude design, was extremely difficult to play in tune.

Many purists insist that the baroque flute, or a modern replica of it, is the only suitable instrument for performance of this music. This places the modern flautist in an awkward position, with only a few options available: first, to disregard completely the 'radical' attitude of those who would insist on historical correctness; second, to adopt some, but not all, of the baroque performance elements on the modern instrument; or third, to take up the baroque flute, in essence learning the new techniques and demands of an obsolete instrument.

Fortunately, Goldfields timber head-joints offer another option that goes a long way towards a fulfilling compromise on this thorny issue. Many of the less dense or lighter-weight Goldfields species seem to be well suited for producing a baroque sound quality on a flute head-joint of relatively modern design, placed on the metal body of a modern flute; essentially a composite instrument. The more fibrous eucalypts, such as Dundas mahogany (*E. brockwayi*), Dundas blackbutt (*E. dundasii*) and merrit (*E. flocktoniae*), for example, have given consistent results along these lines. Other species worth exploring further because of light-weight yet fine texture are white cypress pine (*Callitris glaucophylla*), boree (*Melaleuca pauperiflora*), and perhaps even the sapwood of the black oak.

A particularly interesting case can be made for Strickland's gum (*E. stricklandii*), which exhibits a mellow and full yet mild tone with a wonderfully 'cushiony' and reliable articulation. Heads made from this species have done remarkably well in the performance of Bach sonatas and arias on both metal and wooden flutes.

Photo – Mary Levin

The Strickland's gum headjoint blends beautifully with the soprano voice.

Felix Skowronek is Professor of Flute at the University of Washington, Seattle. An accomplished flautist, Felix was a founding member of the Soni Ventorum Wind Quartet in 1962, and has made more than 24 recordings with them. He also performs with his jazz combo, the FS Jazz Trio, which debuted at the 20th Annual National Flute Convention held in Los Angeles in August 1992.

Felix has been a leading promoter of the revival of the wooden Boehm-system flute in the USA, and through his research has become an authority on the use of new hardwood species for flute and woodwind instrument manufacture. He can be contacted on (USA) +1 206 543 9260, or e-mail: fesaushw@u.washington.edu.
Ian Kealley is CALM's Goldfields Regional Manager and has been actively involved in helping Prof. Skowronek in his search for specialist timber on the WA Goldfields. Ian can be contacted on (090) 21 7831.

Unless otherwise indicated, all photos are by Jiri Lochman

LANDSCOPE

VOLUME ELEVEN NO. 1 SPRING ISSUE 1995

The threatened Wyalkatchem foxglove is being given a helping hand by scientists from CALM and Kings Park and Botanic Garden (see page 17).

This nesting pair of splendid fairy-wrens is one of the many 'Birds of the Stirling Range' (see page 36).

WA Goldfields timbers are fast becoming recognised as prime materials for producing world-class musical instruments. See 'Musical Timbers' on page 48.

A new CALM book, Dive & Snorkel Sites in Western Australia, *will encourage novice divers and snorkellers to explore the rich and diverse coastline of WA. See 'Secrets of the Sea' on page 10.*

The common rock-rat, photographed here in the Kimberley, has recently been recorded in the Kennedy Range National Park. See page 28 for a profile of this wonderful wilderness area.

FEATURES

REGULARS

COVER

The brilliant purple flowers of the twining fringed lily (*Thysanotus patersonii*) entwined around the burnt stem of a slender banksia (*B. attenuata*). See 'After the Burn' on page 21.

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