II. FUTURE

Developments, Innovations and Experiments

The steel pan is very much an instrument in development – new layouts, new crafting methods and refinements are tried by panmakers all the time. Several of the new methods have been mentioned in the practical section, but some of these experiments need extra attention. This section lists inventions and experiments that I have come across or heard about and it may be seen as a hint to where the pan is going in the future.

PAN INNOVATION AWARD

To encourage the creativity of tuners and pan players, a competition for innovations on the pan has been founded – the Rudolph Charles Pan Innovation Award Competition. The competition is a part of the Trinidad & Tobago National Steelband Music Festival, held in November each year. The awarded innovations may involve any aspect of the steelband, from the pan to its accessories. The competition has resulted in several inventions; among the more interesting is the bore pan, which is described below.

16. Innovations regarding the instrument

THE BORE PAN

In the crafting section it has been mentioned that the groove around the note can be supplemented by a line of holes. The holes make the border ”joint” of the note looser than the ordinary grooving. The acoustic effect is to preserve the vibrations more efficiently in the note area. This lowers the pitch and makes the tone clearer and longer, but somewhat weaker in volume.

The bore pan was invented by the panmaker Denzil Fernandez in the mid 80’s, but it has not won a broader acceptance among the steelbands of Trinidad yet. So far, I have only seen the bore method used on tenor pans.

The most significant effect of the row of bore-holes is that the improved acoustic separation from the surrounding surface lowers the pitch of the note. This makes it possible to make the notes of a bore pan smaller than on an ordinary pan. The bore pan is also said to be easier to tune, as the interference from the surrounding notes is minimized.

The spacing of the holes is crucial; it affects both the pitch and the strength of the sound from the note. The pitch can be lowered by increasing the number of holes and putting them closer to each other. But if the holes are drilled too close, the border of the note will be too soft, making the tone too long and weak. The best result seems to be accomplished with holes of approximately 0.5 cm diameter, spaced with 1 cm between them, see fig. 16.1. See the theoretical section for a discussion of how the groove works and how an increased acoustic separation of the notes affects the tone.

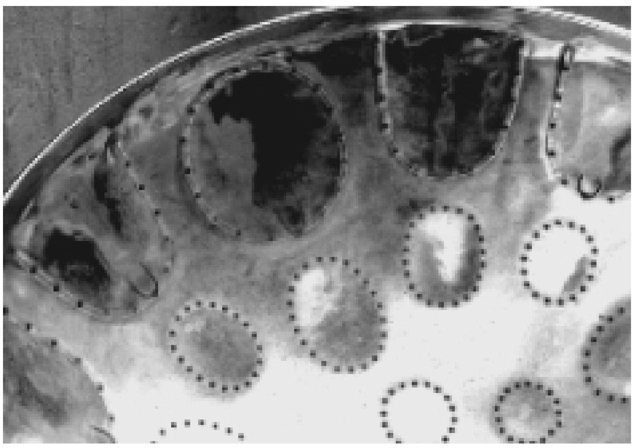

Fig. 16.1 A section of a Bore Pan. The outer notes have reeds, see the chapter about the bore-reed method below.

The decreased area of the notes in the bore pan makes it possible to put more notes in each drum. This advantage will make the bore pan a good candidate for further development of the pan. If the tuners want to develop new pans with an increased tonal range, this should be the best way to go.

But the bore method has two major disadvantages. The first is of a practical nature; the many sharp edges of the holes will presumably make it harder to protect the pan from rusting. The second disadvantage is aesthetic; an instrument with many holes doesn't look good to most people.

If the row of bore holes can be used fully *instead* of a groove (which seems plausible), this may have interesting implications for future attempts to industrialize the panmaking. It is presumably much easier to design a machine to make a row of holes than a groove.

THE BORE-REED PAN

The tuner Denzil Fernandez has continued his work on the bore pan. He has invented a new method to lower the note resonance frequency further. This is done by introducing a "reed" at the end of the note, see figures 16.1 and 16.2.

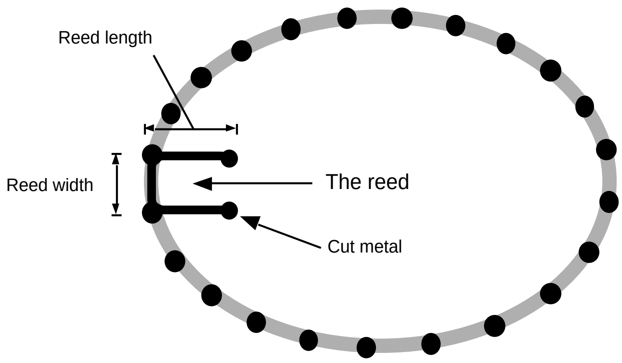

Fig. 16.2 A note from the Bore-reed Pan.

The reed is done by making a 1 to 1.5 cm long cut along the groove. Then a 1 to 2 cm long cut is made into the note at each side of the former cut, making a rectangular "tongue" in the note. The reed has a resonance frequency of its own, which can be adjusted by varying the length of the tongue. The fine adjustment of the resonance frequency is done by filing off metal from the tip of the reed. The pitch of the reed is adjusted to match the octave of the note.

Denzil Fernandez claims that he can make notes of the same size more than an octave lower with the reed method. The reed method can also be applied to a note without bore-holes with a similar result.

Acoustically, the reed method seems to be somewhat questionable. The adding of a new resonance part to the note dent introduces further complicating factors into the tone generation mechanism. The sound of the reed pan can be perceived as ”double” in its nature, because of the different resonance frequencies of the note and the reed. The tuner has to control them both while he is tuning. If the reed and the note are not in tune, the tone will sound harsh and false.

One benefit of the reed method though is that the reed can be tuned to the right pitch independently of the dent. This will presumably make it easier to tune the note afterwards. I believe, however, that the bore-reed pan is an offspring that will have hard to catch on. The benefits of the lowered pitch and the saved space don't compensate the increased complications in tuning and the more complex tone.

STAINLESS STEEL

The material used for steel pans since the beginning of the steel pan history has been mild steel. This is of course because mild steel is the most common material in steel drums. One problem with the mild steel is that it rusts and therefore must be protected against moisture. This protection is expensive and involves an extra step in the crafting process. So, if a non-corrosive material could be used from the start, it would be a benefit. Therefore, tuner Lawrence Mayers and I decided to do an experiment on a drum made out of stainless steel. The following is a brief description of our work and the result.

Stainless steel is much harder than mild steel. This means that all processes that involve shaping of the steel will demand much more energy input from the panmaker. The sinking down to tenor depth, for instance, took about three to four times as long as an ordinary drum. The backing was also tough, but the hardness of the steel made the surface stay more firm and reduced the need for re-shaping.

Fig. 16.3 Experiments with stainless steel. Tuner Lawrence Mayers and the author during a discussion about the sinking. *Photograph by Linus Torell.*

The grooving couldn't be done with the ordinary grooving hammer – the tuning hammer had to be used to get enough force. Afterwards, I realised that a nail-punch with a smaller head would have made more impact on the surface. Reducing the diameter from 5 mm to 3 mm may make it possible to use the ordinary grooving hammer. The appropriate time for tempering is still unknown. We burned the drum over a tyre for 2 min 15 sek, but this was later found to be insufficient. Three to four minutes seems to be more appropriate.

During the tuning, the inner notes needed softening about four to five times to get a good tone. The softening also needed much more force than on an ordinary drum. Some notes were hard to tune, but the notes that came in tune were very stable due the hardness of the stainless steel. The sound was also good and had a prevalent brilliance. The tone could be considered to be a bit ”harder” than on an ordinary pan, but on the other hand it could take much harder hitting without ”breaking” in sound.

This experiment revealed that the stainless steel seems to be acceptable to make a good pan. When tuned it can perhaps make ”a lifetime pan”, because of the hardness and its ability to stay in tune. To sum up, the arguments speaking for stainless steel as raw-material for panmaking are that no chroming is needed and the result is a more durable pan with a louder and more stable tone. The drawbacks are that the raw-material is expensive and rare and that much more crafting work is needed.

COLLAPSABLE DRUMS

During transportation, the full-length drums of the basses take up a lot of space. Much work is being done to find a way to reduce the transport volume of the basses. One way to do this is to make the sides of the drums removable or collapsable. As the bass pans are hanging on strings when they are being played, the main function of the sides is to give resonance to the sound. This can be done with a weaker side. One possibility is to design the sides as ”telescopic” sections, to be pushed into each other when the drums are transported. A disadvantage of removing or collapsing the bass sides is that the parts will tend to rattle during performance if they are not securely fastened to each other and the playing surface.

AMPLIFICATION

One way to increase the output volume from a steel pan would be to put a microphone in front of the pan and connect the microphone to an amplifier. This is frequently done when pans are used together with other (electrical) instruments. In a steelband this doesn't seem to work well, because the very special sound of a steelband is formed by the ”blending” of the sound from several pans. If microphones are put close to each pan, the assembled sound ”picture” of the band is broken up into pieces and you will get a hard, noisy sound. To get the right, mellow sound, the microphones have to be placed at a far distance, and much of the purpose of the amplification is lost.

NEW PAN MODELS

The steel pan has not yet been established as a fixed instrument. New pan models are emerging all the time. Many of the models vanish after a few years. Some of the models are restricted to use in one or a few steelbands. Here are some examples of new models that have caught wider acceptance and two experimental pans:

QUADROPHONIC PAN, FOUR PAN

The ”Quad” pan and the Four pan are two recently invented pan models. They have quickly found their place in the steelbands and are now used by almost every band. The Quadrophonic pan can be seen as a double second, whose tonal range is extended, mainly downwards. The Four pan may be seen as a guitar pan that is extended upwards. The models are now so common that I have chosen to include them in appendix A, together with the rest of the standard pan models.

TEN BASS, TWELVE BASS

These bass models are commonly used extensions of the ordinary nine bass. The advantage of the extended tonal range doesn't seem to be enough to get them to catch on, though. The 27-note range of the nine bass is usually considered to be sufficient, and it doesn't seem possible to reach much lower in musical pitch by using more drums.

OVER-SIZED TENOR

Steel drums are made with several different diameters. The most common exception from the standard drum is a small drum, used for kiddies' pans and tourist pans. Some drums have a diameter that is bigger than the ordinary drum. The Phase II Steelband has several tenor pans made from ”over-sized” drums. These tenors cover a range that is almost equal to a double tenor and have a pleasant tone.

Due to the difficulty in finding these big drums the idea of making pans from over-sized drums will presumably have hard to catch on. But to the experimenting panmaker, the differently styled pans show that it is possible to make pans with other sizes than the standard one. If the pan-making process is mechanised in the future it is probable that the standard steel drum is abandoned as raw-material. It may well happen that the drums will be shaped and sized in a way that is more directly adapted to the acoustical needs of the pan, maybe bigger and in another shape rather than round.

"ROCKET PAN"

The Rocket pan is a fancy, experimental pan, used by the Desperadoes Steelband. The lower ends of the drum skirts are attached to funnel-shaped tunnels – they look like the back end of a rocket. The purpose of these tunnels is to act as acoustic horns to increase the sound level of the pan. I have not seen the rocket pan used in any other band than the Desperadoes. It will probably not catch on.

IMPROVED STICKS

A problem with the tenors is that the small, innermost notes need a hard stick to get a good tone, while the outer notes sound better with a soft stick. A way to accomplish a compromise is to make the tip of the stick rounded. This can be done by removing rubber on the inside of the tubing in the end that is going to be at the top of the stick, see fig. 16.4. This makes the rubber rounded off towards the top, which makes the stick harder in the part you are using when you are hitting the small,

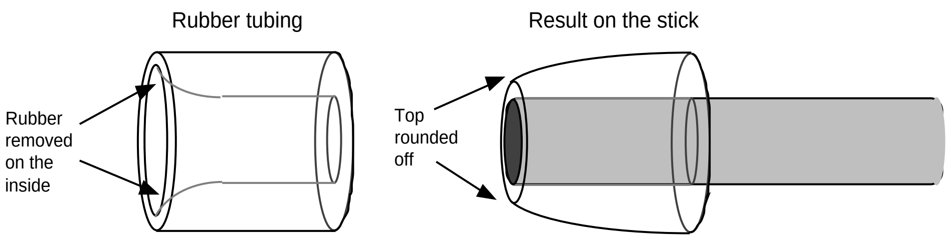

Fig. 16.4 Tenor stick with rounded top.

higher notes.

17. New tools and crafting methods

NEW TOOLS

Wooden wedges for the raising of outer notes

The tuner Denzil Fernandez has introduced special wooden wedges to be used for the raising of outer notes during softening and tuning. The paddle-like wedges are specially shaped for the various pans.

Usually, two different wedges are used for each pan – one broader and one narrower. The narrower one is used to raise the part of the outer note that is closest to the rim. The broader one is designed to raise the note in the middle, see fig. 17.1.

The benefit of using wedges instead of a bent iron or just hitting it with a hammer is that the shape of the wedges establishes the curvature of the dent. Properly shaped wedges will thus make the tuning easier. These wooden wedges are being used in the pre-tuning work at MIC (Metal Industries Corp. – see next chapter).

The wedges are used in the following way: Put the wedge at the bottom of the side angle, leaning against the skirt. Then hit it at the top with a hammer while moving it along the note to raise the note to the desired shape.

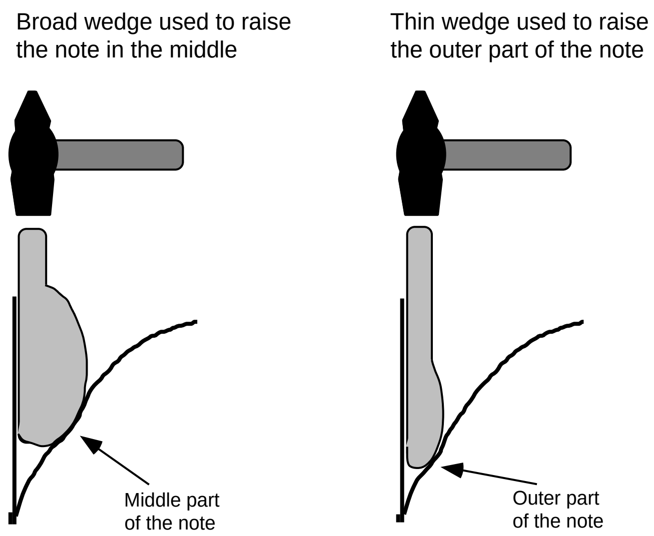

Fig. 17.1 Using wedges to raise outer notes.

Templates for outer notes

Denzil Fernandez uses quasi-circular templates when he marks the outer notes. The benefit of using templates for the outer notes is that the radial length of the notes and their inner curves are fixed by the template. This means that no arbitrary bending of a ruler is needed to shape the inner border of the notes.

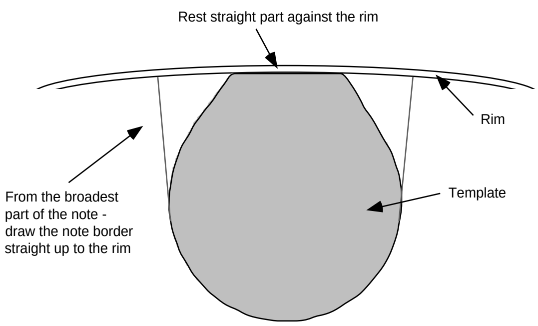

Fig. 17.2 Shape of a suggested template for an outer note.

The shape of a template for an outer note is suggested in fig. 17.2. The straight part is meant to lean against the rim. For the tenor maker, a set of templates for tenor outer notes can be found in appendix A.

Moulds to shape the note surface

A tool that I have never seen used, but that I believe would be of benefit for the tuning is the abutments, used to re-shape dented cars. While hammering from above, the abutment is held tightly against the opposite side and makes the surface shape after it, see fig. 17.3.

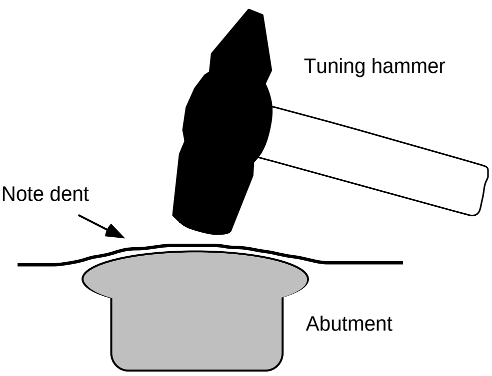

Fig. 17.3 Using an abutment to shape a note.

The use of an abutment would presumably reduce the amount of small unevenesses in the note surface and make it easier to tune the overtones of the note. At least, the note would react more consistently to the tuning manoeuvres when it is more evenly shaped.

A future test has to reveal if working with abutments is an improvement. For a beginner it might be beneficial, but if the backing and the levelling are well done, the shape may be smooth enough without any mould-shaping. The best stage to use an abutment would presumably be in the latter part of the softening, just before the actual tuning starts.

INDUSTRIAL DEVELOPMENTS – A PAN FACTORY

In Trinidad & Tobago, an awareness of the cultural and economic potential of the unique steel pan instrument started to awake during the 1970's. In the late 70's, a research committee was founded; the 1979-85 research committee on pan. An outcome of the work of the committee was the decision to start a steel pan factory on Trinidad. One of the objectives for industrialisation was the increased need for cheap, standardised instruments for the education on steel pan playing is schools. Another prospect was to start exporting instruments on a larger scale.

The benefits of an industrialised production were considered to be: Reduced price, increased production and improved quality. Mechanised sinking and tempering would give a product with a higher and more uniform quality for the tuners to work on.

A first attempt to start a pan-factory has been made by CARIRI – The Caribbean Industrial Research Institute, in cooperation with MIC – Metal Industries Corporation Ltd. The mechanisation of the pan-making only involves the sinking and the tempering so far, see below.

Spin form sinking

By using a lathe with a mould mounted on it, the bottom of a drum can be shaped by pressing it into the mould while the lathe is rotating. This is done in the following way: A raw plate that is to be the bottom of a drum is mounted on the mould at the lathe. While the bottom is rotating, a support is pushed against its surface and moved sideways along the bottom, see fig. 17.4.

When the bottom has been shaped to that of the mould, it is removed and mounted to the side of the drum. The sunk plates are mounted to the side in pairs so that the drum will have two bottoms, i.e., both ends are sunk. Spin form sinking can be utilised for pans ranging from tenor down to cello. (The lower pans are not

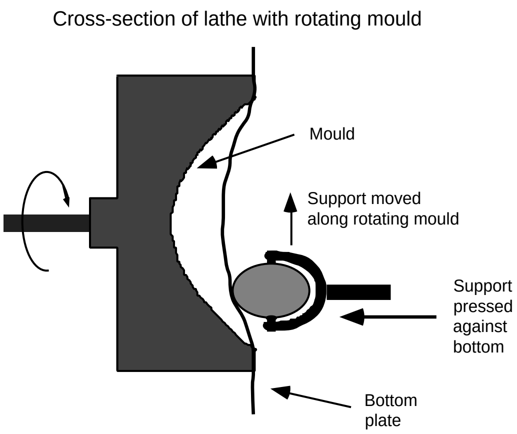

Fig. 17.4 Spin form sinking.

sunk before the shaping of the notes.)

MIC are selling these machine-sunk drums to tuners and claims that the even, machine-sunk surface will make it easier to control the harmonics of the notes. Some tuners claim that the machine-sunk bottoms do not have the right shape and that they are too thick in the middle. The spin forming also makes small circular scratches in the metal, which some tuners consider to be fatal for the later grooving and backing.

Electrical oven for tempering

In the industrial pan-making at MIC, an electrical oven is used for the tempering. This gives better control of the amount of heat transferred to the drum than the ordinary heating method. Unfortunately, I haven't been able to get any specifications on temperature and heating time yet.

Press form sinking

At the University of the West Indies some research has been done on the steel pan. Researchers at the Department for Industrial Engineering have experimented with the possibility of forming the surface of the pan by pressing it into a mould. The difference from spin-form sinking is that here, the bottom is pressed to its final shape in one, single process.

The research on press-forming has not led to any explicit results yet. Experiments with moulds for single note shaping in the same way have also been done. In 1990, all university research on the pan had stopped, due to the present lack of funding.

18. Standardization

NOMENCLATURE

As a proposal for a Trinidad and Tobago standard, a glossary of terms relating to the steel pan was outlined in 1989. The purpose of the glossary is said to be ”to standardize and co-ordinate the meaning of terms used in connection with the steel pan.” ”The need for such a glossary arose from the very prevalent use of synonyms in the steel pan industry, most of which are purely local in origin and application.” (Ad Hoc Specification Committee on Steel Pan, 1989.)

A more thorough discussion of the use of terms can be found in appendix E. Appendix E also shows how my use of various terms relates to the proposed standard of Trinidad and Tobago.

LAYOUTS

The need for a standardisation of pan layouts has increased since steel pan playing was introduced as a regular subject in the schools of Trinidad and Tobago. The standardisation organisation of Trinidad and Tobago conducted a ”pan survey” together with Pan Trinbago during 1990. The intention of the survey was to gather data and layouts on the various existing models of pan. As far as I know the data from the survey have not yet been compiled.

The works by Pan Trinbago and the Trinidad and Tobago Bureau of Standards are intended to point out the direction for a standardised set of steel pans. But, as the pan still is evolving, special odd models and experimental pans will be seen for a long time in the future. The pan models listed in appendix A may be seen as a sample of the models that have come farthest towards standardisation.