Kingsbury Plant, China
Ed McMorrow
11/16/2015

Kingsbury China, on a peninsula along the coast.

Clean and neat, but no musical base. No machinists in factory
Start about 7:30 and ends around 5:30, plus Saturdays. Evenily split between women and men. The only male job is the heavy belly work.
At lunch they are provided meals in a huge dining hall where they all eat together. After lunch the factory is still shut down, and they have bed roles and take naps. Lunch and nap is about 1.5 hours. The cultural level is not like junior high with wicked interpersonal relationships, but more like a family.
In the morning Ed & would get up early and go far walks along the beach. It's kind of like LA, with shallow water. The farmers and fishers are all gone now, and people live in twenty-five story buildings. The beach is complete public access for miles, with trails and art work. Therre are resort hotels, beach activities, exercise parks with simple machines. The infrastructure is dynamic, with a lot of roads, airports, transportation options. However, the Chinese market is in a giant economic bubble, so the cities are full of brand new buildings that are totally empty. Therre are huge factories that are not operating. In spite of the extensive public infrastructure, their currency is over-valued.
There are cameras everywhere. You can[t exchange money anywhere but the banks, and dollars are worthless. The people are very friendly, the scene is safe with no vibes of danger.

Buyers would come into the show room to pick a piano, but all the pianos were horribly out of tune. People wanted a brand new piano directly from the factory, brand new in the crate right to the house. There was a Yamaha factory dealer right across the street from the factory.

The food is awful: salty, sweet, and gobbed with fat. There is a lot of good sea food, but no big fish. Ed & Ira spent an afternoon in the engineer's office talking. They could not bring up web sites because they are all firewalled. Some of the tuners wanted to get together with Ed & Ira afterwards, the management would suddenly offer to take them to dinner. One fellow knew where they were staying, and waited for them in the stairwell. He had some fruit and barely spoke English. He said, "I don't really want to talk. I just want to be with you because you are teaching us." At the shop, this guy was getting how to tune. They have a very small amount of time to tune. Ed suggested to the management that they should let the good people go down to the show room and spend three or four hours on the pianos to figure out how they work. The management was worried that if these people get good they will go off and become private. Ed rebutted that these people would be your representatives. Developing a skill that makes a piano playable by an artist will help the entire industry.

They are very interested in doing things and learning. Their image of the piano market is in making big grands. Ed suggested they make the world's greatest upright. The Chines figured out the math for keyboards before the Egyptians did. Prince Zau was like a physicist. He sat down and figured out the twelfth root of two. Howard Goodman's degree is a Chinese scholar told Ed they would all already know this, but Ed found out they didn't. There are very few independent piano tuners, and even fewer independent piano builders. China is all about sales: they will sell anything they can.

They make agraffes, hammers, felt, actions, but not strings in China. Chinese felt is not so good. A horrible concert grand is still sitting in the factory and still hasn't sold. Yantai is pretty balmy, although it does rain; they grow a lot of citrus and grapes. Humidity is aroiund 55-60. The naval academy is in Yantai, so no one can walk the beach there. Ed met a German man who came right up to him and asked if he were Irish. Get people to laugh in China and you will get free drinks.

Fully Tempered Duplex Scale

Ed held up his official grant. 44 claims granted. Tried for 47. Three of them were questioned.
The duplex is not behind the bridge. It is the piece between the duplex bar and the capo bar.
If the duplex is too close to the speaking length there will be harmonics. A while ago this was desirable. In 1872 longitudinal mode was just beginning to be looked at. The helomstds tube was the tool used for analyzing frequency. They claim to be able to harmonize longitudinal modes. The pivot termination with stiff piano wire is a key point; the string needs to be able to move on either side. The speaking length of the duplex controls the motion. The motion is not wasted: it allows flex. Strike close to the V-bar, to let the tone out of the string and to get the fundamental.

If the speaking length is vibrating and the other side is not, there will be some losses and the wire will fatigue. By allowing flexing so the duplex can rock, there will be more energy in the speaking length. The string rocks on the V-bar. If it's a harmonic relationship, it will light up and couple; there will be a change in spectrum of the sound. All the low notes are partials and the high notes are fundamentals. The pivot termination is pivotal to treble tone. These duplex segments have to be de-tuned so they are not in conjunction with the fundamental; otherwise it will sound like two tones at once. In most pianos, the V-bars are not narrow enough to act as a perfect pivot. Piano moves so much you can get away without getting an over-buzz. However, older pianos develop buzzes because the wire is bent more around – has become sharper – and is like the round V-bar so it buzzes on the speaking length. Put new wires on and this buzz will come back in another ten years. Agraffes are soft and work well. Suddenly in the de capo section the transition is hard. Some Steinways case-harden the V-bar, which produces loads of false beats and ugly sounds. One rebuilder had the idea to put hard drill rod by the V-bar, and those sounds were awful.

Noises with duplexes. Whistling sounds are just beats. Jim ? couldn't determine the longitudinal modes for piano strings because the vibration was travelling beyond the termination point. Raylees rod: he put a piece of piano wire from the piano through the bridge, down two stories below to a violin. Enough energy could go through the wire longitudinally to make the sound come out the violin. Nothing can stop the longitudinal modes from going beyond the V-bar. With a slight difference in the speaking length, you can have slight but noticeable differences. These differences will start to pulse, beat, shimmer, or ring. If the longitudinal beats are close to the transverse mode, you will get a cacophony of beats.

Ed found a material that is soft like wood, and slippery. Ed prefers to use glass-filled Acetyl copolymer, but when it is glass-filled it dulls his saw blades. This would enable the longitudinal mode not damper the transvers mode and allow the longitudinal mode. He ratio-mapped his duplex scales. The lengths in the treble are close to the unisons. Do this with non-damping and there will be all kinds of noise. Put the lowest duplex ratios in the high treble, then they get shorter faster. This pivots the termination more easily so there is a break in the agraffes.

A mode is a wave. A longitudinal mode is created by stretching of the wire. When it stretches, goes down and comes back is one wave. False beats are complex, but longitudinal modes are a big part of them. When the string comes up to bridge at an angle, the bridge is more stable. At the points where the bridge is more perpendicular to the string, the bridge moves around a lot more. In the treble, the string line should be in a nice straight line for a clean tone. When there is an angle between the tuning pin and the hitch pin, the string will vibrate in a circle.

To get his strings straight, Ed puts masking tape down and uses a thread and straight edges. He marks his plate with a punch or sometimes a grinding wheel. To straighten the hitch pins Ed fills the old holes and installs new pins. The holes should be slightly back from vertical, so Ed sets up car jacks as guides.

Even though you can't hear the frequencies, the longitudinal mode will shock the bridge. During the transverse mode the termination is screwed up. We only want the bridge to be moving up and down. To reduce the mass in the treble, Ed modified a bridge, making it trapezoidal. He runs his bridge pins close together, keeping them away from their neighbors, making them stiffer and smaller. He calculates the speaking lengths so the strings are calibrated.

The bridge is a damper. It is coupled with damping in the air. When the longitudinal modes start knocking the bridge around, Ed removed the overhangs to make it harder for the bridge to rock. Old pianos with modern wire often sound terrible because the new wire is stiffer. Softer wires, like stainless wires, carry more, and there is no whangy sound. Stringing soft wire is difficult because it is important not to bend or kink it. High carbon steel wire carries less longitudinal mode and is more like the older wires. It's not a good idea where the bridges are crossing the strings to put modern wire on them. By controlling the way the bridge is constructed and the location of the duplex, extraneous sounds can be eliminated.

When Ed has a piano apart to rebuild, it essentially becomes a drafting table where he can take measurements, design, and alter what was there. Establish uniformity, progression in the treble, spacing, straight lines, and more. Most plates are being machined. If you hear the string sound of two files being rubbed together, that means the V-bar is hard. Because the striking point is closer to the edge, there is more longitudinal mode in the treble. With the problems in the industry of false beats, Ed believes he has found a solution.

Ed has two rebuilders in the U.S. who are licensing Ed's patent.