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Some Thoughts on Pipe Metal

As I write this, the price of tin hovers around six dollars per pound. Five years ago it was less than three dollars. For organ builders, most of whom tend to feel that their instruments are already too expensive, the rise of tin price has been a throughgoing headache.

Each builder in his own way has sought relief from the tin price problem. Some have shifted upward the breaking point between their zinc basses and their tin alloy trebles. Others have cut their spotted metal from a flashy 52% to the old prewar 42%. Flutes that once were made of spotted metal are now made in common or Hoyt's metal. Polished tin façade pipes, ever a luxury, are now regarded as a shocking extravagance. And some builders are beginning to use 97% lead for a large part of their flue work; these builders are, in effect, turning their backs on tin as a material for organ pipes.

If you look inside an EM Skinner organ of the 1920s, you are made aware that in America tin was not always used on the extensive scale we have come to regard as normal. G. Donald Harrison, Ernest Skinner's successor, was the man who started us all on our tin habit, a habit later much intensified by the postwar Dutch, German, Swiss and Danish export builders who often used tin alloys for all bass pipes, thus eliminating zinc entirely from the organ. Nowadays most organists will tell you that tin is good, lead is not and zinc is something one tries not to talk about. (Most organ builders agree zinc is primarily a metal of convenience. Large bass pipes made of soft metals like lead and tin are very difficult to handle in the workshop and in transit without denting; zinc has more strength for its weight and produces a very durable pipe.)

But if there is little argument over zinc, the lead versus tin argument cannot be disposed of so easily. Centuries old, it has always had to endure the influence of the cost factor, one aspect of which is the popular

assumption that the more expensive metal produces the better sound.

If American organ building, through economic necessity, is headed for more lead, does this mean a loss of quality for America's future instruments? For an answer to this question we should consult history.

Tin has always been an expensive metal, and while it boasts a long history of use in organ building, the fact is that “pure" lead - without any additions whatever - was the normal material for making organ pipes almost up to the time of Schnitger. (By “pure” lead I mean the purest lead available at the time, i.e., a metal which analyses at around 97% lead and 3% trace metals which the refining process of the time could not remove.) Schnitger rebuilt a great many Gothic and Renaissance organs, and what a scavenger he was! He never threw aside any stop that in his eyes had virtue. We thus find in his organs stop after stop from earlier builders made of pure lead. His elegant organ at the Aa Kerk in Groningen retains many old stops, including de Mare's 16, 8 and 4 foot foundations for the Great chorus. These are of “pure” lead and lend a surpassing dignity to Schnitger's instrument. Interestingly enough, Schnitger often saved the lead foundation stops but habitually threw out the lead mixtures he found in the Gothic and Renaissance organs, preferring the schneidern quality of his own mixtures, which were usually made with about 20% of tin.

What are the characteristic sounds of the old lead stops? First, a darkness, a hollowness, a sound as of deepest antiquity. Second, an astonishing agility, an ability to move as the music moves, to flit about like a freshly hatched insect. These two characteristics seem contradictory, and indeed, as I see it, the attractiveness of lead pipes seem to lie in the paradox that qualities of youth and great age can cohabit the same mysterious envelope.

Another paradox relates to the strength of the sound. A lead pipe, when voiced in the old way, yields a tone with a softness about it, an unformed, amateurish kind of tone. Yet a chorus of lead pipes produces resultants of great carrying power. Lead is what gave the small Gothic organ the power to fill a vast cathedral. Recall the little organ at Oosthuizen and its “brave sound,” as E. Power Biggs so aptly titles it. That bravura, that all-out quality, is the sound of lead.

What, alternatively, is the sound of tin? I think of it as the sound of refinement, the argentine sound of the French Plein Jeu, or at its very best, the blaze of weightless color and light that Gottfried Silbermann knew so well how to achieve in his paper-thin, hammered tin choruses. Tin pipes love to produce overtones, and there is something about the metal that

lends itself to the production of pleasing overtones, particularly when the voicing is done in the old way, with high cutups. This is how the “silver” of Silbermann is achieved. In our own time, unfortunately, there has been a widespread tendency to make tin pipes with walls that are thick (a waste of material) and with cutups that are low (a French technique) and with toeholes that are wide open (a German idea). No wonder that upperwork made in this polyglot way is piercing beyond the bounds of music; no wonder that foundations so constructed are foundationless and characterless. Low cutups put the tin in a bad mood, so to speak, whence it cannot rise to its natural elegance. I believe the misapplication and abuse of tin will come to be seen historically as the great organ building mistake of the '50s, '60s, and '70s.

Those Americans wishing to seek out the virtues of lead might appreciate a few reflections on the problems lead presents for the manufacture of organ pipes:

a. Lead is difficult to cast into sheets because of the high temperature required and because there is no pasty stage as there is in the lead/tin alloys. Casting must be done on a fiberglass or Nomex cloth; cotton or linen will disintegrate.

b. Pig lead available on the market is generally so pure as to be dead soft and must therefore be doctored. By adding some of the impurities that come naturally in the old “pure” lead of the 17th century, the metal can be made sturdy enough to stand for many years. Antimony (0.75%), copper (0.06%), bismuth (0.05%) and tin (1.0%) when added all together will produce the desired stiffening. Curiously, lead with these trace elements scarcely creeps at all; ordinary common metal (20% tin, 80% lead) creeps far more. This explains why the lead front pipes from the Gothic and Renaissance stand without any sign of collapsing, while American common metal front pipes of the early 19th century always sagged. Adding tin to the lead actually increases the creep. (For this information our whole trade is indebted to Herman Greunke, organ curator at the Oberlin Conservatory of Music, who is a learned source on the subject of lead technology as applied to organs.)

c. The tone seems best when the metal is hammered. When cast, 97% lead is particularly porous. It seems not to be hardened by hammering, but it is made more dense, and this is apparently helpful. Cavaillé-Coll says, “Hammering renders the metal more dense and more sonorous.” Cor Edskes maintains that hammering causes the pipe to speak more quickly.

d. Lead pipes require less nicking than do tin-alloy pipes, particularly if there is a small counterface [counter-phase] (Gegenphase) on the leading edge of the languid.

e. Scales that are right for tin or spotted metal will be too large for lead. A lead stop should be two to three scales smaller than its tin-alloy counterpart. People have often wondered at the slender scales of the front pipes in Dutch and German cases of the Renaissance. These scales were correct for lead, and the organs they served were by no means the bass-hungry devices we might imagine them to be.

f. It is useless to try for an edgy or stringy sound from "pure" lead. Not that it is impossible; indeed a low cutup mouth sharply skived will produce a surprising array of overtones. But it is as if the pipe were saying to the voicer, "All right, I'll do it your way, but you aren't going to like it." There is something heavy and unpleasant about the overtones thus forced from lead. The solution is to cut the pipe up until the mouth is no longer imposing its will on the resonator and the tone is relatively free of "mouth engendered" overtones. A lead mixture pipe when cut up high enough sounds a little like a traverse flute, especially when blown by mouth.

Returning to Cambridge after one of his many European trips, the late E. Power Biggs was heard to say, "There must be at least a dozen ways of building an absolutely perfect organ." This brings to mind Landowska's famous pronouncement, "In art there is no progress - only change." Clearly an organ's artistic merit does not depend on whether its builder uses lead or tin for his pipes but on how he uses what he uses. It is a simple question, really: If American organ builders wish to rely more on lead than they have in the past, let them consider the masterful examples set by the de Mares and Schnitgers of our world, and then let them apply their own unbiased ears and their own immutable good taste.