

Sunday morning 1 February 1981
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Greetings---

Sunlight at last! Things may dry out. I sepn spent some time yesterday and the day before grinding out graphs of 12-to-19 by Accidental Haphazard Random Chance or, Two Experiments for the Price of One--maybe that would be way to describe this mathematical fluke.

By using the 12-tone pitches at the side of the graph you can see and understand the additive-synthesis scheme used on older Hammond organs for about 40 years--say 1928 (date of principal inventions) and 1938 (hard selling of Hammond Organs was in full swing--indeed they had already been shown at the San Diego World Fair! -- to about 1978, when Hammond's better models using more normal electronic tones with natural harmonics began to take over. I don't think the transition is quite complete even yet. Some other companies also used this additive-synthesis-of-12-tone--tempered-imitation-harmonics in the 1 2 3 4 5 6 8 fashion of Hammond, omitting the 7th since it is $31\frac{1}{2}\%$ flat of the nearest 12-tone pitch. For a while there was a Gulbransen transistorized organ that did so (around 1960 if I remember correctly). There have been a few other instruments, and numerous patented inventions that were not marketed which used the tempered "harmonics" scheme. Ivan Brumeeff in the late 20s and early 30s wanted to use a tone-generator very similar to Hammond's with exactly the same synthetic scheme to provide all the tones and "harmonics" for a whole electronic orchestra. Later on he invented a photoelectric organ using interrupted light-beams and a normal tone-quality, thank goodness!

Anyway, J.R. Pierce's computer simulation was as exact a Hammond-organ tone-quality as you could possibly attain. This is the utter extreme of 12-tone-worship. You can't possibly go any further in the apotheosis and abject surrender and dog-like devotion to Twelvism. You noted, I am sure, the harshness of the 12-tone passages before octave-stretching. This just might have not been Pierce's fault: let's be fair--it might have been harmonic distortion and intermodulation distortion in the recording or playback amplifiers, introducing false combinational tones and true harmonics which beat with the imitation 12-tone "harmonics". I can't mention it in public because I must not appear to be accusing anyone of deliberate harshness through that cause--it would be quite innocent.

He should have used just intonation to have been really fair about the consonance-dissonance situation and the harshness which was due to the octave-stretching. That is, this harshness to some degree lessened the impact of his experiment. Nobody in the audience even implied that there exists such a thing as just intonation!!! That is the serious situation we are now in.

Not until I drew the graphs enclosed did I realize what made the chime-like quality of the stretched tones. It is a just minor third and then a double-octave which latter may be very very slightly off by a fraction of a cent. And the diminished fifth would help too way up there in the upper octave.

I am more and more puzzled by the t affair: Did Pierce have any suspicion at all of what he was doing--conducting a second experiment in 19-tone atonality at the same time? Or there is another rather attractive possibility: He chose that amount of stretch which would put in a minor third (minor tenth) and a double-octave and that diminished fifth above it (19-tone g-flat) in order to get close to another quality of tone which is somewhat familiar to most people--chimes, bells, mantel-clocks, toy-pianos, certain marimbas and similar instruments. Why did he choose the 2.4 stretch, in other words? Surely he must have tried over other stretches and shrinks for that matter. But I don't dare ask these questions bluntly in public--I don't want to make an enemy or critic out of him.

I got a letter from him about 10 years ago or such a matter, when I had played the recording of his 8-tone Canon experiment in a book on computer music, and wrote him about it. I made the mistake of mentioning Numaudo since he was then helping run Bell Telephone Laboratories. He wrote back approving of my composing and musical instrument research but disapproving of any attempt to make a math code. (His visual bias, no doubt.)

This was the main reason I did not attempt to speak to him after the lecture, and would not have tried to speak to him before the lecture if we had arrived early. I presume that we were not so late anyhow--maybe three or four minutes no more after he had begun talking.

It would take the most delicate possible diplomatic manoeuvres to arrange to meet him at CalTech in Pasadena c sometime. I could get into trouble by saying the wrong things or someone else who Meant Well spoiling things for me by an innocent chance remark beforehand. I think you realize how touchy a situation this is.

The important thing about all this is what I learned from the questions of the audience and their reactions to the lecture and by what was not said in the lecture nor shown on those slides and his blackboard writing. Complete Twelve-Tone Religious Devotion just like a congregation of 25 Southern Baptists or Mohammedans or Amish or Mormons or Jehovah's Witnesses or Holy Rollers, rather than the actual 25 or so Music Faculty with University Degrees. This is NOT an experimenter's scientific attitude. This is religious dogmatism! We learned some Practical Social Psychology that afternoon. Heed it! I mean every exclamation-mark here. 12-tone serialists use mathematical and scientific buzzwords, but not in the way the scientists who created the jargon-terms really mean them. They worship John Cage, not Albert Einstein.

I feel like some news reporter sent to cover an unsolved murder mystery. Or an undercover detective investigating the shenanigans of ext or Sciendollargy or Herbert Armstrong's Church of God. One false move and I would be blown to pieces. My lifetime reputation in shreds and tatters.

Scientists, even eminent scientists like J.R. Pierce who has many books and articles to his credit and about his work, have been intimidated by the 12-tone serialists to the point where they dare not advocate just, or non-12 temperament either.