Electric and electronic sound in the scores of John Cage

[Frederic Rzewski and John Cage]

Electronics and technology appear in a great manifold of Cage's scores. It would constitute a study on its own to cover the composers complete works from this perspective, and therewith to pay attention to all problems one may encounter in attempts to perform it 'historically correct' now.

Here we will discuss just a few of his scores, where problems related to the electronic legacy can rise.

Radio Music (1956)

To be performed as a solo or ensemble for 1 to 8 performers, each at one radio.

Problem:

The numbers in the score seem to represent 'tunings' for the radio sets. No units are given however. Numbers given range from 55 to 153 and -as they are not continuous- are likely derived from a tuning scale found on a given radio set from the fifties. The numbers written in the score as tuning instructions are determined by chance operations. They neither follow the official standard for channel separation used in Europe (10kHz), nor in the US (9kHz). To interpret this score, first thing we need to do, is to find a correct interpretation for the numbers. Usualy period radio sets had a tuning scale with tuning expressed either in wavelength (m) or in frequency units (kHz or MHz). The numbers in Cage's score suggest a scale encountered on a radioreceiver like this one:

Thus it is suggesting the radiobroadcast AM band, with frequencies expressed in 10kHz units. However, therewith the problem is not solved at all: recordings from period performances, reveal that short wave radio was used: we hear morse signals and all audible artefacts so typical for shortwave bands. Further evidence for this is in the fact that the radio AM band was reserved for national radio stations and not legally allowed for use by amateur morse broadcasts. But, if we have a close look at period radioreceivers, we will notice that the tuning scale often has many numbers printed on it. The radio on the picture, has a 0 to 10 scale, below the large-number scale. The largest set of numbers, standing for the wavelengths of common radio stations in the AM band. A rotary switch (most often) allowed the user to switch the radio receiver to different frequency bands: The long wave range as well as one or more short-wave ranges.

Cage does not give even the slightest hint as to the frequency range to be used. The only other knob he has instructions for, is the volume controller. This fact in any case, already entails a hint for the equipment to be used: portable self-contained receivers and not tuner's fed into a central mixing board. So there should not be any external amplification.

If attempting to perform this piece first thing to be done would be to recalculate all numbers/tuning in the score such as to correspond to the scale used by the radioreceivers at hand. Dividing the given scale proportionally to the number range given in the score is one solution, a better idea might be to use a length of white sticky tape, cut to the length of the physical scale, and copy Cage's range with marks on it. Then, just stick the tape on the receiver scale and perform the piece from the original parts.

A technical detail, however with high relevance to performance practices for this piece (and other pieces using radio receivers) is that old radio receivers rarely had a squelch circuit. This is a circuit that suppresses automatically all noises that normally are received when the radio set is not exactly tuned to the carrier frequency of the broadcasting station. On allmost all multi-band receivers produced after the vacuum tube era, such circuits became universal. Of course, on sets with such circuits, most likely a performance of 'radio music' could likely lead to nothing but silence, as the composer doesn't want the performer to adjust the tuning for good reception. The only thing he is supposed to do is setting the dial for the frequency and turning the volume all the way up, regardless what the receiver spits out.

In our opinion it is and remains mandatory to use, if not period radio receivers if still in working

condition, than at least equivalent modern ones. It is not very hard nor expensive to build simple short wave receivers and one can find literaly thousands of proven designs on the internet. They are even available as DIY kits. At Aliexpress, we easily could find even kits using vacuum tubes. We have yet to try it though. As there are much more sources of ether-smog nowadays than in the fiftees, we would advice to use reasonably long antennas. Modern world-receivers are to be avoided, as more often than not they are way too sophisticated: they have autotune facilities and digital frequency synthesisers, automatic volume control, squelch circuits and automatic interference suppression. Moreover, they rarely have a tuning dial and instead use a numeric keyboard to enter the required tuning frequency.

So far, we have been talking about the technical aspects of performing 'Radio Music' from the performers perspective. But, there is a second maybe even more prohibitive problem, unrelated to what a performer can or could do: the ether and the radio signals occupying it itself. The short-wave bands as well as the AM broadcast MW band, are more and more abandonned or, used for all sorts of radio beacons, digital and encrypted transmissions. In other words: the entire radio environment has changed tremendously. It is pointless to attempt to re-create the ether as it was in the fiftees, filled with morse signals and short-wave stations with national news from all countries in the world. There really wasn't much music to be found there, as the possible quality that could be obtained in those radiobands was way too low for even recreational pleasure.

One may get seduced into trying to perform this piece, using modern portable radios using the FM band. We are absolutely certain that this entails a complete misunderstanding of Cagean aesthetics. The piece would sound more or less like a John Zorn collage, because on a modern FM receiver, stations allways come out right and thus you would get mostly commercial and entertainment musics, as that is what occupies this band. Also, as FM radio covers only an area of at most 50 km around, the adventurous character of tuning into remote radio stations, evaporated. Alvin Lucier in his book 'Music 109', reports about Cage at a performance with a radio set, happening to hit Radio Vatican, and got the pope speaching for a while...

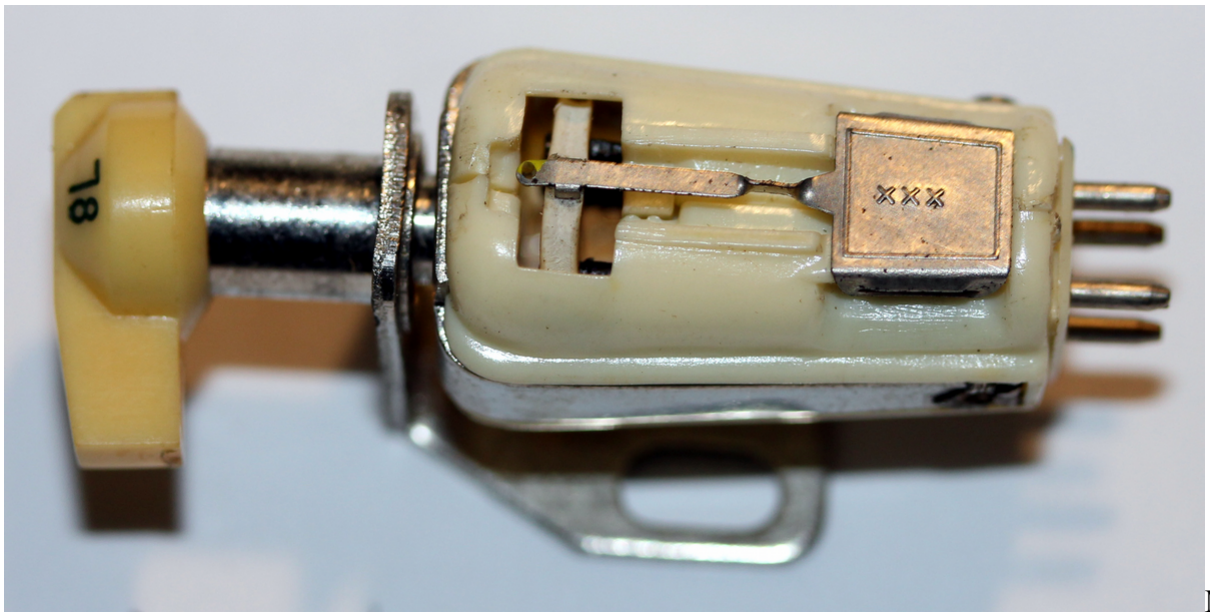
As a conclusion, we are convinced that a historical performance in the sense of a recreation of this piece is impossible. It would never sound the same as in the time of its conception. At the other end one may argue, that the changes the piece undergoes by historically informed performance of it, are an intrinsic part of the Cagean aesthetic. It we extrapolate it into a further future, at the end, we may end up with nothing but silence. We are certain Cage would have loved that consequence.

Cartridge Music (1960)

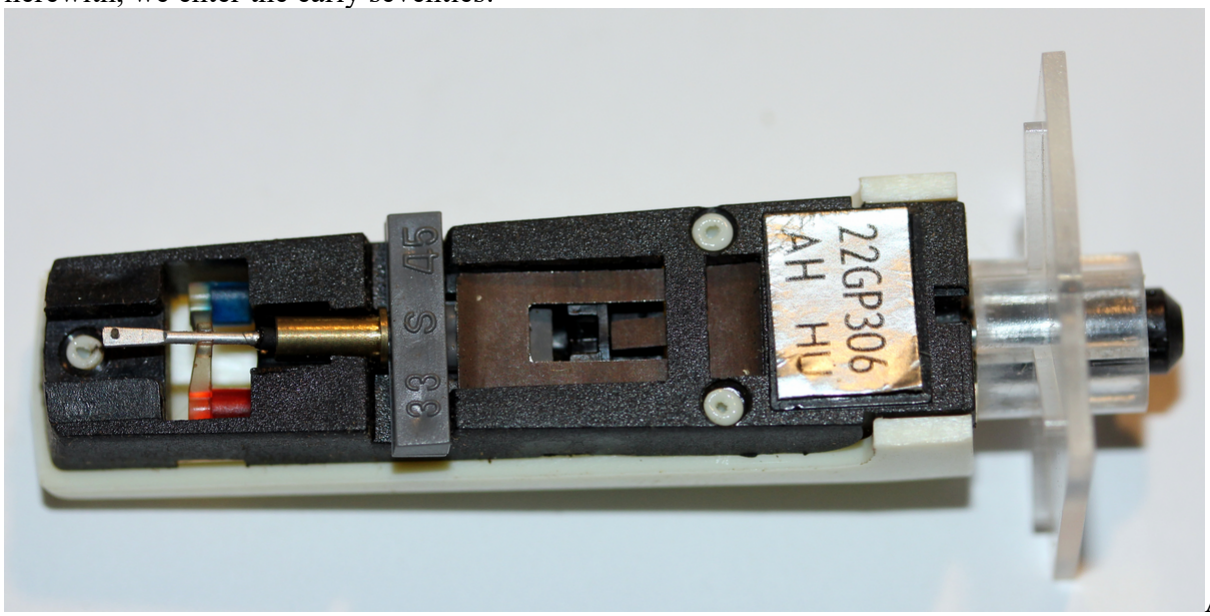
In a footnote in the score, Cage writes: *'A cartridge is an ordinary phonograph pick-up in which customarily a playing needle is inserted. Instead of a playing needle, any object that will fit into a cartridge may be inserted (e.g., a coil of wire, a toothprick, a pipe-cleaner, a twig etc.).*

Turntables, certainly those commonly used in the sixtees, are harder and harder to find. The cartridge in an old turntable is about the very first component to fail... So hunting for well functioning old phono cartridges may have become quite an undertaking by now. Here are some pictures of period-cartridges of the kind used by Cage:

Notice that these cartridges even have a small screw wherewith the needle is to be secured in the cell. This makes attaching other objects as Cage suggests for this piece, an almost trivial undertaking. Also note that all such cartridges are mono, as they date from before the time stereo records were introduced. Cartridges from the mid-sixtees look like this:



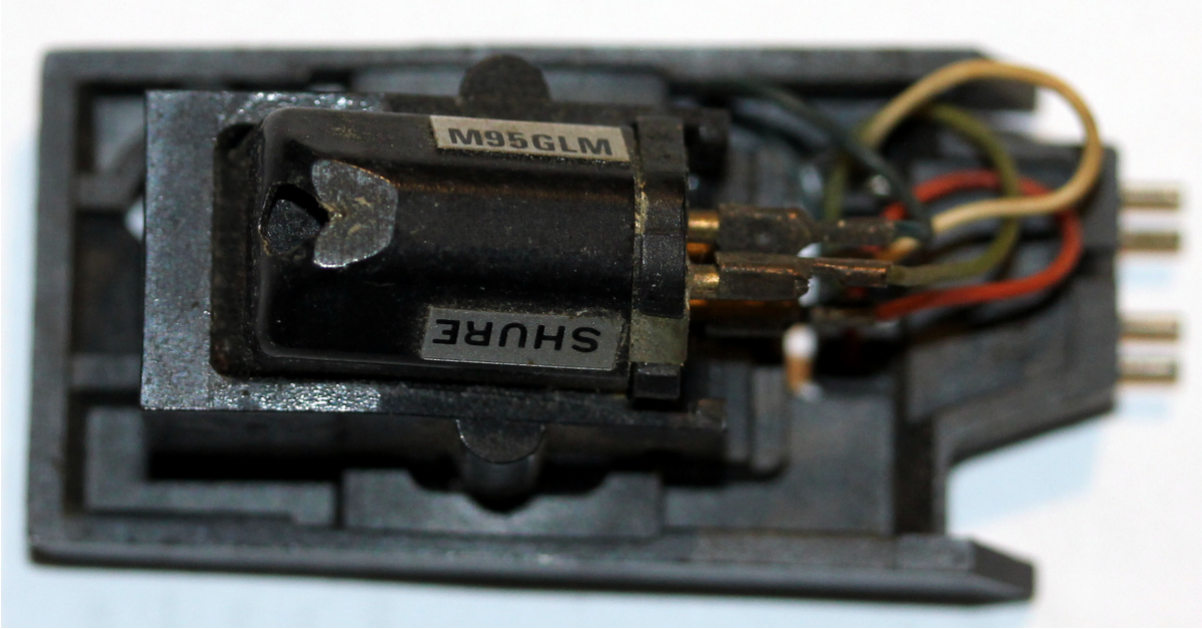
Mono cartridges became very rare and only made for the reproduction of older grammophone recordings. And herewith, we enter the early seventies:



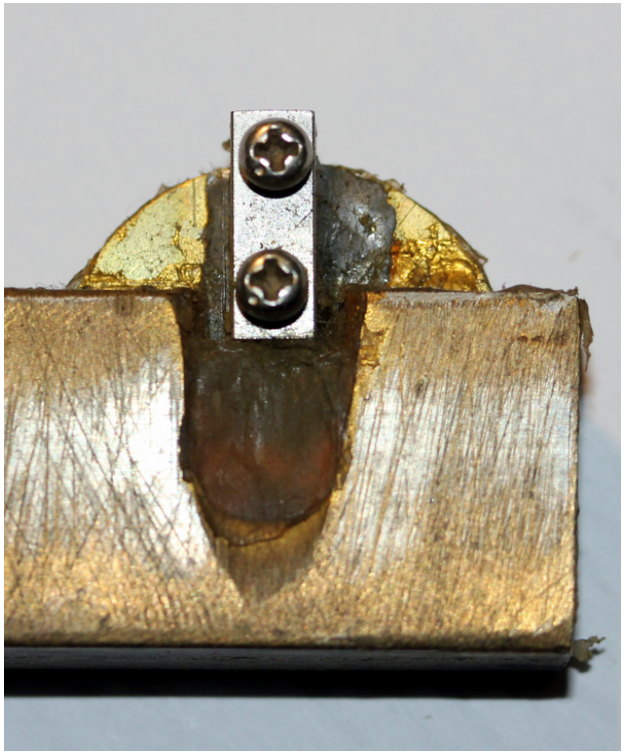
As one sees right away, its already a bit more tricky to secure other objects. Still it's feasable with a bit of handyness.

Good quality modern cartridges as made by Shure, Pickering, Orthophon and the like, are still made today in answer to an unexpected popularity of vinyl in some circuits. These high quality and expensive types

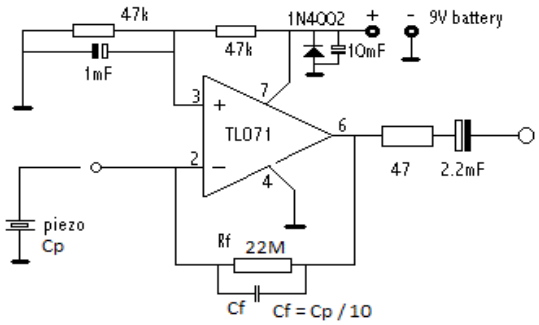
-allways stereo- are very hard to use for performing this Cage piece because they are very fragile and too light. It's difficult to replace the stylus / needle assembly by inserting other objects. In no time, the cartridge is ruined by doing so. Here a picture of a Shure cartridge, the needle removed:



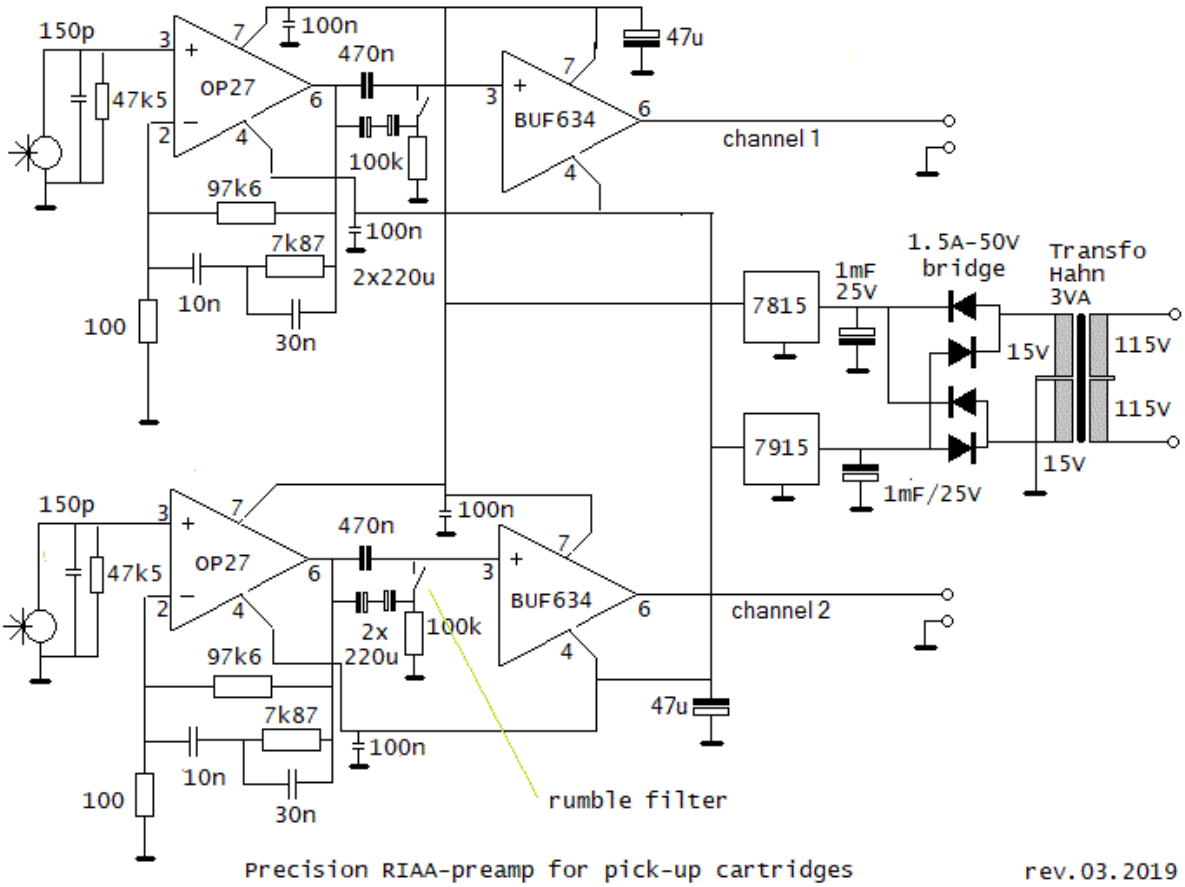
If it appears impossible to obtain original cartridges, there are acceptable alternatives, requiring some construction and simple circuit building. Piezo electric material can be used, in combination with a suitable preamp. Here is a picture of a very simple yet sturdy construction, using a piezo disc, clamped in silicone rubber and provided with a screw mechanism to attach all sorts of objects:



And this is a circuit for the buffer preamp to go with it:



If original cartridges are used, of the magnetic type, one should use a circuit like this one:



This is designed and drawn for a stereo magnetic cartridge, providing in proper equalisation as specified in the RIAA standard for phonographic recordings. Modules with spare preamps of this type are still available on the market, one of the reasons being that many modern amplifiers do not have the required inputs anymore for connecting turntables.

In the score instructions Cage is very clear about the idea that each cartridge and player should have its own amplifier and loudspeaker in close proximity. The amplifiers used should have individual volume as well as a single sound control. The latter used to be a simple low pass filter. The control knobs must be of the rotary potentiometer type, as a scale for them to use is included in the score. The amplifiers are preferably to be setup around the audience. So, the use of mixing desks is certainly a wrong practice for this piece. It kills the sonic transparancy of the piece.

A good source for information with regard to old phono-cartridges is: James Moir, High Quality Sound Reproduction, ed. Chapman & Hall Ltd., London 1958.

Bird Cage (1972)

Twelve tapes to be distributed by a single performer in a space in which people are free to move and birds to fly

Apparently, the tape recorders Cage envisaged for this piece are mono machines, nominal speed 7 1/2 ips (19 cm/s), each with an amplifier of its own. Cage explicitly states that other machine speeds may be used. The performance, for and by a single person, consists of manipulating the tape recorders: switching on and off, swapping tapes, rewinding... Also it is clearly not ment to be a 'concert' piece but much rather what is called nowadays an 'audio art installation' or a soundscape.

Alternative technologies that can be used here: analog cassettes, DAT tapes. Digital computer based technology is not appropriate for performances here.

Telephones and Birds (1977)

For three to perform.

Next to calling for tape recorders -their noises are declared explicitly part of the performance- this piece calls for telephones, yet another technology that has changed substantially over time: dialing a number, automated answering machines, ring-tones, taking up the horn... all these once so typical sounds for telephony have changed. Also the list of phone numbers, 17 USA numbers for the National Rare Birds Alert Network, specified in the score has not a single number that is still connected now.

Trying to perform this piece with period telephones is vain, as technology made old phones obsolete. They can no longer be used to connect to the phone network. This piece, if one judges it worth the effort, ought to be recomposed. Using chat sessions and the internet may be a valid way to go. However, in performing, it should be made clear to the public that it is an adaptation and that the performance as presented may deviate heavily from any period performance.

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