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The *Gatorra*: a Technologically Disobedient Instrument for Protest Music

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Abstract:

The present paper is an introduction to the *Gatorra*, an electronic experimental instrument developed in southern Brazil by builder and musical artist Tony da Gatorra. The author presents some of the findings from original research on its circuit design and its origins, in relation to similar designs of electronic circuitry made popular in hobbyist and DIY magazines. References are also discussed to establish a theoretical framework to be used as a basis of an analysis of this production in further works, using Reed Ghazala's notion of *Threshold of invention* as a starting point.

"My name is Tony and I've built an instrument, To speak, to express myself and to protest"[1]

Fig. 1. Still from the videoclip for "Meu nome é Tony".

1. INTRODUCTION

1.1. The artist

The Gatorra is the brainchild of one Antônio Carlos Correia de Moura, born on August 3rd, 1951 in Cachoeira do Sul, a small city about 150 miles west of Porto Alegre, capital of the southernmost state in Brazil, Rio Grande do Sul. Being one of 8 siblings in a family of humble beginnings, Antônio studied at a public boarding school until the age of thirteen, at which he started working as a lathe turner apprentice. At the age of 25, whilst still working as a lathe turner, he took a mail order course in electronics, at the end of which he set up a TV and stereo repair shop at the city of Esteio in the Porto Alegre sprawl, where Antônio still lives and works to the present day.[2]

Tony da Gatorra was born about two decades later, following an inspiration to build an instrument to make protest music. Tony's own account on how long its research and development stage went for varies from two to four years starting in 1994, but it is certain to say that by 1998 an operational prototype of the Gatorra was used to record the first batch of songs released on a demonstration CD.[3] The uniqueness of Tony's delivery and composition quickly drew the attention of local radio producer Eduardo Santos, and nationally famous producer and TV celebrity Carlos Eduardo Miranda.

Both producers helped Tony attain a certain visibility through contacts in traditional media outlets in Porto Alegre and São Paulo, Brazil's biggest city and a hub for national TV and radio broadcast, and also through Miranda's project website *Trama Virtual*[4].This led to a couple of releases through independent labels — Peligro re-released the original demos under the title *Só Protesto* in 2005, Slag Records released *Novos Pensamentos* in 2008[5] — and concerts throughout Brazil, with additional dates in the US, the UK and continental Europe.[6]

Over the last decade Tony self-released the albums *Paiz sem Lei* (2013), *Gomorra* (2016), and an EP with guitarist / producer Tainam Dias in 2015. In 2010 Turnstile Music released *The Terror of Cosmic Loneliness*, a collaboration between Tony and Welsh musician Gruff Rhys,[7] and in 2013 Reco-head released *Tony da Gatorra e os Ufonistas*, a collaboration between Tony and musicians from the experimental electronic music scene in São Paulo: Paulo Beto, Arthur Joly and Eloi Chiquetto.

1. Lyrics of "Meu nome é Tony", by Tony da Gatorra and Bruno Ramos.

2. Esteio is located around 20 miles north of Porto Alegre, with a population of about 80 thousand and a HDI of 0,842, which is considered high. Tony, however, lives in one of the poorest areas of the city. Data available at: https://pt.wikipedia.org/wiki/Esteio, as of February 10, 2018.

3. Tony has been interviewed several times by the author since 2013.

4. Trama Virtual was a web portal for musicians and bands, lasting from 2002 to 2013, and was a launch platform for several independent artists.

5. The author was the mixing engineer for the *Novos Pensamentos* album in 2007.

6. As of February, 2018, Tony's channel on You Tube features his entire discography: https://www.youtube.com/channel/UCseC4OMbcugna-n8CPYLBxA.

7. According to the liner notes, the album was recorded in 2007 during the practice sessions for a series of concerts featuring Tony and Gruff, and mixed "in Cardiff, Wales in one 12 hour session with the aid of 5 flasks of coffee, 75 sticks of gum and a bank of vintage compressors".

In parallel to his musical career Tony has, over the last two decades, taken orders to build Gatorras and other instruments by demand of musicians and fans, including Gatorra #5 custom-built for Lovefoxxx of the band CSS, Gatorra #7 custom-built for Scottish musician Nick McCarthy of the band Franz Ferdinand[8] and Gatorra #21 for composer and guitarist Marcelo Birck.

2. THE INSTRUMENT

2.1. The circuit

Research by the present author on the construction of the Gatorra was guided by an aural realization that the instrument sounds very similar to an electronics project of a handheld electronic drum kit made popular in Brazil during the 1980s and 1990s. Handheld kits such as these would be sold in electronic supply shops in most capital cities in Brazil, and DIY projects for such kits were published in amateur electronics magazines for hobbyists and such. In the past few years a few music producers have unearthed units of this drum machine as an addition to their repertoire of studio tricks.[9]

Fig. 2. A SLICIE drum kit. Photo by the author.

An attempt to find out more about this kit, widely known either as *SLICIE* or one of several commercial names,[10] led to findings on its history from DIY electronics blogs and forums. On one particular website an engineer named Nelson Ribeiro (2005) describes the process of reviving a specimen of this drum machine, and recreating its design for handmade production. In the same post, Ribeiro mentions the similarities with a project published in the hobbyist magazine *Popular Electronics*, published from 1954 to 2003,[11] and a source for more information on the origins of this particular design, DJ and teacher Eric Marke.

Two projects for automated rhythm sections were published in Popular electronics Magazine by John Stayton Simonton Jr. in the early 1970s, the *Thumpa-Thumpa* in the February 1970 issue, and the *Drummer Boy* in the July 1971 issue.[12] The Thumpa-Thumpa is a very simple circuit offering two sounds — bass drum and woodblock — and

8. This instrument has since been given to Graeme Ronald of the band *Remember Remember*, who informed the author in a Facebook chat message. The instrument can be heard on the following track: https://www.youtube.com/watch?v=DTdAFR9VMSU&index=5&list=PLYE-r8eJxWcvQLAVMqsfFKZbB5CP3ji-M

9. The SLICIE can be seen being played by producer Homero Basílio on this video: https://www.youtube.com/watch?v=J4W0oX-noriU&t=2s. The final version of this same track can be heard at: https://www.youtube.com/watch?v=9fAebO3mP9I

10. Other commercial names include *Dinâmica*, *Pontus*, *Slcie*, *Batronic 7* and *Spineer* (Ribeiro 2015).

11. As of February, 7, 2018 the entire run of the magazine is available for download at: http://www.americanradiohistory.com/Popular-Electronics-Guide.htm

12. Simonton was also the founder and one of the designers of PAiA Electronics, a company founded in 1967 in Oklahoma City specialized in selling electronic kits by mail order. From the 1970s onwards PAiA started selling kits for electronic music instruments, and PAiA kits of the Thumpa Thumpa and the Drummer Boy. More information on: http://www.paia.com/.

controls to set the speed and the pattern in which the sounds play (Simonton 1970). The Drummer Boy is a more complex project divided in three sections: a counter used to control tempo and the length of the rhythm loops, a switching and decoding system used to change between different rhythm patterns and a tone generator that creates the drum sounds themselves. Simonton suggests early in the article that the tone generator section can be built as a standalone unit and operated as a hand-held, finger-operated electronic percussion instrument (Simonton 1971).

The tone generators in both the Thumpa-Thumpa and the Drummer Boy are based on the *parallel-* or *twin-T* oscillator principle, whose workings can be explained in layman's terms as "applying a sharp pulse to a parallel-T audio oscillator that is normally just below the point of oscillation" (Simonton 1791, 30). Different combinations of the electronic components involved account for the differences in pitch for different sounds, and a slightly different combination of components is used to implement a noise generator, used for cymbal-type sounds.

The origins of the SLICIE-type drum kit in Brazil are attributed to George Romano (Marke 2017, 159), a designer of electronic circuitry working on research and development for electronic musical instruments for the most of the 1970s and 1980s, a period in which he also manufactured his own brand of electronic organ, Audac. While designing a rhythm section for electronic organ manufacturer Gambitt, Romano came up with an implementation of the twin-T oscillators for the tone generator, employing a CMOS integrated circuit instead of the transistor approach which made its energy consumption more efficient. Romano designed a version for this rhythm machine which would be built into the Gambitt organs, and also a standalone version aimed at players of other instruments, both versions coupled with sequencers Romano designed based on existing projects that also used integrated circuits.

It was while building the tone generator, however, that the idea of a standalone version without the sequencer came about. In Romano's account when he accidentally touched the circuit, assembled in a protoboard, one of the drum tones sounded. This sparked the idea of using touch plates to trigger the sounds instead of regular switches. Romano, however, never got around to manufacturing such a design. In his own account, he gave it to a friend that also worked in electronics, and this led to the manufacturing of the first units that reached the shops (George Romano, telephone interview with the author, February 2, 2018).

Romano's account of designing this drum machine does not mention Simonton's projects directly, but rather the vast repository of circuit projects that populated hobbyist's publications, and also electronics compendiums and literature published by integrated circuit manufacturers, such as Texas Instruments and Fairchild, among others. Although being unable to recollect the exact time this happened, Romano believes it was at some point between 1975 and 1980.[13]

13. In Ribeiro (2015) this is dated as happening between 1983-84.

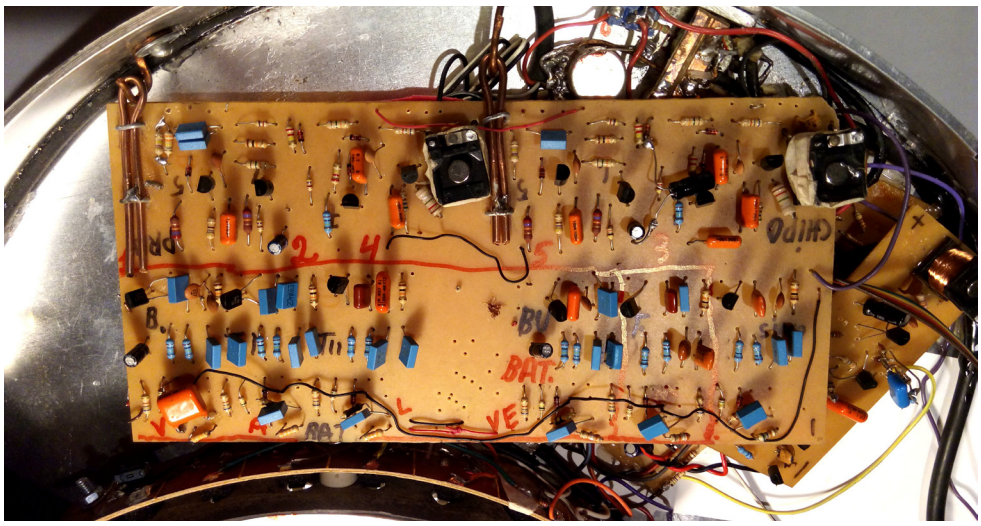

Fig. 3. Part of the tone generator in Gatorra #19. Photo by the author.

The Gatorra tone generator follows a similar project using general-purpose NPN transistors (in the example featured here, BC549), which function similarly to the ones used both in the Thumpa Thumpa (2N5129) and the Drummer Boy (2N2712). Tony describes that the development of the Gatorra started from projects he found and experimented with in electronics magazines, and on his accounts no mentions are made directly to the SLICIE-type drum kit. It is likely, however, that he was aware of the existence of such instruments due to their vast availability in supply shops. As mentioned above, Tony spent a number of years in the process of adapting the circuits to his own design, as well as adding some extra features.

2.2. Layout and assembling

Fig. 4. Tony playing the Gatorra #1 live at Casa do Mancha in São Paulo, along with producer Paulo Beto, seen here playing the Gatorra #15. Photo by Eloy Silvestre used with permission.

As seen on Figure 4, the Gatorra is laid out in a fashion similar to a traditional guitar. On a regular, right-handed, instrument the right hand plays seven push buttons located at the bottom side of the Gatorra's "body", as well as controls knobs and sliders located in its front panel. Halfway across the front of the instrument's "neck" there are two rows of buttons: usually on the bottom row there are seven buttons that trigger the same circuits for the seven sounds playable on the body plus an additional button that plays an extra sound; on the top row there's a variable number of extra buttons for additional sounds. The seven-button layout on the body is consistent throughout the entire series of the Gatorra, whereas the layout for the neck buttons varies greatly. On the back of the instrument there's a RCA jack that connects to a foot pedal, which doubles as a trigger for the kick sound.

Apart from its general shape, the seven basic sounds and the buttons both on the body and on the neck, most other features change from Gatorra to Gatorra. The body shape that can be seen on Figure 4 for Gatorra #1 is more or less consistent from instruments 1 through 13. Gatorra #14 is already built with a body shape that has been consistent from that instrument onwards, and can be also seen on Figure 4.[14]

To build the instruments, Tony employs both discarded materials purchased at junkyards and found in recycling bins and garbage disposals in general, as well as discarded electronic equipment. On some instruments the tuning panel for conventional CRT TV sets is repurposed as a tuning interface for some of the sounds, as seen on Figure 5. Additional slide controls and knobs are sometimes added to control the individual volume of some sounds, as well as rotating levers that control the pitch of specific sounds:

14. Gatorra #14, exceptionally, uses touch contacts for the body and neck instead of push buttons.

Fig. 5. Detail of Gatorra #3, equipped with a TV tuning panel.

> [On] the first few I built, I put a plastic tuner from a TV set, up to the 4th, 5th, 6th, you could tune all the 12 sounds. But then I ran out of tuners, and couldn't find any more for sale, so I switched to potentiometers. (Tony da Gatorra, interviewed in November 2016 by the author)

The sides of Gatorras are shaped from aluminum profiles, riveted together at junctions and also to anchor internal parts. Panels for the front are usually made either from reused Formica laminate or aluminum panels, whereas panels for the rear are made out of repurposed acrylic panels formerly used as shower enclosures or toiletry cabinets. Starting at Gatorra #21 transparent polycarbonate panels have also been used for the front and sides of some instruments.

Tony has also been producing scaled down versions of the Gatorra in the shape of the *Minigatorra* and also the *Batucador*,[15] which employ the same tone generator. The Minigatorra looks similar in shape to a regular Gatorra, only smaller in size, and has 5 of the regular timbres plus a variable number of additional sounds ranging from 3 to 4, whereas the Batucador is usually limited to 3 or 4 sounds, with a built-in repeater device based on a 555 microchip. At the time of writing Tony has built 25 Gatorras, 7 Minigatorras and 5 Batucadores. Each instrument has its own modifications and tweaks, which makes Tony believe a patent for the instruments would be unobtainable:

> I'm always trying to improve the Gatorra, you know? Each of them has something different, I'm always looking for something new to add to them. For the next one I want to add a wireless transmitter... (Tony da Gatorra, interviewed in March 2015 by the author)[16]

3. ANALYSIS

Similar accounts of accidentally making sounds from a piece of electronic equipment by touching or shorting its circuit are also given by Reed Ghazala (2004, 97) and Michel Waisvisz (2004), which quote such experiences as an inspiration to develop touch interfaces in electronic instruments.[17] Although both acknowledge each other's work — along with the work of other artists which are broadly similar, such as Nicolas Collins — and have started their experiments with touch interfaces in the late 1960s, it is unlikely that there was any influence between the two until much later, if ever.

15. *Batucador* comes from the verb *batucar*, which is a synonym to drumming.

16. A wireless Gatorra has indeed been built, but only in early 2018.

17. Ghazala is widely known as the "Father" of Circuit Bending, whereas Waisvisz was a prolific composer involved in the development of a number of experimental music instruments and interfaces, and also the artistic director of STEIM in Amsterdam from 1981 onwards.

Just as unlikely is the possibility that either George Romano or Tony da Gatorra had any influence from Ghazala, Collins or Waisvisz. Throughout most of the military dictatorship period in Brazil, lasting from 1964 to 1985, the customs policy applied prohibitive import taxes to electronic goods as a strategy to foster the growth of the national technology research, development and production. It is beyond the scope of this paper to discuss such a policy further, but in practical terms such development fell short of its expected results and during this period a lot of initiatives in terms of developing technologies for music consisted in cloning foreign designs that were already cherished by the music industry (Pinto 2002). Both Brazilians learned the ropes of electronics during said period, and worked for the most part of their careers in environments mostly unrelated to the experimental music and academia communities.

> I took several courses on electronics, even before I went to trade school. I got interested in the Theremin because at this particular school they had this mounted jaguar at the reception, and as you came in it would light its eyes and do this screeching noise. I started to research how that worked and learned about the working principle of the Theremin, and that got me into building instruments. (George Romano, interviewed in February 2018 by the author)

Ghazala (2005, 6) describes this coincidence as a "principle of simultaneous discovery" he calls the *threshold of invention*. He goes on to posit that the popularization of transistor-based, miniaturized electronics, along with the widespread use of electronic music in popular culture — by means of soundtracks and the use of electronic instruments in pop records — brought about the threshold of invention that made circuit bending and the *Kraakdoos*[18] possible. The relationship between creativity and a certain technological zeitgeist is also discussed at length by Nicolas Collins (2008) in relation to his own experience as an apprentice to David Tudor, Gordon Mumma and David Behrman in their own exploration of analog circuitry and early microchip technology as alternatives for making experimental electronic music that didn't follow the commercial path of Moog, Buchla and ARP synthesizers.

A different sort of zeitgeist also relates to some experimental electronic music genres of the late twentieth / early twenty-first century: that of repurposing electronic consumer goods that have been discarded either by malfunction of as a consequence of replacement by newer versions, a process that can be related to the industrial practice of *planned obsolescence*. Hertz and Parikka (2012, 426) argue that, while the repurposing of everyday objects as artistic output has been acknowledged since at least the 1910s, artforms based on the repurposing of electronic commodities deal with the mass production and discard of such items.

Tony's work sheds light onto a different perspective to analyse such claims. Whereas Ghazala's *threshold of invention* and planned obsolescence in industrial design are valid in the Brazilian perspective, they should be assessed from a different point of view. Both in North America and western Europe, playing with electronics is

> characteristic of the early-20th-century wireless and radio culture, post-World War II electronics culture (especially post-1970s electronic amateurism), hobbyism or DIY-tinkering. (Hertz and Parikka 2012, 426)

While this certainly holds true to examples springing from the Brazilian middle class,[19] Tony's approach originates from a maverick drive rather than communal exchange, given his humble origins, the circumstances of a hand-to-mouth existence and also the fact that neither his electronics apprenticeship nor his instrument development ever qualified as hobbies.

Although Tony's research and development for Gatorra building over the past two decades has at times crossed paths with the brazilian DIY electronic scene, it wasn't informed by it at the time of its inception. Beyond their artistic collaboration, Tony has

18. *Kraakdoos* is the dutch name for *Cracklebox*, the electronic instrument developed by Michel Waisvisz together with Geert Hamelberg in the late 1960s and further developed after Waisvisz joined STEIM in 1973, as described by Waiswisz at http://www.crackle.org/CrackleBox.htm.

19. An extensive account of which can be found in Pinto (2002).

exchanged some electronics expertise with synthesizer builder Arthur Joly, which led to building an Atari Punk Console into Gatorras #18 and #20. He has also discussed plans of developing an instrument in collaboration with the *Garoa Hacker Clube* hackerspace in São Paulo, however Tony's own concerns about his intellectual property — namely the fear of someone stealing the Gatorra design and profiting from it — have at times stood in the way of collaborations and workshops. In this sense, it can be stated that although the Gatorra is very much a DIY instrument, it was not developed within the collective learning environments normally associated with the DIY / DIWO / DIT[20] and the "Maker" trends of the recent decades.

An important concept in the literature concerning the development of new musical instruments is that of hyperinstruments, associated with the hyperinstruments project developed under the guidance of Tod Machover at the MIT beginning in the 1980s. The basic concept of hyperinstruments in their first generation is defined my Machover (1999) as: "to take musical performance data in some form, to process it through a series of computer programs, and to generate a musical result", and hence the goal of hyperinstruments can be defined as producing "music of unprecedented subtlety, complexity, richness, and generation expressive power that is intimately, but not obviously, linked to the original intent of the performer / composer".

The values embedded in Machover's discourse exemplify the application of the "Californian Ideology"[21] to interactive music-making in the late XXth century, and they entail a degree of virtuality that's absent in the raw electronic correlations present in an instrument such as the Gatorra. Perhaps, in terms of the hyperinstrument discourse, the Gatorra would fit in better with the second generation of hyperinstruments, developed from 1991 onwards, aimed at amateur musicians (Machover 1995).

Bowers and Archer (2005, 6) discuss the notion of hyperinstruments in contrast to that of meta-instruments and virtual (cyber) instruments in the context of the NIME conference,[22] summing up their capabilities as: rich interactive capability, detailed performance measurement, engendering of complex music, expressivity and virtuosity. In the same paper, the authors contrast said approaches to what, in 2005, was deemed a growing influence of approaches such as Ghazala's and Collin's in instrument building, proposing the concept of *infra-instruments*. Hence an infra-instrument's capabilities would be: a constrained interactive repertoire; the use of fewer sensors and fewer gesture measurements; to engender relatively simple musics restricted in their virtuosity and expressivity (Bowers and Archer 2005, 6).

At least one of the infra-instrumental principles of construction proposed by Bowers and Archer, "Take Something Non-Instrumental and find the Instrument Within",[23] resonates with one of Tony da Gatorra's guiding principles: "The circuit tells you one thing, and you find other things in it" (Tony da Gatorra, interviewed by the author in May, 2016). Although the Gatorra as a control interface has clear hyperinstrument potential, it is itself more of an infra-instrument in its actual state.

The work of Oroza (2012), analysing the repurposing of technological goods in Cuba with an emphasis on the *período especial*,[24] helps establish some groundwork to discuss practices such as Tony's. Oroza postulates that the scarcity of consumer goods fostered an attitude of *technological disobedience* towards commodities designed for markets with a much higher level of consumption, and borrows the term *Revolico* to describe the extreme repurposing of such commodities.[25] Drawing from Oroza's work, Obici has coined the term *Gambioluthiery* to describe:

> the construction of instruments originated around the logic of *gambiarra*,[26] which involves activities such as composing, decomposing, inventing, proposing, constructing, collecting, adapting and appropriating materials, objects, artifacts, devices, instruments or system setups. (Obici 2017, 89)

Obici's *Gambioluthiery*, along with Oroza's *Revolico*, seem more adequate as a starting point for a deeper understanding of Tony da Gatorra's approach. The factors behind

20. Acronyms for Do-it-yourself, Do-it-with-others and Do-it-together, respectively.

21. "The Californian Ideology" is an essay published in September, 1995 by Richard Barbrook and Andy Cameron that critiques Silicon Valley dominant school of thought of "naturalising and giving a technological proof to a libertarian political philosophy, and therefore foreclosing on alternative futures". Available at http://www.metamute.org/editorial/articles/californian-ideology as of February 2nd, 2018.

22. The New Interfaces for Musical Expression conference, or NIME, has been happening annually since 2001. Available at: http://www.nime.org/.

23. The others being: "Take an Instrument and Make it Less"; "Take Materials Partway to Instrumenthood"; "Build and Instrument but include Obvious Mistakes"; "Find Infra-instruments Readymade" (Bowers and Archer 2005, 6).

24. The *período especial en tiempos de paz*, or special period in times of peace, is the name given to period of severe economic crisis in Cuba, roughly situated between 1991 and 1997: https://en.wikipedia.org/wiki/Special_Period.

25. The term *Revolico* is a Cuban term that means disorder or an alteration of the regular pattern of events. It has been chosen as the name of an e-commerce cuban website in which heavily modified vehicles are bought and sold, among other repurposed and modified goods. Available at https://www.revolico.com/ as of February 11th, 2018.

26. *Gambiarra* is a word in Portuguese widely used in Brazil to describe a makeshift, improvised solution to a practical problem, and has been applied in the brazilian art discourse since the turn of the 21st Century to describe "an improvisational method of working with materials, devices, technology and/or institutions" (Obici 2017, 87).

the ebb and flow of Brazilian economy are somewhat different from those of the Cuban economic crisis of the 1990s, but a mixture of such economic conditions, along with the technological and informational blockage of the dictatorship period — the effects of which were influential for a much longer time — prompted a similar attitude towards electronic musical instruments, exemplified in Tony's creations: a meeting point between engineering and scavenging, designing and repurposing which is in stark contrast to the "Californian Ideology" ideal of technological evolution.

4. CONCLUSION

This paper attempts to present part of the author's research on the experimental instrument building scene blossoming in Brazil over the last two decades, focusing on Tony da Gatorra's own career and agenda and its intersections with the wider scene. Part of the obstacles found in order to sketch a linear history of the Gatorra's development since its inception in the 1990s had to do with contemporary archiving: valuable sources of information such as Tony's own blog, his *Trama Virtual* page and a number of other pages documenting the first ten years of Tony's artistic activity have been preserved only in their textual content, if at all. Most media attached to such websites that would be valuable to retrieve further information is unavailable.

Other obstacles were found in terms of actual memory and language: Tony's own recollection of what went into each instrument and about who owns each instrument vary from time to time, and attempts to reach Gatorra owners and players showed varied results. It is important to bear in mind that successful ones also presented limitations as to what could be gathered: the grammar available to describe established electronic instruments is not consolidated for the general public, in the context of a unique instrument such as the Gatorra it is gargantuan in its variety.

Future developments of this research include deepening the archaeological findings on the Gatorras, an attempt to closely examine the specimens, which would entail something akin to a pilgrimage. On the other hand, there is greatest interest in developing the Gatorra design for other purposes: the possibility of printing the circuit boards at professional facilities in order to make Gatorra production easier for Tony himself, researching the interface potentials of Gatorra-like instruments, and exploring the educational possibilities of building electronic instruments.

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