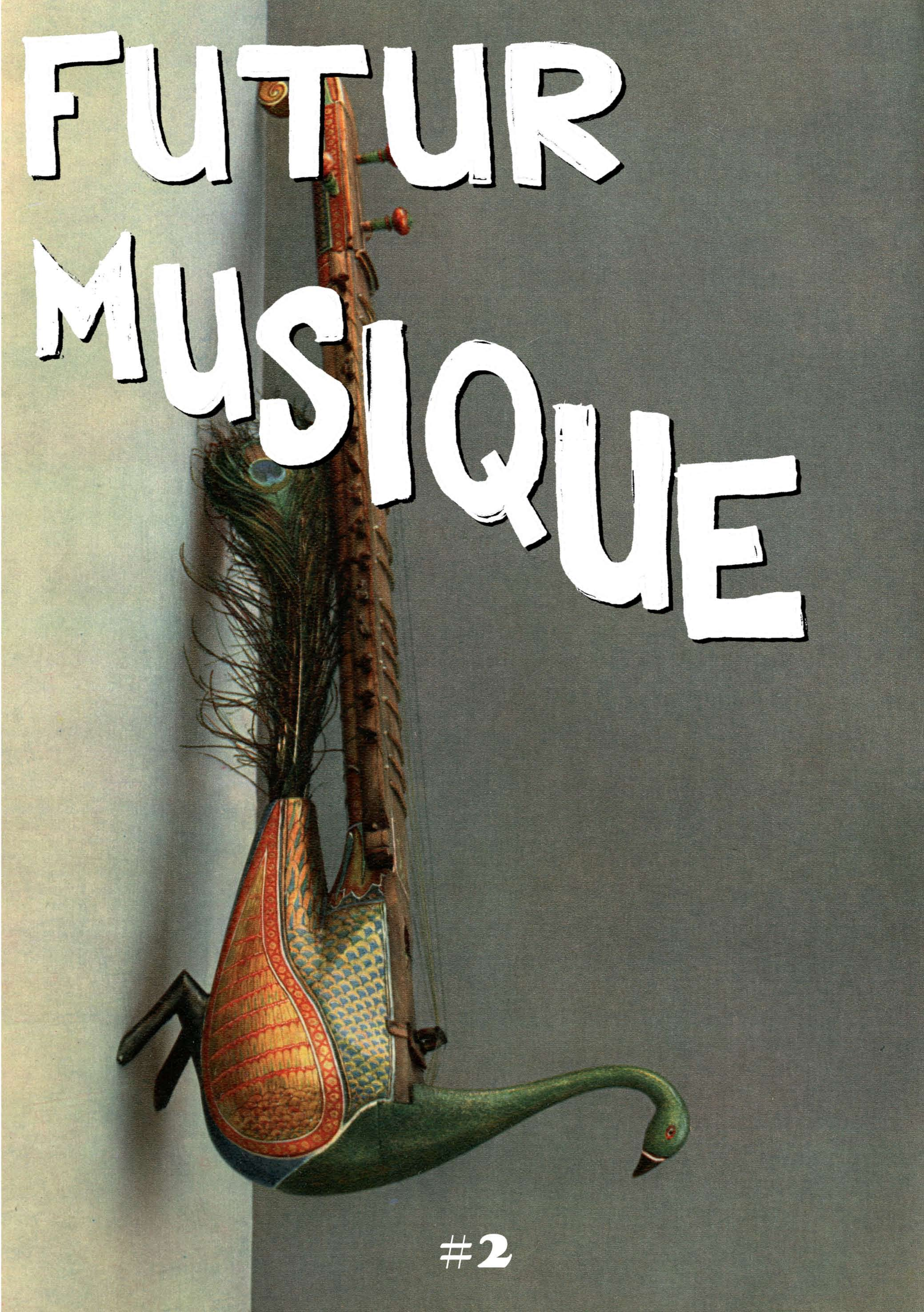
FUTUR MUSIQUE



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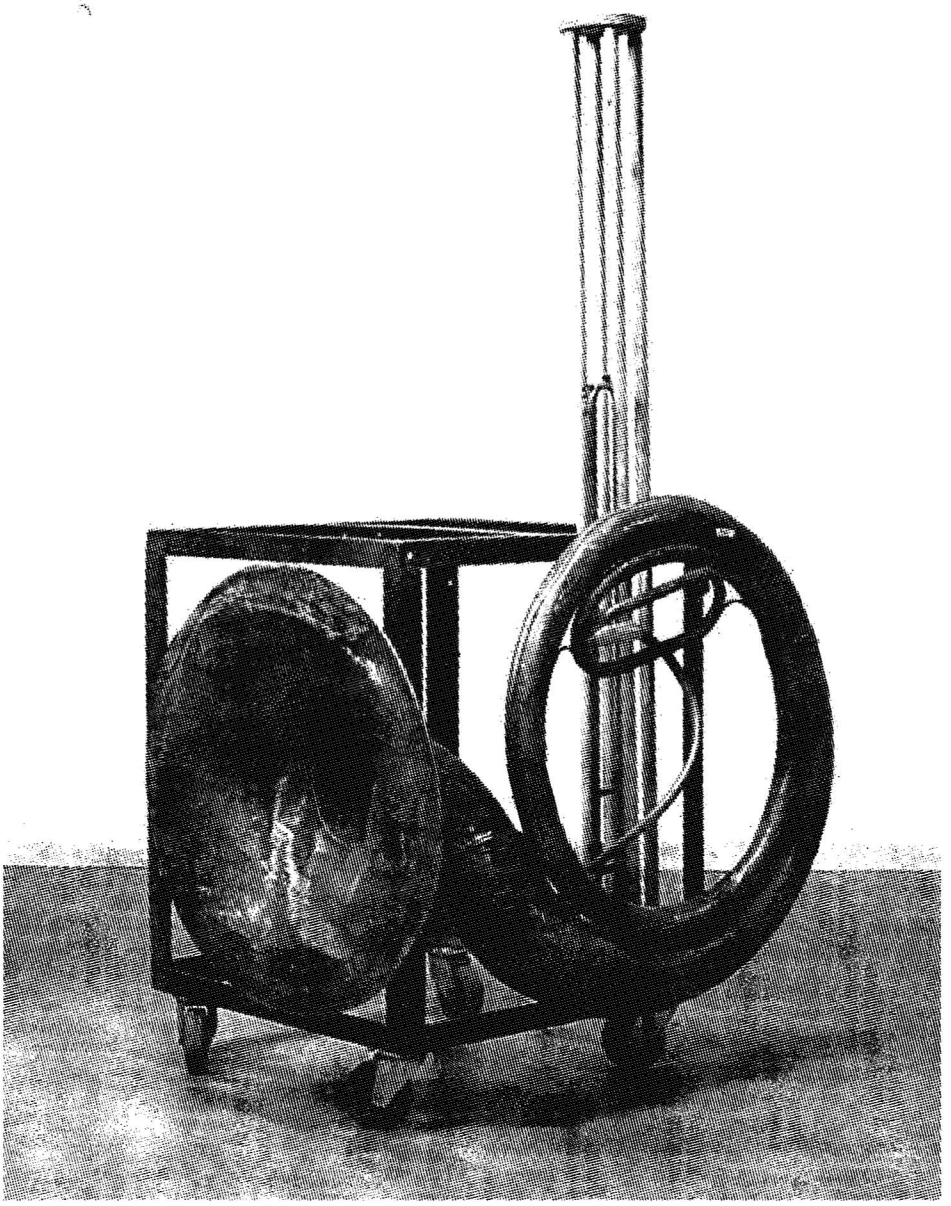

Peter Zegveld - Perslucht Tuba.jpeg

These pages contain practical and theoretical texts about the construction of various musical instruments.
They are reprinted from websites and various books.
On the last page you will find a bibliographie of source material.

FUTUR MUSIQUE #2

contents:

backcover model: The Ghost of Ana Palma - *Andreas O. Hirsch*

¡¡¡¡pay no more than 3 euros!!!!

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WOODSTONE KUGELBLITZ

"DISCBITCH"

Posted on October 9, 2012

Hello! Welcome to my portable CD player hacking journey.

My intention is to modify an old portable CD player (easily purchasable on ebay) and turn it into a disgusting noisemaker, then put it in a pretty box that makes it easy to interact with.

This will be done primarily by abusing the anti-skip mechanism of the CD player.

The model I am using is the Sony D-E301 Discman from 1997, though bear in mind that any other CD player with anti-skip features can be used for a project like this.

Here is the outside of my Discman:

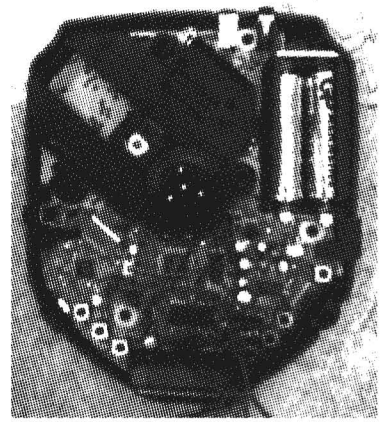
It's grey. The lid claims to be heat resistant. A nice thing about this discman is that it's old and the buttons are not located on the lid as they are with many other (particularly more "modern") portable CD players. The meaty guts of the thing that we will be doing all of our poking around in is very easily exposed and messed with without doing too much screwing around with the case. I like this.

More to come.

Posted on October 10, 2012

Electronic Skip Protection is a beautiful thing. When switched on, the CD player will buffer a certain amount of incoming audio from the disc in RAM. When something happens to make the disc skip, the player plays this stored audio from RAM while it figures out what the hell is going on with the disc and fixes itself, making for lovely skipless playback on the listener's side. My CD player stores 10 seconds of audio for anti skip purposes; other CD players store different lengths of audio.

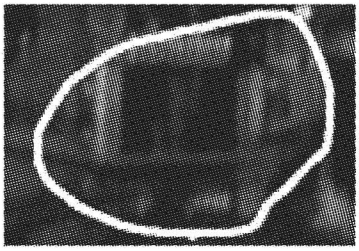
The bend I will be doing is performed by making the RAM used for skip protection sad.



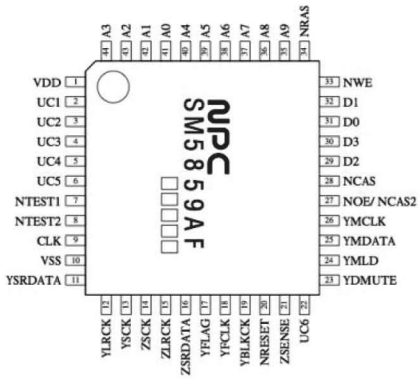
Here's the inside of my CD player (with some work already done):

I wouldn't say I'm a particularly tech-savvy lady; I don't really know too much about what I'm looking at. However, something I can deduce is that there's some IC somewhere that does something anti-skip memory related.

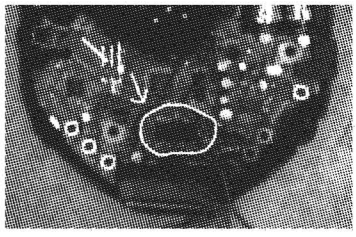
So I looked at this thing here



And googled it. SM5859AF. Nippon Precision Circuits anti-shock memory controller. There's a data sheet freely availble. Main thing:

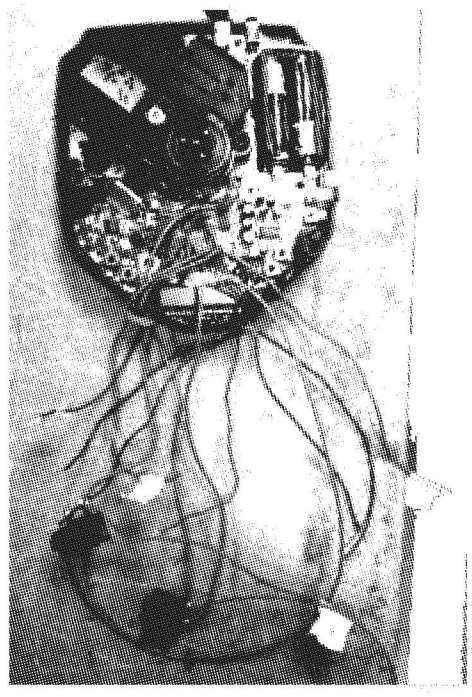


A0 through A9 – DRAM addresses 0 through 9. These go to the anti skip memory. There's also YDMUTE, a "force mute" pin that I'll be exploring later. Exciting!
And so we follow the leads from A0 through A9 down the line and end up at the magic box just above the screen: the anti skip RAM.



This is where our journey, consisting of randomly bridging pins, begins.

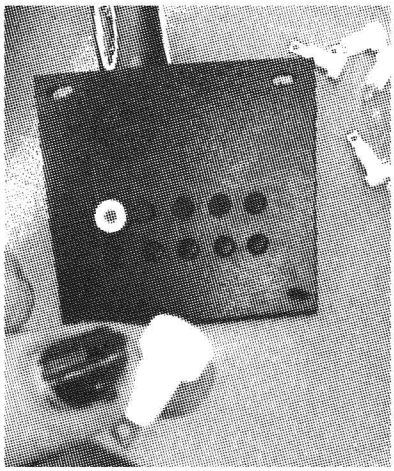
Posted on December 12, 2012
Solder a little wire to each RAM pin, and you end up with this



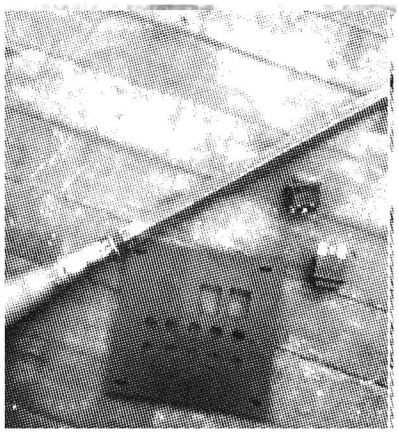
When a CD is playing and you connect these wires together, crazy stuff happens. I highly recommend grabbing some alligator clips and playing with your machine at this point. It's loads of fun!
There are switches attached to two of the pins because I'm crappy at soldering. I accidentally broke the connections to two of the pins while attempting to solder to the tiny contacts, so I went ahead and chucked on/off switches for those pins in there while I was fixing them.
And that's it! The electronic component of this project is now complete.

Posted on December 12, 2012

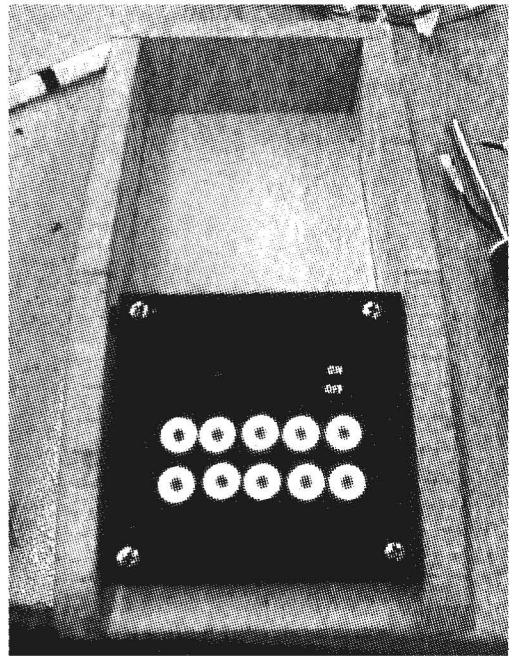
For the faceplate of the CD machine, I used a piece of plastic. I cut some holes to mount the panel to the rest of the box, plus ten holes for banana jacks.



Banana jacks are a beautiful thing. These are what each pin of the CD player RAM will connect to.
When the machine is finished, each jack will correspond to one of the RAM pins, and they will be connectable via patch cables.
Banana cables/jacks are super awesome for making patch bays because the cables are able to stack, meaning you can cram multiple cables into each other to connect more than one thing to a given jack at a time. It's great.



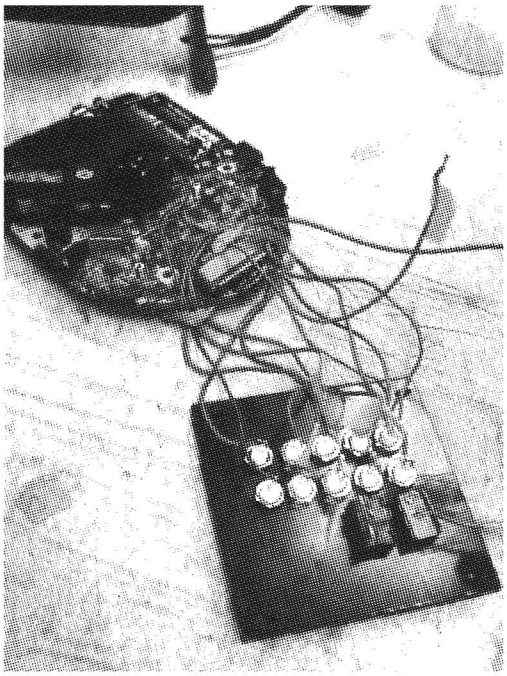
Anyway, I then drilled two more holes in the faceplate and used a square file to shape them into suitable rectangles for the CD player's switches to sit in. I desoldered the switches from the CD player in order to measure them and put them in the faceplate properly.



Yep.

Posted on December 12, 2012

To get everything from the CD player working with the new patch bay, I soldered each pin from the RAM to a banana jack, and connected the two switches.
I I then screwed the faceplate into the box I made and let the CD player rest on top.

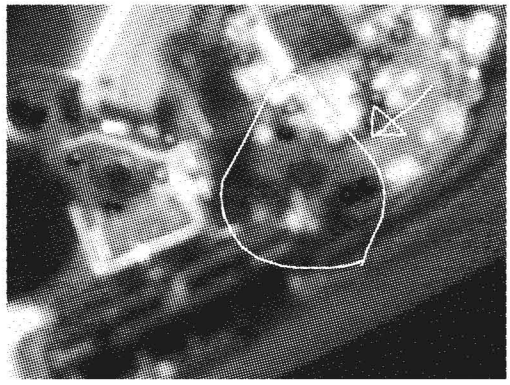


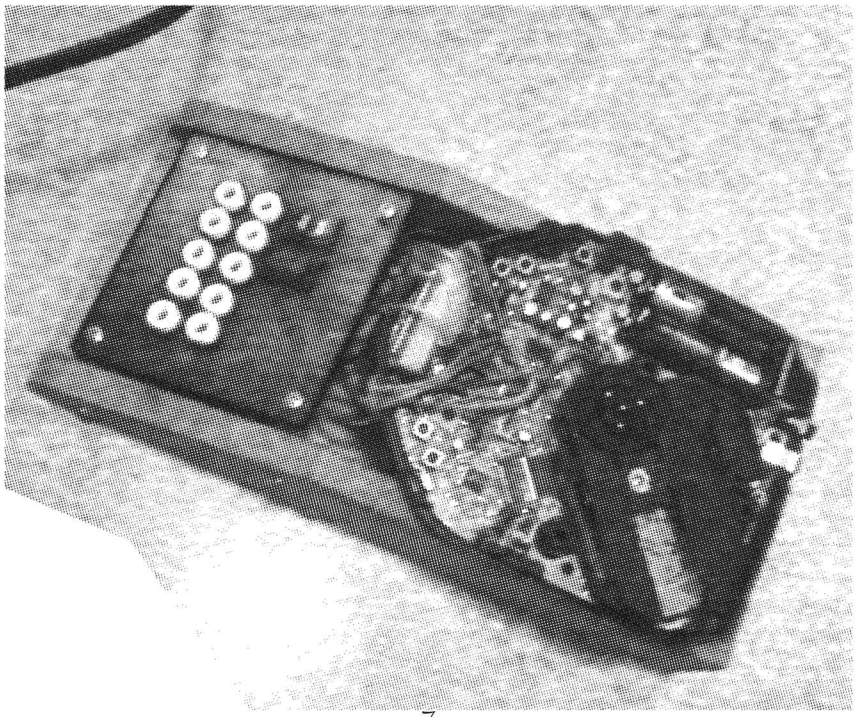
Posted on December 12, 2012

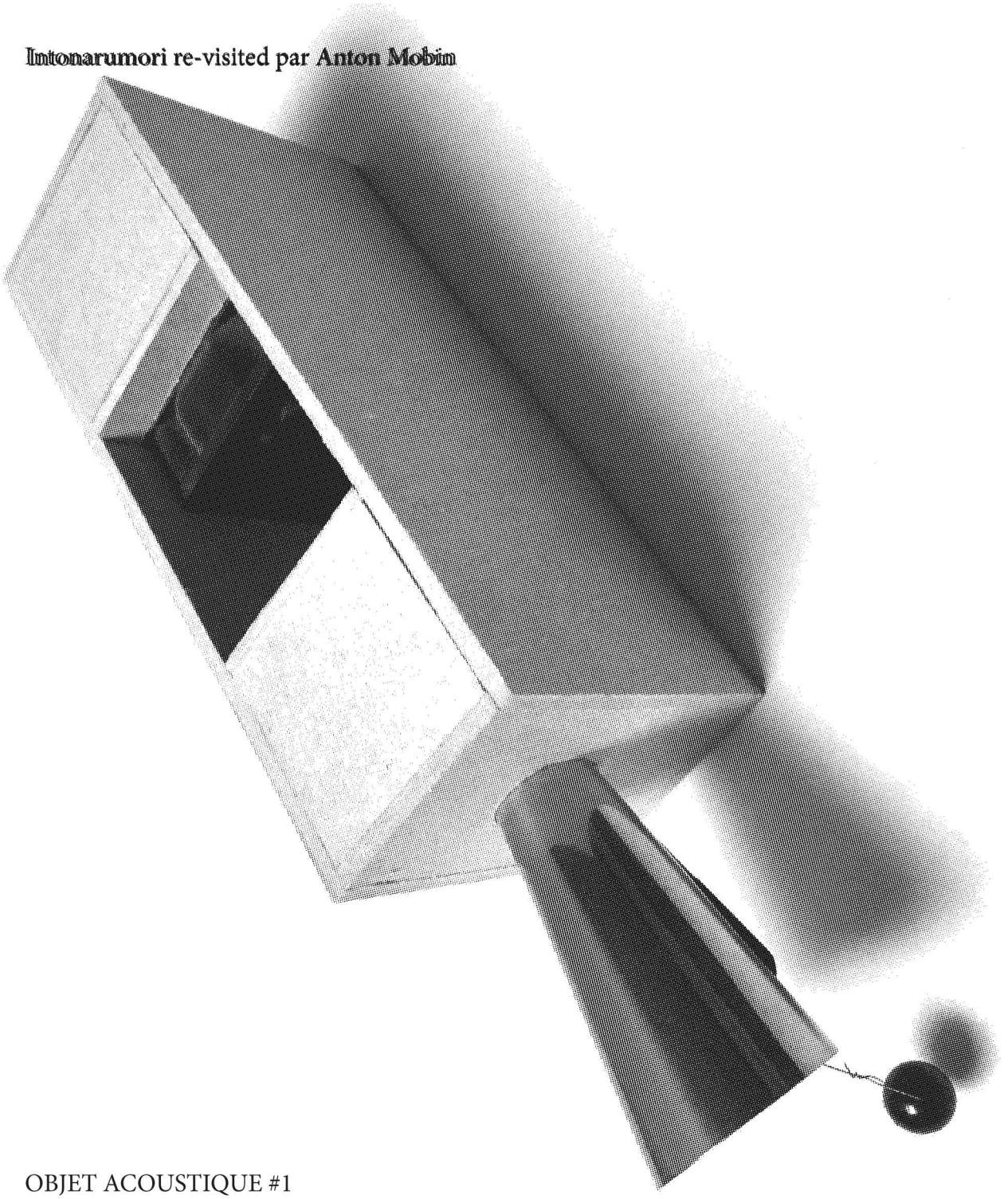
Finishing touches–

Now, at the moment, one could push play, but nothing will happen.

This is because of a small button in the lower left of the CD player that prevents it from playing discs when the lid is open.
It's pretty tiny and my phone takes awful pictures, but here's what it looks like (for what it's worth)
Apply crazy glue to stick it down and… We're finished!







OBJET ACOUSTIQUE #1
Audio > https://middleeightrecordings.bandcamp.com/track/13-objet-acoustique-1

L'obtention du son se fait par pression du bouton poussoir situé au dos de l'objet, ce qui actionne le ventilateur et opère une rotation rapide de la corde de guitare à l'intérieur du cône en aluminium. La perle située à l'extrémité du cône vient aléatoirement heurter le bord du cône ce qui amplifie l'effet percussif.

OBJET ACOUSTIQUE #2
Audio > https://middleeightrecordings.bandcamp.com/track/14-objet-acoustique-2

L'obtention du son se fait par pression du bouton poussoir situé au dos de l'objet, ce qui actionne le ventilateur et opère une rotation rapide de la corde de guitare à l'intérieur du cône en aluminium. Les cinq graines enfilées dans la corde viennent aléatoirement heurter l'intérieur du cylindre ce qui procure un effet percussif différent.

(4.1-2.1)-§ **151**-*Primitieve hoorns en trompetten – natuurvoorwerpen.* Overal over de wereld vinden wij instrumenten uit deze groep – wij noemen slechts *schelphoorns* (zoals de *quiquiztli* uit Mexico – bij de Indianen aldaar in gebruik bij bezweringsrituelen) de hoorns die ècht hoorns zijn – namelijk *runder-* of *buffelhoorns (koehoorns)* (zoals de *tuda* uit India) – de *ramshoorns* (zoals de *sofar* uit zowel het oude als het nieuwe Palestina/Israël) – *bokshoorns* (zoals de *prillarhorn* uit het Noorse hooggebergte – een instrument met 3-5 greepgaten in de wand geboord) – de *antilopenhoorns* (die we overal in Afrika kunnen vinden onder voor ons duistere namen als *barugumu* – die, tussen twee haakjes, een voorbeeld vormt van een hoorn met aanblaasgat aan de zijwand van de buis – *ikondi, mangval* etc.) – *kalebashoorns – schedelhoorns – beenderhoorns* etc. Het spreekt vanzelf dat al zulke instrumenten het 'mondstuk' ontberen.

(4.1-2.2)-§ **152**-*Eenvoudige hoorns en trompetten – kunstvoorwerpen uit natuurmateriaal.* Deze instrumenten vinden we in nog veel grotere getale overal over de wereld verspreid – zelfs in Europa! Want de Nederlandse (Twentse) *midwinterhoorn*, de Scandinavische *lur*, de Roemeense *bucium*, de Baltische *truba* en de Oostenrijks/Zwitserse *Alphorn* behoren in deze groep thuis; deze instrumenten zijn eveneens (vaak) mondstukloos; bij de Alphoorn is de boring (bewust) onregelmatig, zodat de 'fa' te hoog klinkt: de beroemd/beruchte 'Alphoornkwart'. Maar ook buiten Europa vinden we de hoorns en trompetten uit deze groep in grote aantallen: India: de *venu* die van bamboe wordt gemaakt, de *turi* die gebruikt wordt bij verbrandingsrituelen, de *tarai*, die geblazen wordt bij de dodenwacht, in een eindeloze antifonie, een instrument dat heinde en verre te horen is, de *karna* voor vreugdevollere gelegenheden. Arabië en andere landen uit het Nabije Oosten: *kornai* (verwant met de Indiase karna), een tot bijna drie meter lange metalen trompet van primitieve makelij, de *saipur*, die – ongeveer als bij onze trombones – een halve toon verstemd kan worden door een soort 'coulisse' vlak bij het mondstuk, de *nefir* of *nafir* – het kleinere familielid van de kornai. Siberië: de *byrgy*, een jagersinstrument waarin men niet blaast, maar waaraan men zuigt: men trekt de lucht 'tegen de draad in' door het aanblaasgat. Het geluid schijnt de roep van het hertenwijfje volmaakt te imiteren – wat de bedoeling is: zo wordt het mannetje gelokt.

The Two Perfect Loops

I read an interview with David Chandler in THUMBzine, in which he mentioned having discovered the ideal length of tape to make loop cassettes. I emailed him, and here's the info he kindly provided me with!

I reproduce it here for the edification of all, so get looping!

Hey, I looked at the numbers: they are **235mm** and **372mm**. The longer one is tricky to figure out the way to thread it: you have to make the top of the loop go under one of the reels and then over and the loop goes around the other reel if that makes sense.... kind of a pulley-locking threading... one of the reels is just a corner around which both sides of the loop come together and over to actually loop around the other reel, er.... maybe I can draw it

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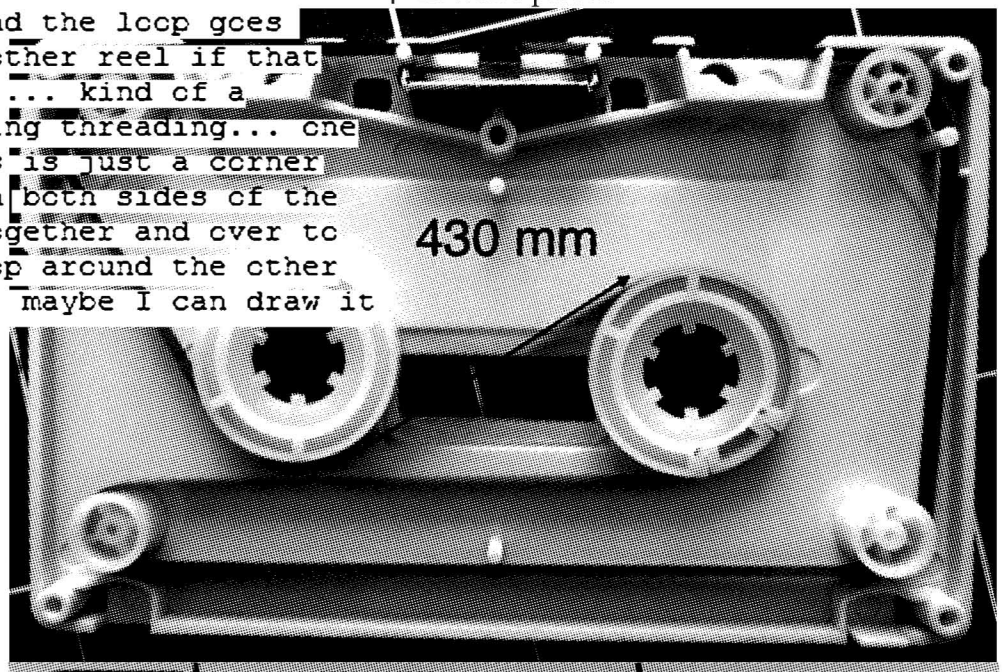
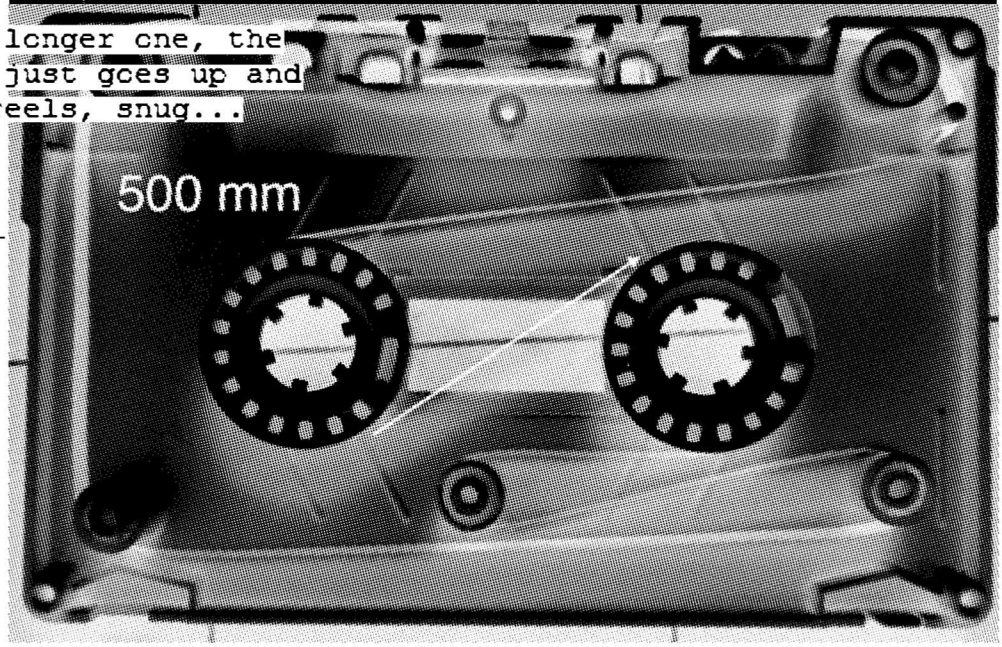
that is the longer one, the shorter one just goes up and around the reels, snug...

David

Zalhietzli on the Maniacs Only forum was kind enough to diagram some alternate designs for a loop cassette, using extra capstains stuck in weird places:





Knife, Fork and Spoon: being a short discourse on the playing of cutlery in the 21st Century

This story is not about the bistoury. It's about eating irons. Flatware. And how to play them. I think we would all agree that they are idiophones. Complete idiophones. Bloody idiophones.

But what are idiophones ? Well, the actual body of the instrument produces the sound. No additional encumbrances. So, now that's cleared up, shall we consider the individual utensils ?

Knife

Having said that, the most common way of playing a knife is to place the blade flat onto a table and pluck the handle. It's known as twanging. So technically it is a reverse lamellaphone – and I make no apologies for leading you up the garden path there.

I asked one noted knife player, who goes under the ridiculous nom de couteau of Faux Knife, if he/she employed any other mode of playing. He/she said there was another way: the criss-crossing of blades. So, two knives I said. He/she nodded.

Fork

I guess it's a sign of the tines, but there really ain't much fork playing these days. One of the best players in the business, Guy Forks, retired 20 years ago. He lives in Peacehaven now. I met him at Pete's Haven, a café in town, for a masterclass of in the art of prong plucking.
'Every fork is different' he told me, 'even the ones that sound the same'.

Spoon

You may have seen a man walking backwards in 'Repulsion'. He was playing the spoons. Although I wouldn't recommend this in areas of heavy traffic. In some quarters, they are known as the 'Cockney Castanets' – and they do bear an auditory resemblance to those Iberian idiophones. A man called Sam played them in the Bonzos. Then there was Spoon Lucifer himself. There are many virtuosi nowadays, so I prefer to play them badly.

In conclusion, you may find it interesting to know that the playing of cutlery is now on the upturn.
Bands are forming in places like Lower Cirencester and West Grinstead. So, run to a kitchen drawer – and see what's there.

Jonathan Bohman

Some Sound Observations

PAULINE OLIVEROS

Composer Pauline Oliveros (1932–) played a key role in the development of a range of contemporary musical practices: tape music, electronic music, experimental music, minimalism, World Music, and Ambient music. In the early 1960s, she co-founded the San Francisco Tape Music Center, one of the first electronic music studios in the United States. She is well known for a series of haunting electronic pieces (among them *Alien Bog*, *Beautiful Soop*, and *Bye, Bye Butterfly*) that make use of analog electronics and tape delay systems. More recently, Oliveros has built her music around drones generated by her just-tuned and often electronically processed accordian. Throughout her career, Oliveros has actively advocated for the recognition of women composers both in her writings and through the Pauline Oliveros Foundation, inaugurated in 1985. The following piece was comissioned by *Source*, a San Francisco-based magazine that documented the American experimental music scene in the late 1960s. The article exemplifies Oliveros' lifelong investigation into the process of listening, its centrality to composition, and its importance for a holistic conception of human existence.

As I sit here trying to compose an article for *Source*, my mind adheres to the sounds of myself and my environment. In the distance a bulldozer is eating away a hillside while its motor is a cascade of harmonics defining the space between it and the Rock and Roll radio playing in the next room. Sounds of birds, insects, children's voices and the rustling of trees fleck this space.

As I penetrate the deep drone of the bulldozer with my ear, the mind opens and reveals the high pitched whine of my nervous system. It reaches out and joins the flight of an airplane drone, floats down the curve of Doppler effect.

Now, fifteen minutes since the beginning of this writing, the bulldozer has stopped for a while. The freeway one-half mile away, unmasked, sends its ever-shifting drone to join with the train whistle from Encinitas.

The bulldozer starts again moving the air like an audible crooked staircase before reaching its full power. As I lean on my wooden table, my arm receives

sympathetic vibrations from the low frequencies of the bulldozer, but hearing seems to take place in my stomach. A jet passes over. Some of its sound moves through my jawbone and out the back of my neck. It is dragging the earth with it.

I would like to amplify my bowl of crackling, shaking jello. (Once in 1959 a bulldozer came through the side of my house while I was eating lunch. The driver looked at me, backed out, and continued to operate the bulldozer.)

I would like to amplify the sound of a bull dozing.

The bulldozer has stopped again. On the other side of the freeway, a dog repeats a high bark which curves downward. My dog has a tinkling collar. I would like to find a free way.

Three days ago at UC Davis, I experienced a magnificent performance of Bob Ashley's *Wolfman*. My ears changed and adapted themselves to the sound pressure level. All the wax in my ears melted. After the performance, ordinary conversation at two feet away sounded very distant. Later, all ordinary sounds seemed heightened, much louder than usual. Today I can still feel *Wolfman* in my ears. MY EARS FEEL LIKE CAVES. Monday I am going to hear *Wolfman* again. It will be the fourth time I've heard *Wolfman,* and I can't wait to hear the feedback dripping from his jaws again.

My present bulldozer has started and stopped again. A faraway jet simulates a fifty foot tabla, accompanied by an infinite freeway tamboura.

I am tired of writing this article, but not of the opportunity it is giving me to listen and remember. My chair is creaking as restlessness grows. I wonder what God's chair sounds like? I would like to amplify it. I would like to amplify a spider spinning its web.

Loren Rush calls his new work Theater of the Mind. Since last night, he is still playing and singing in the theater of my mind.

The bulldozer remains silent. A very low frequency is shaking my belly. (7 Hz at high intensity can make you sick or kill you.) It is an automobile becoming more apparent as it passes, now accented by a motorbike.

(Once in a half-waking state, my head was held hard against a wall by the sound of a model airplane motor. I thought some cosmic dentist was drilling for my mind's tooth.)

The breeze is rising and blowing my papers about the table. The rustling in the trees sounds like tape hiss until it mixes with the next plane overhead.

Recently, a young man described his experience working in proximity to jet engines. After overcoming fear of the sound, he began to find sounds to listen to, such as small tinklings within the engine.

Why can't sounds be visible? Would the feedback from ear to eye cause fatal oscillation? Can you remember the first sound you ever heard? What is the first sound you remember hearing?

Why shouldn't a music department in a university devote itself entirely to music since 1950? Without a substantial body of new literature and instrumentation, the symphony and opera will become defunct—dead horses in the 21st Century. Who cares.

I often think of the title of one of La Monte Young's pieces which I have not yet had the pleasure of hearing: *The Second Dream of the High Tension Wire.*

In the Schwann long-playing record catalog there are special sections for railroads, sound effects, sports cars, test records, and honky-tonk piano, but none for electronic music.

When a concert pianist is on tour, he usually finds a tuned Steinway grand piano to play. What kind of sound system does the electronic musician find?

When I stopped writing yesterday, I went on listening. I attended dinner in a Syrian restaurant and ate a concert with my *Wolfman* ears. The house lights dimmed to a singing SCR (Silicon Controlled Rectifier). Spots came up and the bassoon soloist walked on the stage, bowed to the applause, walked off again and told someone to turn off the heating fan which was playing a duet with the SCR. He returned, bowed again to the new round of applause. His taped accompaniment began. I heard trees rustling in the speakers.

Loren Rush has synthesized a bassoon sound at the artificial intelligence center at Stanford. With John Chowning's programming, he can make it move in circles, ellipses, or figure-eights around two speakers. He can make the synthesized bassoon do a *glissando*. Loren has a lecture entitled "A Day in the Life of a Plastic Bassoon."

Next, a quiet trio played in the manner of Morton Feldman: accented, perfectly-cued car drones.

I listened to a Schubert octet in the recording engineer's sound booth. The speakers added their characteristics to the orchestration. As we watched the audience, the engineer said, "Those people are not listening to the music as it was intended. They should be having dinner."

I am inside my house now. Outside, sounds are attenuated by the insulation. I hear a dripping faucet and the ticking of my cuckoo clock. They combine and are joined by the refrigerator. The planes from Palomar Airport dwindle in through the furnace openings.

I have listened to many refrigerators. There is often a flickering between the sixth and seventh harmonic. Once, while in the process of drinking ouzo with David, Bob, and Orville, a refrigerator sent its harmonics out to surround my head with circles, ellipses, and figure-eights.

In 1963 I made a tape piece for dancer Elizabeth Harris. It was made from piano sounds. On the night of the first performance, I stood in the wings prepared to start the tape recorder. Suddenly, I heard the opening sounds of my piece, but the tape transport was not moving. The dance involved a mobile that was suspended from a strand of piano wire. When the mobile was lowered, it moved like a pendulum, causing the piano wire to vibrate.

In New York, Terry Riley led me fifteen blocks out of our way to hear a building ventilator. I wonder what microbes hear?

Sitting in a parking lot on my third day of article writing, I could listen to the stereophony of car starter gagglings, motor wigglings, door squeals, and "bilaps" forever. It's almost like Debussy, compared to Saturday's Wagnerian bulldozer.

The best part of Lincoln Center is the tunnel from the IRT to the Beaumont Theater. Walking toward the theater, my footsteps greeted me from the approaching wall; midway, they followed me from the opposite wall. I listened to this more than one hundred and fifty times—an Alice in Tunnelland—while moving from the saga of subway sound to Brechtian music drama.

"If the moon is ever visited, one feature of its environment will be known beforehand with certainty; the wastes will be noiseless except for vibration transmitted through the solid surface. Since there is no gaseous atmosphere, there can be no tread of footsteps heard, no rustle of clothing, and if an obstruction is dyna-

mited, the debris will fly apart silently as in a dream." (Edgar Villchur: *Reproduction of Sound*)

During the quiet evening of a summer vacation near the Feather River Canyon, Lynn, Bob, and I wanted to play music. We decided to read John Cage's *Atlas Eclipticalis* from the original score, which was shining brightly above.[1] The canyon creatures joined us as we played, and we played until our awareness became imbedded in the canyon and summoned a ghostly, floating train, an apparition of metal meeting metal, reflected doubly, triply, endlessly from the canyon, from the mind, from the flickering passenger windows, the rumbling ties, OUR EARS FELT LIKE CANYONS. We didn't speak until morning.

One's ideas about music can change radically after listening to recorded works at fast forward or rewind on a tape recorder. Ramón Sender arranged Wagner's *Ring Cycle* by a series of re-recordings at fast forward to four successive clicks. "The auditory basis of obstacle detection by bats was independently recognized in 1932 by a Dutch zoologist, Sven Dijkgraaf, who made a careful study of these faint, audible clicks and noted how closely they were correlated with the echo-location of obstacles. This is an example of the need for care, patience, and appropriate conditions if one is to notice and enjoy some of the more fascinating facets of the natural world." (Donald R. Griffin: *Echoes of Bats and Men*)

According to Loren Rush, the reason for studying counterpoint is that you may have to teach it some day.

"Airborne sound waves are reflected back almost totally from the water, and underwater sound is equally well reflected back downward from the surface . . . once proper equipment was available for converting underwater sound to audible airborne sound . . . underwater listening became refined enough and common enough to reveal the immense variety of sounds used by marine animals." (Ibid)

In most schools and universities the language laboratories are better equipped for sound processing and modifications than the music departments.

Human hearing is non-linear. Our ears are less sensitive to low and high frequencies approaching the limits of audibility. Our ears are most sensitive at about 3000 Hz where some people can hear collisions of air molecules.

A fast sweep of the audio range by a tone generator can produce a click.

"Some animals, notably insects, do not have ears in their heads but in such unlikely places as legs (some crickets) or the thorax, the 'middle' portions of the insect body to which the legs attach (some grasshoppers)." (Bergeijk, Pierce & David, *Waves and the Ear*)

I stopped writing yesterday in order to go on listening. Monday's performance of *Wolfman* was somewhat marred because the sponsors failed to provide proper speakers and amplifiers. I heard Wolfman's ghost drooling feedback.

Many music departments are more concerned with analysis than communication.

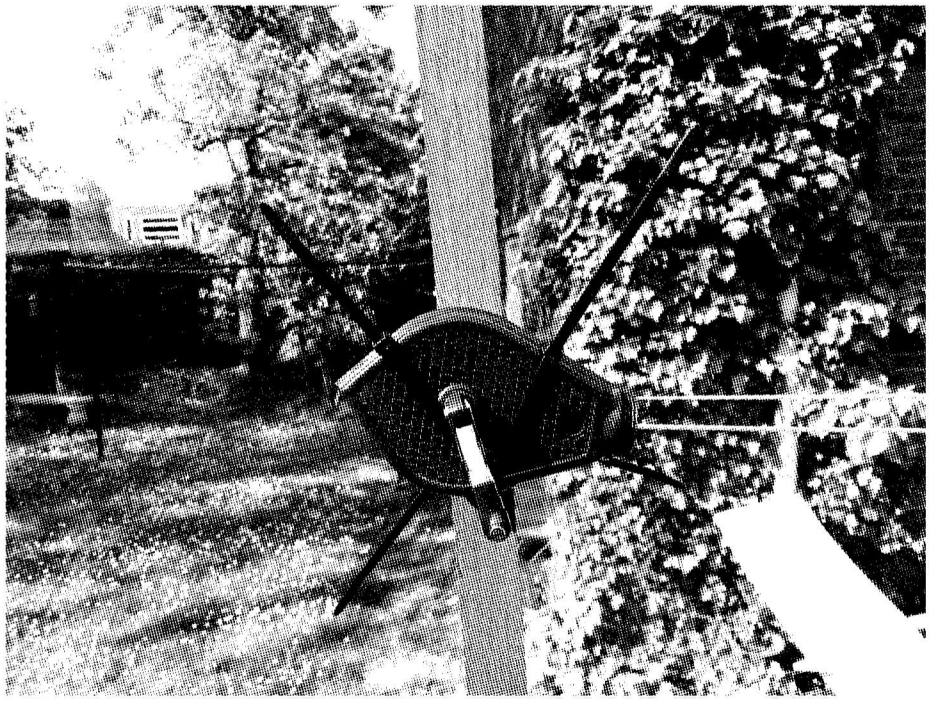
When I was sixteen, my accordion teacher taught me to hear combination tones. The accordion is particularly able to produce them if you squeeze hard enough. From that time, I wished for a way to eliminate the fundamental tones so I could listen only to the combination tones. When I was thirty-two, I began to set signal generators beyond the range of hearing and to make electronic music from amplified combination tones. I felt like a witch capturing sounds from a nether realm.

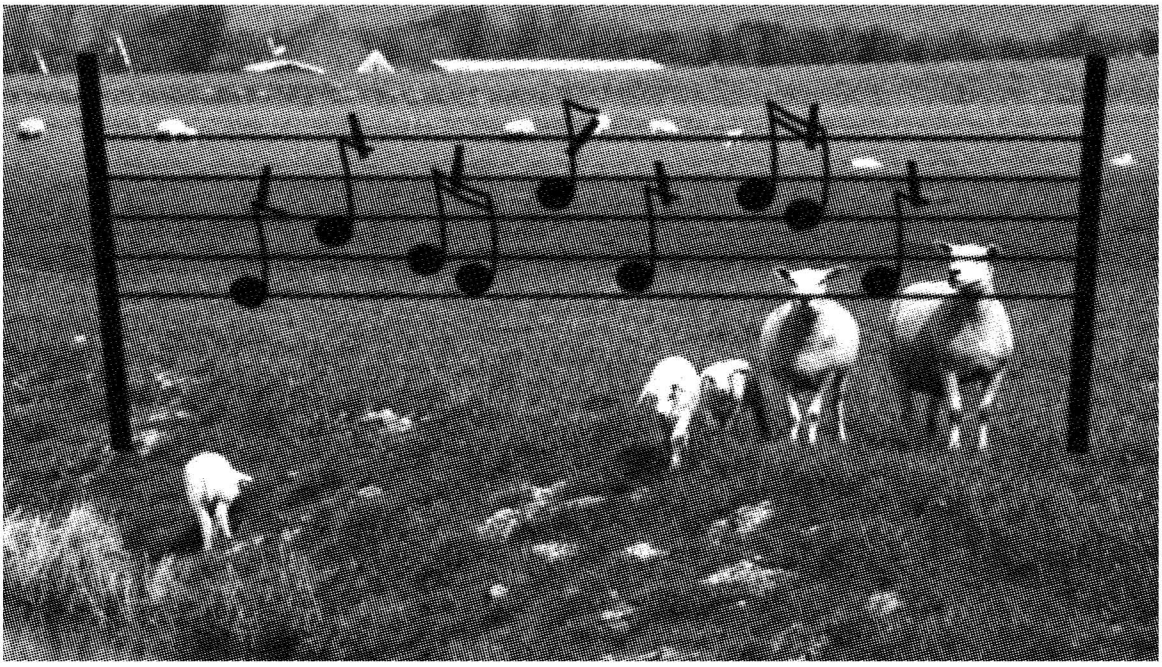
In one electronic studio I was accused of black art, and the director disconnected line amplifiers to discourage my practices, declaring that signal generators are of no use above or below the audio range because you can't hear them. Since all active processing equipment contains amplifiers, I found that I could cascade two pieces of equipment and get enough gain for my combination tones to continue my work, plus the addition of various amplifier characteristics as orchestration. I worked there for two months, and, for recreation, would ride my bicycle to the town power plant where I would listen for hours to the source of my newly-found powers.

Saturday's bulldozer has gone away. The birds and insects share the air with waxing, waning plane and car drones. The insects are singing in the supersonic range. I hear their combination tones while the insects probably hear the radio frequency sounds created by motor drones, but not the fundamentals. If we could hear the micro-world, we would probably hear the brain functioning.

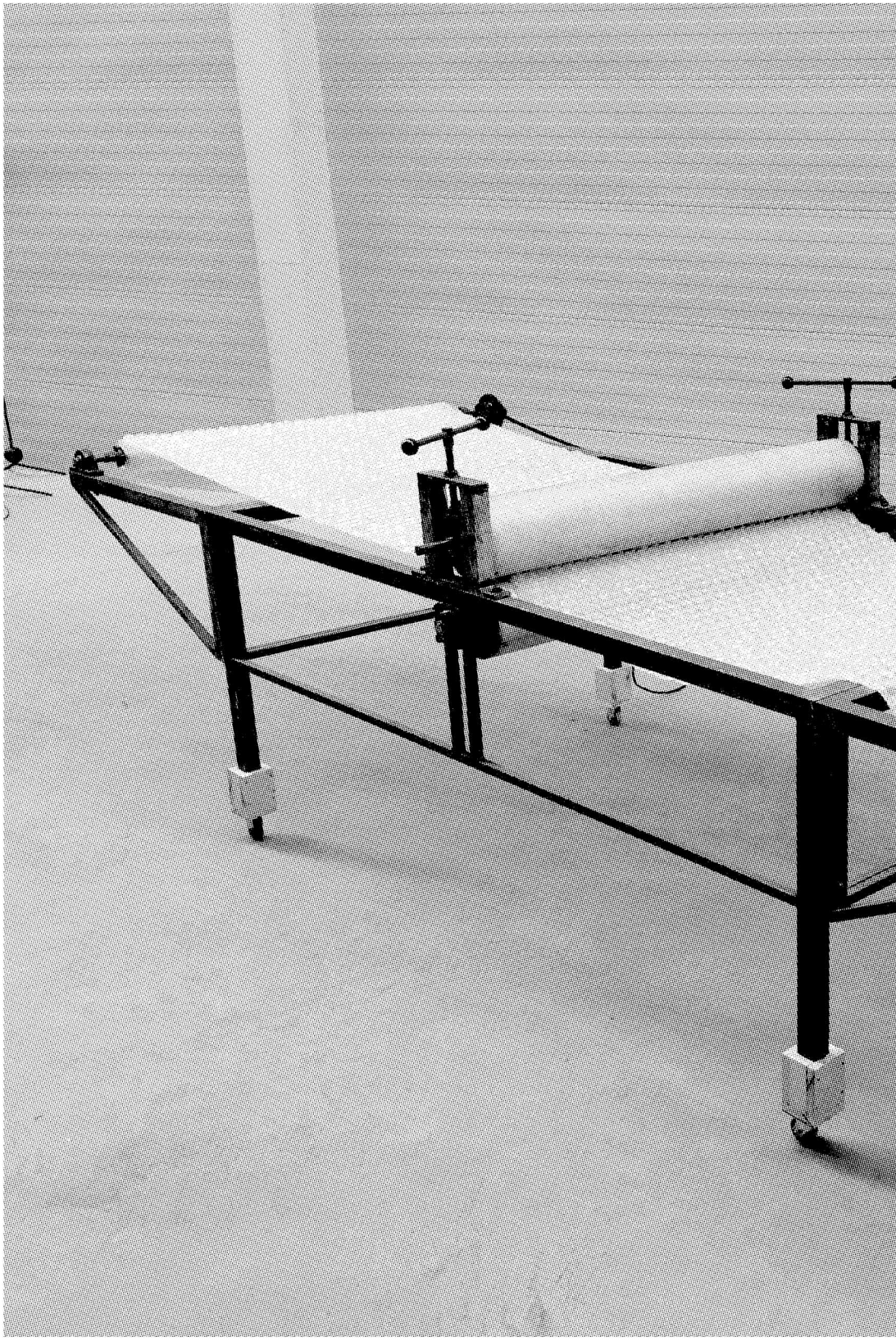
NOTES

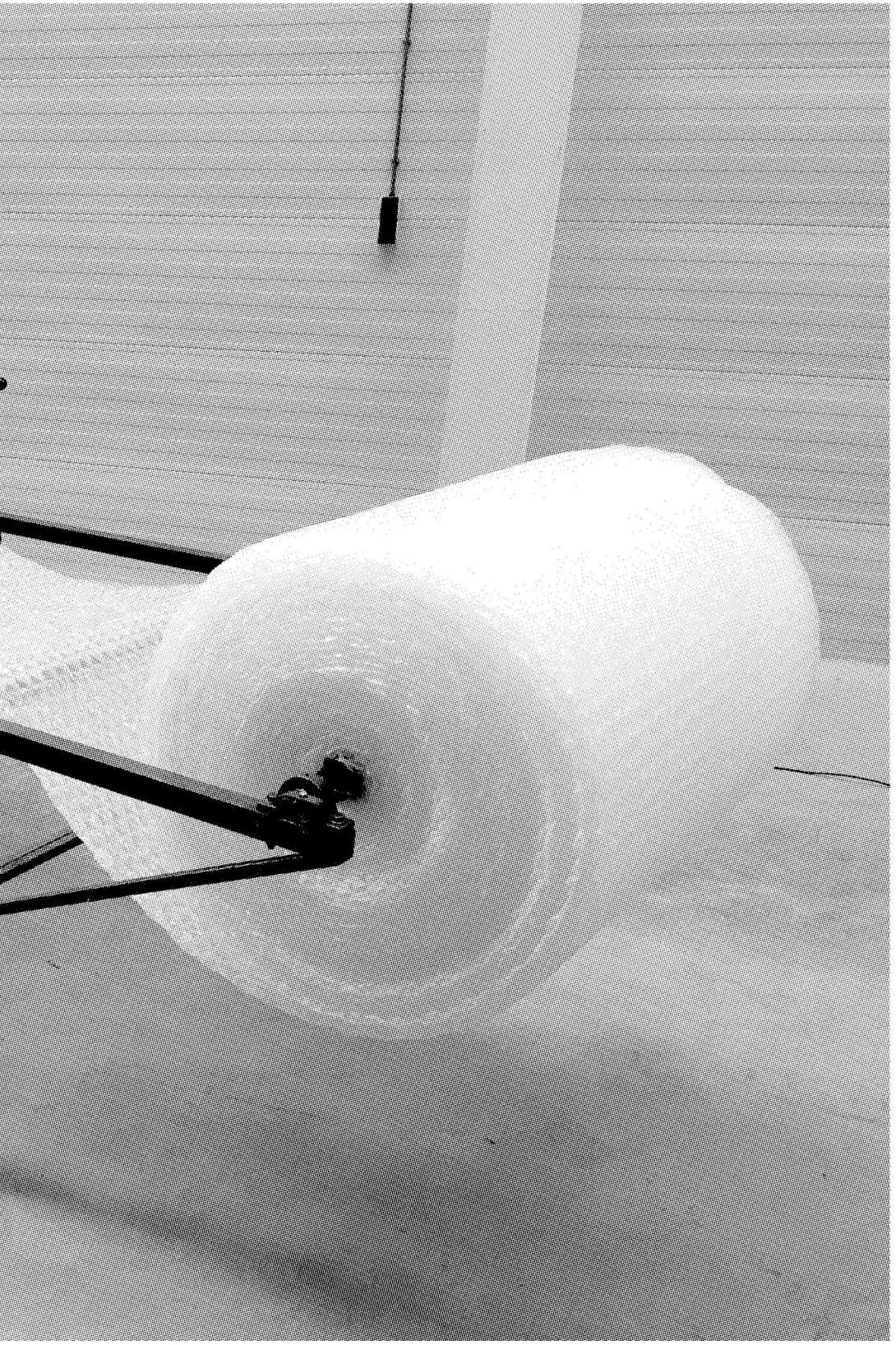
1. [*Atlas Eclipticalis* is a graphic score rendered from star charts —Eds.]





The *Portatrabem* is a portable music staff that allows composers to compose with their direct surroundings at any place, any time. The prototype consists of five adjustable reels, each corresponding to one line of the traditional music staff. These are connected by rope across a distance of 5 meters, to a pole that can be read as a bar line. With the help of squeezers composers can add any element they like, from traditional music notes to graphical components such as leaves and fish. Each line can be moved independently by turning the reel handles, which are amplified to sonify the very act of adjusting the score.

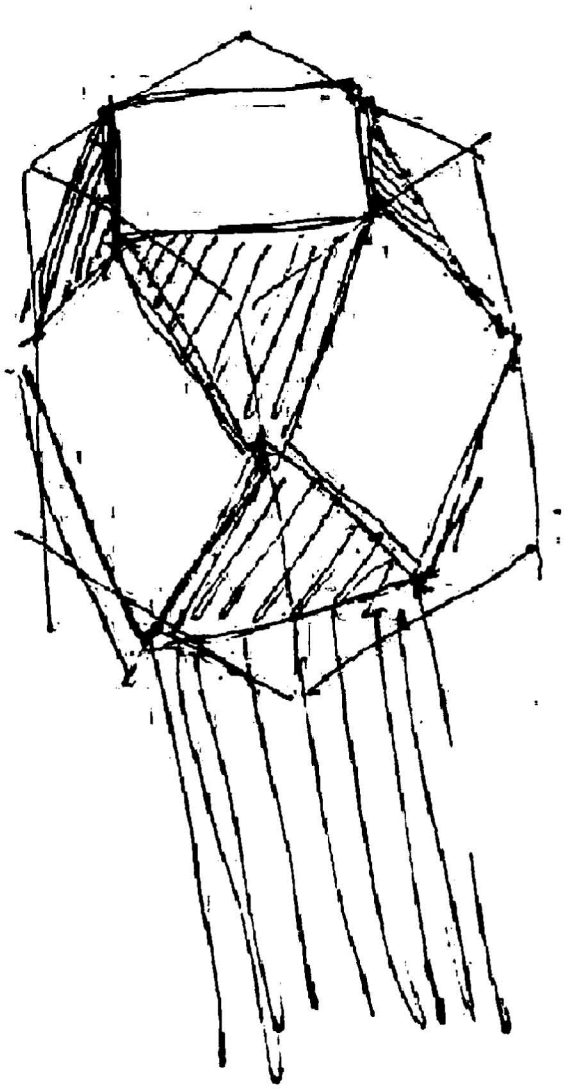




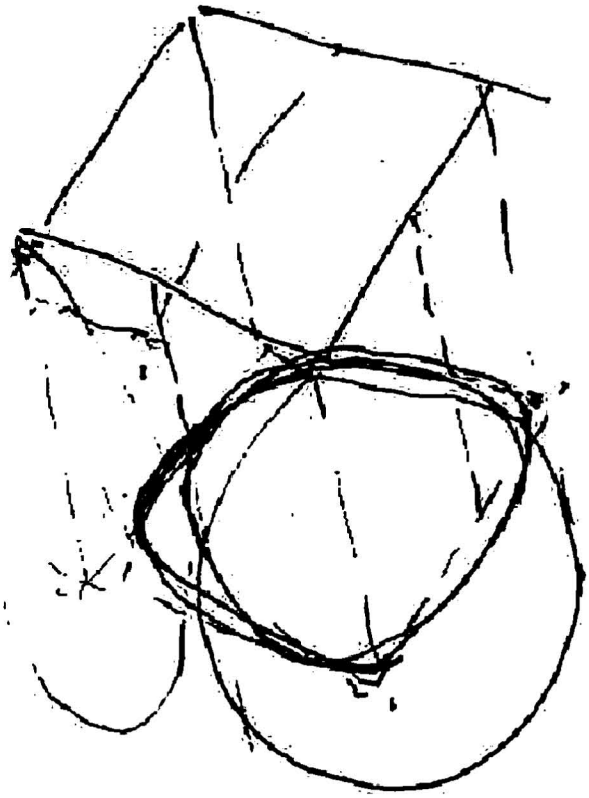
Peter Zegveld - Noppenfolie Vernietiger 1987.jpeg

talking to the spirits and listening back

In the long tradition of kiting, the soundkites are a vertex of kite-culture, due to their use of winds for sonic purposes. Since windsounds are associated with the ghostly and the spiritual, they can literaly cary you away into the world of acoustic ecologies of any times and tell stories you have never heard before. The soundscapes that occur, seem innitely connected to the landscapes, the skies and the weather conditions.

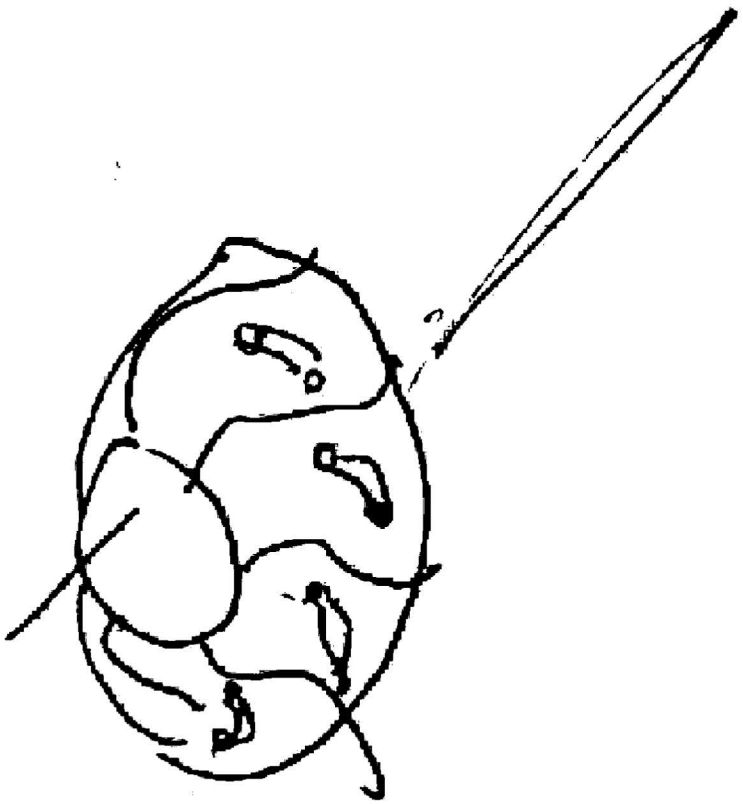


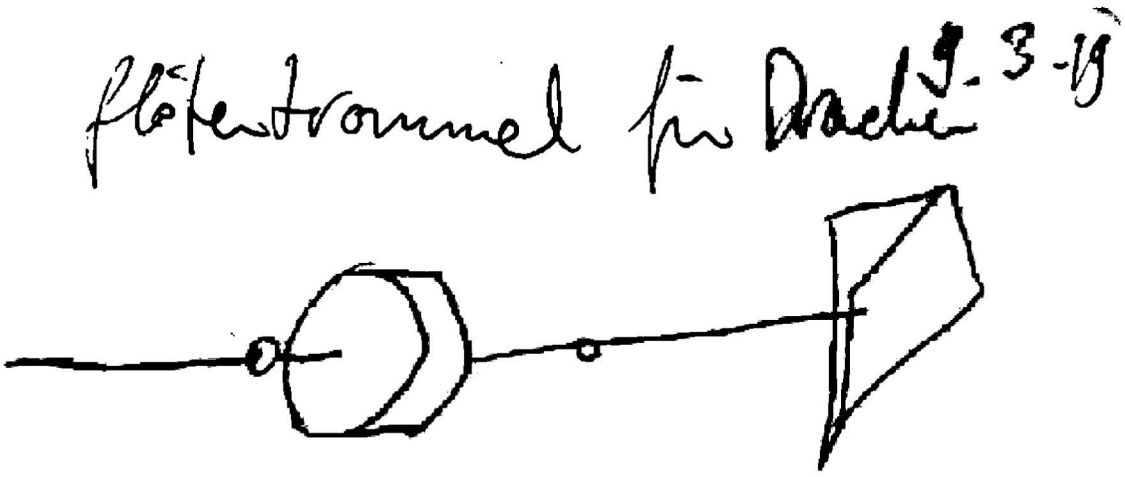
sound culture in the Air!



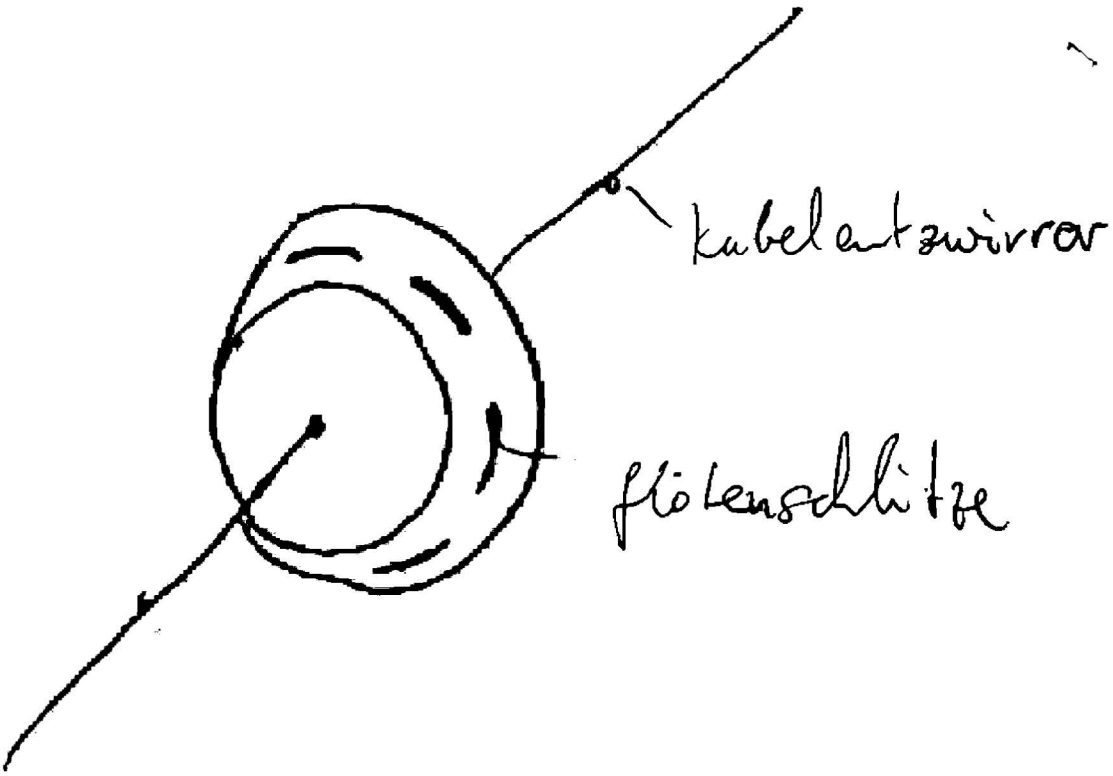
Soundkites are skyrocketing!
Even a bluetooth boombox
can be lifted into the sky
till you reach the end of the
signal of your device.

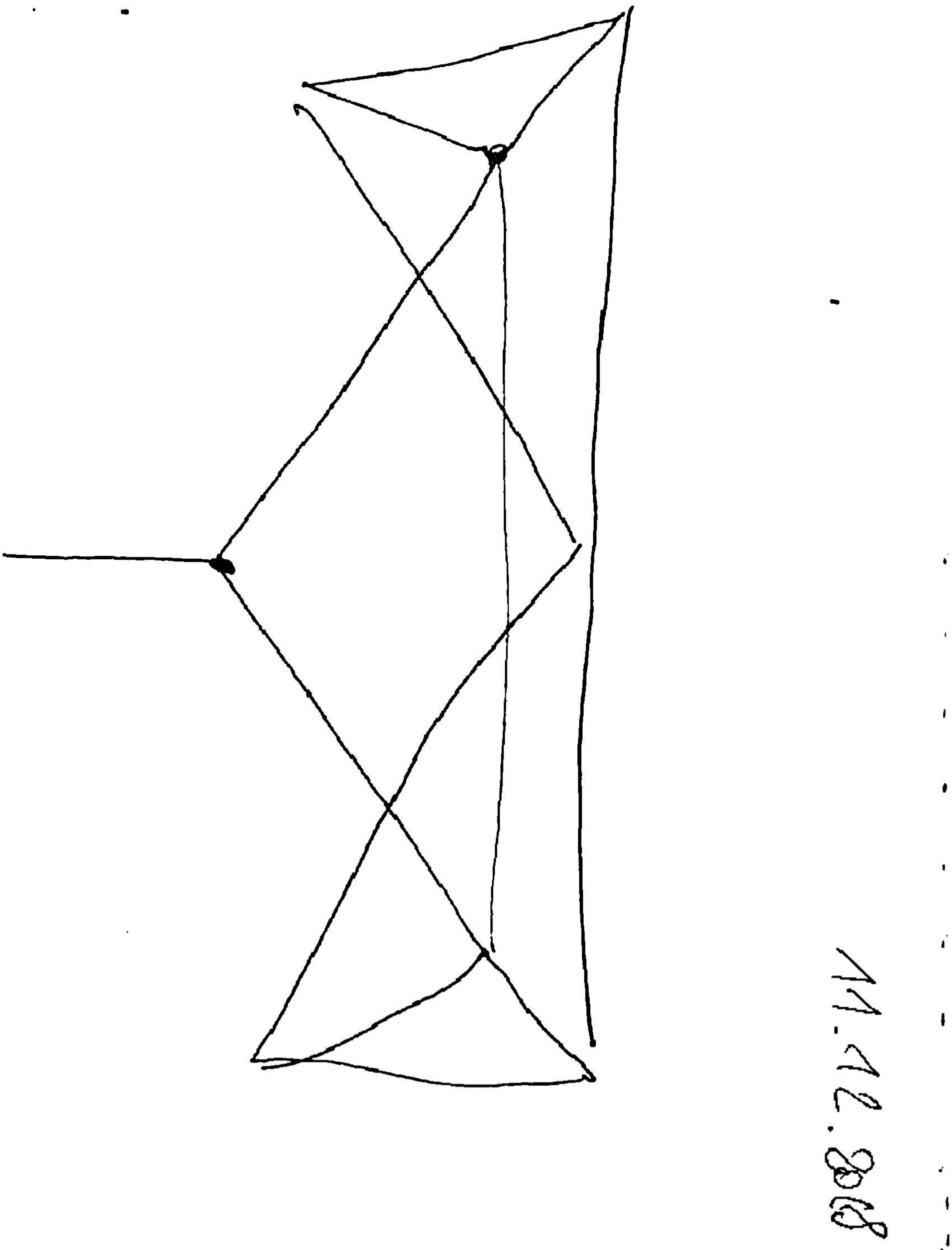
swirrling, sizzling and moving sounds are triggering the ears in the rm wind. Howling for the spirits that seem to trust the aeroacoustic frame of the project.



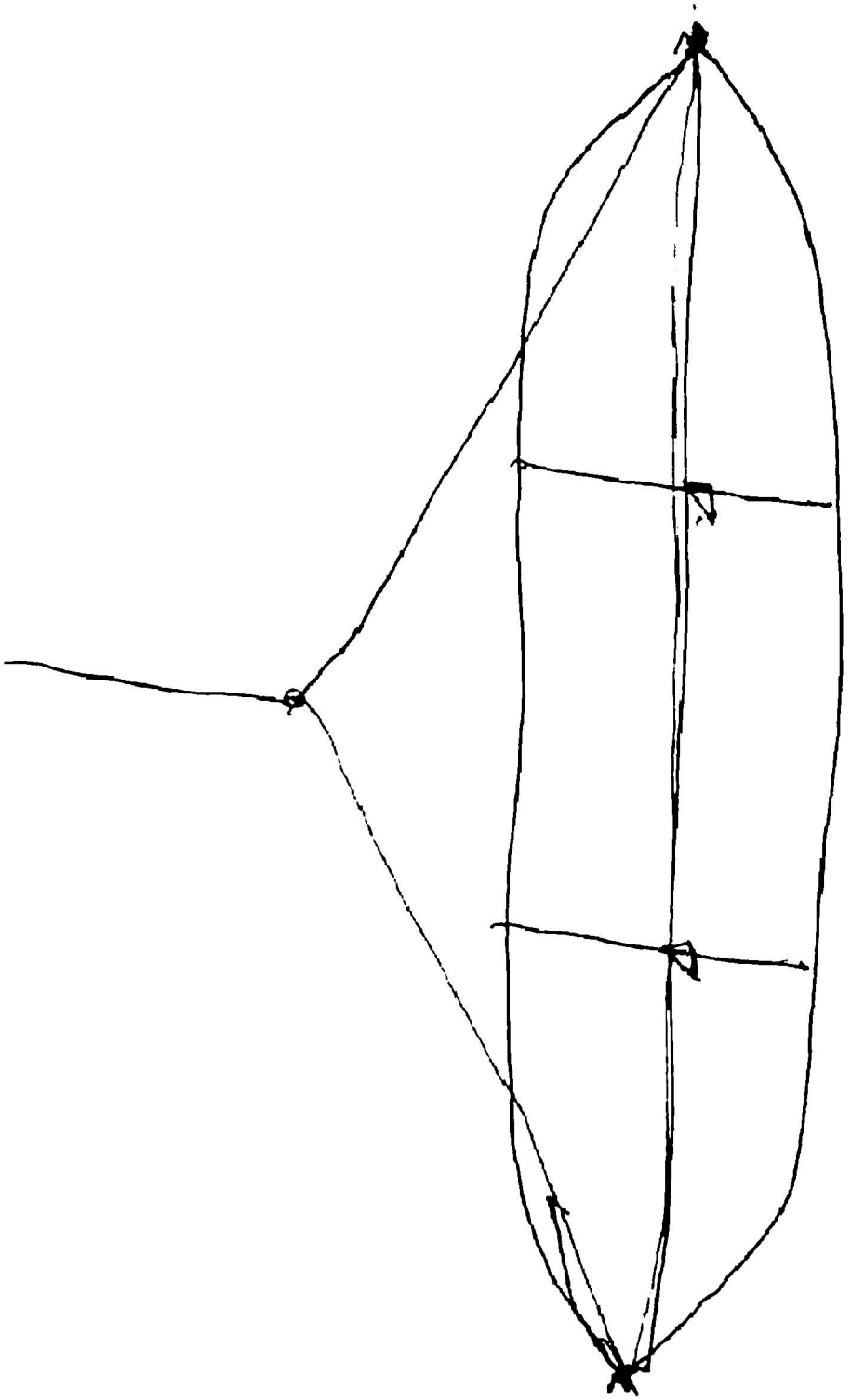


Flutes, drums, or flutedrums and kites work great together!




11.12.2018

String (buzzer) attached to the outher span of the kite



Matrices

David Tudor, one of the pioneers in the field of live electronic music (see "David Tudor and *Rainforest*," chapter 8), used mixer matrices to combine relatively simple circuits into networks that produced sound of surprising richness and variation. Instead of simply mixing a handful of sound sources down to a stereo signal, Tudor interconnected sound modules with multiple feedback paths and output channels. The recent rise of the "no input mixing" school of internal machine feedback has exposed a new generation of musicians and listeners to the possibilities of matrix feedback. Consider the 3 × 3 matrix mixer shown in figure 27.5.

You will notice that the design is similar to that of our basic mixer in figure 27.1, but here each input signal is connected to three pots instead of one, and we have three output

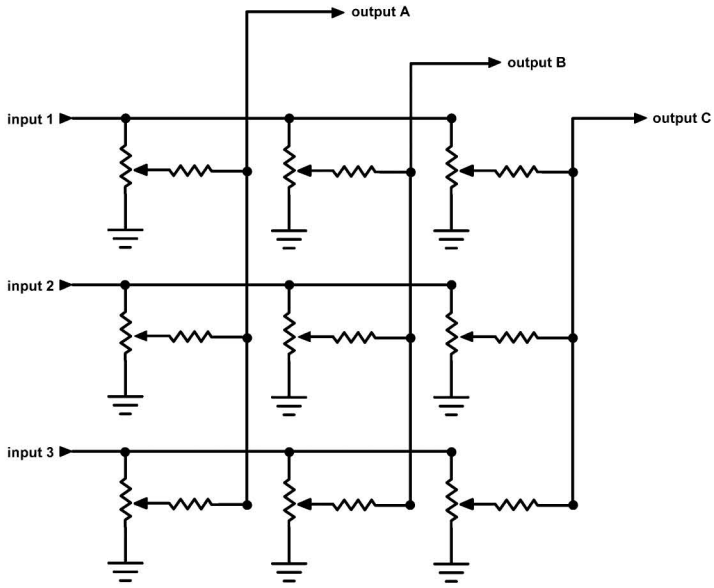


Figure 27.5 3 × 3 matrix mixer.

buses instead of one. You can expand this circuit with as many pots and jacks as you need and can afford.

Connect a few circuits, including both sound *generating* circuits, such as your oscillators or toys, and some *processing* circuits, such as the photoresistor gate, the distortion circuit, or any guitar pedal (such as a delay, wah-wah, or graphic equalizer). Send one output of the matrix to an amplifier for listening, and the others can be sent to the inputs of your circuits. By adjusting the levels of the various pots you can create a pretty straightforward signal path (toy through distortion to speaker) or a more devious one (toy through distortion to speaker, distortion also to delay which goes both to speaker and back into its own input).

The piezo-driver pseudo-reverbs we discussed in chapter 8 work very well in these configurations. Some of the most unassuming rock pedals reveal astonishing musicality when placed in feedback loops. Incorporated into matrices, time based effects (such as delays and flangers) contribute a wonderful instability that transforms a table of commonplace effects into a richly challenging performance instrument (see figure 27.6) .

If you intend to use a matrix to generate feedback you will need some gain, which you can provide with the simple 4049 preamp circuit of chapter 23, or using effect pedals that include a gain stage. Feedback matrices benefit greatly from the inclusion of some kind of equalization, to aid in steering pitch response and nulling out unwanted shrieks—a simple graphic EQ effect pedal provides both the requisite level boost and useful frequency shaping.

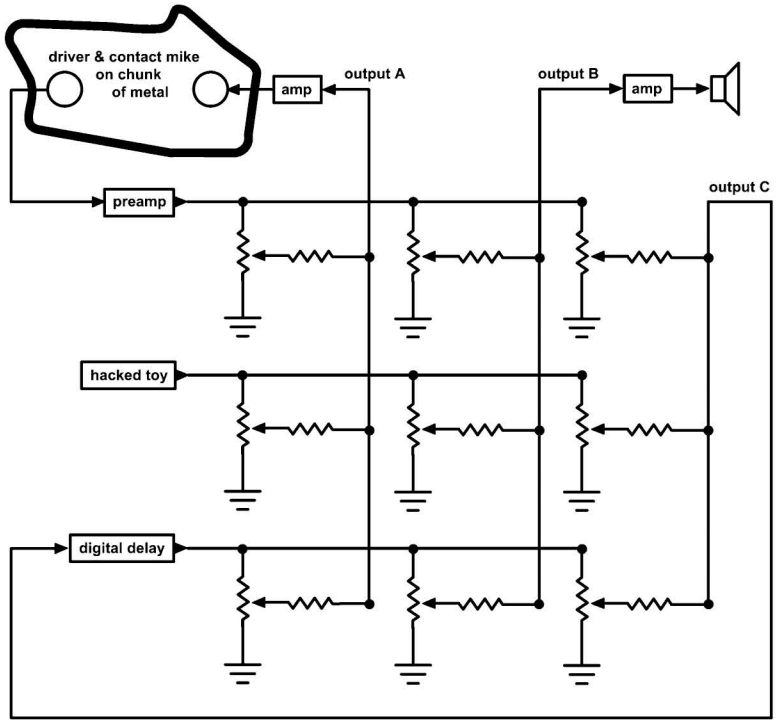


Figure 27.6 Circuits in a matrix.

Computer Keyboards

Discarded computer keyboards roam contemporary urban streets like unwanted mutts in Latin America. While bereft of cool wet noses or beseeching brown eyes, these electronic strays can nonetheless prove friendly companions. A computer keyboard consists of a switch matrix: instead of each key closing two discrete contacts, it bridges specific lines in an X–Y grid, as shown in figure 27.7.

Pressing Key 1 connects horizontal row 1 to vertical column A, Key 3 connects row 1 to column C, Key 4 connects row 2 to column A, etc. In a computer keyboard there are enough rows and columns to handle the full alphabet, plus numbers and all those extra function keys. A 10 by 8 matrix, for example, will handle the 80 keys. The computer "scans" the matrix to detect which key is depressed. It sends a pulse down each row and checks which column it comes out of (like an extreme version of Splat the Rat).

If you open up the keyboard and scrutinize the circuit board, you should notice that the traces are arranged in a vague grid (see figure 27.8). Solder a wire between the ground terminals of two female jacks; solder a wire to each of the hot terminals, and strip the loose ends.

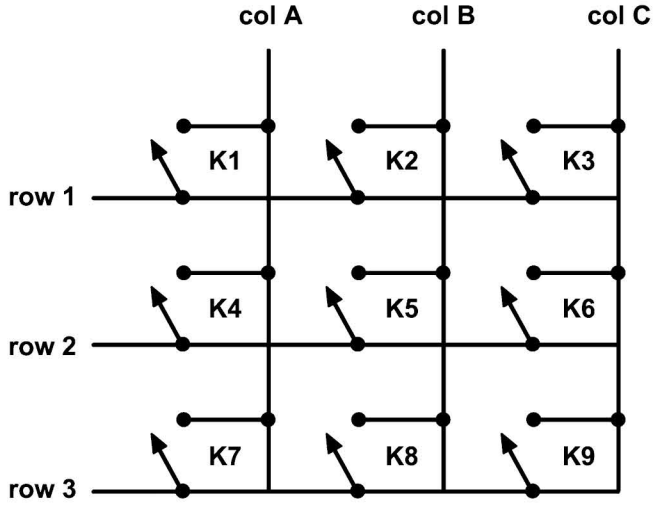


Figure 27.7 A keyboard matrix.

Connect a sound source, such as a CD player, to one jack, and connect the other jack to an amplifier. Use a clip lead or solder to connect the wire from the sound source (CD) jack to one of the traces (the traces may be routed to connectors at the edge of the circuit board) (see figure 27.9). Press down a key and touch the amplifier lead to other traces until you hear your sounds; then release the key: if the sound shuts off, you've found a cross point in the matrix—mark it somehow. If it doesn't, you've just touched another point along the trace that the sound source is connected to, so keep testing other points until you find a cross.

By repeating this admittedly arduous process you should be able to decode the matrix into rows and columns. Solder each row and column to the hot terminal of an audio jack. Connect all the shields together. Use all the rows as inputs and all the columns as outputs, or vice versa. By pressing keys you can route any input to any output. You can use this device alone—as a signal router for spatial distribution, for example—or in conjunction with the matrix mixers described above to add switching to matrix-based signal processing.

If the decoding process sounds too daunting, you can find smaller, more easily decodable switch matrices in touch-tone telephones (3 columns x 4 rows) or calculators—two frequently discarded household items. "Raw" matrix keypads of various sizes can also be bought from a number of online retailers (see Appendix A). Membrane switches, commonly used in inexpensive keypads, have the advantage that, in addition to being able to close the switches by direct finger pressure, one can often activate them by "drawing" across the surface with a stylus of some sort, or rolling a billiard ball over it—nice gestural options.

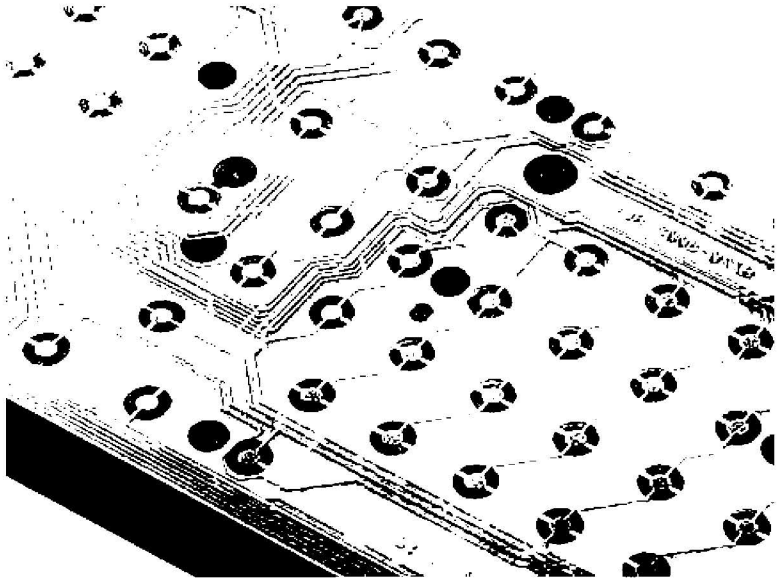


Figure 27.8 Computer keyboard circuit board showing matrix traces.

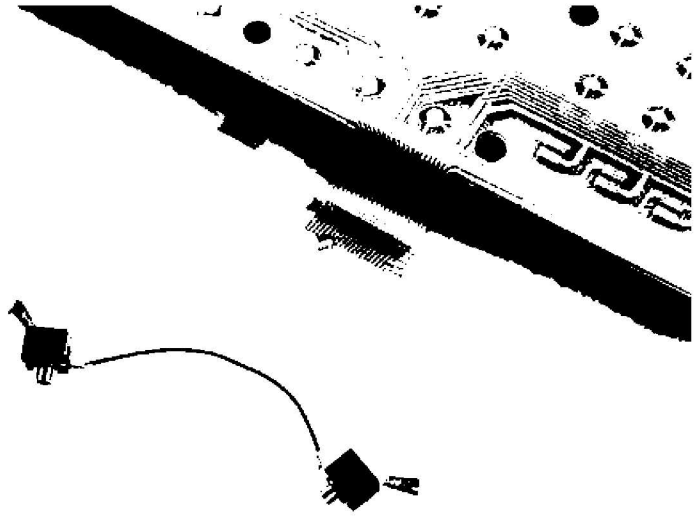
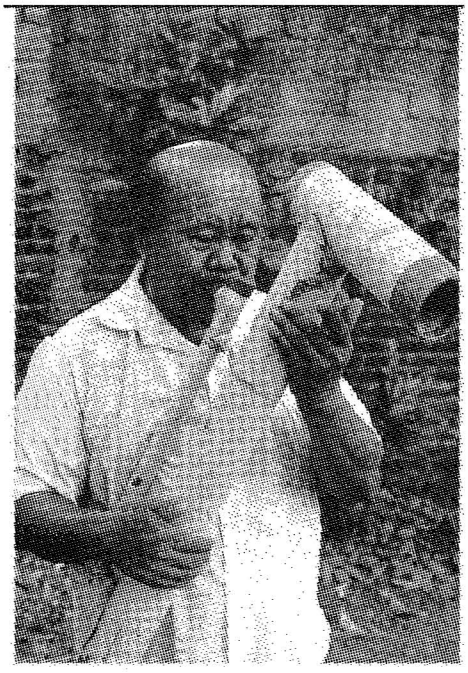
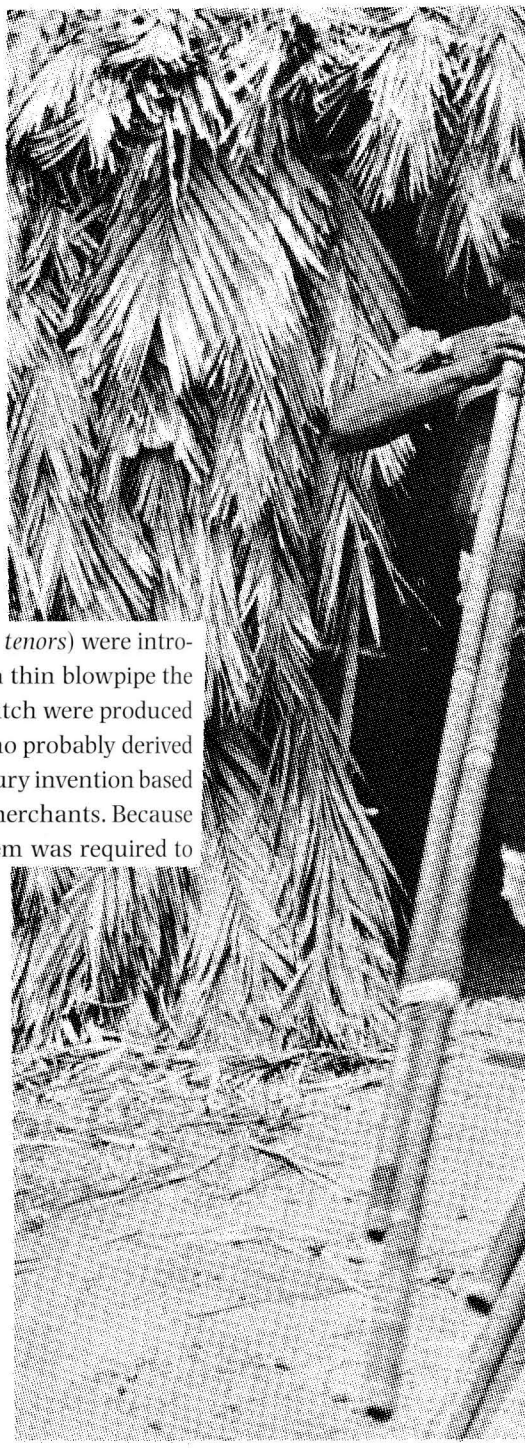


Figure 27.9 Computer keyboard wired for testing audio routing.



A modern version of the korno by Boni Samau, that is used by Sangirese orchestras.

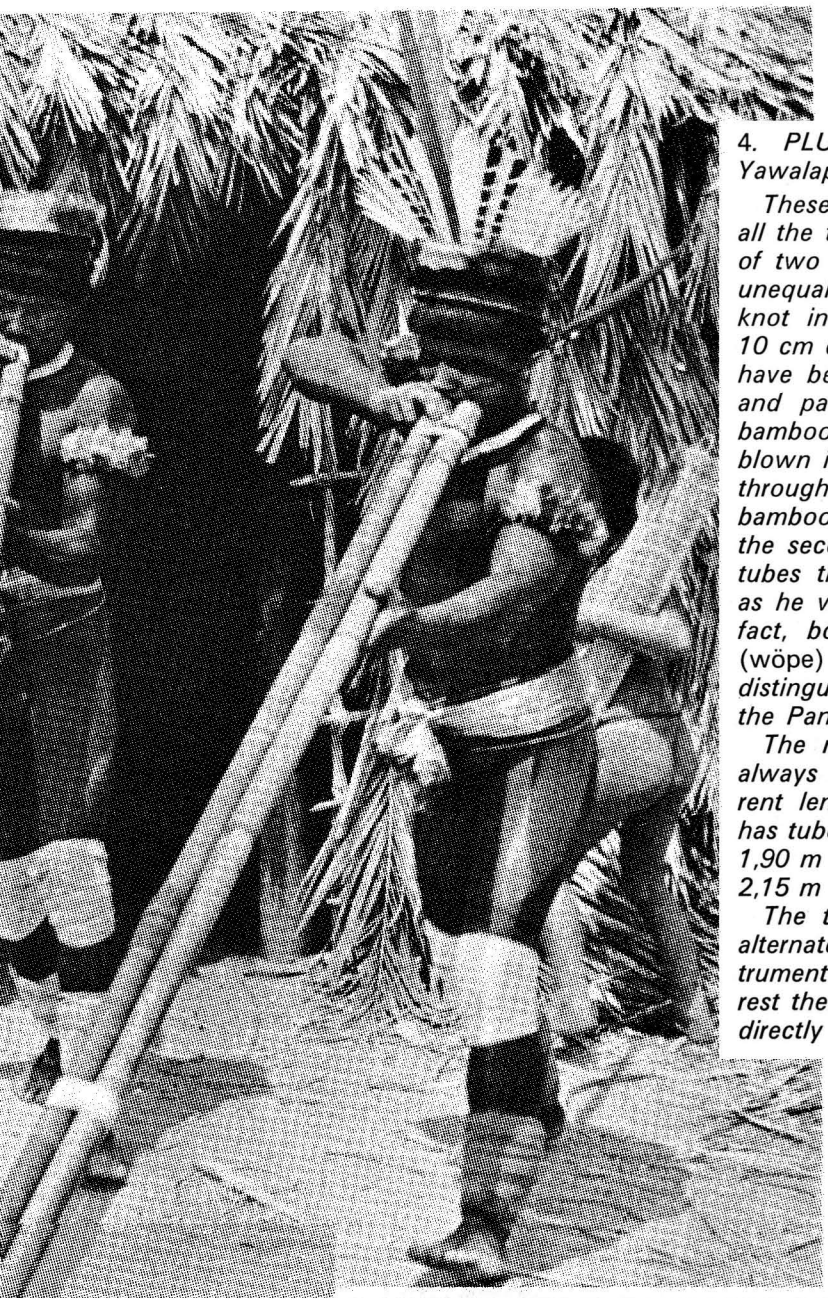
(indonesia)



Kornos (also known as *tenors*) were introduced later; these were bamboo cups played by blowing an *anak*, a thin blowpipe the lower part of which is cut out in the shape of a beak. Changes in pitch were produced by shifting the anak or covering the cup with one's hand. The korno probably derived from a traditional Moluccan instrument or was else a sixteenth century invention based on the military signal horns of the former Portuguese or Spanish merchants. Because it only has a range of at most three notes, a large number of them was required to ensure that they combined in harmonious fashion.

"clarinette traversiere, niger" perhaps related to:

3. **Beku. Floris Janga uit Rincon, Bonaire.**
Ook de **beku** is zoals de vorige twee instrumenten, van Afrikaanse origine, in Opper-Volta heet het **biko** of **bumpa,** in Benin, **papo.** Dit dwarsgeblazen instrument wordt gesneden uit de stengel van de sorghumplant, **palu di maïshi.** Aan beide uiteinden wordt één vingergat gebrand en het mondstuk bestaat uit een smal riet dat wordt losgesneden uit de stengel, maar zo dat het aan één zijde met de stengel verbonden blijft. Door in- en uitademen en het alternatief sluiten van de vingergaten kan de speler verschillende tonen voortbrengen en eenvoudige melodieën, meestal in funktie van de **simadan,** spelen.



4. *PLUG-FLUTES*
Yawalapiti Indians (brasil)

These large double plug-flutes are known to all the tribes of the Upper Xingu; they consist of two bamboo tubes of similar make but of unequal length, tied together with lianas. A knot in the wood closes the passage some 10 cm down from the mouth-piece; two holes have been bored above and below this knot, and partially covered on the outer side by bamboo strips held with wax. As the air is blown into the mouthpiece, it seeks to escape through the first hole where it encounters the bamboo strip which makes it deviate towards the second opening. From each of the bound tubes the performer obtains a unique sound, as he would with a Pan pipe. As a matter of fact, both instruments bear the same name (wöpe) *among the Yawalapiti (the Camayura distinguish between the plug-flute,* urua, *and the Pan pipe,* aviraré).

The music to be played on the plug-flute always calls for a pair of instruments of different lengths. One of the flute here recorded has tubes measuring approximately 2,30 m and 1,90 m while those of the other measures only 2,15 m and 1,70 m.

The two Yawalapiti performers blow either alternately or simultaneously, lifting their instrument to a horizontal position. In repose, they rest their instrument on a small wooden board directly on the ground.

3) **LE CARILLON HYDRAULIQUE (TANG KOA). - Tribu Sedang.** (vietnam)

Situé à proximité des champs pour charmer les génies tutélaires du riz, le carillon est composé de 50 tuyaux de bambou suspendus verticalement et frappés par des marteaux reliés à un châssis mobile. Celui-ci est animé d'un mouvement constant de va-et-vient sous l'action d'un levier, dont l'extrémité porte un réservoir placé sous une chute d'eau. Le réservoir se remplit, ce qui a pour effet d'abaisser le levier; le mouvement se transmet au châssis qui entraîne les marteaux, tandis que l'eau s'écoule du réservoir. Celui-ci allégé, remonte et revient alors se placer sous la chute d'eau qui le remplit à nouveau.

La musique tient en deux mesures indéfiniment répétées. Elle se rattache au système pentatonique, à peine teinté d'heptatonisme. L'instrument fonctionne sans interruption, durant des mois. Un accordeur vient tous les matins en vérifier le fonctionnement et la justesse.

9) **LE PAH PUNG. - Tribu Bahnar.**

Le Pah Pung est une série de 8 tubes de bambou de longueur croissante vers le grave, disposés parallèlement. L'exécutant claque des mains devant l'ouverture qu'il veut faire sonner : cette percussion provoque dans le tube correspondant une onde stationnaire dont la hauteur sonore est déterminée, par la longueur du tuyau. Le timbre de cet instrument est plus proche de celui d'un instrument à cordes frappées que de l'instrument à vent. La musique en est purement monodique; elle n'est exécutée que par un seul musicien.

Le musicien joue du Pah Pung, soit au champ, soit le soir à la maison commune, pour passer le temps.

Neue Gestaltung in der Musik

Möglichkeiten des Grammophons

L. Moholy-Nagy

Unter den heutigen musikalischen Versuchen spielen die Untersuchungen mit den Verstärkeröhren, welche einen neuen Weg in der Herstellung aller akustischen Erscheinungen ermöglichen, eine grosse Rolle. Die Bestrebungen der italienischen Bruitisten, neue Instrumente mit neuer Tonbildung zu konstruieren, sind durch die Versuche mit der Verstärkeröhre als Einheitsinstrument, mit dem alle Arten akustischer Phänomene erzeugbar sind, im weitesten Masse erfüllt. Aber mit dieser Möglichkeit allein ist nicht alles erschöpft, was für die Umgestaltung der Musik zu erwarten wäre. Ich weise auf den ausgezeichneten Artikel von P. Mondrian: Die neue Gestaltung in der Musik und die italienischen Bruitisten (De Stijl) hin, worin er die Grundlagen zur Erneuerung der Tongestaltung analysiert.

Er sagt unter anderem: „Die Musik kann sich nicht entwickeln durch Bereicherung an Tönen oder Verfeinerung, noch durch Verstärkung der Töne, sondern durch die Aufhebung der Dualität zwischen dem Individuellen und dem Universalen, zwischen dem Natürlichen und dem Geistigen; das heisst, dass die Erreichung des Gleichgewichtes des Menschen das Ziel aller Gestaltung ist." Er sagt weiter: „Die Geräusche in der Natur ergeben sich aus einer gleichzeitigen und fortdauernden Verschmelzung. Die alte Musik hat, indem sie teilweise diese Verschmelzung und die Fortdauer zerstörte, aus dem Geräusch Töne abgeleitet und sie in einer bestimmten Harmonie geordnet. Um zu einer mehr universalen Gestaltung zu gelangen, wird die neue Musik eine neue Ordnung der Töne und Nichttöne (bestimmter Geräusche) wagen müssen. Das Wesentliche ist, uns in der Gestaltung von dem „Natürlichen", von dem „Animalischen" befreien, dessen charakteristische Merkmale Verschmelzung und Wiederholung sind. Will man die Verschmelzung und damit die Herrschaft des Individualistischen vermeiden, so müssen die Instrumente Töne derart bilden, dass sowohl Wellenlänge wie Schwingungszahl so gleichmässig wie nur möglich bleiben. Demnach müssen die Instrumente derart gebaut sein, dass es möglich wird, jedes Nachschwingen mit plötzlichem Ruck abzubrechen. Man kann sich ohne eine andere Technik und ohne andere Instrumente diese Gestaltung nicht vorstellen."

Diese Forderungen, insofern sie durch technische Erfindungen äusserlich erreicht werden können, werden durch die Inanspruchnahme der Verstärkeröhre auch verwirklicht.

Meine Bestrebung auf demselben Gebiet der Umgestaltungsversuche in der Musik ist eine andere und steht in enger Verbindung mit dem Gedankengang von Mondrian. Ich übergehe in den folgenden Ausführungen die Beweggründe zu der neuen Tongestaltung, ich zeige nur eine Möglichkeit zu ihrer Verwirklichung mit Hilfe eines neuen Ausdruckmittels.

Ich schlug vor, aus dem Grammophon als aus einem Reproduktionsinstrument ein produktives zu schaffen, so, dass auf der Platte ohne vorherige akustische Existenzen durch Einkratzen der dazu nötigen Ritzschriftreihen das akustische Phänomen selbst entsteht.

Da die Beschreibung dieses Vorgangs dort als Beispiel zu einem anderen Gedanken diente, habe ich nur kurz die Möglichkeiten, aber nicht die ausführlichen Beweise aufgezählt, die zu der Umgestaltung unserer bisherigen musikalischen Auffassung auf diesem Wege führen. Spekulativ ist klar:

1. Durch das Feststellen eines Ritzschrift-ABC ist das Generalinstrument geschaffen, das alle bisherigen Instrumente überflüssig macht.
2. Die graphischen Zeichen ermöglichen die Aufstellung einer neuen graphisch-mechanischen Tonleiter*), das heisst das Entstehen einer neuen mechanischen Harmonie, indem man die einzelnen graphischen Zeichen untersucht und ihre Verhältnisse in ein Gesetz bringt. (Hier ist die heute noch utopisch klingende

*) Unsere heutige Tonleiter ist vielleicht tausend Jahre alt und ihrer Enge heute zu folgen nicht unbedingt notwendig.

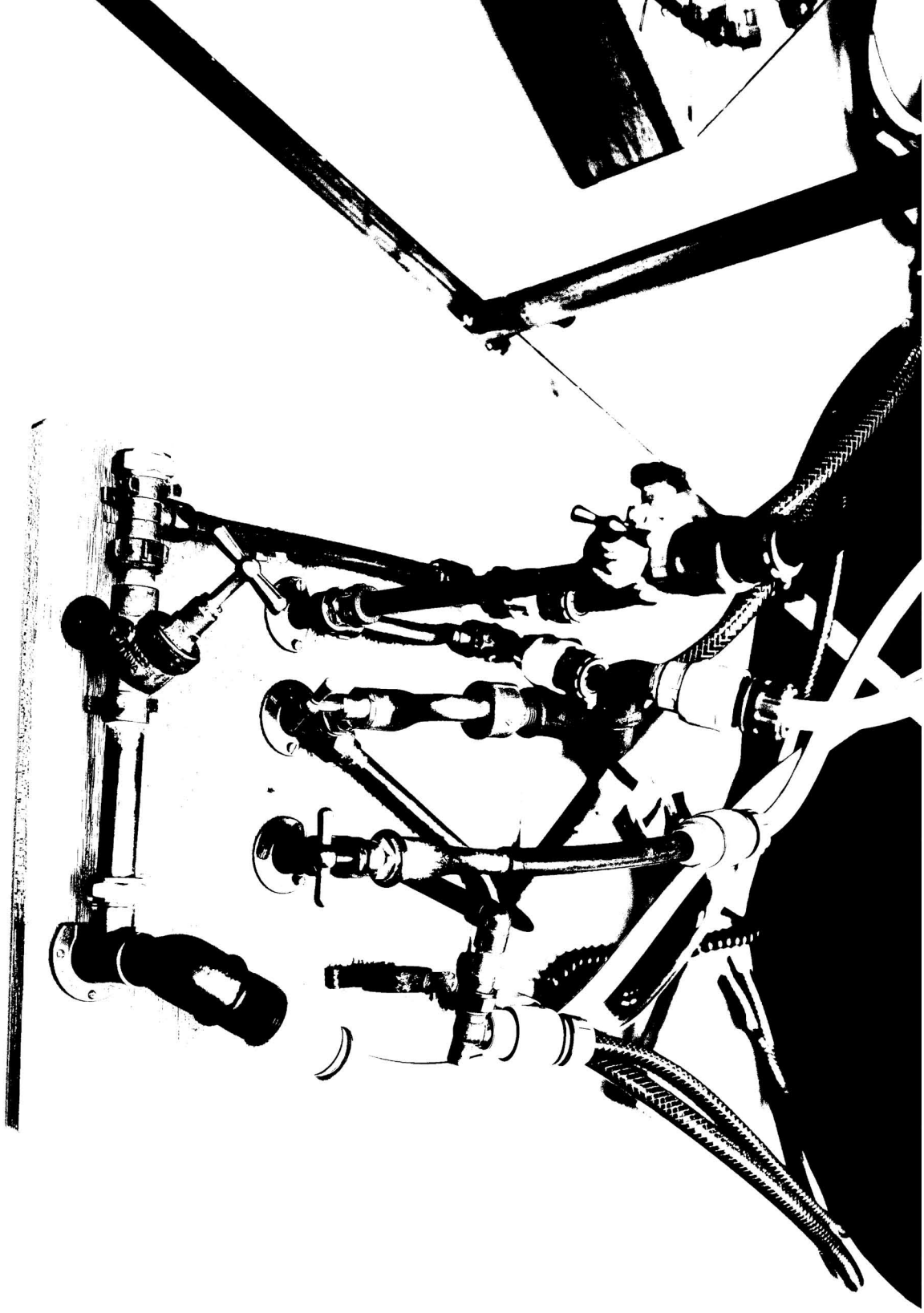
Erwägung zu nennen: graphische Darstellungen auf Grund strenger Verhältnis-Gesetzmässigkeiten in die Musik zu übertragen.)

3. Der Komponist kann seine Komposition selbst schon auf der Platte reproduktionsbereit schaffen, also er ist nicht angewiesen auf das absolute Können des Interpretierenden. Dieser hat bis jetzt meistens seine eigenen Seelenerlebnisse in die in Noten aufgeschriebene Komposition hineinzuschmuggeln vermocht. Die neue Möglichkeit des Grammophons wird die heutige dilettantische Musikerziehung auf eine gesundere Basis stellen. Statt der vielen „Reproduktionstalente", die mit der w i r k l i c h e n Tongestaltung weder aktiv noch passiv etwas zu tun haben, werden die Menschen zu w i r k l i c h Musikaufnehmenden oder Gestaltenden erzogen.
4. Die Einführung dieses Systems bei Musikaufführungen würde ebenfalls eine wesentliche Erleichterung geben: Unabhängigkeit von grossen Orchesterunternehmungen; ungeheure Verbreitung der schöpferischen Originale durch das einfache Mittel.

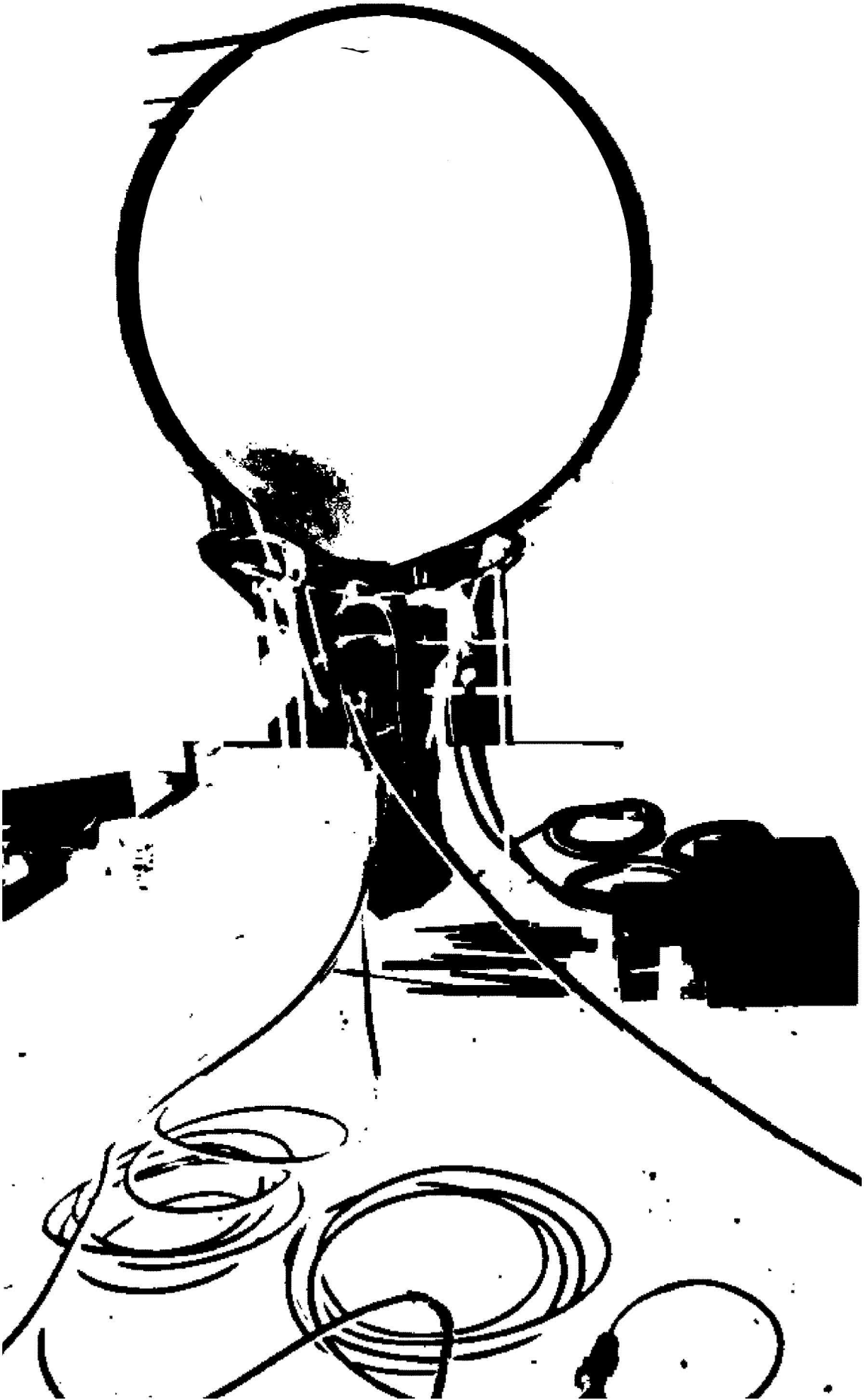
(Die Leistungsfähigkeit des Grammophons wurde in der letzten Zeit durch einige technische Verbesserungen vorzüglich gefördert. Es gibt unter anderem zwei wichtige Erfindungen auf diesem Gebiet. Die eine arbeitet mit elektrischem Betrieb und die andere mit einer neuen Membranerfindung und gibt schon fast vollkommen reibungslose Wiederholung hineingespielter Werke. Ich denke, wenn wir sie wirklich als Forderung haben, werden wir in kürzester Zeit technisch einwandfreie Apparate besitzen.)

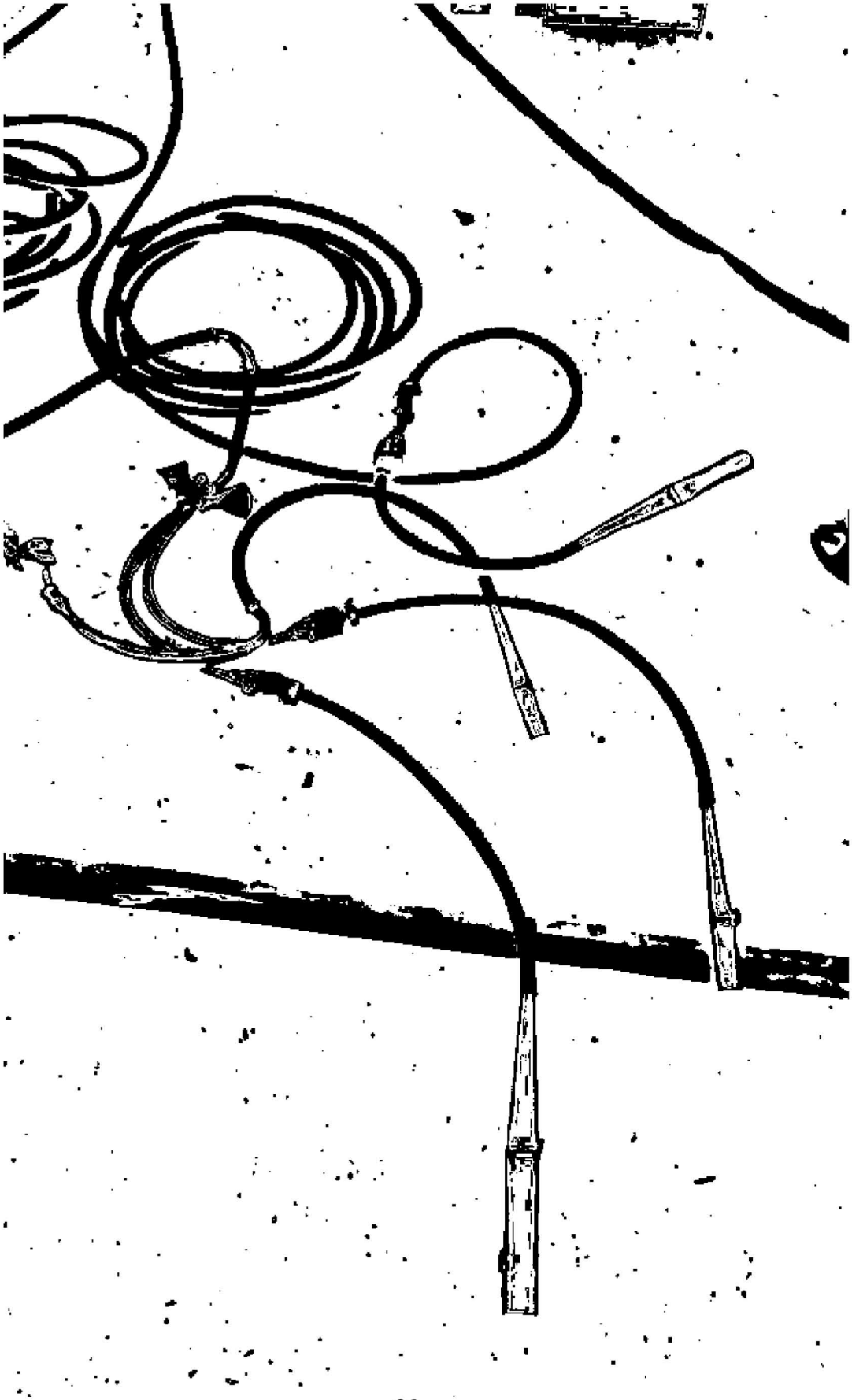
Die praktischen Versuche mit dem Grammophon auf musikschöpferischem Gebiet glaube ich so zu beginnen:

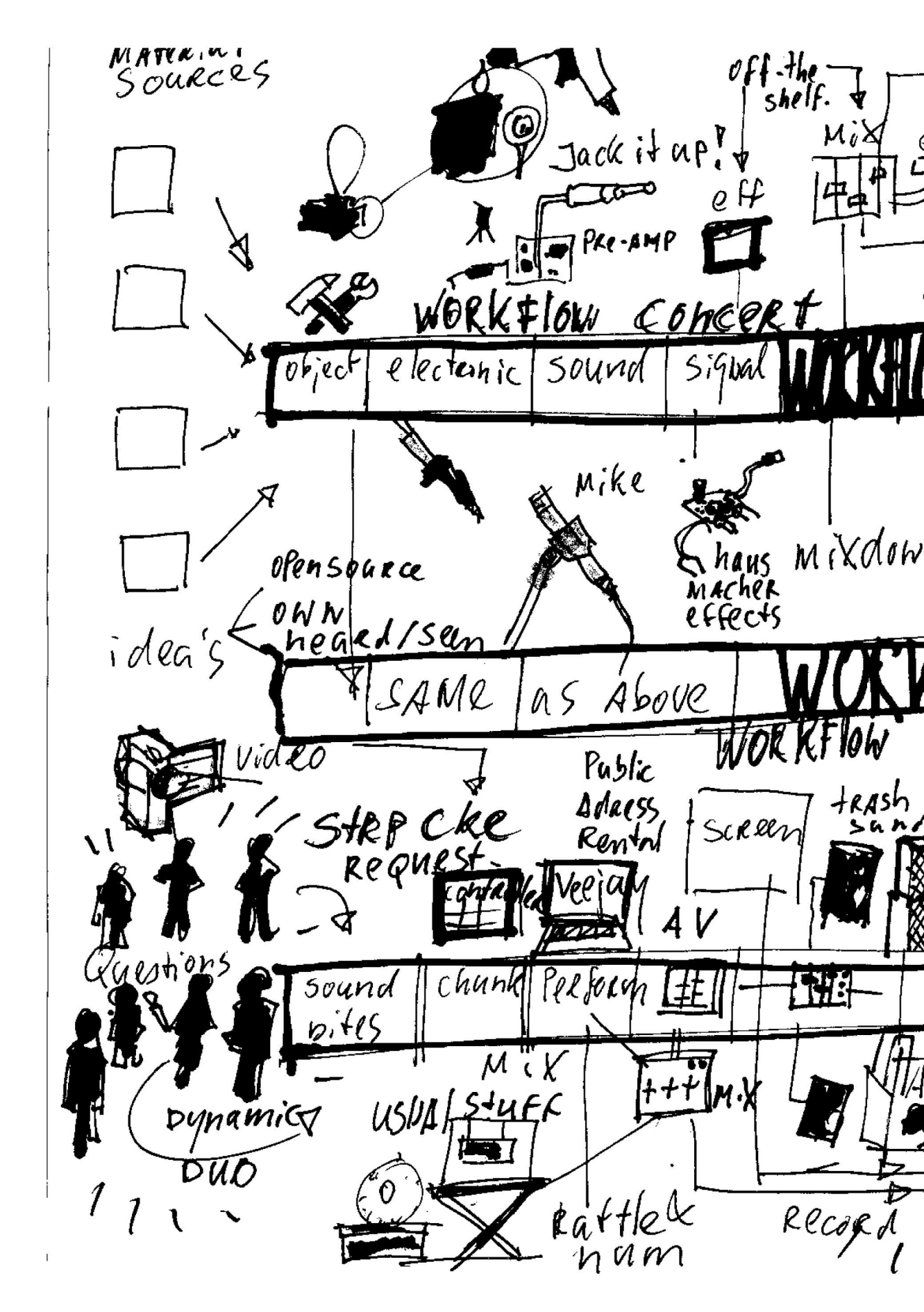
1. Da die Ritzen in der auf mechanischem Wege entstandenen Platte mikroskopisch klein sind, muss zu allererst ein Mittel gefunden werden, von einer grossen Ritzschriftplatte, die mit der Hand bequem zu bearbeiten ist, auf technisch-mechanischem Wege Verkleinerungen im Format der heute üblichen Platten zu erzielen. Am besten, man lässt eine heutige Grammophon(reproduktions)-platte photographieren und von der Photographie ein Photo- oder Autotypie-Klischee auf zinkographischem, galvanoplastischem Wege herstellen. Wenn diese Platte nur annähernd spielbar wäre, ist die Grundlage für die Weiterarbeit auf diese Weise gesichert.
2. Studium der graphischen Zeichen der verschiedensten (gleichzeitig und isoliert ertönenden) akustischen Phänomene. Inanspruchnahme von Projektionsapparaten. Film. (Darüber gibt es schon in physikalischen Spezialstudien eingehende Beschreibungen.)
3. Untersuchungen mechanisch-metallischer, mineralischer Klänge. Der Versuch, daraus — vorläufig graphisch — eine eigene Sprache zu bilden. Besondere Achtung auf die Zeichen, die durch die verschiedenen Klangfarben hervorgerufen werden.
4. Herstellung — graphisch — der grössten Kontrastverhältnisse. (Bevor man die Versuche auf der Wachsplatte anfängt, ist zu empfehlen, mit einer Nadel auf verschiedenen Grammophon(reproduktions)platten, den graphischen Wellenlinien der Musik, deren Gestaltungsfolge dem den Versuch Ausführenden bekannt ist, nachzugehen, um ein Gefühl für die graphische Darstellung zu bekommen.)
5. Dann kämen I m p r o v i s a t i o n e n auf der Wachsplatte in Frage, deren klangliche Resultate theoretisch nicht abzusehen, von denen aber grosse Anregungen zu erwarten sind, da das Mittel uns ziemlich unbekannt ist.



De Groet is onderdeel van Abstractiepark7090, een interactief abstract attractiepark
en is een tafel met 4 helikopters van Yuri Landman en 4 ballon-orgels van Nora Mulder






Material Sources
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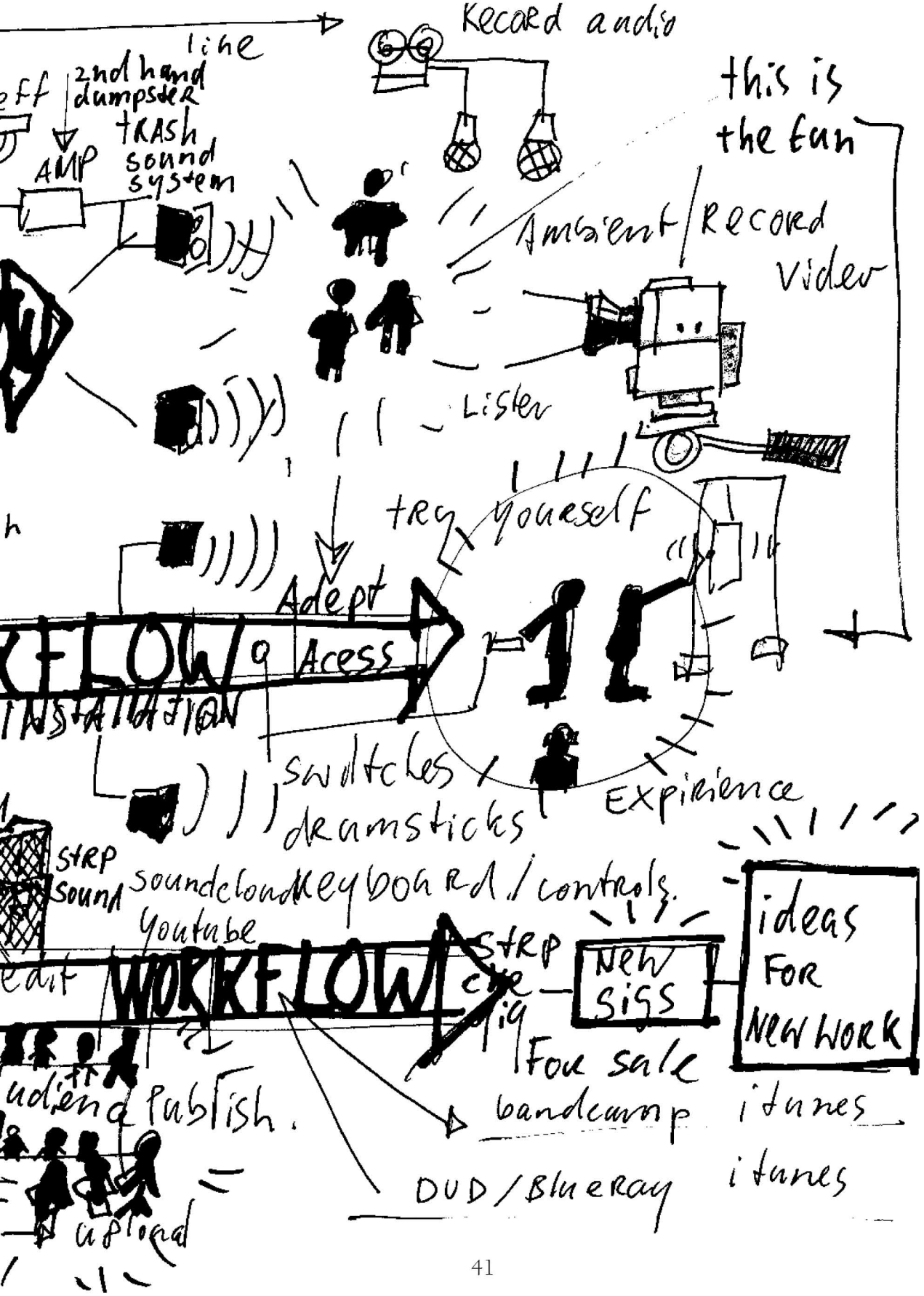
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this is the fun
Ambient/Record
video
Listen
try youself
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INSTALLATION
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drumsticks
EXPIRIENCE
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sound
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(4.1-3.2-1.2) -§ **200** - *Dubbel-enkelbladschalmeien met konische boring.* Instrumenten die voor ons noemenswaard zijn komen in deze groep niet voor; inheems zijn zij – sporadisch – in het Nabije Oosten; om het 'ritme' van de systematiek niet te verstoren wordt hier slechts terloops even de aandacht gevestigd op het desalniettemin voorkomen van vertegenwoordigers dezer groep.

(4.1-3.2-2.1) -§ **201** - *Enkel-enkelbladschalmeien met cilindrische boring.* Van de volksinstrumenten moge hier genoemd worden de Chinese *cuen kuan:* een uiterst korte pijp; grootste lengte 15 cm! en de Egyptische *ghete,* die tezamen met de eerder genoemde *zamr* wordt geblazen; de *ghete* heeft een koperen beker op een houten pijp; er zijn 7 vingergaten. In Mexico slaat men dan andere records! Daar is de *acocotl* (tegenwoordig: *clarin*) een ongeveer 3 meter lange, zeer nauwe buis, gemaakt uit het hout van de in Mexico zeer bekende acocotlstruik! De speler is hier – als bij de Siberische byrgy (zie § 152) – geen blazer, eerder een zuiger: door het mondstuk, voorzien van een in verhouding tot de lange pijp eigenlijk vrij klein riet, moet de lucht met grote kracht ingezogen worden. In Europa vinden we als volksinstrument de *chalumeau,* een instrument dat van de later nog te noemen *arghûl* schijnt te zijn afgeleid. Het instrument dat ook bekend was (en plaatselijk: nl. in Midden-Italië en Spanje – in gewijzigde vorm – nog ís) onder de naam *zampogne*[1], mat ongeveer 30 cm lengte en had negen vingergaten: acht van voren en een aan de achterzijde. Tegen het einde van de zeventiende eeuw ontstond uit dit volksinstrument de klarinet. (De oud-Egyptische ma-it en as-it werden reeds besproken – § 192 – bij de dubbelrietschalmeien; daar het mogelijk is dat deze instrumenten óók als enkelrietbladschalmeien voorkwamen, of misschien zelfs: uitsluitend enkelrietbladschalmeien waren, vermelden wij ze hier volledigheidshalve nog eens extra.)

1. Niet verwarren met de *zampogna* die in § 183 genoemd werd.

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"Bass Sheng"