Breaks

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Repetition is a form of change. —*Brian Eno*

In jazz, a break is the moment the band stops and one player keeps going. It is a hole in the arrangement, two bars wide, sometimes four, and the player standing in it fills it with something new before the band comes back on the downbeat as if it had never left. The word says what it is: the band breaks off. What does not break is the time. Everyone is still counting, which is why the return is exact, and why a break is short: two bars is about what a whole band can count in silence without losing one another. The break belongs to no instrument in particular; on the Hot Five records Armstrong's breaks are trumpet, and a clarinet break or a trombone break was as ordinary as a drum break.

Written down, with a letter for each bar of the drum pattern and a subscript for whatever is playing on top of that bar, so that a_{xy} is a bar of drums with the band on it and a plain a is the drummer alone, the drum break is a hole holding two bars of new material.

Jazz break
a_{xy} b_{xy} c d a_{xy} b_{xy}

The solo comes later, and the order matters, because the natural assumption is that a break is a constrained solo, and it is the other way round. In the New Orleans jazz of the 1910s and early 1920s the horns played all at once, and the break was the only place a single player was exposed.[1] The long solo over a rhythm section arrives with Armstrong around 1925, and it is the break let loose: the band comes back in underneath the exposed player instead of waiting for him, so that he can keep going. What happens in a solo is that the horns

[1]There's a lovely story from King Oliver's Creole Jazz Band, from before Armstrong went out on his own, when he was playing second cornet next to Oliver. The two of them would take breaks together in harmony, apparently improvised, and other musicians couldn't figure out how. Armstrong said he'd watch Oliver's valve fingers in the bars leading up to the break and follow them. So even the exposure was a duet, one player reading the other's hands for a clue about what was coming.

stop and the rhythm section continues. The band is stripped to exactly the part that keeps the pattern, and something new stands on top of it. With xy for the full band, x for the rhythm section, y for the horns and s for the soloist, the drums do not change letter during a solo. The subscript changes.

Jazz solo

$a_{xy}\ b_{xy}\ (a_{xs}\ b_{xs}\ a_{xs}\ b_{xs}\ \ldots)\ a_{xy}\ b_{xy}$

The parentheses are open because the length is set from inside. A solo runs in whole choruses, twelve bars or thirty-two, so it is not free in its unit, but how many choruses is the soloist's decision, and the band waits for his cue. A break is a hole whose size everyone knows; a solo is a hole whose size is decided by the person in it.

Funk changes what is inside the hole.

From about 1967 James Brown's rhythm section was built on a fixed pattern locked to the first beat of the bar, the one, over a single chord that did not move. A funk groove is periodic by construction: the same bar, again, with the harmony standing still. Brown's break, the thing he called for with "give the drummer some," is the band dropping out and the drummer continuing to

play exactly what he was already playing.[2] On "Funky Drummer," recorded in 1969, the instruction is on the record. He tells Clyde Stubblefield "don't turn it loose, 'cause it's a mother," then counts the band out, "when I count to four I want everybody to lay out and let the drummer go, one, two, three, four," and for eight bars Stubblefield plays the pattern he had been playing under the band, alone.

The definition this gives is unusually clean. A funk break is the band stopping, the drummer changing nothing, and the band returning after a counted number of bars. It could be made after the fact by muting: take the multitrack, silence every track but the drums for eight bars, and there is a funk break the drummer never knew he was playing. Put the drummer in earplugs and count him in, and the break happens around him on schedule. In the jazz break the player knows, and it changes what he plays. In the funk break the player may know, and it changes nothing. It is the only break where the person in it could be deaf to it.

[2]The phrase first shows up on "Cold Sweat," from 1967, spoken to the same drummer, Clyde Stubblefield, so the call has a two-year history before it lands on "Funky Drummer."

Funk break

a_x b_x a b a_x b_x

The letters inside are the same as the letters outside. The break is the subscript vanishing—not new content.[3]

And this is why the funk break tiles when the jazz break does not. What a jazz drummer plays in a break is a fill, something that goes toward the downbeat where the band returns; the two bars are shaped like an arrow, and the end does not resemble the beginning. What a funk drummer plays in a break is the pattern, and the pattern was already periodic under the band. So the last beat of the break lands on the same point of the bar as its first, and once you go round the bar the two endpoints are the same point. The break is not an interval; it is a loop with the ends already glued. Nobody designed it to repeat. It was a tile, played once. A jazz solo is a painting, with a frame where the painter stopped. A funk break is wallpaper, and wallpaper has the word

[3]Notice the band isn't written a_{xy} anymore; around the break the subscript is just x, rhythm section, no horns. And that's true to Brown: his horns didn't carry melody lines so much as stab, short punches on the beat, and the guitar played those scratchy single-chord chops, so the whole band had been turned into drums. By the time the band drops out, there's nothing left to subtract but the one letter.

already: the unit printed on the roll, the distance before the pattern comes back to itself, is called the repeat.

Records played instead of a band begins in Paris under the occupation, when live jazz was banned and the clubs put on records: the discothèque.[4]

Around 1970 Francis Grasso at the Sanctuary in New York joined the two turntables into one continuous sound. Three things, together. Headphones, to hear the next record before the room does. The slip-cue, holding the record still with a thumb on the felt while the platter turns underneath, and releasing on the beat so that it starts at full speed at the moment you choose. And beatmatching, nudging the second record's speed until its drums fall on the first's, so that both can play at once. One record no longer follows another; it lies on top of it. Alex Rosner built a two-channel mixer for Grasso to use, and in 1971 the Bozak CMA-10-2DL became the first DJ mixer you could buy. The Technics SL-1200 of 1972 had direct drive, full torque under a held record, and made the slip-cue reliable.[5]

[4]The word was coined on the model of bibliothèque, a library of discs, and the first place to carry it as a name, La Discothèque on the rue de la Huchette, was a bar where you ordered a record along with your drink.

[5]It was designed as a hi-fi turntable, not a DJ tool; the DJs adopted it. The MK2 of 1979 added the pitch slider, and the same deck stayed

With that equipment the break gets repeated. Clive Campbell, Kool Herc,[6]

A square bracket stands for exactly one thing: a section marked off from outside the performance, by a hand that is not the band's. The band dropping out is already shown by the subscript disappearing; the bracket is for the DJ's cue, the producer's mute, the splice. Herc's bracket is the funk break as found on the record, and v is the voice added in the room.

Hip hop, Herc, 1973

$a_x\ b_x\ [a\ \ b\ \ a\ \ b]_v\ [a\ \ b\ \ a\ \ b]_v\ [a\ \ b\ \ a\ \ b]_v$ ...

Grandmaster Flash, a couple of years later, treated Herc's switch as a precision problem and solved it with Grasso's tools: headphone cueing, the slip-cue, and a crayon mark on the label so that he could find the first beat of the break by eye and drop it exactly on time.

in production until 2010, thirty-eight years on one design, which is longer than any of the music played on it has lasted as a style.

[6] Herc was born in Kingston and came to the Bronx in 1967, and the rig he played the party on was a Jamaican sound system in the Jamaican sense, a wall of speakers built for bass. So the sound system appears in this history three times before it is named: under Herc's break in 1973, under King Tubby's version in 1972, and under jungle in Hackney twenty years later, the same object carrying the same low end into three different rooms.

He called it the quick mix theory and the clock theory, and what he did with two copies he called cutting. The repeat was already there; Flash made the cut clean, and once the cuts were clean, breaks from different records could be cut against each other. Grand Wizzard Theodore's scratch, around 1975, is the cueing motion itself becoming a sound, a side branch.[7]

Hip hop, Flash, c. 1975
$[a\ b\ a\ b]_v\ [c\ d\ c\ d]_v\ [a\ b\ a\ b]_v\ [e\ f\ e\ f]_v \ldots$

Disco is a drum pattern before it is anything else. In 1973 at Sigma Sound in Philadelphia, Earl Young, the drummer of MFSB and the Trammps, played the kick on every beat of the bar and opened the hi-hat on every off-beat, on Harold Melvin and the Blue Notes' "The Love I Lost," and that is the disco beat: four on the floor, the hi-hat breathing between the kicks. It is already the least fill-like pattern a drummer can play. Every beat is the same beat, so every bar is the same bar, and the Philadelphia records put thirty players of strings and horns on top of it, which is where the money went. A

[7] The story goes that he was holding a record still in his room because his mother was banging on the door telling him to turn it down, and he kept rubbing it back and forth under his fingers while she talked, and liked what he heard.

disco record is a funk groove and an orchestra with the one spread out evenly over all four beats and the other hired to decorate the result.

The records also got long at the source, not only at the edit. In 1975 Casablanca asked Moroder for a longer version of Donna Summer's "Love to Love You Baby" and got a seventeen-minute one that filled a whole side. Cerrone, a drummer, made "Love in C Minor" in Paris in 1976 as a sixteen-minute side with the drums out on their own for stretches, the break written into the composition before any DJ had touched it. And in New York David Mancuso's Loft, a private party from 1970, played the records whole, no mixing, on a sound system built for listening, which is the counter-object to everything that follows: the record as it was made, honoured to the last groove. The edit is what happens when the record is not enough.

Tape does the rest of the work, in parallel with the Bronx and separately from it.

Tom Moulton in 1972 made continuous reel-to-reel mixes for the Sandpiper on Fire Island, songs run into one another with no gaps, and he did it the crude way first, recording sections onto tape one after another, something like eighty hours for forty-five minutes. Then in 1974, in a studio, with the multitrack

tapes instead of the finished record, he began extending songs: letting the rhythm section run longer, moving the vocal, putting the drums alone in the middle. The razor blade is a refinement of recording-over. Instead of stopping and restarting the machine at a seam, you cut the tape and join it, so that the seam is a splice, inaudible if done with enough precision or technique.

The tape was quarter-inch, running at fifteen inches per second, so that a bar of disco at 120 beats to the minute was thirty inches of tape and a single beat seven and a half. The tape was rocked back and forth across the playback head by hand until the beat could be heard as a thump, marked with a grease pencil, and laid in a splicing block, an aluminium bar with a channel the width of the tape and a groove across the channel at forty-five degrees. A single-edged razor blade drawn along the groove made the cut. The two ends to be joined were butted together in the channel and fixed with a short strip of splicing tape on the back. The cut was diagonal so that the join would be smeared over a few milliseconds instead of arriving all at once, which clicks.[8] Splice the end of a break to a copy of

[8]You can actually work out how many, following the essay's own arithmetic: a forty-five-degree cut across quarter-inch tape spreads the join over a quarter inch of length, and at fifteen inches a second

its beginning and the tape plays the break twice; splice another copy in and it plays three times. The edit is the two turntables carried out once, with a blade, so that the repeat no longer has to be performed. Moulton did it with multitracks; Walter Gibbons and the re-editors after him did it with finished records dubbed to tape.

The record itself was never cut. No razor touched vinyl. What gets cut is the lacquer, at the lathe, where a cutting head engraves the master from which the pressings are made, and the mastering engineer's word for making a record at all is cutting it. The twelve-inch single was born at that lathe. In 1975 José Rodriguez at Media Sound had no seven-inch blanks left for a Moulton mix of Al Downing's "I'll Be Holding On" and cut it on a twelve-inch instead, and the wide groove turned out louder and deeper. The first one sold commercially was Double Exposure's "Ten Percent" on Salsoul in 1976, and its mix was by Gibbons. So there are three cuts, and the same word for all of them: the lathe cuts the record, the razor cuts the tape, and the DJ cuts between two copies of the same thing.

Two objects come out of the tape, and they are different. The disco break is the funk break made on purpose:

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that's a sixtieth of a second, about seventeen milliseconds of crossfade made by the angle of a groove in a metal bar.

a producer opening a hole in a full band performance after the fact, by muting the multitrack, already long, built to be repeated. One muting is one stretch, however wide, so it is one bracket. Gibbons's "Ten Percent" has a single bracket eight bars wide.

Disco break
$a_x\ b_x\ [a\ \ b\ \ a\ \ b]\ a_x\ b_x$

The disco edit is that bracket copied. The width of a bracket belongs to the studio; the number of brackets belongs to the DJ or the tape.

Disco edit, 1974–76
$a_x\ b_x\ [a\ \ b\ \ a\ \ b]\ [a\ \ b\ \ a\ \ b]\ [a\ \ b\ \ a\ \ b]\ a_x\ b_x$

Gibbons is where the two lineages meet. At Galaxy 21 in 1976 he was playing the break of "Ten Percent" on two copies, over and over, in a Manhattan disco, which is exactly what Herc was doing in the Bronx; Salsoul then let him do on tape what he had been doing by hand. Larry Levan at the Paradise Garage from 1977 inherits this as the normal condition: the record you play already contains the repeat. And Frankie Knuckles, who had come up alongside Levan in New York, moved to Chicago in 1977 to play a club called the Warehouse.

What he played there was this: disco edits, reel-to-reel extensions, records with the middle stretched. Kids in the record shops asked for "house music," meaning the stuff from the Warehouse. The name arrived six years before the thing.

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Meanwhile, Italy, which begins in Munich.

Giorgio Moroder is from Ortisei in the South Tyrol, and the Munich records he made with Pete Bellotte at Musicland from 1975 are the first Italian disco.[9] "I Feel Love," in 1977, is a bass line played by a Moog sequencer for the whole length of the record, a machine already holding the floor, though its drums were still Keith Forsey, a drummer, playing along with the sequencer.[10] The band pretending to be a machine.

After the American crash of 1979 the US labels dropped disco, but the Italian market kept wanting

[9]His hometown makes the sentence about Italy beginning in Munich even stranger than it looks. Ortisei is in Val Gardena, where the local language is Ladin, neither Italian nor German, so the first Italian disco was made in Germany by a man whose mother tongue was a third thing entirely.

[10]There's a story that Eno, in Berlin with Bowie while they were making records there, came in holding "I Feel Love" and said this was it, this single would change the sound of club music for the next fifteen years.

it, and Italy did not have the Philadelphia session economy of thirty players on a string date. It had small studios in Milan, Bologna, Rome and Florence, labels like Discomagic and Full Time and Baby Records, a producer, a couple of synths, a drum machine, and a hired singer, often pseudonymous, often singing English phonetically. The Italians went the rest of the way from Munich because the drummer was the expensive part. Kano's "I'm Ready" in 1980 is a Milan studio band already leaning on the machine. Klein & MBO's "Dirty Talk" in 1982 is a producer, a Roland, a Prophet, and a girl on vocals, and no band ever existed. By 1983 the form is complete: Alexander Robotnick's "Problèmes d'amour" from Florence, an 808 and a Korg and a man singing in French about love as if reading it off a card; Charlie's "Spacer Woman"; Doctor's Cat's "Feel the Drive"; Gaznevada's "I.C. Love Affair." The tempo crept up past 120, the vocals thinned, the bass lines became sequences. The name came from Germany: Bernhard Mikulski at ZYX Records in Frankfurt started printing "Italo Disco" on the compilations he licensed in 1983, a label made in one country for a music made in another, for a form that had begun in a third.

The same object was being made in San Francisco at the same time under another name. Patrick Cowley put

his synthesizers under Sylvester's "You Make Me Feel (Mighty Real)" in 1978 and made "Menergy" in 1981 with no band at all, and the gay clubs called it Hi-NRG: machine disco, faster, the American italo. Disco went to every country and in each one took the cheapest available means of keeping the beat even. In Philadelphia that was Earl Young. In Munich it was a sequencer with a drummer chasing it. In Paris it was Cerrone himself. In Italy, and in San Francisco, it was a box.

An italo record was built in layers, and the order of the layers is the thing. The drum machine goes down first, programmed to run one pattern the whole length of the track. Then the synth bass, then the chords, then the singer last. The break is the stretch where nothing was put on top of the machine; it is in the arrangement from the start, not muted afterwards, because there was never a full take to mute. Same sound as a disco break, opposite direction of construction: one is subtraction from a band, the other a machine that has simply not had things put on it yet. Assembled in the order house would later use, machine first and song on top, but still shaped like a song.

So capitals stand for the machine: A and B are bars of a machine pattern. A capital never takes a bracket, because a bracket is a selection from a record, and a

machine has no record to be selected from. The machine runs until someone switches it off.

Italo record, c. 1980
$A_x\ B_x\ \ A\ \ B\ \ A\ \ B\ \ A_x\ B_x$

"Dirty Talk" was in Knuckles's bag at the Warehouse and in Ron Hardy's at the Music Box. Capital A was on the Chicago dance floor in 1982, with a song around it.

The machine reaches hip hop the same year. Afrika Bambaataa and the Soulsonic Force's "Planet Rock," produced by Arthur Baker in 1982, is a Roland TR-808 pattern with the melody of Kraftwerk's "Trans-Europe Express" played on a synth over it and rapping on top: electro, no record underneath, the bracket gone. Run-DMC's "Sucker M.C.'s" in 1983 strips even the melody: just an Oberheim DMX pattern and two voices.

Hip hop on a machine, 1982–83
$A_v\ \ B_v\ \ A_v\ \ B_v\ \ \ldots$

Then Chicago, 1984. Roland had released the TR-808 in 1980 and the TR-909 in 1983,[11]

[11]The 909 is not all machine. Its kick, snare and toms are analog circuits, but its hi-hats and cymbals are short digital recordings of real ones, so the box that replaced the disco drummer carries a few

House, first stage, 1984

A_r B_r A_r B_r ...
A_R B_R A_R B_R ...

Jesse Saunders's "On and On," from January 1984, is usually called the first house record, and it is the line above with the record removed: a drum machine, a bass, a few chords, made in Chicago to sound like what the Warehouse played.[12] Then the record was dropped in general and the disco parts were played by hand, the piano on a synth, a singer over it, and the parts could change independently of the pattern, and the pattern could change because there was no record to return to. Ron Hardy at the Music Box, Marshall Jefferson's "Move Your Body" in 1986 with its piano, Larry Heard's "Can You Feel It" the same year. This is house: a bracket with nothing around it to select from, disco kept on top. The piano and vocals, p and q, move on their own.

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hundred milliseconds of an actual cymbal inside it: a lowercase sealed into the capital, the way a record was sealed into R.

[12] As the story goes, "the line above with the record removed" is literally what happened: Saunders had a favorite record, a bootleg disco mix also called "On and On," and it got stolen out of his crate, so he made his own with a drum machine to replace it. The first house record was a replacement for a missing record, the r taken out of A_r by a thief.

House

$A_p\ B_p\ A_q\ B_q\ C_q\ D_q\ C_p\ D_p$ ...

It is the same line as hip hop on a machine with a different subscript. Both are capitals all the way across, no lowercase, no bracket. Hip hop on the machine has a voice added in the room; house on the machine has the song the record used to carry. The two lineages that split at the funk break, one taking it off the record on turntables and the other remaking it on tape and calling it disco, meet again at the drum machine in 1983 and 1984, and from then on the only thing keeping them apart is the subscript.

Acid house is a subscript that is itself a machine. The Roland TB-303 came out in 1982 as a bass-guitar substitute for guitarists practising alone, failed completely, was discontinued in 1984, and turned up secondhand in Chicago for next to nothing. DJ Pierre and Spanky, as Phuture, did not program it as a bass; they let a pattern run and turned the cutoff and resonance knobs while it played, and the squelch is the filter being abused.[13] Ron

[13]The story usually told about their machine fits almost too well: the 303 Spanky bought secondhand still had a pattern sitting in its memory from the previous owner, and the pattern on "Acid Tracks" is supposedly that one, a stranger's leftover bars, with Pierre turning the knobs on top of it. So the first acid record might be a found object

Hardy played the tape at the Music Box for a year before "Acid Tracks" came out in 1987. No piano, no singer. The song has been replaced by a second machine, misused, so the subscript is a capital too: T for the 303.[14]

Acid house, 1987
$A_T\ B_T\ A_T\ B_T\ \ldots$

Acid is more of a sideways move than a step toward techno: the layer is still there, it is just no longer human.

Techno is the layer removed.

Kraftwerk first, because techno is a reading of Kraftwerk. Four men in Düsseldorf who from "Autobahn" in 1974 played electronic instruments they had partly built themselves,[15]

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after all—not selected from a record, but inherited from the memory of a used machine.

[14]The capitals were already there in $A_R\ B_R$, but R is a capital for what's inside the record, and the record itself is the old lowercase kind of thing, a finished recording you can only select from and copy, which just happens to have a machine sealed inside it. It's a photograph of a machine. The T is different: the 303 is actually running in the room, turning out its bars fresh, with Pierre's hand on the knobs. So this is the first line where every symbol is a machine that's switched on, rather than a machine that was switched on once, somewhere else, and pressed into vinyl.

[15]Wolfgang Flür's drum pads, built with Florian Schneider in 1973, were metal plates wired to a home-made trigger box, and in the early

Charles Johnson, the Electrifying Mojo, on WGPR from 1977, played Kraftwerk and Parliament in the same hour and Prince next to the B-52s, with no regard for the lines American radio was built on.[16] Three kids in Belleville, half an hour west of Detroit, listened: Juan Atkins, Derrick May, Kevin Saunderson. Atkins and May played as Deep Space Soundworks from 1981. At Washtenaw Community College Atkins met Rick Davis, a Vietnam veteran who owned synthesizers, and as Cybotron they made "Alleys of Your Mind" in 1981 and "Clear" in 1983: electro, an 808 and a sequencer with a voice still on top. The word came from a book. Atkins had read Alvin Toffler's *The Third Wave*, from 1980, in which the people who take technology into their own hands are called the techno rebels, and he took the word

days he played them with knitting needles. The robots' first drumsticks came from a sewing basket.

[16]Mojo is a wonderful figure to have in here. He almost never let himself be photographed, so for most of Detroit he was only a voice, and his show opened every night with the landing of the Mothership, a whole spoken ritual, during which he'd ask listeners to flash their porch lights or blink their car headlights to signal they were out there. A city answering a radio with its lights.

for what he was doing.[17] Cybotron had a track called "Techno City" in 1984.

Then Atkins alone, as Model 500, on his own label Metroplex, in 1985: "No UFO's." That is the object. A machine playing a pattern, with nothing on it that a disco record had ever carried, and nothing before or after it. Kraftwerk had been a band pretending to be robots; techno is the robots without the band. The funk break was a drummer with the band removed. Techno is a machine with the band never there. Techno is house with the subscripts erased.

Techno, 1985
A B A B C D C D ...

No lowercase, so nothing was ever recorded. No bracket, so nothing was ever selected. No subscript, so nothing was ever sung. It is the first line in the chain with no recording anywhere in its ancestry that it still carries. Everything before it, house included, is still holding something a band once played.

[17] The same book coined another word that fits Atkins even better: "prosumer," Toffler's name for the person who produces the thing he consumes, the listener who starts making what he listens to. Both words for what those kids in Belleville were came out of one paperback from 1980.

May's label Transmat followed in 1986 and Saunderson's KMS in 1987, one label each, and between them the three made the records the definition gets tested on. "Strings of Life," Rhythim Is Rhythim, Transmat, 1987, has a piano on it: chords stabbed across the whole length, played by Michael James, sampled by May and re-sequenced until it was no longer a performance but a pattern.[18] Frankie Knuckles gave it its name. It is techno. So the definition has to be said more exactly than no keyboard: nothing a singer would have carried. A song is what a record is about, and the piano on "Strings of Life" is not about anything; it is a second machine pattern that happens to be made of piano, and the subscript is empty because a pattern is not a song. Inner City's "Big Fun," in 1988, Saunderson with Paris Grey singing, put the song back on and went into the British top ten. That is the exception that marks the line. The moment a singer arrives it is the house line again, A_p B_p, whoever made it and wherever.

The name got fixed the way italo's did, on a compilation, abroad. Neil Rushton collected the Detroit records for Virgin in 1988 under the working title *The House*

[18] It's the mirror image of R. R was a machine sealed inside a recording, and "Strings of Life" is a recording ground down until it became a machine.

Sound of Detroit. Atkins refused it, and the record came out as *Techno! The New Dance Sound of Detroit*. The word was Toffler's, the choice Atkins's, the printing London's.

What techno did after that was find out how little the line needs.

Underground Resistance, from 1989: Mike Banks and Jeff Mills, joined by Robert Hood, masked, no names on the records, a label run from a house in Detroit that refused photographs and treated the music as a campaign against the record industry. Mills played three turntables with a 909 on top of them, live, the machine put back into the DJ's hands where Knuckles had first placed it.[19] Then Hood left and in 1994 made "Minimal Nation" on Mills's label Axis, and that is a style: take the techno line and remove elements from inside the letter until one bar barely differs from the next. The changes from A to C become smaller than the notation can show. Richie Hawtin, in Windsor, across the river from Detroit, had already made the limit case in 1993, "Spastik," as Plastikman: one 909 and nothing else on the record, eight minutes of one machine's drum

[19]Mills had his own radio life before that, as The Wizard on WJLB, doing fast mixes on the air under a name that wasn't his. Underground Resistance refusing photographs makes them Mojo's heirs in more than taste; the voice nobody saw becomes a label nobody saw.

voices moving against each other. The line is one letter, repeated, and everything happens inside it.

Minimal techno, 1994
A A A A A A ...

The letter is the floor of the notation. Minimal is music that lives below it.

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Berlin.

The first Love Parade was July 1, 1989, a hundred and fifty people behind a truck on the Kurfürstendamm, four months before the wall came down.[20] When it came down, on the ninth of November, what opened was space: the East's abandoned buildings, power stations, vaults and bunkers, with no owner who could be found and no rent. Disco in each country had taken the cheapest available means of keeping the beat, and in Berlin the cheapest available thing was rooms. Tresor opened in March 1991 in the vault of the old Wertheim department store on Leipziger Straße, a few

[20] Dr. Motte registered it with the police as a political demonstration, and the motto was "Friede, Freude, Eierkuchen," peace, joy, pancakes. The founding march of Berlin techno was legally a protest in favor of pancakes.

metres from where the wall had run, with the steel safe-deposit boxes still on the walls.[21] Dimitri Hegemann, who had run the Ufo club where acid house arrived in Berlin, brought the Detroit records there directly, Underground Resistance and Mills and Blake Baxter and Eddie Fowlkes on Tresor's own label, and by 1993 a compilation subtitled *Berlin & Detroit: A Techno Alliance*. The music went from one emptied industrial city to another and was played in the second one louder, faster and longer than the first had played it.

The move Berlin added, rather than inherited, is Basic Channel. Mark Ernestus had opened the record shop Hard Wax in 1989; Moritz von Oswald had been a drummer.[22] From 1993 to 1995 the two of them made a run of twelve-inches, "Phylyps Trak," "Quadrant Dub," "Radiance," in which a techno pattern, chords and hi-hats, was run through delay and reverb so that each bar's echo fell across the next bar. The word dub is

[21] The room names the music again, just like the Warehouse did in Chicago: Tresor is simply German for a safe or a vault, the name of the room it was in. Even the club before it has a name that rhymes with Detroit: Hegemann's Ufo, where acid house arrived in Berlin, a few years before Atkins released "No UFO's."

[22] That's a modest way to describe it: he played percussion in Palais Schaumburg, one of the Neue Deutsche Welle bands of the early eighties, so the man who made the machine accompany itself had started out as the kind of person machines replace.

Jamaican. Around 1972, in Kingston, King Tubby took the mixing desk itself as the instrument: on the instrumental side of a single, the version, he muted the vocal and fed the drums and bass through echo.[23] That is the disco break done at the desk instead of on tape, two years before Moulton and an ocean away, with one addition, that the echo puts a ghost of what was removed back on top. Basic Channel did that to the machine. The subscript comes back, but it is made of the letter, delayed. The pattern accompanying itself.

Dub techno, 1993
$A_A\ B_B\ \ A_A\ B_B\ \ \ldots$

Every other subscript in the chain came from somewhere else: a band, a singer, a record, a voice in the room, a second machine. This one comes from inside the letter and arrives late. And when the two of them wanted their records cut a particular way, deep and loud, they opened their own cutting room, Dubplates

[23] He was a radio and television repairman before he was anything else, and the desk he used was one he'd modified himself, so it was an instrument he knew from inside, soldering iron in hand.

& Mastering, in 1995, so that the lathe was in the same hands as the pattern.[24]

One more object, from the same year as Metroplex, because it closes the loop. Samplers, the E-mu SP-12 in 1985, the Akai S900 in 1986, the SP-1200 in 1987, let you load a bracket into a machine.[25] Two bars of Stubblefield go in and come out as a pattern the box plays, repeatable, retriggerable, with no record around them. A bracket that has become a capital letter:

Sampled hip hop, 1986 on
$S_v \ S_v \ S_v \ \ldots$

And house, which had dropped the record in 1984, could now take pieces of it back as layers. Black Box's "Ride on Time," made in Bologna in 1989 by three Italian producers, is a machine on the bottom and Loleatta

[24] Even the name is a small history: a dubplate is a Jamaican sound-system object, a one-off acetate cut for a single system to play before anyone else had the tune, so the Berlin cutting room named itself after the lathe work of the same Kingston culture that gave them the word dub.

[25] The SP-1200 has a nice constraint hidden in it: it held only about ten seconds of sound in total, so producers would play the record into it at 45 instead of 33 to squeeze more in, then tune it back down inside the machine, and the grit that came from that is part of what those records sound like. The memory limit of a box is audible in a whole era of hip hop.

Holloway's vocal from a 1980 Salsoul record, "Love Sensation," lifted whole and laid on top: the song returning as a subscript made from the very kind of record the machine had replaced, and Italy, which had first put the machine under a disco song, now putting a disco song back on the machine. It went to number one in Britain for six weeks.[26]

Sampled house
$A_s\ B_s\ A_s\ B_s\ \ldots$

The last object is the smallest. Hardcore in London in 1991 and 1992 had been speeding breaks up by pitching them, the way a record sounds when the platter runs fast. Then the time-stretch function on the Akai samplers, which changes a sample's speed without changing its pitch by slicing it into slivers and repeating or dropping them, let a break run at a hundred and sixty beats a minute and still sound like a drummer, with a

[26]The video makes the subscript even stranger. Black Box put a model, Katrin Quinol, in front of the camera to mime the vocal, so the face singing "Ride on Time" on television belonged to someone who hadn't sung it, and the voice belonged to a woman who hadn't been asked. Holloway sued and eventually got paid. The sample had a body swapped onto it.

metallic grain where the slivers met.[27] Goldie's "Terminator," as Rufige Kru in 1992, is the record where that grain is the point: the stretch made audible. The disco editors' word, done not with a razor on tape but with a function on a chip, and leaving a scar you can hear. Then the chop. The six seconds of "Amen, Brother" were cut into their separate hits and re-sequenced by hand, the snare where the kick had been, so that a bar of jungle is a drum pattern G. C. Coleman never played, assembled entirely from things he did play.[28] Remarc, Dillinja, 4hero, Shy FX's "Original Nuttah" in 1994, Metalheadz the same year. The Winstons' four bars, played once in 1969, are the most sampled bars in recorded music.[29]

[27] On vinyl and tape, speed and pitch are one knob, because they're the same physical fact, the groove passing the needle faster. The chip pulls apart two things that physics had welded together.

[28] The six seconds walk in here already wearing the definite article, having been introduced by the culture itself. Among jungle producers the word Amen stopped being a title altogether and became a common noun: people talked about "chopping amens," lowercase, plural, the way you'd talk about slicing onions. A record that had been demoted into an ingredient.

[29] There's a wonderful irony in where those six seconds lived. "Amen, Brother" was the B-side of "Color Him Father," which won a Grammy, so the side the industry honored is a song almost nobody remembers, and the side nobody cared about became the most sampled bars in recorded music. It reached the samplers through *Ultimate*

The drums run at a hundred and sixty and the bass at half that, so the body chooses: dancers move at eighty while the breaks go past at double time. The bass is Jamaican sound-system bass, and so is the rest of the room. Jungle travelled on pirate radio, Kool FM from 1991, and the records the DJs played were not records. They were dubplates, one-off acetates cut at Music House in London so that a tune could be played for months before it was pressed, or never pressed at all. The lathe a third time, now upstream of the record instead of after it: King Tubby's dubplate culture arriving in Hackney with the bass it had been built to carry.

A letter has always been a bar. Here s is a single hit, and it is lowercase, because it is Coleman's snare.[30] The bracket is around two of them, because that is what the hand selected, and the bass holds under the pair. Two hits is not much of a selection, but it is the smallest one that still has an inside and an outside: a single hit would be a letter, and a letter cannot be bracketed.

Breaks and Beats, a series of bootleg compilations from the mid-eighties that gathered breaks for DJs, a whole record label made of brackets.

[30]The letter s is having a remarkable career in this notation: the soloist, then the sample, now the snare, and all three are the same kind of thing, the one exposed figure standing in the hole.

Jungle, 1993
$[\mathrm{s}\ \ \mathrm{s}]_{\mathrm{b}}\ [\mathrm{s}\ \ \mathrm{s}]_{\mathrm{b}}\ [\mathrm{s}\ \ \mathrm{s}]_{\mathrm{b}}\ [\mathrm{s}\ \ \mathrm{s}]_{\mathrm{b}}\ \ldots$

That is Herc's line. Bracket, subscript, bracket, subscript: the record selected by hand and a layer put over the selection. Only the unit has changed. Herc's bracket was four bars, Moulton's eight, the sampler's two, and this one is a kick and a snare, so the Bronx move is being done inside a single bar, on the same six seconds of 1969, twenty years and one ocean later.

Mark Fisher thought jungle was the last one. He was at the Cybernetic Culture Research Unit in Warwick when it was current, so it was the music of his own room rather than something looked back on, and the claim he built on it, in the k-punk blog from 2003 and in *Ghosts of My Life* in 2014, was that after jungle nothing arrived that had not been here before.[31] He called it the slow cancellation of the future, a phrase he took from Franco Berardi, and his test for it was two records twenty years apart. Play someone in 1975 a record from 1995 and they hear another world; play

[31] His colleague from that same circle, Kodwo Eshun, wrote *More Brilliant than the Sun* in 1998, a book arguing that the music from Kraftwerk to jungle was a kind of science fiction, sound arriving from the future, which makes Fisher's later claim the other half of an argument the same room had started.

someone in 1995 a record from 2015 and they hear a record. Jungle was the last time the test came out the first way, the last sound that seemed to have come from somewhere ahead. The moment he dated the loss to was a single, the Arctic Monkeys' "I Bet You Look Good on the Dancefloor," in 2005: he heard it and placed it twenty years earlier, and the video had been shot to look like a television performance from the 1980s, on purpose, and nobody found that strange. That was the vertigo, not that a band sounded old but that a new thing could pass as an old one without anyone minding the gap. Fredric Jameson's word for it was pastiche; Fisher's was hauntology,[32] and Burial's *Untrue* in 2007 was his exhibit,[33] jungle heard through a wall, a haunting where a new genre should have been.[34]

[32]The word is itself a ghost. Derrida coined it in *Specters of Marx*, and in French hantologie and ontologie are pronounced almost the same, so it's an older word haunted by a new meaning, which is the Arctic Monkeys problem in miniature.

[33]Burial is a perfect exhibit for reasons the essay's own lineage makes visible. He stayed anonymous for years, no face, the line of Mojo and Underground Resistance continuing into London, until a tabloid threatened to unmask him and he posted a single photo of himself on MySpace to take the story away from them.

[34]*Untrue* came out on Hyperdub, the label run by Kode9, Steve Goodman, who had been at the CCRU with Fisher. So the record Fisher held up as the sound of the cancelled future was released by someone from his own old room.

The notation says something about that claim, and it is not quite what Fisher said. By 1994 the notation had been driven to both of its edges in the same year. Minimal took the letter as far down as it goes: one A, the music below the resolution of the bar. Jungle took the bracket as far down as it goes: one hit, because below a hit there is no selection left to make, only waveform. Between them stand the two poles the whole sequence turns on, the funk break, a drummer with the band removed, and techno, a machine with the band never there, and around them the moves: remove the song, select the section, replace the drummer, put a layer back, cut the layer smaller. Every move after 1994 is a move already on the page. Fisher heard that as the future failing to arrive. It can be heard the other way. An alphabet does not end when the last letter is found; that is when the spelling starts. What felt to him like the end of the new is what it feels like from inside when a notation becomes complete, which is the one condition under which nothing is new and everything can be written.[35]

[35]This is the precise sense of "complete" that computation uses. A complete set of logic gates, a Turing-complete language: once you have it, nothing you add lets you express anything you couldn't already express, and that is exactly the moment everything becomes writable. Fisher heard the arrival of completeness as a death.

Across the whole run, three things leave in order. The lowercase letters, the record, go at 1982 for hip hop and 1984 for house. The brackets, the selection, go at the same moment, because once the drums are a machine there is nothing to select from. The subscripts, the song, go at techno. After that two things come back, and neither comes back as itself: in Berlin the subscript returns made of the letter's own echo, and S brings the lowercase back inside a capital, which is the only way it can return, and then S itself is cut open.

The funk break is the hinge of the whole sequence. It is the one line where the bracket could be drawn or erased without changing a sound, because what is inside it is identical to what is outside: a hole that was already a tile, the band's absence visible only as a subscript going missing. Every line after it is someone deciding to stay inside that hole; then someone deciding the hole does not need a record around it; then someone deciding it does not need a song on it either.

Fisher was from Leicestershire, working class, and he heard music the way a person reads a letter from somewhere he has not been. Joy Division, the Fall, Japan, Tricky, jungle, Burial: what he loved in each was a world that did not exist yet making itself audible, and the k-punk blog was written at the speed of someone who

still expected the next letter. When the letters stopped he wrote that down too. His depression had been with him since he was a teenager. He traced it to the belief a working-class boy is given that he is worth nothing, and he noticed that it spoke in the same voice as the thing he had spent his life describing—the voice that says: This is simply how things are. The depressed person, he wrote, is sure he sees the world as it really is, and that certainty is the trap. The cancelled future and the cancelled self were one diagnosis heard from two rooms.

The last thing he wrote before he killed himself was the introduction to a book called *Acid Communism*, about the years around 1970, when, for a moment, another world had seemed possible.

