

Title: ERD: an electro-alchemical rosarium

Subtitle:

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Issue: #8

Publication date:

Review status:

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Article DOI:

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By degrees the idea of cultivation subsided into that of merely digital care. This slowly became merged in a sense of retirement - this again in a consciousness of solitude.

[Edgar Allen Poe. The Domain of Arnheim. Altered.]

Take erth of erth erthes sister.

ERD stands for Earth Returns Distortion, and names both a range of eurorack audio synthesis modules which address the materiality and ecology of both analogue and digital electronics and algorithms, as well as a specific edition of modules (as ERD/ERD) which make use of the occulted and material properties of earth obtained from charged global sites or locations.

ERD/ERD was the first and most extreme expression of the ERD philosophy. Seeking to literally put the earth back into circuit with all technology, ERD/ERD places a small, encased, contained and conditioned block of a very specifically sourced earth sample within the electronic synthesis circuit and wider discourse.

The ERD/ERD module can (but should preferably not) be described in conventional terms as an earth conditioned VCA (Voltage Controlled Amplifier) and distortion unit. Yet the earth here is everything; always unbounded, necessarily leaky and outside enclosure, unbordered and uncontained. Local electrical and atmospheric signals condition, headily influence, mix with and are rendered as part of the earth-bound signal. The presence and proximity of the modular human or non-human operator is an important part of the modular circuit, rendering

an un/easy equivalence of earth, modular operator and atmosphere; of ourselves becoming earth, becoming metal and becoming cosmic and of the earth becoming us.

ERD/ERD was produced as a number of special limited editions with the most recent ERD/gott edition inserting earth from local rye fields, mixed with toxic ergot mycelium extracted from growing rye cultured on the author's blood, into the Eurorack circuit. The earlier Raven edition (nevermore) embedded earth samples from the grave site of Edgar Allen Poe in Westminster Cemetery, Baltimore, and the iconic vampiric edition mixed earth samples from Golgotha, the site of the crucifixion, with soils from Whitby abbey in England, where the writer Bram Stoker was inspired, programmed and conditioned by local psychic-geological forces to write the novel Dracula.

Further ERD modules have opened the modular synthesizer to other cosmic and world materialities and both real and fictional processes including dirt, dust, blood, plague and contagion, fungal agencies, radioactive gamma decay, smoke, heat, and light.

As the earthed focus of this article, ERD/ERD makes manifest the unearthing of hidden or occulted potentials within unbounded electronics and systems, allowing these autonomous potentials to redefine and question boundaries, constraints and polarities expressed within the terms and relations of instruments, users and creators.

Earth as substrate.

"Then your things which enter your work are things which people cursed, despised and rejected?" He said: "If it were not like that, this science would be clear."

[Zosimos of Panopolis]

The design and technical approach of all ERD modules begins with an autonomist material obsession which sets in motion a series of intertwined plays with electronics, refined and unforged sets of materials, elemental source code, layouts, emblems and processes, informed, illuminated and made revolutionary, through a research and imagination living within (the history of) alchemy, considered as a precursor of the contemporary technological landscape. This obsession becomes necessarily adapted to and is forged within layered infrastructures of production and the histories and ecosystems of modular and eurorack instruments, perhaps as a burrowing process adapts to changes in sedimentation, to the growth and movement of creatures and plants over time, but without maintaining clear ideas or projections of outcomes or the imagined approach of an end user to the instrument. The obsession is warped and bent somewhat in this encounter, submitting to contradictory impulses which reshape the terms of

creator and user. The eurorack garden is tended with an awareness of these infrastructural forces and constraints.

The material obsession driving ERD can be set down as the question of where precisely software or code, that active dictation which defines humanity, is executed. Is there a specific location where this magic, the muddy flesh made word, happens and is this despised place not where it appears to be? How do logical or symbolic structures, computation and code, meaning and language, emerge from, intertwine with and return to earth and materiality? What is the necessity which forges technical structures and infrastructures from the earth and from rare earth minerals? And how are technical communications intertwined with cosmic, atmospheric and telluric phenomena? These questions form part of the obsession which ERD/ERD to some degree makes material, embedding these ideas within an active conditioned and machined chunk of heterogenous materials such as copper, silicon, gold, epoxy resin, cadmium, glass fabric composite, polymethyl methacrylate, nickel chromium, tantalum, tin, silver, nickel, aluminium, zinc, existing within a modular ecosystem, extended by articles such as this one with a certain digital materiality.

Earthy minerals are excavated en masse from the earth, broken up and disturbed, washed and weathered, producing toxic exposures and tailings, acid mine drainages, fragments of language. These are cleaned, refined and combined with synthetic crystallisations to produce technological artefacts. The earth is made to signify. The doping of the earth can be viewed as the introduction of certain impurities into crystal structures enabling the work of both analogue electronics and computation, the inscription of active symbols and logic within matter. The earth becomes a substrate for electromagnetic manipulations of logical signals, on which symbolic and linguistic structures can be bootstrapped. Logic and control is imposed on the earth in a multiplicity of complex feedback loops - for example, financial computations driven by earth substrates and energies (oil and coal) dictate fluctuations in the price of gold or other earth commodities which drive renewed earth-binding excavations and unearthing.

Functional electronics (enchained within the modular synthesizer) can thus be described as the absolute and instrumental control and manipulation of electromagnetic energies (embracing all times of sun, earth and cosmos) through principles of negative feedback and a necessary, flawed opposition to gradients of entropy inside each contained component. Electronics is the imposition of order on electrons, and thus on flows of energy. For example, a transistor embedded within the operational amplifier used in ERD/ERD modules, controls the flow of current, causing a larger flow to be controlled by a tiny change, amplifying that control signal. Yet, this flow is never allowed to run away with itself - to fly or soar too high. It is always pulled down by the mutilated bird of negative feedback. The figure of the toad brings it down to earth. Negative feedback in the transistor circuit, chains the bird to the toad on the emitter. Alchemical illustrations thus pre-figure contemporary engineering.

ERD/ERD sets out to ask material questions of the nature of this conspiracy which submits the earth to technology, forcing the despised earth to become an equally despised substrate sister which submits to technology on the condition that all materiality, all noise, all becoming cosmic is erased once and for all time; this conspiracy which was grasped, predicted in images and in parables, by the early alchemists who inform the imaginary of ERD.

worms.txt

All technology that is derived of earth, must be decomposed and again reduced to earth.
[Basil Valentine.]

The design and technical approach of all ERD/ERD modules is identical, differing only in panel design and soil sample geolocation sourcing. The technical design is inspired by custom-made circuits constructed by the artist for a series of performances called earthvoice, alongside workshops investigating the un-earthing of buried signals (the stone tape), and the design of a device, named earthboot, which allows the earth to code an operating system bootable on any laptop. Projects such as earthboot, and worms.txt, cede authorship of software and poetry to the earth, and to the earthworms (respectively), who can now be imagined as the creators and users, and thus inhabitants, users and gardeners, of the ERD rosarium.

Both earthvoice and ERD/ERD use electronics, refined from earth sources, to divine, make present and amplify tiny electrical signals in the earth. In the first performances in Paris, this earth was sourced close to the grave of Oscar Wilde located in Père Lachaise cemetery. I wanted to make the electronic circuit as simple as possible, to impose as little of my own intentionality and psyche on the earth, to literally give voice to the specificity of that tiny mound of earth, now isolated from the creatures of the grave, of the forest, of the night. I was interested in inserting signals from my hands into the earth, to hear how these signals could be transformed. A special glove (modified lowly washing up glove) was used to generate signals which responded to earth conditions, channeling the earth. These signals would be inserted, massaged by my hands into the graveyard earth. I would then use powerful and precise instrumentation amplifiers (the AD620 from analog devices commonly used in medical electronics) to hugely amplify the tiny electrical signals within the earth. It is important to realise that these flows are not in any way separate from external atmospheric or body signals. Everything is under the occult and material influence. At the same time I desired to make my own circuits part of the earth circuit; during the performances the electronics would be slowly buried in the earth, my hands digging deep into the pile. It became impossible to divine what signals were sourced from where, what manipulations would generate certain sounds. Sensitive radio transmitters, influenced by earth properties were also buried, and local radio

receivers would pick up these unknown transmissions. Frequencies would mix and change, modulate and de-modulate each other unknowingly. The electronics would frequently overheat during burial, or malfunction within the more moist or drenched earths, returning to the materiality of earth, to the decline and declension of unvoiced noise, puppeting the processes of obsolescence, techno-decay and disposal of consumer electronics.

The ERD/ERD modular edition thus grew from a contrary set of desires to fix, to enclose and pin down the earth sample, to maintain its functional materiality and to widen the circuit to include the operator and the modular synthesis garden (the rosarium, and its diagrammatic double).

Just as my hands are (in the) earth, so the user of the module, is now within the earth, now transformed into an embedded operator writing and etched in the earth, becoming electronics and module at the same time. In many senses, they are within , just as they are equally structured and described within infrastructural and economic chains of algorithmic agencies which dictate how the earth is refined into functional electronics, and also how the earth is structured by logical supply chains furnishing these refined elements and driving them into logical arrangements (a printed circuit board which is assembled by unknown hands and machines, and known and named hands and limbs in Shenzhen and Berlin) designed using free software (such as Kicad) itself running on now obsolete hardware and subject to versioning and revisioning (using further software suites and running on servers located in ...). This is what we could call the "composition of the waters", which already starts to suggest the figure of the ouroboros or serpent biting its own tail: a module which seeks to highlight the agency of the earth and its structural role in global electronics is itself composed and thus ordered not just of (holy) earth, but of constrained and refined (rare) earth elements, designed and ordered by Mina Harker's (MH's) typewriter/computer, embedded within cyclical chains of computers, servers and operating systems, all dependent on the earth.

The earth sample is enclosed in a small perspex case, with two copper plates inserted on either side of the sample, allowing for close contact with the earth. These plates are the two feet of the hermaphrodite king and queen standing on a rock of gold (sun) and a rock of silver (moon) as the dragon operator patches signals in and out from ERD/ERD. They touch the twin streaming earth.

These hermaphroditic copper plates are where the signal is passed through the earth, from attenuated input to large-scale amplifier. The density and moisture-content of the earth is very important, and can be manipulated, through attending to the module over large time-scales. Modules can be allowed to dry out, or can be placed in a dish of water to replenish moisture levels. The module is a garden (a rosarium), a questionable controlled and contained paradise, which can be tended, cared for, or left to wither, and dry out. In this last case the sound is very

noticeably different, and more open to atmospheric and local body influences. It is equally possible that the earth sample can retain some imprint of all the signals which have and will pass through its confines (as a stone tape).

The first ERD/ERD modular front panel was made of clear rectangular perspex with a sole inscription for the alchemical symbol for earth, a downward pointing triangle, with a line across; the inverse of the sign for air. For the release of the vampiric edition, embedding the twinned holy and cursed earths, a coffin shape was employed to reflect the earth containers of Dracula on their voyages and interment/disinterments; a perfect format for technology and electronics which also purposefully breaks with the rectilinear form of the modular synthesiser, allowing for gaps and holes, opening up the black box of the instrument to fingers, dust and insects perhaps. It is to have done with the judgement of god/s, snaking towards a synthesis without modules.

Vampiric edition.

The names of minerals and the minerals themselves do not differ from each other, because at the bottom of both the material and the print is the beginning of an abysmal number of fissures. Code and rocks contain a language that follows a syntax of splits and ruptures. Look at any software listing long enough and you will see it open up into a series of faults, into a terrain of particles each containing its own void.

[Robert Smithson. A Sedimentation of the Mind: Earth Projects. Altered.]

From the earth treated as a material, mined and refined, dug out and undermined, rerouted and drained or flooded, and encabled in order to facilitate and create symbolic structures and any technical apparatus of the earth, signifying that we write our psyche on the earth, ERD imagines the natural movement in an opposing direction: that the earth writes us, that language comes to be treated as a material - burned, dribbled out, drilled into, mined, burned, scoured, cut into, undermined, emptied, trampled underfoot by scores of unnamed and unmentionable animals, regurgitated by a rank of soft worms, dug into by the beaks of crows, stored in any season, piled up arbitrarily. In this opposing movement, ERD/ERD asks of the modular operator the question as to how we are coded, written or executed by the earth. How does geology and the earth author us?

This intelligence or sentience of the earth which is writing us, inwardly turning or entangling modular operator Usher's mind (Poe's The Fall of House of Usher), against the sterilising urges of technology, directly informs the ERD/ERD series of embedded earth samples, spreading amongst their enchained operators, against control. This definition of technologies of control as a means of sterilising the sentient earth, rendering it into another silence, was the

primary counter inspiration for the ERD/ERD vampiric edition, and informs the very specific sourcing of the earth for each series of modules (a geophagic logic in some instances).

We must sterilise this earth, so sacred of holy memories, that he has brought from a far distant land for such fell use. He has chosen this earth because it has been holy. Thus we defeat him with his own weapon, for we make it more holy still. [Bram Stoker. Dracula]

The ERD/ERD vampiric edition contains mixed earth from both Golgotha, Jerusalem and Whitby Abbey, England. Whitby is the landing and stranding place of Dracula's ghost ship Demeter, delivering the fifty oblong boxes ("a number of great wooden boxes filled with mould") which find their way to the Count's chapel at Carfax. This earth is essential to Dracula, it forms "his earthhome, his coffin-home, his hell-home. . . "

It is this earth which is later sterilised and rendered more holy by Dr. Van Helsing. It is this earth which is contained and rendered audibly and psychically influential with the ERD/ERD vampiric edition. It is my belief that Stoker was programmed by the geology and sentient earth of Whitby to literally transcribe the story of a technology to come; the future technology of plague or contagious computation which in turn writes itself on every earth substrate (doped silicon) as holy. This ERD/ERD edition sought to re-animate this geophysical writing machine, and to curse that more than holy earth

For the ERD/ERD Necromanteion edition, earth was collected from three different locations, each identified in Ancient Greek times with an entry to the underworld, a place of putting questions to the Oracles of the Dead. These include the Oracle of the Sibyl at Cumae, the Oracle of the Dead at Baia, and Grotto of the Sibyl, next to Lake Avernus. These sourced earths have been mixed for each Necromanteion module. This module is intended to function as an oracle of and for the dead, with no input use preferred.

The ourorack operator.

The Earth is a monster with many faces: and the container of all variety. Go home, stand not idle. Provide by Arts for the hardnesse of Nature ...

[John Dee, A True and Faithful Relation.]

The earth re-writes psyche which subjects and encodes the earth which again re-writes the psyche, and so on within a glassy and excessive ouroboric feedback loop. Under a tail-recursive underground passageway or earth evaluator, earth becomes language and language is becoming earth, undermined and holey. We become earthy and the earth becomes us; this is

the circular, ouroboric circuit which ERD/ERD enacts following an alchemical prediction. Earth to earth us.

Within ERD/ERD, the modality of "the earth as substrate for technology" executes the becoming-substrate, the becoming-earthly, of the modular operator (the user). The entwined sentience of the earth, undermining language through its becoming sheer material or mud executes a twinned embedding of the ourorack (a contraction of ouroboric eurorack synthesis) operator within the module or vessel.

The modular operator is thus both within the earth, and within the module, doubled within prescient software; inside or interior to a flask, prison or earth container, an inwardly involuted golem, membranous and crystalline, divining itself and its own procedures in earth, water and smoke, descending into an underground, circuitous labyrinth. We become the enacted process. They are inside the process (the person of copper, of silicon), in absolute identity with the process, subject to and acting as monadic witness to their own thermal noise.

The serpent biting its own patch cord of intentionality of control, is how the user now interacts creatively with the tool or instrument (become ourorack), and this feedbacking and embedding has much in common with techniques of divination such a geomancy or earth divination. The latest ERD work-in progress, ERD/ghost vehicle, is based on ancient Chinese diviner's boards found in Han dynasty tombs aroiund 200 BCE. These boards, composed of a rotating central heaven plate (with the polar Ursa Major constellation depicted at the centre), embedded within a square earth plate, were later developed into the Lo P'an or feng shui compass, which is used to calculate alignments with earth energies. ERD/ghost vehicle simulates the movements of the sun, moon and stars and planets, and makes use of a digital compass to enable the modular operator to favourably position the modular synth, and to suggest auspicious moments for certain patching operations. ERD/ghost vehicle thus marks a serpentine trajectory from an earthy interior (ERD/ERD) to cosmic divination.

The earth and geology is incorporeal, incorporated and interior, inside us; at the same time we become, serpent-skin-like or vomited (a modular operator I saw, did vomit the waves and sheets of clouds, of noise and thunder so fast), our outsides, a landscape or garden, within which the operator casts or throws some stones or seeds onto lines or markings in the earth. This form of geomantic divination in that interior garden situates where the earth and metal within us brings the planets down to earth, bringing the mutilated technological birds (with faked or synthetic voices and warbles) down to the blackened, smog-crusted earth. We are beginning to become cosmic.

I am the revealer of secrets; in me are marvels of wisdom and strange and hidden things.
But I have spread out the surface of my face out of humility,

and have prepared it as a substitute for earth.

[Inscription from a thirteenth century Islamic geomantic tablet.]