



Fr

# Elements 87

francium

Oscar van Dillen

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# Elements 87: Fr

**Elements 87: Francium** is the twenty-fifth album in this series of music on the Elements, a very large work in progress consisting of electronically/digitally created architectural music compositions by Oscar van Dillen.

The cover art in the Elements series consists of color inverted pencil drawings made by the composer.

*A word of warning: after careful listening, the world around you may not sound the same any longer.*

The work on this album was created, composed, recorded, and produced August-September 2023. All works, cover art and booklet of this album were created by Oscar van Dillen.

## On scientific content as artistic inspiration

"The new BIG STORIES are all told by science, their scope is vast, and their telling has only begun relatively recently. We are daily getting updates on answers to all the ancient basic questions of life that inspired human art, cultures, and religions for millennia, and we are getting *verifiable* answers this time. Most important is perhaps that we are also facing completely new questions.

It is high time the old myths and beliefs are abandoned and replaced by contemporary, that is to say: *scientific* sources of information, imagination, and inspiration. The vast field of modern science is far more complex, has a verifiable and direct relation to reality, and it offers a far greater abundance of possible stories and references for artists in all disciplines than any older belief or myth system, however poetic, could ever come up with<sup>1</sup>.

In our times we need new and innovative music in all genres, whether electronically or no; let these leave behind the stories of our alleged past and use such new narrative sources as our present times offer for reference and inspiration."

--Oscar van Dillen

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<sup>1</sup> as was superbly demonstrated by writers such as Stanislaw Lem (The Cyberiad), Primo Levi (The Periodic Table), and Italo Calvino (The Complete Cosmicomics).

All albums in the Elements series so far, in order of release:

- Elements 1: Hydrogen Deuterium Tritium H D T
- Elements 118: Oganesson Og
- Elements 6: Carbon C
- Elements 8: Oxygen – Ozone O
- Elements 14: Silicon Si
- Elements 7: Azote N
- Elements 2: Helium He
- Elements 15: Phosphorus P
- Elements 20: Calcium Ca
- Elements 12: Magnesium Mg
- Elements 38: Strontium Sr
- Elements 4: Beryllium Be
- Elements 56: Barium Ba
- Elements 88: Radium Ra
- Elements 49: Indium In
- Elements 31: Gallium Ga
- Elements 13: Aluminium Al
- Elements 5: Boron B
- Elements 81: Thallium Tl
- Elements 3: Lithium Li
- Elements 11: Natrium Na
- Elements 19: Kalium K

- Elements 37: Rubidium Rb
- Elements 55: Caesium Cs
- Elements 87: Francium Fr
- Elements 9: Fluorine F
- Elements 17: Chlorine Cl

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
1																		He		
2	Li Be															B C N O F Ne				
3	Na	Mg											Al	Si	P	S	Cl	Ar		
4	K	Ca	21	22	23	24	25	Sc	27	28	29	30	Ga	32	33	34	35	36		
	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Cd	Ag	Pt	Au	Hg	Pb	Bi	Po	At	Rn
5	Rb	Sr	39	40	41	42	43	44	45	46	47	48	In	50	51	52	53	54		
	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe				
6	Cs	Ba	72	73	74	75	76	77	78	79	80	Tl	82	83	84	85	86			
	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu					
7	Fr	Ra	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118			
	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr					

## Tracks

1. Francium – section 1	05:45
2. Francium – section 2	04:59
3. Francium – section 3	08:24
4. Francium – section 4	08:38
5. Francium – section 5	06:32
6. Francium – section 6	08:53
7. Francium – section 7	02:33
8. Francium – complete	45:44

Total duration: 01:31:28

## Ways of hearing

Just like in other arts and sciences, the history of music gradually develops from the prehistory of music, bit by bit findings and remainders from long ago start appearing in the archaeological record. Painting left its oldest recognizable works to us, in caves. These are found all over the world, from Africa, Australia, Indonesia, and Europe. In Spain, the currently oldest found cave paintings were found, dating back to more than 64,000 years. To compare, the age of the Neolithic archaeological site Göbekli Tepe with its wonderful architecture and sculpture is estimated to be between 10,000 and 11,500 years, meaning the oldest paintings preserved are at least over 6 times older. At this age, the humans having made them are still classified as Neanderthal, which most people do not realize is partly us too, as many humans today share vestiges of Neanderthal genes, or similar genes in Asia. A persistent solipsistic attitude of looking at these our common ancestors tends to hold on to the belief that “we” came to Europe only later, but this narrow view of

what is “us” is gradually shifting in paleoanthropology<sup>2</sup>. The descent of humans is now found to be a complex web of interconnections, reconnecting and interbreeding, not a simple tree with branches splitting off, its structure is much more alike to a mycelium or rhizome. Music is lucky to have in its archaeological record a flute of close to the same age as the paintings in the Maltravieso cave: the Divje Babe flute, preserved because it was made of a cave bear femur, not wood nor bamboo, and this flute happens to have a pentatonic scale built into it. So music history started with a Neanderthal flute and a scale, at around 55,000 years ago, but of course no composition survived.

Still older than these is the Bruniquel cave, where the other humans the Neanderthals built with broken stalagmites 176,000 years ago.



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<sup>2</sup> See the excellent book *Close Encounters with Humankind* by Sang-Hee Lee and Shin-Young Yoon, 2015/2018



We take for granted that music makes use of tones, pitches, scales and harmonies, forgetting that these are special cases of sounds as heard and recognized by our ears. Yet music has always consisted of much more than these specific sounds such as tones, but since these are mostly not represented in contemporary notation, they seem to be irrelevant and are forgotten, even not heard. The 21st century is flooded with "music", some of it made by artists who cannot read notation or cannot even sing in tune, some of these world famous and immensely rich. We cannot even think of starting to understand the origins and true nature of music if all we are aware of is this mix of worldwide broadcast and sold popular or commercial music in other genres in general. If such a daily listening experience, marketed to us by many contemporary media, characterizes, delineates, defines, and sets the boundaries of what we consider to be "music" is used as reference, then auditive exploration of new music is made very hard indeed. Great innovators are often largely misunderstood and undervalued, even by their peers. More time and more music are needed, and open ears.

In the various surviving living traditions of world music, memories and vestiges of prehistoric music can sometimes still be found, *along with the various disciplines of listening these require*. The secret of their appreciation lies in the willingness to commit the necessary effort to learn to understand such different languages of music, it cannot be expected that every music is always immediately a language which explains itself while listening to it. Like with learning a spoken language, learning to understand other musical languages takes time and effort. Once one has developed a basic understanding, learning will proceed by repeated and discovering listening. Mere hearing, as people are supposed to do with mass marketed "music" will not suffice, just as one cannot absorb knowledge by sleeping with a book under one's pillow. Along with the development of understanding new musical languages, listening itself is being schooled and trained in the process, and *the world around you may not sound the same any longer*, as van Dillen warns above. While becoming more precisely aware of sound, the perceived world becomes more real perhaps, or larger, surprising, more meaningful.

## On listening to electronic music today

The meaning of the term *electronic music* has changed dramatically since modern composers started to work with electronic equipment in radio studios after the second world war. In the 50's and 60's of the 20<sup>th</sup> century it meant mostly avant-garde esthetics by an elite group of mostly male composers making the headlines for this at the time niche medium. Today the term changed meaning but at the same time its history is in the process of being rewritten as more and more female composers are being credited for having played a defining role in the development of the medium. In 2021 the acclaimed documentary film called *Sisters with Transistors* was released, it demonstrated this process for a larger than specialist audience. One can also conclude that on the whole and over time the term *electronic music* defines a *medium* rather than a *style*.

Compositional ideologies played a major role in the times of avant-garde aesthetics, and they still do for many contemporary composers today. In more popular genres this aesthetics has been transformed to a more practical

approach to the instruments actually used, with more musicianship involved in the creation of works, and less cold quasi scientific laboratory-like calculations to justify the results (a major consequence and certainly a hobby of the avant-garde ideologues). Today the first thing a young listener will think of when expecting to hear *electronic music* will be known as EDM, or Electronic Dance Music. Music to party, to dance, to have fun. A starker contrast to the early composed electronic music, say to the times of a Stockhausen and his Etudes I and II and Kontakte can hardly be imagined. Meanwhile the innovative pioneering work of Eliane Radigue was almost completely ignored. What the early electronic composers shared was a very elaborate working process: to create a single minute of music took days/weeks to produce. With the rapid and drastic advances of technology in our times with regards to sound generation and recording this changed completely. What used to take a large studio with very expensive hardware to produce can today be done on a good laptop with professional software, much of it affordable or even free and open source.

When listening to electronic music, one misses the musical instruments such as strings and winds, yet on careful listening there may be sounds referring to these, but more flexible and moving in sound than the physical instrument could ever practically realize. Moreover, with electronic music one misses a musician for every single sound, there may be just one person performing on a laptop, or just a recording, and one stares at loudspeakers (never stare at loudspeakers btw, rather try to locate the sounds instead, as they are not in the speaker but resonating in the room). Most electronic music is however still made by humans and by composers' choices, the path from human action and sound creation is just somewhat different than playing an instrument, a mouse or a button or a wheel is moved, a bit more technically indirect perhaps, but at the same time producing an audible sound not significantly less instantaneous than playing a live piano would. Moving the mouse, the wheel or the button are of course less visible on stage than a performance on a piano or wind instrument, where an informed viewer can read the keys.

The truly informed listeners to electronic music will be able to recognize historical instruments when used, such as the ARP 2500 or 2600, or the Buchla 200, or the Moog Modular, in case these are used. Each of these iconic and historical instruments can be found again today, mostly in the form of software versions, but now and then in hardware form, all newly made, sometimes with new, sometimes even with “vintage” components. Most modern synthesizer clones reliably reproduce the iconic sound and usage, and sound but slightly different. Hearing the differences between old hardware and modern hard- or software can be similarly a specialist skill as in being able to hear the differences between a Steinway, a Bösendorfer, a Yamaha, a Fazioli, or a Schimmel grand piano – *on a recording*. Not obvious, not obvious at all, as music is about music first of all and not about musical instruments at all. Still, diehard electronic composers may swear by certain hardware: Moog, Buchla or ARP synths. Likewise acoustic instrumentalists swear by instrument brands and types, Muramatsu or Haynes flutes, Selmer vs Yanagisawa saxophones, Stradivari vs Guarneri or Amati violins, etc.

Specific instruments matter more to performers and should not be made into criteria for listeners. Nevertheless, being able to hear *types of instruments* is just as important in acoustic as in electronic music. Can one recognize the sound of a clarinet and distinguish it from the oboe, from the soprano saxophone, or the flute? Can one pick up the melody of the bassoon, the French horn, the trombone? Similarly with electronic music: can one hear the wave form types, the sine, the modulated sine, the square and mixed triangle waves in slightly detuned unisons, the types of noise, white, pink, brown? Can one hear certain brands of hardware being used, type of filters or a ring modulator, or the synthesizer itself in case of an iconic known sound?

Most difficult of all: can one hear how a music was made, composed, and produced? Most important of all: can one actually enjoy this music, both with and without all this knowledge and ability to recognize specifics?

And lastly: can we actually let go of the illusion of being in control of that *pet* we call our *mind* and let the music and musical perception simply take over and surprise us?

The challenge with innovative contemporary music made for listening per se such as this album, lies in a challenge to connect in a free way, and go through the steps of open perception and appreciation individually, without recipe, without a priori dos and don'ts, without expectations but with memories, with a sense of exploration as in starting a new novel or unknown movie without spoilers:

1. Observe – hear everything, don't be distracted, be aware of what happens in the various registers of time, tone, timbre, space, and volume (the range of each is much larger than with instrumental music): try to imprint what you hear into memory, ask yourself what is it objectively that I heard?
2. Evaluate – can you perceive every form distinctly enough, some things may be harder to hear, or are sounds that affect you emotionally or even physically: observe and evaluate the effect of it.
3. Interpret – observe your mind creating associations of its own: they are yours and not in the music itself yet are created by the music in you personally.



## Elements of both Music and Chemistry

The Elements referred to in the title are obviously the chemical elements: the very first of the periodic table of which is Hydrogen with its remarkable isotopes Deuterium and Tritium, the only isotopes with their own chemical abbreviation. Less obvious from the titles is the use of Elements of Music, as described in his original approach to composing: his *method* (not a system) of *prepositional analysis*, developed from 1998-2011 by van Dillen.

Prepositional analysis is a new approach to the creation and analysis of music, not restricted to any style or vocabulary, but based on how humans hear music and perceive its elements Sound and Silence in interaction. Sound manifests itself in spectrum, time, and space, and from this observation 5 categories are derived, which sum up to 6 with silence included. These both include and transcend Stockhausen's 5 dimensions of sound (pitch, duration, volume, timbre, and place). Based on the interactions a set of 22 prepositional analytical concepts is postulated, for use in creative composition or analysis.

These elements of music have in fact been used for a longer time and some if not all of them can be found in music history. In the work on this album, they are used to create new music inspired by the chemical elements. The chemical elements being such basic building blocks of matter, represent the basis for every existence, and for life. By means of Mendeleev's system for natural matter, and thus for material nature, van Dillen ventured to compose his meta-symphony *Elements*.

This series *Elements* is an elaboration of a lifelong love for the basic building blocks of matter as it formed during the billions of years following the Big Bang.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	H																	He
2	Li	Be											B	C	N	O	F	Ne
3	Na	Mg											Al	Si	P	S	Cl	Ar
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba		72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra		104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og
				57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
				89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

*periodic table with currently published element compositions in gray*

## Francium

Element 87 is found in the 7<sup>th</sup> period of Group 1 in the periodic system, the group containing all alkali metals.

Francium is the last and heaviest of the Alkali metals and can only come into being by being produced artificially, such as by bombarding Gold with Oxygen atoms to create a nuclear fusion. The most stable isotope known of Francium has a half-life of 22 minutes; the largest sample ever produced was 300,000 atoms.

The above explains why we do not know the light spectral lines of this element yet.



*light spectral lines of the element francium unknown*

## **Music of Francium**

The music of Francium makes use of a variety of digital electronic techniques, some are explained below.

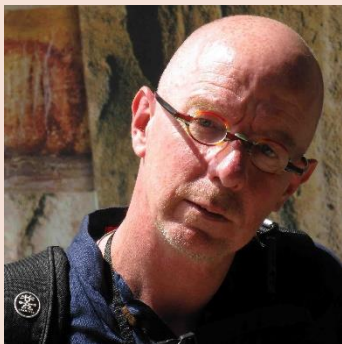
Virtual modeling: a sample of sound is used as the first stage and makes up the basis for a virtual modeling chain. Such a sample can be anything from a live recording to a synthesized sound, and it is the next procedure of virtual modeling which will process it in a way similar to the working of a physical musical instrument. In the second stage namely, the sample is modeled as if it were made to vibrate in a string, board, or plate, adding a specific character to the sample, modifying its sound character accordingly. The third and final stage of physical modeling involves the simulation of making this processed sound resonate according to the properties of a physical body, such as a wooden or metal box, a drum skin, etc. The result of such a chain of processing is mostly sounds that sound as if they were real or could have been recorded in real life.

Spatiality: another critical point in the Elements music is the use of particular places and spaces assigned to sounds. In Francium and other alkali metal musics there is a variety of spatially moving sounds, not just by ping pong echoes but in much more complicated ways. Often such placement is linked to gates and envelopes derived from the sounds themselves. Not only is this music created by the creation and by the composition of sounds, but it is also largely composed by composing a virtual space for each of these sounds and for a virtual space created by all of this together. As opposed to a live performance of music in a certain room or hall which is in itself not composed nor part of the music itself, here the space is very much a part of the composition, and this can be a different experience in a room through speakers: sounds will appear to not really come from the speakers.

A final element is the always intentional semi-permeability in van Dillen's electronic music: this music is intended to sound in and with the world around, so random surround "noise" shall be incorporated into the listening experience.

## Oscar van Dillen

Oscar Ignatius Joannes van Dillen ('s-Hertogenbosch 1958), is composer and performer of music, professor of music at Codarts University for the Arts in Rotterdam, as well as visual artist. A polyglot and an erudite world citizen, he is also one of the pioneers from the early years of Wikipedia, having been founding president of Wikimedia Nederland and serving as a trustee of the Wikimedia Foundation. Van Dillen has studied a wide variety of musical traditions with many renowned teachers. His music education having started at the age of 7, performing both classical and rock music in his youth, van Dillen first studied North-Indian classical music (sitar, tabla, vocal) with Jamaluddin Bhartiya at the Tritantri School in Amsterdam and bansuri with Gurbachan Singh Sachdev at the Bansuri School of Music in Berkeley, California. Next, he studied classical and jazz flute at the Sweelinck Conservatory in Amsterdam. He took composition lessons from Misha Mengelberg. As a flutist, he was taught by Lens Derogée and Dieks Visser, and followed masterclasses from Pierre-Yves Artaud, Geoffrey Gilbert and Barthold Kuijken.



After his following postgraduate studies of medieval and Renaissance music with Paul Van Nevel in Leuven (Belgium), he studied classical and contemporary composition with, among others, Dick Raaymakers, Diderik Wagenaar and Gilius van Bergeijk at the Koninklijk Conservatory in The Hague, with Klaas de Vries, Peter-Jan Wagemans and René Uijlenhoet at the Rotterdam Conservatory and with Manfred Trojahn at the Robert Schumann College in Düsseldorf, where he also received lessons in conducting from Lutz Herbig. As a composer he furthermore followed masterclasses from, among others, Isang Yun, George Crumb, Jan van Vlijmen, Marek Stachowski, Zbigniew Bojarski and Gerard Brophy.

A founding member of the Rotterdam School of composers and the author of its manifesto, he currently works as professor of music at the Codarts University of the Arts Rotterdam since 1997, teaching composition and arranging, improvisation, world music composition, music history and music theory in the Jazz-, the Pop-, the World music, the Classical music, and the Music Education Academies of Codarts.

Oscar van Dillen is the inventor of *original world music composition*, combining strictly composed- with improvised classical and folk traditions, and their techniques and mentalities for creating music: a new and contemporary form of art music.



Van Dillen is a member of Nieuw Geneco and the Dutch-Flemish Society for Music Theory. As of 2020 his scores are published by Donemus, of which he is a board member from 2022.

Next to his fulltime work as composer, musician and pedagogue, van Dillen is also a visual artist. As composer, he has been a regular member of various juries, among which the composition prize juries, in the Val Tidone Festival Competitions, since 2013.

Oscar van Dillen's personal website: [www.oscarvandillen.com](http://www.oscarvandillen.com)

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music is sound and silence



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