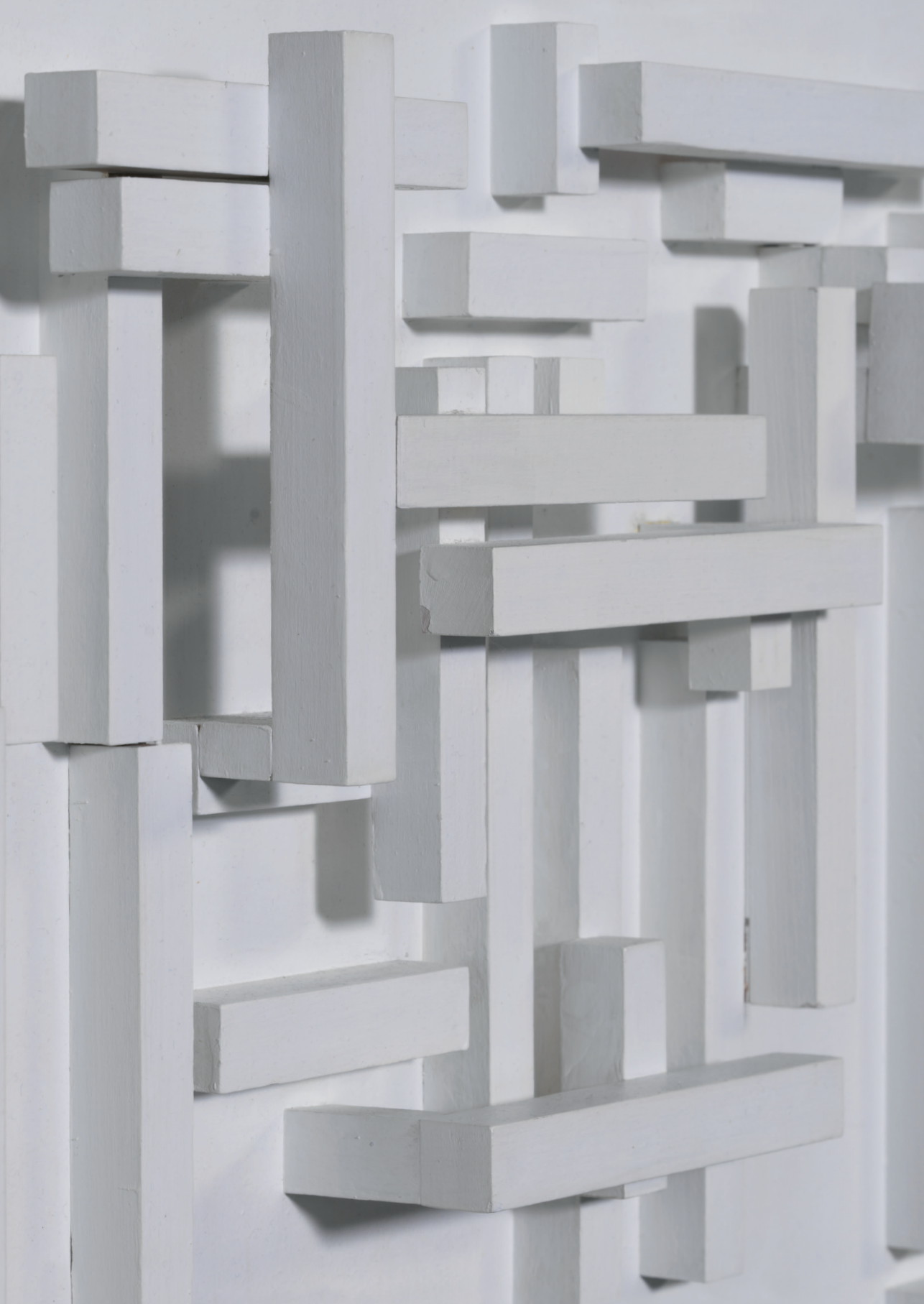


herman de vries, *random objectivation v67-36c*: Ecology as Context of a Systematic Artwork

• CEES DE BOER AND ROB DE WINDT •

Measuring more than six metres across, herman de vries's relief titled *random objectivation v67-36c* is an absolute eye-catcher in the display of twentieth-century art in the Rijksmuseum (fig. 1).[1] The relief is composed of square and elongated white blocks in various sizes mounted perpendicular to each other on a long, narrow white planar surface. Viewed from left to right, an increasing number of larger elements are stacked higher and higher, resulting in a highly complex accumulation, after which the structures' complexity gradually diminishes. Its creator writes his name and everything related to his work without capital letters – hence 'herman de vries' – an expression of his observation that hierarchies in nature are non-existent and nothing more than a human invention. In fact, nature figures as the central theme in de vries's oeuvre. In past discussions of de vries's art, Cees de Boer observed that works following the same artistic concept of *random objectivation* as the present relief are centred on nature and natural processes.[2] Yet De Boer's interpretation requires a more precise clarification, as became evident from archival research – initiated by Rob de Windt and presented in this article – into the context of the artist's life and work up to around 1970.[3] de vries's vast knowledge of and experience with

< *Detail of fig. 1*

the new perspective on ecology that emerged in the nineteen fifties and sixties, and the new scientific methodology that consequently arose from it, would inspire him to develop an art based on a vision of nature as an ecological network – as a network of networks.[4]

herman de vries the ecological researcher

herman de vries was born in the Dutch city of Alkmaar in 1931 to parents who enjoyed being outdoors. As soon as he was old enough, herman enrolled himself in the Nederlandse Jeugdbond voor Natuurstudie (NJN, Dutch Youth Association for Nature Study) at the age of twelve. The dunes and beaches near the coastal villages of Schoorl and Bergen were his personal domain – a landscape for the young herman to explore nature and gather his natural history finds. There he also dreamed of future travels and other, more egalitarian societies.[5]

After attending the MULO, de vries went on to complete his studies at the Middelbare Tuinbouwschool in Hoorn. Motivated by a love of freedom and desire to travel, he spent the next year roaming around France. To cover his room and board expenses, he worked as a farmhand and in the fields. In May 1952, de vries's application to the Plantenziektenkundige Dienst

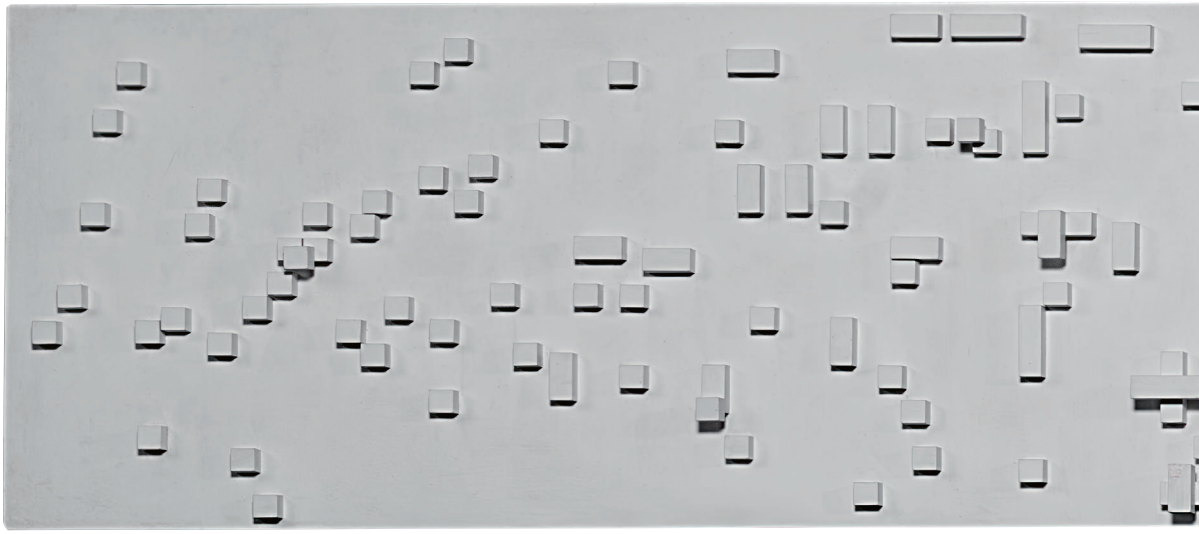
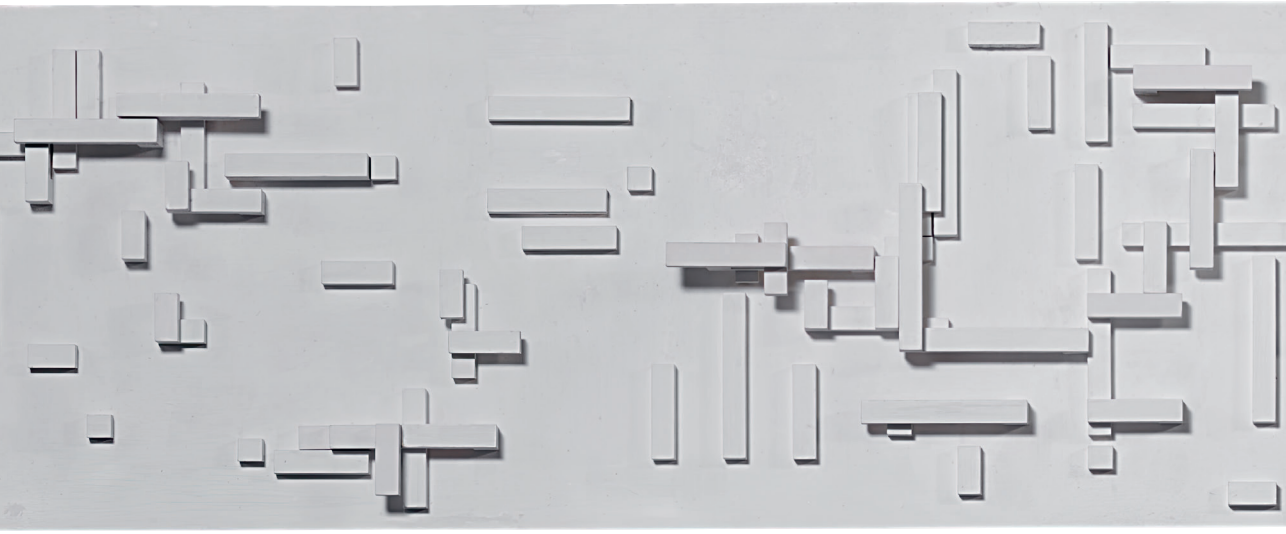
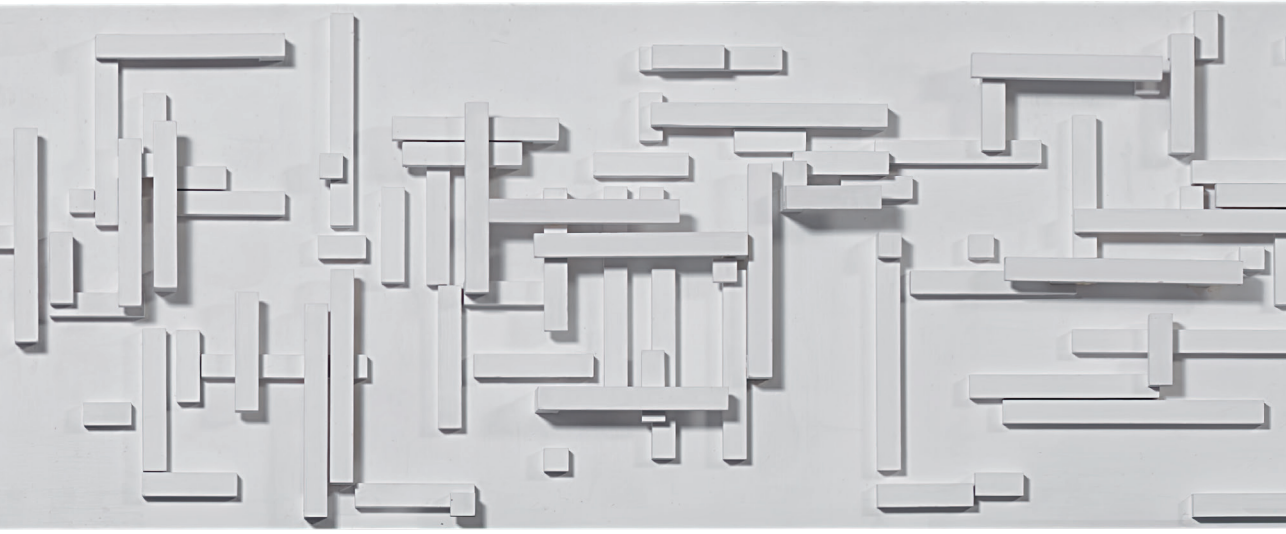
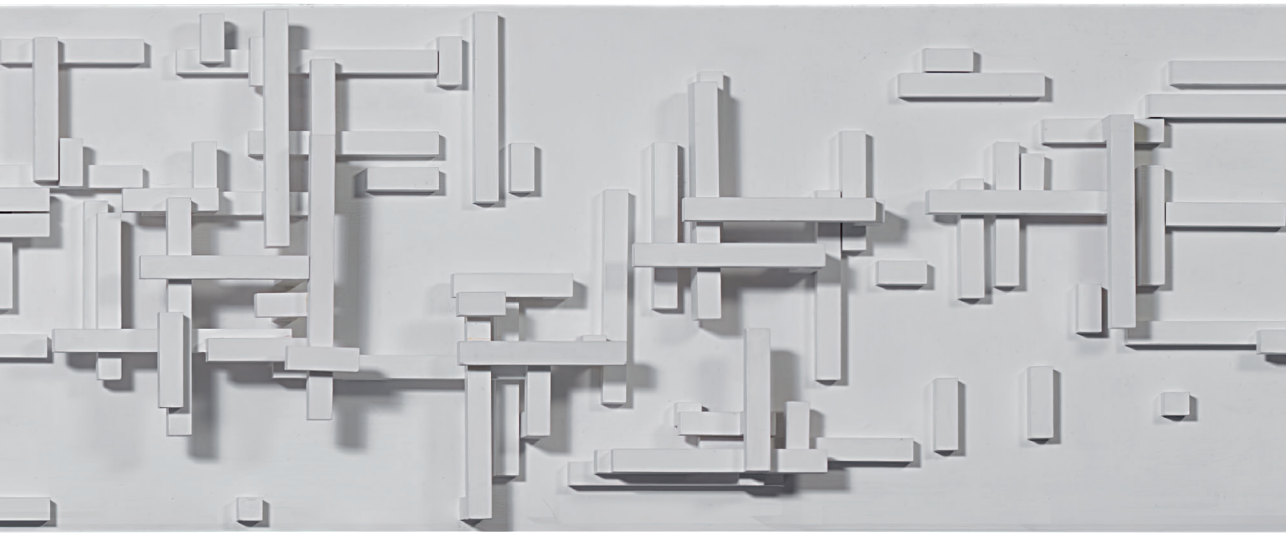
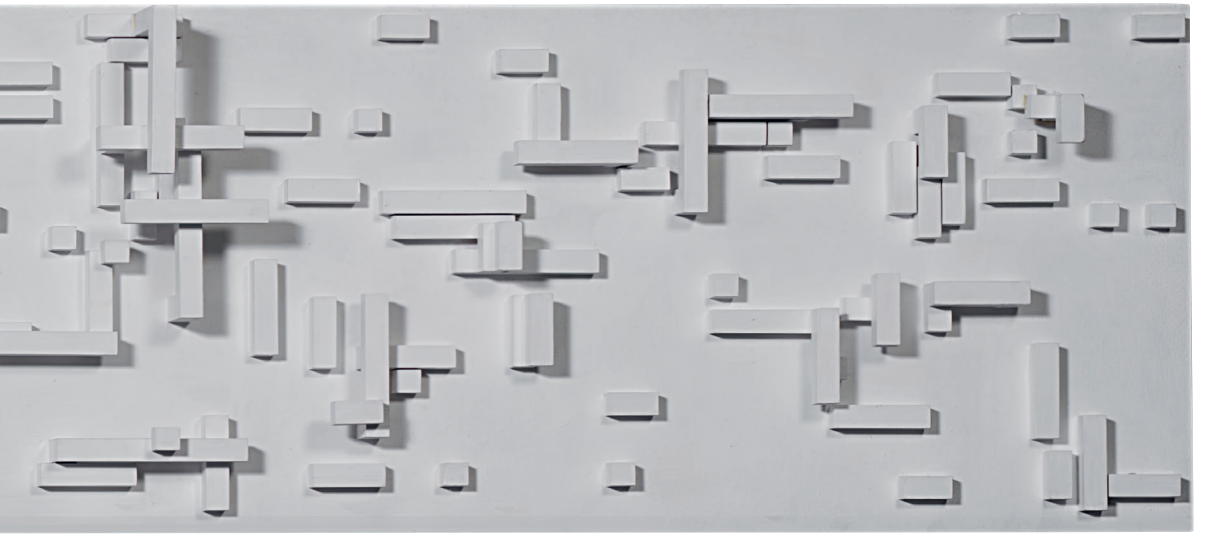


Fig. 1
HERMAN DE VRIES,
random objectivation v67-36c, 1967.
Chipboard, wood, white paint, 45 x 640 x 25 cm.
Amsterdam, Rijksmuseum, inv. no. SK-C-1762, on loan from Wageningen University & Research.









Wageningen (PD, Phytopathology Service) was accepted. The nature of his assignment in the department of vertebrate animals was two-fold: to conduct research into rat control and the effects of various types of poison (fig. 2), and to assist biologist Anne van Wijngaarden with his research on the field mouse.[6] The latter enterprise involved aspects of population dynamics, fauna, botany, ethology and landscape ecology.[7] de vries's ability to detect and interpret these animals' tracks in the landscape was crucial to this kind of field research.[8] Both projects had some urgency: dike integrity was being undermined by the harmful brown rat and water vole, while major infestations of field mice, occurring every three to four years (e.g. in 1945, 1949 and 1952), had left areas of agricultural and horticultural importance ravaged.

In 1957, Van Wijngaarden transferred to the newly established Rijksinstituut voor Veldbiologisch Onderzoek ten behoeve van het Natuurbehoud (RIVON, National Institute of Field-Biological Research for Nature Conservation), where he became head of the zoology department. Meanwhile, in 1958, the PD's department of vertebrate animals came under the direction of the Directie Faunabeheer (fauna management committee) of the Ministry of Agriculture and Fisheries. At this time, the focus of de vries's work shifted to researching chemical pesticides for rats and insects, a task with which he was decidedly unhappy given his opposition to chemical pesticides. In 1959, Dr Cornelis J. Briejèr, then director of the PD, nominated de vries to assist Peter Gruys, a forestry scientist working at the Instituut voor Toegepast Biologisch Onderzoek in de Natuur (ITBON, Institute for Applied Biological Research in Nature). Gruys was just beginning his PhD research on the caterpillar/moth Bupalus piniaria (pine looper or bordered white), an insect pest that uses pine and other coniferous trees as its host plant.[9] The PD transferred de vries to the ITBON, a temporary position that later became permanent.[10] In his work at both of these organizations, the common thread in de vries's research was population dynamics – a method that combined laboratory and field research in mapping ecological relationships.

The entomologist Briejèr was an active opponent of the use of chemical pesticides. At the ITBON, de vries came under a new director, the forest entomologist Dr Alexander D. Voûte, likewise an outspoken opponent of chemical pest control in agriculture. Voûte was the intellectual motor behind the ITBON, founded in 1940 to conduct ecological research in the interest of agriculture, horticulture and forestry.[11] Briejèr, in his turn, had been the driving force behind the Werkgroep Harmonische Bestrijding van Plagen (WHBP, Workgroup Harmonious Pest Control), founded in 1959, and the first chairman of the group's executive committee, with Voûte in the role of secretary.[12] The group was formed in response to objections voiced by the scientific

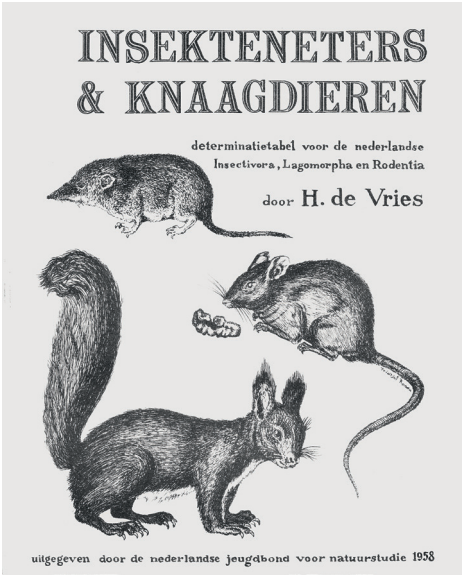
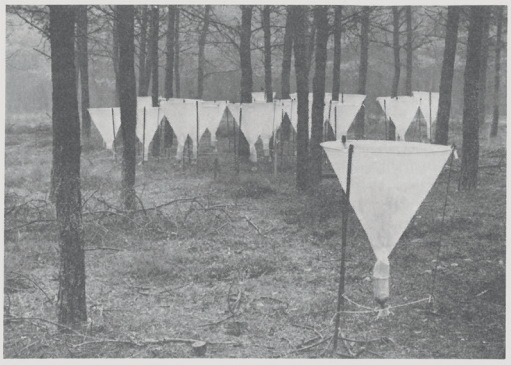


Fig. 2
H. DE VRIES, *Insekteneters & knaagdieren. Determinatietabel voor de Nederlandse Insectivora, Lagomorpha en Rodentia,* Amsterdam: Nederlandse Jeugdbond voor Natuurstudie, 1958.

world with respect to the use of chemicals for pest control: insects were becoming increasingly resistant; the awareness of dangers to public health was emerging; by killing off predators and parasites, insect plagues were occurring with far greater frequency than ever before; and lastly, ecological communities were being disrupted for extended periods of time (with very little known about the consequences of insecticides for ecological communities living in the ground).[13] Both Briejèr and Voûte were avid proponents of harmonious pest management (also known as integrated pest control), which favoured the use of natural enemies, sustaining a natural balance and other ecological strategies. Poisons were to be used only as the very last resort.[14]

To conduct his PhD research on the pine looper moth, Peter Gruys was posted to the ITBON in 1959, with herman de vries as his research assistant. The research project was described as follows: 'Title: Harmonious control of insect pests (population dynamics). Objective: Determining the relationship between population density and the development of Bupalus piniarius. Methodology: To propagate Bupalus piniarius at varying densities in the field and in the laboratory, and at different temperatures.'[15] For this project, population dynamics experiments were carried out in the ITBON laboratory, insectarium and greenhouse. The research focused on measuring the influence of food availability, ambient temperature and daylight on the eggs, larvae (caterpillars) and pupae of the pine looper moth. de vries's task was to climb into the tree crowns of Scots pines in the De Hoge Veluwe National Park and gather the caterpillars and their food by hand; later in the season, when they fell from the trees to the ground to pupate, it was also his task to intercept them in funnel-shaped nets (fig. 3).



Funnels for catching *Bupalus* larvae, which in October drop to the ground for pupation.

Rearing *Bupalus* larvae.

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In the insectarium, Gruys applied a methodology known as jam jar ecology, which involved setting up a test configuration that approached the research object's natural conditions as close as feasibly possible.[16] Accordingly, varying quantities of pine looper caterpillars were placed into empty glass jars, together with the caterpillars' food of choice, pine twigs, and arranged in grids. herman de vries recalls 720 jars, each with a volume of 0.37 liters and furnished with a bronze mesh lid, grouped in twelve rows of sixty pots. Each row of jars had its own composition. Using tables of random numbers (fig. 4), the twelve rows of sixty pots were distributed across the test configuration; the jars with the same contents were given an identical

Fig. 3
'Funnels for catching *Bupalus* larvae, which in October drop to the ground for pupation' and 'Rearing *Bupalus* larvae'.
Illustration page in the chapter 'Research/Population Dynamics', in Alexander D. Voûte et al., *ITBON 1940-1965*, Arnhem: ITBON, Mededeling no. 77, 1965, p. 97.

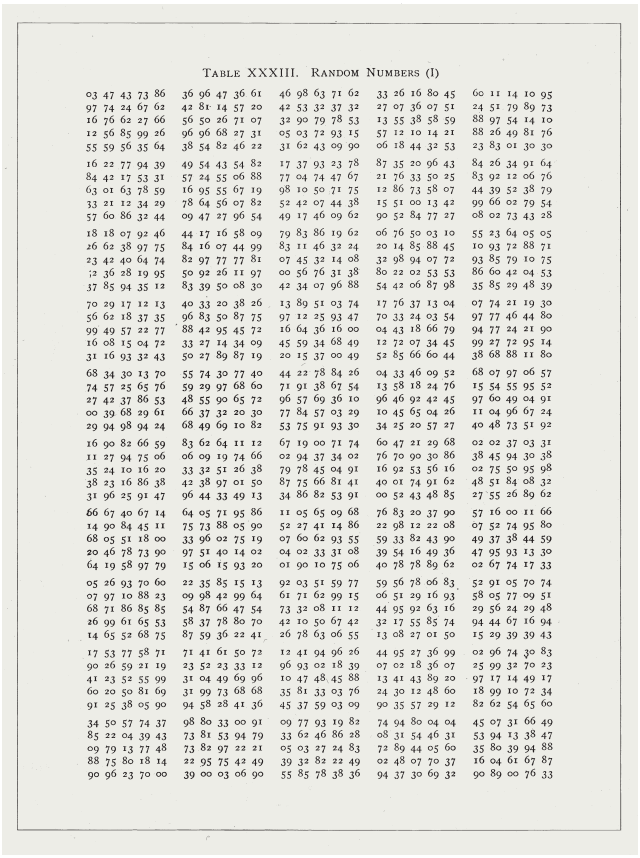


TABLE XXXIII. RANDOM NUMBERS (1)

03	47	43	73	86	36	96	47	36	61	46	98	63	71	62	33	26	16	80	45	60	11	14	10	95
97	74	24	67	62	42	81	14	57	20	42	53	32	37	32	27	07	36	07	51	24	51	79	89	73
16	76	62	27	66	56	50	26	71	07	32	90	79	78	53	13	55	38	58	59	88	97	54	14	10
12	56	85	99	26	96	96	68	27	31	05	03	72	93	15	57	12	10	14	21	88	26	49	81	76
55	59	56	35	64	38	54	82	46	22	31	62	43	09	90	06	18	44	32	53	23	83	01	30	30
16	22	77	94	39	49	54	43	54	82	17	37	93	23	78	87	35	20	96	43	84	26	34	91	64
84	42	17	53	31	57	24	55	06	88	77	04	74	47	67	21	76	33	50	25	83	92	12	06	76
63	01	63	78	59	16	95	55	67	19	98	10	50	71	75	12	86	73	58	07	44	39	52	38	79
33	21	12	34	29	78	64	56	07	82	52	42	07	44	38	15	51	00	13	42	99	66	02	79	54
57	60	86	32	44	09	47	27	96	54	49	17	46	09	62	90	52	84	77	27	08	02	73	43	28
18	18	07	92	46	44	17	16	58	09	79	83	86	19	62	06	76	50	03	10	55	23	64	05	05
26	62	38	97	75	84	16	07	44	99	83	11	46	32	24	20	14	85	88	45	10	93	72	88	71
23	42	40	64	74	82	97	77	77	81	07	45	32	14	08	32	98	94	07	72	93	85	79	10	75
12	36	28	19	95	50	92	26	11	97	00	56	76	31	38	80	22	02	53	53	86	60	42	04	53
37	85	94	35	12	83	39	50	08	30	42	34	07	96	88	54	42	06	87	98	35	85	29	48	39
70	29	17	12	13	40	33	20	38	26	13	89	51	03	74	17	76	37	13	04	07	74	21	19	30
56	62	18	37	35	96	83	50	87	75	97	12	25	93	47	70	33	24	03	54	97	77	46	44	80
99	49	57	22	77	88	42	95	45	72	16	64	36	16	00	04	43	18	66	79	94	77	24	21	90
16	08	15	04	72	33	27	14	34	09	45	59	34	68	49	12	72	07	34	45	99	27	72	95	14
31	16	93	32	43	50	27	89	87	19	20	15	37	00	49	52	85	66	60	44	38	68	88	11	80
68	34	30	13	70	55	74	30	77	40	44	22	78	84	26	04	33	46	09	52	68	07	97	06	57
74	57	25	65	76	59	29	97	68	60	71	91	38	67	54	13	58	18	24	76	15	54	55	95	52
27	42	37	86	53	48	55	90	65	72	96	57	69	36	10	96	46	92	42	45	97	60	49	04	91
00	39	68	29	61	66	37	32	20	30	77	84	57	03	29	10	45	65	04	26	11	04	96	67	24
29	94	98	94	24	68	49	69	10	82	53	75	91	93	30	34	25	20	57	27	40	48	73	51	92
16	90	82	66	59	83	62	64	11	12	67	19	00	71	74	60	47	21	29	68	02	02	37	03	31
11	27	94	75	06	06	09	19	74	66	02	94	37	34	02	76	70	90	30	86	38	45	94	30	38
35	24	10	16	20	33	32	51	26	38	79	78	45	04	91	16	92	53	56	16	02	75	50	95	98
38	23	16	86	38	42	38	97	01	50	87	75	66	81	41	40	01	74	91	62	48	51	84	08	32
31	96	25	91	47	96	44	33	49	13	34	86	82	53	91	00	52	43	48	85	27	55	26	89	62
66	67	40	67	14	64	05	71	95	86	11	05	65	09	68	76	83	20	37	90	57	16	00	11	66
14	90	84	45	11	75	73	88	05	90	52	27	41	14	86	22	98	12	22	08	07	52	74	95	80
68	05	51	18	00	33	96	02	75	19	07	60	62	93	55	59	33	82	43	90	49	37	38	44	59
20	46	78	73	90	97	51	40	14	02	04	02	33	31	08	39	54	16	49	36	47	95	93	13	39
64	19	58	97	79	15	06	15	93	20	01	90	10	75	06	40	78	78	89	62	02	67	74	17	33
05	26	93	70	60	22	35	85	15	13	92	03	51	59	77	59	56	78	06	83	52	91	05	70	74
07	97	10	88	23	09	98	42	99	64	61	71	62	99	15	06	51	29	16	93	58	05	77	09	51
68	71	86	85	85	54	87	66	47	54	73	32	08	11	12	44	95	92	63	16	29	56	24	29	48
26	99	61	65	53	58	37	78	80	70	42	10	50	67	42	32	17	55	85	74	94	44	67	16	94
14	65	52	68	75	87	59	36	22	41	26	78	63	06	55	13	08	27	01	50	15	29	39	39	43
17	53	77	58	71	71	41	61	50	72	12	41	94	96	26	44	95	27	36	99	02	96	74	30	83
90	26	59	21	19	23	52	23	33	12	96	93	02	18	39	07	02	18	36	07	55	99	32	70	23
41	23	52	55	99	31	04	49	69	96	10	47	48	45	88	13	41	43	89	20	97	17	14	49	17
60	20	50	81	69	31	99	73	68	68	35	81	33	03	76	24	30	12	48	60	18	99	10	72	34
91	25	38	05	90	94	58	28	41	36	45	37	59	03	09	90	35	57	29	12	82	62	54	65	60
34	50	57	74	37	98	80	33	00	91	09	77	93	19	82	74	94	80	04	04	45	07	31	66	49
85	22	04	39	43	73	81	53	94	79	33	62	46	86	28	08	31	54	46	31	53	94	13	38	47
09	79	13	77	48	73	82	97	22	21	05	03	27	24	83	72	89	44	05	60	35	80	39	94	88
88	75	80	18	14	22	95	75	42	49	39	32	82	22	49	02	48	07	70	37	16	04	61	67	87
90	96	23	70	00	39	00	03	06	90	55	85	78	38	36	94	37	30	69	32	90	89	00	76	33

colour code, indicated by means of a coloured label. Devised by herman de vries himself, this visual coding system using coloured stickers proved more efficient than a coding with numbers or words necessitating that readings be made from up close. Surviving colour photos show that each jam jar bears multiple colour codes. This implies that, during the course of the experiments, each jar (and type of content) would have been placed in multiple sequences or test configurations (figs. 5-7).

Fig. 4
Table XXXIII Random Numbers (1), in R.A. Fisher and F. Yates, *Statistical Tables for Biological, Agricultural and Medical Research*, Edinburgh 1953.

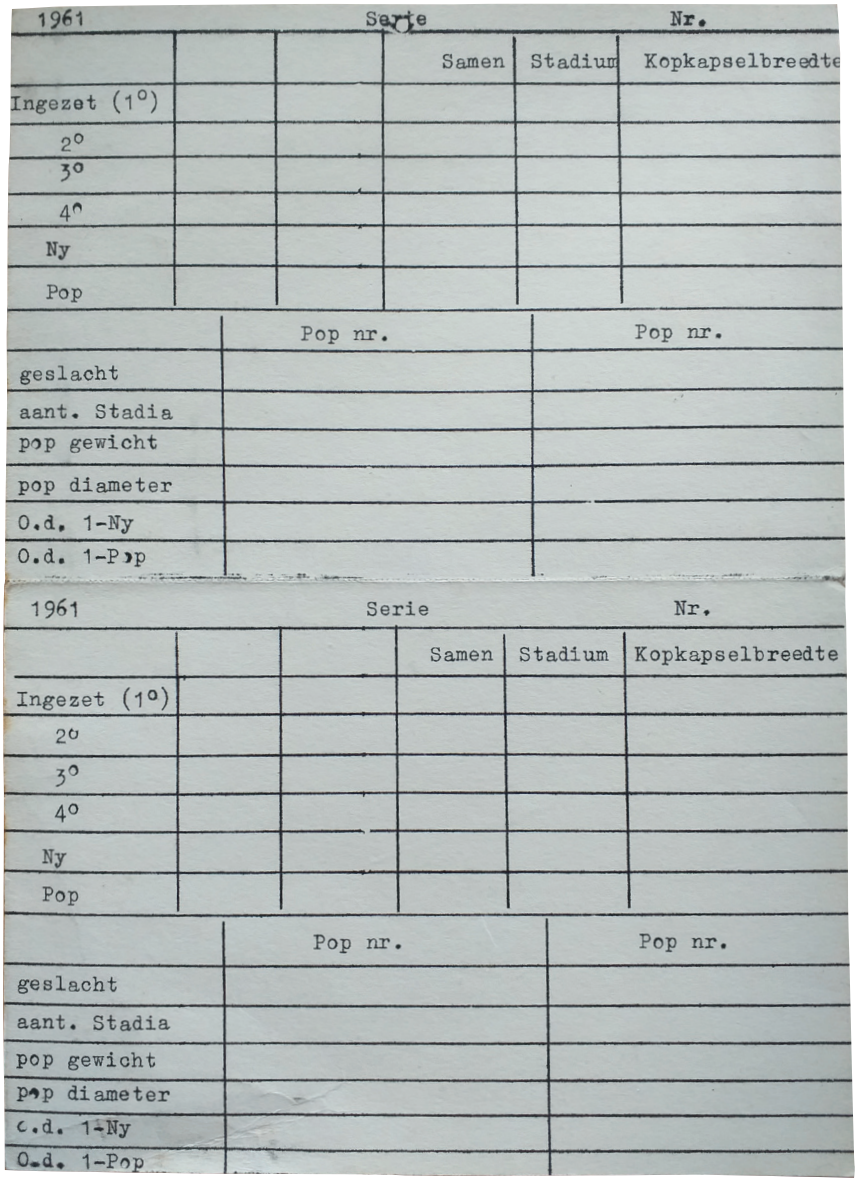
> *Figs. 6, 7*
Test materials, Insectarium, ITBON Arnhem, 1962, photographer unknown. Eschenau, herman de vries archive.

Fig. 5
Assistant herman de vries at the ITBON, in *Photo Album of the ITBON*, c. 1960, photographer unknown. Collection Wageningen University & Research (Environmental Sciences Group).

One of the file cards used in this research has been found in herman de vries's archives (fig. 8). According to de vries, the colour codes were also recorded on these file cards. At some point during this working process, de vries had an epiphany: by applying the underlying statistical method to the creation of works of art, such constellations of colour coding would produce interesting images.[17]

herman de vries the artist

herman de vries's earliest surviving works date from circa 1953. His development as an autodidact was shaped by a coinciding love of nature, interest in art and the processing of scientific data. At first, his visual work was largely based on drawing techniques, soon after followed by experiments with collage; he also integrated text, either his own or quotations by others.



1961 Serie Nr.

			Samen	Stadium	Kopkapselbreedte
Ingezet (1°)					
2°					
3°					
4°					
Ny					
Pop					

	Pop nr.	Pop nr.
geslacht		
aant. Stadia		
pop gewicht		
pop diameter		
O.d. 1-Ny		
O.d. 1-Pop		

1961 Serie Nr.

			Samen	Stadium	Kopkapselbreedte
Ingezet (1°)					
2°					
3°					
4°					
Ny					
Pop					

	Pop nr.	Pop nr.
geslacht		
aant. Stadia		
pop gewicht		
pop diameter		
O.d. 1-Ny		
O.d. 1-Pop		

Fig. 8
HERMAN DE VRIES, Double file card for the Bupalus research. Eschenau, herman de vries archive.

His earliest surviving painting dates from 1954. For his early exhibitions, de vries produced his own booklets in small editions. In the first of his numerous notebooks, entitled *notitie-boekje 0*, herman de vries, in January 1957, asked himself two pertinent questions. What is the function of art in general? And, were I to decide to become an artist, what is my artistic objective and what societal function can I fulfil with my art?[18] His annotations also reveal that he followed the exhibitions in the Stedelijk Museum Amsterdam fervently, that he read and reflected on the subsequent magazine reviews, and that he kept himself well informed about art history. He was also drawn to the exotic; classical Chinese painting appealed to him, leaving a clearly traceable mark on his early drawings. Through the essays of Daisetz Suzuki, de vries discovered a concept of art in Japanese Zen philosophy; he then attempted to transform this into his own approach to art, in which naturalism and materiality were key factors as well as downplaying the importance of authorship.[19] In his artistic experiments, a clear tension initially arose between ordered structures versus looser, informal figurations. At exhibitions of so-called 'informal' art, herman de vries presented paintings in nuances of black, white and gray. In 1959, this culminated in paintings that were almost uniformly gray, and by the end of the year, entirely white, as described in his written manifesto *0 =nul*.[20]

In 1960 and 1961, structures began to emerge from the relative, white emptiness found in herman de vries's works; as opposed to the dynamic formal/informal, however, these structures were now based on the dynamic homogeneous/inhomogeneous. One example of a homogeneous structure is a chessboard, essentially a picture plane entirely filled with one type of element. This was followed in 1962 by the random distribution of elements across a planar surface, essentially the primary topic of the present article. What binds this succession of works – informal, white, homogeneous, random – is an ever-ongoing reduction of the 'image': all that remains is a white painting, a white object, a homogeneous pattern, a white, blank book or page. Visually, image and object, image and support thus become virtually indistinguishable from each other.[21]

In this light, herman de vries's various remarks on Mondrian's art can be better understood. de vries admired Mondrian chiefly for his tenacity in developing a new and authentic art deemed both philosophically and socially relevant. He also valued art's utopian role, as envisioned by this fellow Dutch artist.[22] What de vries rejected, however, was Mondrian's choice to distance himself from the reality of life, his focus on the metaphysical source of art and the almost religious status he afforded mathematics and aesthetics.

Although herman de vries makes no direct reference to the artist Theo van Doesburg, a brief consideration of Mondrian's former associate proves warranted.[23] In his 1930 manifesto on concrete art, Van Doesburg relinquished metaphysical pretension in favour of artworks realized solely by means of objective (i.e. geometric) visual elements in rule-based (i.e. mathematical) arrangement and/or transformation. The systematics of geometry, in Van Doesburg's estimation, forms an autonomous system, one enabling the artist to permanently distance himself from nature, sever all ties with reality and dissociate himself from his personal preferences.[24]

At first glance, works of art like *random objectivation v67-36c* follow the principles of concrete art: geometry and serial change as the sole visual means. The form of abstraction at which herman de vries arrived, however, was not a dissociation from but actually a visualization of nature,

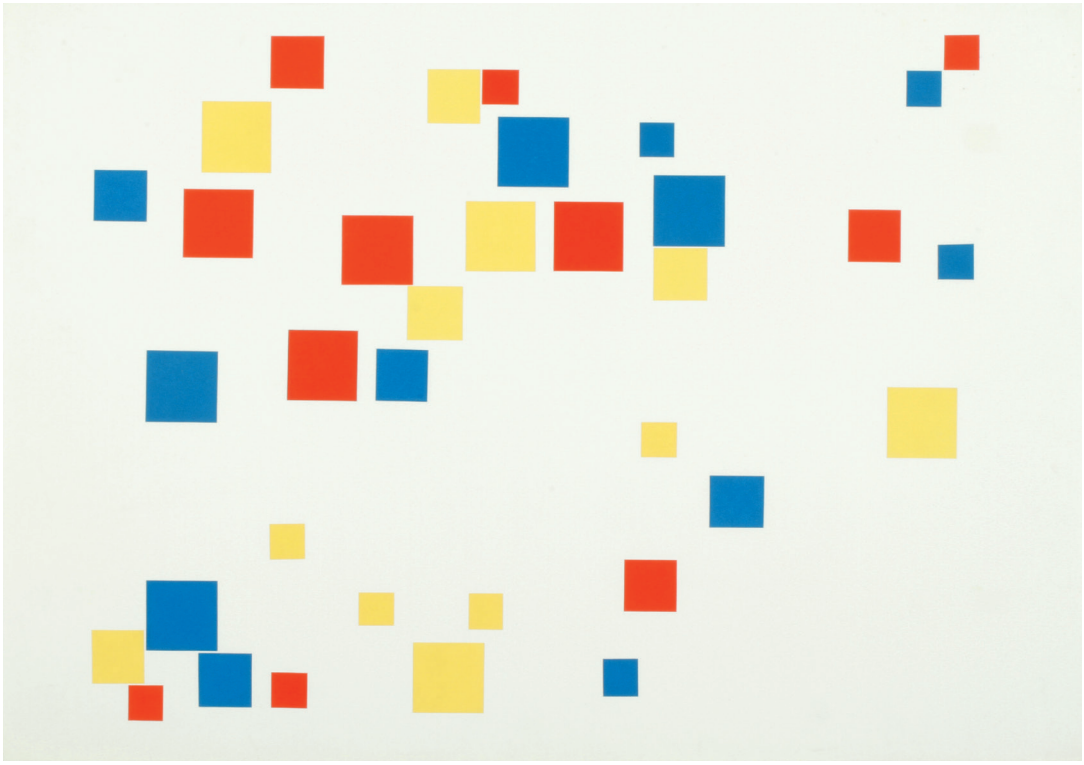


Fig. 9
HERMAN DE VRIES, *random objectivation v66-58a*, 1966. Coloured paper on cardboard, 43 x 61,5 cm. Private collection, Knetzgau. Eschenau, herman de vries archive, list of works and their programmes, 31 November 1996: 'collage of red, yellow and blue squares. 4 x 4 cm, 3 x 3 cm and 2 x 2 cm. each 4 ex., (36 elements in total), on white paper. program: randomly distributed placement of the elements.'

developed in cooperation with nature. The statistical method of population dynamics, summarily described above, in combination with the inventive colour coding system that de vries himself devised, opened the way to an artistic continuation of a scientific methodology. It gave him an opportunity to visualize dynamic and complex situations like those found in nature. Through art, de vries was able to transform something that was seen from a scientific perspective, as a statistical abstraction, into a visual model representing the complexity of nature. All works of art produced by means of this method would then assume the validity of a temporary situation within an ever-ongoing dynamic, parallel to the dynamic encountered in nature (e.g. fig. 9).

In its simplest form, this concept of artistic production can be described as follows. A visual plane is divided into a regular grid. The placement of the elements in this grid is then determined by the reading of random numbers (see fig. 4), for example: an even number means a 'yes' (place an element), an odd number means a 'no' (place no element); or, a number with a '2' means a red element, with a '4' means a yellow element, with a '6' means a blue element. By varying visual elements, by constructing the grids according to random decisions (grid lines placed at random versus right angles) or introducing any other random variable, one could produce increasingly complex structures (e.g. fig. 10). Applying this concept, herman de vries developed what he called his *random objectivations*, the first in 1962 and the relief commissioned by the ITBON in 1967.

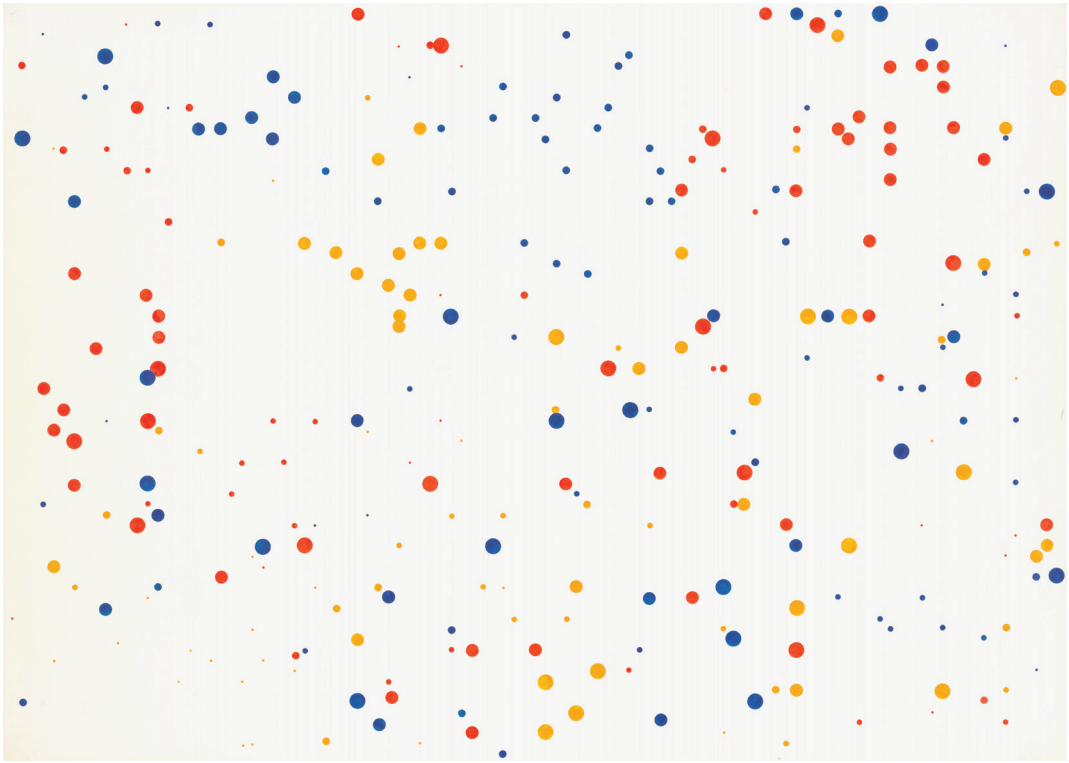


Fig. 10
SUSANNE DE VRIES (in the name of herman de vries), *random colour dots in a random grid. v74-30s*, 1974. Ink on carboard, 73 x 102 cm. Amsterdam, Rijksmuseum, inv. no. RP-T-2015-12, purchased with the support of Pon Holdings B.V. Eschenau, herman de vries archive, list of works and their programmes, April 1974: 'program: red, yellow, blue dots, in 5 sizes, 300 pieces, in random distribution. in 10 singled out areas (a.r. [at random], place, ø) the dots have one colour and one size a.r. for the whole area (of the circle).'

random objectivation v67-38c

In May 1968, the ITBON moved to a new building in Arnhem (fig. 11), located on the Kemperbergerweg, just a stone's throw away from its former place of operation since 1954, the Villa Sylvahoeve. The new building was also close to the De Hoge Veluwe National Park, an important area for conducting field research due to its vastness and relatively natural condition. Because the ITBON was part of the TNO,[25] the design of this new accommodation fell under the charge of the Department of the *Rijksbouwmeester*, the advisory authority for government property. The Arnhem architectural firm Ir. H. Lammers & Ir. C.Ch. Lammers-Koelman was commissioned for the design of the modernist, efficient building, which included recreational facilities, office, study and laboratory spaces. As was customary in those years, all government buildings were subject to the *percentageregeling beeldende kunst*, a regulation requiring that one percent of a building's total construction budget be earmarked for works of art, building-related or otherwise. In the case of the ITBON building, the artist Piet Slegers was commissioned to create a monumental sculpture in the red lava stone then characteristic of his work (fig. 12). Resting on a red-brick plinth, the sculpture was erected adjacent to the stairs to the building's main entrance.[26]

At the time of the new building's realization, a surplus remained in the allocated arts budget. As recorded in the minutes of the ITBON board meeting of 14 June 1966, then director Alexander Voûte suggested that 'our artists, misters De Vries and Mulder, be given the opportunity to create something for the new building'.[27] Voûte approached both the architects and the *Rijksgebouwendienst* for approval.[28] de vries was granted this permission and he was commissioned

Fig. 11
New building for the ITBON location Kemperbergerweg, Arnhem. Architects Ir. H. Lammers and Ir. C. Ch. Lammers-Koelman, Arnhem. Photo: Archief Rijkscollectie Percentagekunst, The Hague

to make a sketch design for a work of art destined for the new building's entrance hall.[29] de vries subsequently presented a design on paper for an elongated relief in landscape format (fig. 13). He also supplied a 1:2 (22.5 x 20 cm) scale model (fig. 14) of one section of the relief – sector XII – that would ultimately form part of a horizontal sequence comprising XVI sectors, with each sector measuring 45 x 40 centimetres.[30] The first design drawing shows total dimensions of 45 x 600 cm with a subdivision of XIV sectors. In close consultation between the artist and architects, it was decided to utilize the entire length of the available wall and extend the relief to 640 centimetres. Constructed with wooden blocks in various sizes, partly stacked on top of each other, the relief has a variable, maximum depth of 25 centimetres.

herman de vries's relief hung on the rear wall of the building's entrance hall, with the doorway to the canteen on the left, the doorway to the library on the right. It was mounted 30 centimetres below the top edge of the panelled wall (with an Oregon Pine veneer), with several tubular chairs and a low table standing in front of it (fig. 15).

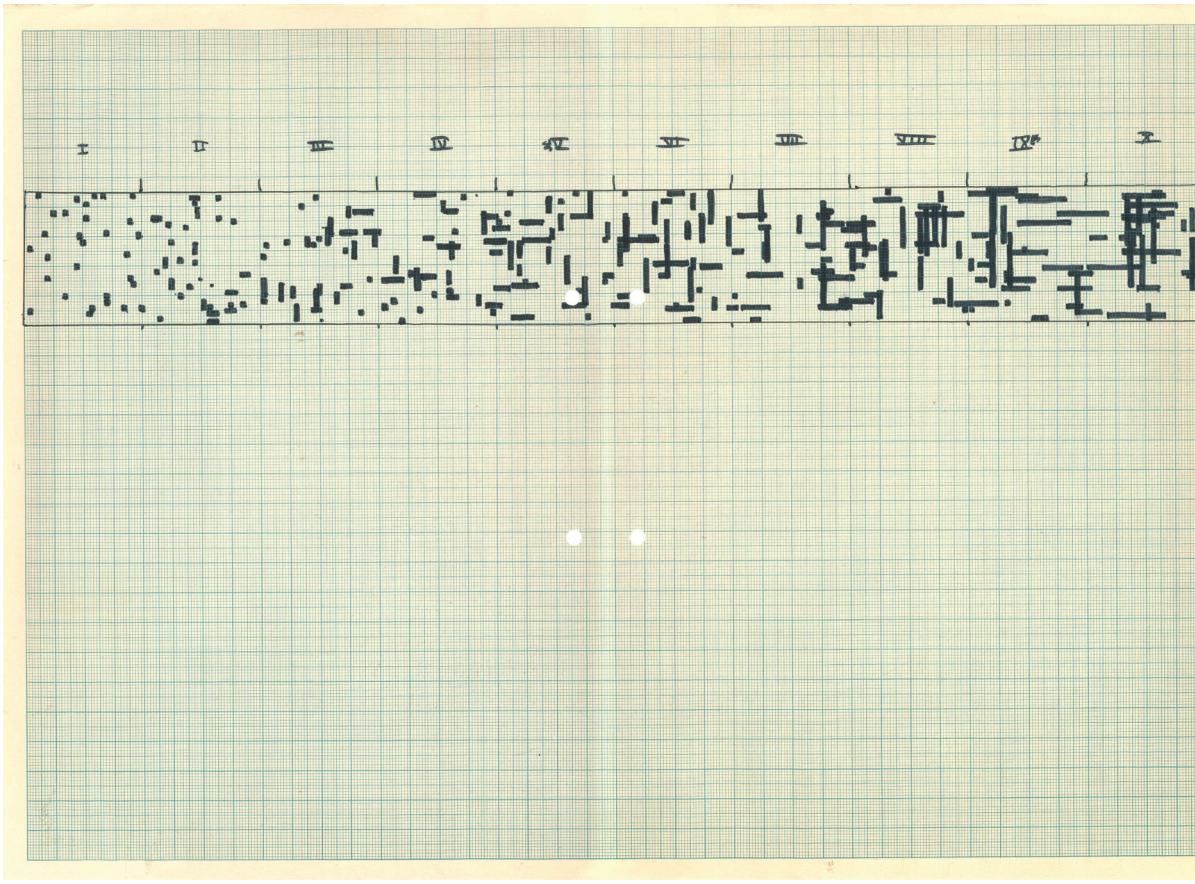
In a brief elucidation addressed to the board of the ITBON and the *Rijksbouwmeester*, herman de vries wrote that his artwork was based on a distribution of elements determined at random on multiple visual levels: variable by sector and the length of the elements, with an additional varying factor applied across the relief's entire length.[31] What were these visual elements and what were the rules that, in accordance with the random numbers, created the image? To answer these questions, we will outline the key principles of the art-

work's programme, as described in a more detailed, lengthier elucidation written by herman de vries, today preserved in his archive (fig. 16).[32]

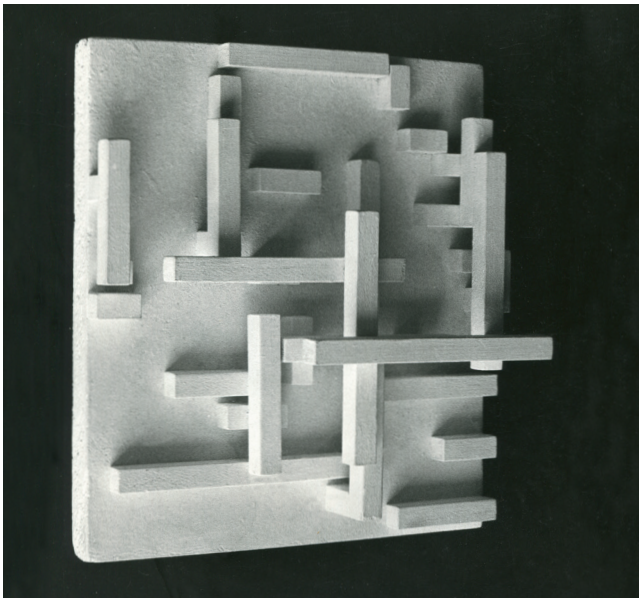
Across its entire length, the relief is divided into XVI sectors, each measuring 45 x 40 cm, with '30 elements of 2 x 2 x 2 cm or an extension thereof' assigned to each sector.[33] By 'extension', de vries meant that the length of the elements was variable; they measure between 2 x 2 x 2 cm and 2 x 24 x 2 cm.[34] In every sector, all thirty elements were randomly assigned a number between 1 and 30 (i.e. by reading the table). The placement of each element within the sector, where it was glued in the grid and in what position (horizontal or vertical), was also left to chance. Accordingly, any overlapping or accumulation of elements that resulted was also incidental. Auxiliary slats, placed perpendicular to the base plane, were used where necessary to support 'floating' elements. de vries also relied on chance to determine the number of elements (per sector) having a given length, but on the principle that the quantity of longer elements in sectors I-XI begin with 0 and thereafter increase, with this number reaching a maximum in sector XII, after which, in sectors XIII-XVI, the number again descends to 0. Accordingly, a chance 'encounter', 'accumulation' or 'population density' of elements is greatest in sector XII.[35]

This programming – from left to right, with a progression from a relatively empty image composed of smaller elements to a full image chiefly composed of larger elements, subsequently followed by a diminution to a less full image composed of smaller elements – is intentional. In his short explanatory statement, de vries wrote that he had inserted an 'additional, serial variation factor' into the programme across the artwork's entire length. Seriality can be understood as the increasing or decreasing of the number of elements in a series. In the nineteen sixties and seventies, this method was commonly used to visualize dynamic developments, changes and processes. In the long explanation, de vries formulated

Fig. 12
PIET SLEGERS, *Growth 68*, 1968. Michelnau red lavastone, 220 x 305 x 70 cm. Collection Wageningen University & Research, since 1998 located near the Lumen Building.

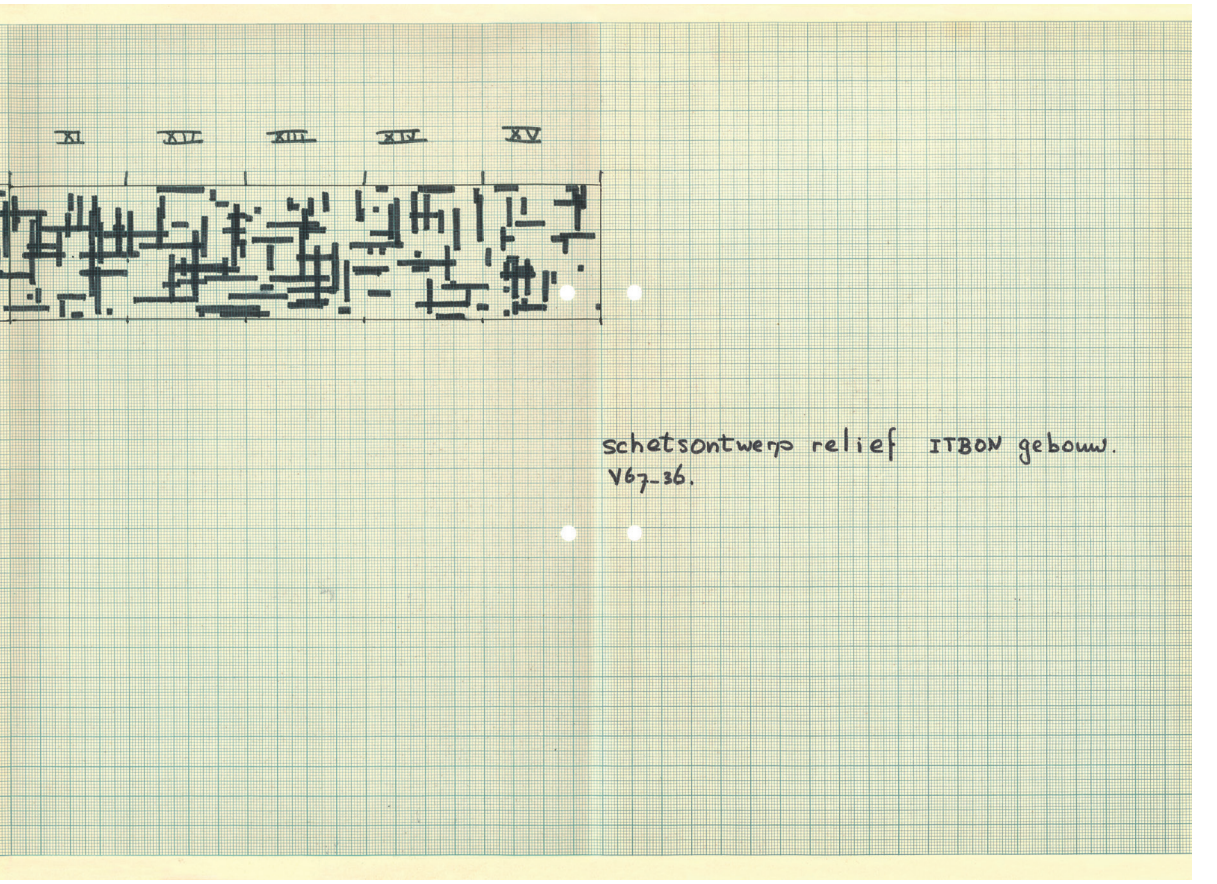


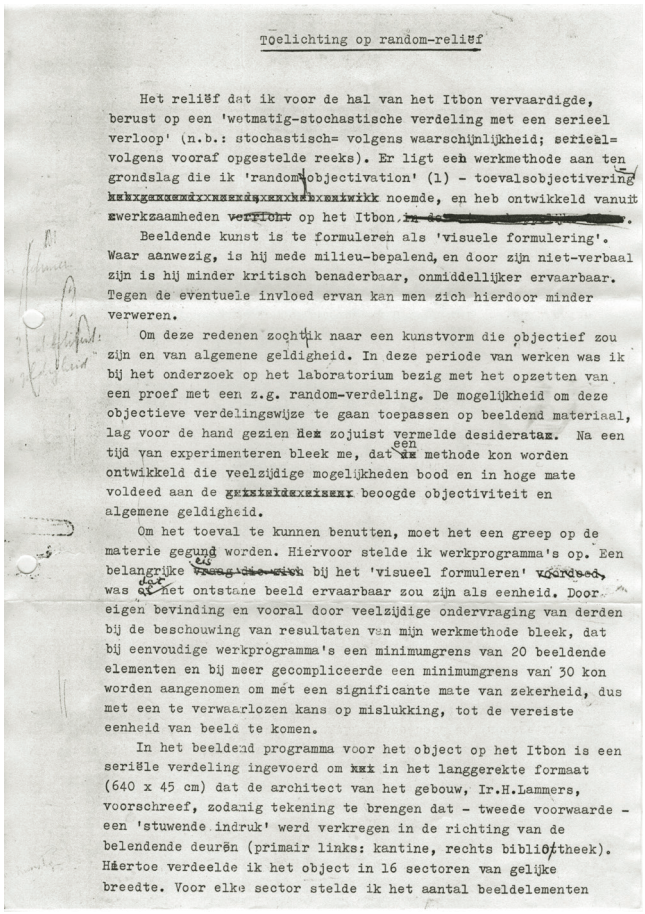
^ *Fig. 13*
HERMAN DE VRIES,
first design on 1:10
scale for the ITBON
relief (XV sectors),
1967.
Ink on graph paper,
design 4,5 x 60 cm
on larger paper.
The Hague,
Rijkscollectie
Percentagekunst.
Photo: Archief
Rijkscollectie
Percentagekunst,
The Hague



< *Fig. 14*
HERMAN DE VRIES,
model on 1:2 scale
of sector XII of the
ITBON relief, 1967.
Chipboard, wood,
white paint,
22.5 x 20 cm.
Amsterdam, private
collection.
Photo: Cor J. de Boer /
Eschenau, herman de
vries archive

> *Fig. 15*
HERMAN DE VRIES,
random objectivation
v67-36c (fig. 1),
in situ at the ITBON,
January 1968.
Photo: unknown /
Eschenau, herman de
vries archive


XI XII XIII XIV XV
schetsontwerp relief ITBON gebouw.
V67_36.



Toelichting op random-reliëf

Het reliëf dat ik voor de hal van het Itbon vervaardigde, berust op een 'wetmatig-stochastische verdeling met een serieel verloop' (n.b.: stochastisch= volgens waarschijnlijkheid; serieel= volgens vooraf opgestelde reeks). Er ligt een werkmethode aan ten grondslag die ik 'random objectivation' (1) - toevalsobjectivering [redacted] noemde, en heb ontwikkeld vanuit [redacted] werkzaamheden [redacted] op het Itbon, [redacted].

Beeldende kunst is te formuleren als 'visuele formulering'. Waar aanwezig, is hij mede milieu-bepalend, en door zijn niet-verbaal zijn is hij minder kritisch benaderbaar, onmiddellijker ervaarbaar. Tegen de eventuele invloed ervan kan men zich hierdoor minder verweren.

Om deze redenen zocht ik naar een kunstvorm die objectief zou zijn en van algemene geldigheid. In deze periode van werken was ik bij het onderzoek op het laboratorium bezig met het opzetten van een proef met een z.g. random-verdeling. De mogelijkheid om deze objectieve verdelingswijze te gaan toepassen op beeldend materiaal, lag voor de hand gezien [redacted] zojuist vermelde desiderata. Na een tijd van experimenteren bleek me, dat een methode kon worden ontwikkeld die veelzijdige mogelijkheden bood en in hoge mate voldeed aan de [redacted] beoogde objectiviteit en algemene geldigheid.

Om het toeval te kunnen benutten, moet het een greep op de materie gegund worden. Hiervoor stelde ik werkprogramma's op. Een belangrijke [redacted] bij het 'visueel formuleren' [redacted], was dat het ontstane beeld ervaarbaar zou zijn als eenheid. Door eigen bevinding en vooral door veelzijdige ondervraging van derden bij de beschouwing van resultaten van mijn werkmethode bleek, dat bij eenvoudige werkprogramma's een minimumgrens van 20 beeldende elementen en bij meer gecompliceerde een minimumgrens van 30 kon worden aangenomen om met een significante mate van zekerheid, dus met een te verwaarlozen kans op mislukking, tot de vereiste eenheid van beeld te komen.

In het beeldend programma voor het object op het Itbon is een seriële verdeling ingevoerd om [redacted] in het langgerekte formaat (640 x 45 cm) dat de architect van het gebouw, Ir.H.Lammers, voorschreef, zodanig tekening te brengen dat - tweede voorwaarde - een 'stuwende indruk' werd verkregen in de richting van de belendende deuren (primair links: kantine, rechts bibliotheek). Hiertoe verdeelde ik het object in 16 sectoren van gelijke breedte. Voor elke sector stelde ik het aantal beeldelementen

Fig. 16
First page from herman de vries's long explanatory statement. Eschenau, herman de vries archive.

his desire to create a 'surging impression', i.e. a dynamic of change, when the relief was read lengthwise. This he achieved by increasing the complexity as one's gaze moves from left to right and decreasing it again after sector XII. By incorporating elements that serially diverge from each other (according to another subsystem within the programme), de vries was able to bring about a 'unity of image'.[36]

art is visualization

de vries programmed this impression of increasing and decreasing complexity based on a desire to transform the relief into a model that paralleled his observations and experiences of nature in the De Hoge Veluwe National Park, especially the distribution of the Scots pine in the park's poor, sandy soils. Trees actively occupy places in the landscape and take up space. On a forest's edge, for example, they colonize sand drifts with their seedlings; when these seedlings grow larger, they form a community, a population that continues to dynamically overtake the landscape. The population dynamic processes that apply to trees likewise apply to plants and animals, birds and insects, and last but not least, people. A landscape harbours a dynamic with a complex layering, determined by the interplay of multiple populations (each with its own laws) *and* external influences (likewise possessing their own laws). In the ITBON relief, each type of element (between 2 x 2 x 2 cm and 2 x 24 x 2 cm) represents a population. de vries endeavoured to visualize the interplay of natural systems that he had observed in the landscape of the Hoge Veluwe during visits made in every season and in all weather conditions.[37] As early as 1957, de vries commented on the famous, early ecological Beijerinck-Baas Becking hypothesis on geobiology, as stated in his *notitieboekje 0*: 'the law of Baas Becking: "everything is everywhere, but, the environment selects" also applies to beauty. (and therefore also to art).'[38] In the case of the relief, the 'environment that selects' is reflected in the artist having chosen a certain point on the table of random numbers where he began to read.

As stated above, herman de vries's archive contains a copy of an extensive explanatory statement, typed and with numerous corrections in pen (fig. 16). As he recalls, this document was compiled in collaboration with an individual in the ITBON public relations department, perhaps at the time of the artwork's completion or the opening of the new building.[39] The long explanation addresses artistic and conceptual aspects not found in the short description.

We suspect that the artwork's actual execution led to a deepening in the artist's thinking, not only because the relief's execution resulted in a realization of the programme that differed from the first sketch design and the half-scale model, but also because each realization produces a unique result when using a programme based on random numbers.[40] Given the context in which we interpreted the relief, one may reasonably conclude that this aspect also implies a parallel to a natural process: after all, every natural realization – stone, plant, human – is unique. de vries formulated retrospectively what was 'important' in scientific work: 'the comparability of manifestations of things. unique aspect of processes. I can describe a process of vegetation: from weeds to a tall forest. plants are sociologically definable, but the individual history in the process is endless.'[41] Natural processes occur uniquely, natural individuals are unique. Science presupposes that these manifestations are comparable, but this in no way alters the reality that the differences between individuals are clearly immutable and constitute an important aspect of nature's functioning.[42]

the concrete truth of nature

In his notes in his *notitieboekje 0*, made in March 1957, herman de vries came up with an answer to his question 'what is art?', namely: 'Art is, I believe I'm now able to define, [a] philosophical contemplation in a visual or imaginative (imagined) form.'[43] This answer corroborates his response to a survey in the international journal *Leonardo* (1968), regarding a personal concept of art: 'the discipline which makes visual formulations / une discipline qui propose des formules visuelles'.[44]

In the first issue of de vries's magazine *integration*, published as a catalogue to accompany the exhibition *aktuell 65* in the Bern galerie aktuell (January 1965), the title of his opening essay was his own definition of art: 'visuelle information'.[45] In his long explanation, herman de vries also applied the notion that art is visual formulation or visual information, while additionally observing that, due to its non-verbal character, visual art largely bypasses man's critical, analytical and language-based capacity, in favour of providing a 'more immediate experience'. To bolster this direct experience, he sought 'an art form that would be objective and of general validity'. de vries formulated all this as a 'desideratum', which he aimed to develop in his artistry and ultimately realized in his work at the ITBON: 'During this period of research work in the laboratory, I was busy setting up a trial with a random distribution. The possibility of applying this objective distribution method to visual material' fulfilled the goal de vries had established for himself.[46]

The question then arises whether, in his visualization of ecological processes in the relief, herman de vries is perhaps representing or depicting something, specifically the dynamics and layering of nature, i.e. nature as an infinite interplay of systems. In our view, any answer must be based on the common thread found throughout the artist's oeuvre: the shift from visual representation to the concrete presentation of nature. In each *random objectivation*, de vries visualizes a systematic image, i.e. a model that produces a visualization parallel to nature. By principle, he chooses not to (re)present an essential reality *behind* the concrete reality, as was attempted by Mondrian and the early Van Doesburg, for whom abstraction and geometry inherently possessed transcendental (abstractive) value and transcendent (metaphysical) significance. Due to the – at first glance less absolute – claim of statistic methodology on truth, derived from statistical averages and statistical extremes, it seems any knowledge of reality must find its secure foundation elsewhere. In his *random objectivations*, herman de vries arrived at a different concept

of abstraction *and* a different concept of (re)presentation – concepts not rooted in metaphysics, not focused on 'Being' or other essentialities written with capital letters. Instead, he introduced a form of abstraction by means of which natural systems, networks and processes could be made experienceable and intelligible – through works of art as visual information. The ecological method of population dynamics provided an ideal way to achieve this: as a statistical method, it offered more openness and freedom than classical geometry (which by this time, incidentally, had twice been overtaken: first by Einstein's theory of relativity, thereafter by Heisenberg's quantum theory). de vries had no desire to return to depictions of nature, nor to adhere to known or new concepts of abstraction – he wished to visualize the natural processes that, from 1970 on, he described as *chance & change*, in which humans also figured as an important ecological factor. The concept of *chance & change* raises the awareness that nature indeed functions according to laws but absolutely never according to hierarchies.

herman de vries formulated this as follows in his long explanation of the ITBON relief: 'order by means of chance [indicates] that order and disorder (chance) are not, in essence, variables standing in opposition to each other, but, as in nature, integral parts of a complexity.'[47] In other words, it is the mutual integration of systems (an integration whereby 1 + 1 = 3, whereby systems become multi-dimensional networks) that is parallel to nature. A powerfully formulated summary of this can be found in de vries's short explanation of the artwork: the relief creates and visualizes an image 'changeable according to its own laws and equal in itself, like nature'.[48] As such, herman de vries depicted nature as an autonomous dynamic, parallel to a work of art possessing its own autonomous dynamic. There is simply no cause, reason, meaning, mover, god, purpose or primal ground to be written with a capital letter; nor is a Chain, Ladder or Pyramid of Being ever realized through nature's evolution.

The artist is free to withdraw further and further from his theme,[49]

Fig. 17
HERMAN DE VRIES, *one, two, and three hours under my apple tree on 31 october 1975*, 1975. Dried apple tree leaves (randomly distributed by nature) on paper, three parts, framed, 86 x 118 cm. Stedelijk Museum Schiedam, long-term loan from Collection Joke and Dick Veeze (part 1), acquired with support of the Mondriaan Stichting and the Vereniging Rembrandt (parts 2 and 3).
Photo: Tom Haartsen/Stedelijk Museum Schiedam

as beautifully demonstrated by de vries's 'fallen leaf works' from 1975 (fig. 17). Since then, his conceptual interpretation of concrete art has changed and expanded, and was ultimately defined as that which presents nature's autonomous works. On one hand, he remains faithful to what was important for the zero movement: the isolation and presentation of reality.[50] Simultaneously, however, he fundamentally shifts the perspective away from that which always lay hidden in the aphorism *natura artis magistra*, i.e. from the representation of nature to nature itself.[51]

Today, herman de vries's vision of nature and its phenomena is a vision increasingly recognized and accepted. The non-personal, objective concept of random objectivation has enabled the artist to distance himself from hierarchical ways of observing and thinking. As an artist, he therefore excludes those concepts essential to the work of natural scientists: comparison (identity), origin (causality) and effectivity (finality). On the basis of ecological concepts, he has also eliminated an entire branch of Western philosophy, i.e. ontology or theory of being. What *is* the plant, what *is* the animal, what *is* Man? What is Being about, what is the First Cause, the Final Ground? Who is the First Mover? As one who loves and contemplates nature, herman de vries is immune to such questions as they are foreign to nature and its dynamic existence.

de vries's ITBON relief – an artwork created for a scientific research institute – visualizes a network of systems by aesthetically autonomous means, and as such, it can raise the awareness of nature's inherent autonomy and freedom. This freedom in nature, according to herman de vries, denies neither the place and role of the individual nor the validity of natural laws. Anno 2024, now that ecological awareness increases and many voices raise questions about what 'order' and 'disorder' tell us about nature and ourselves as part of nature, this vision has never been more pertinent.

ABSTRACT

In its collection of twentieth-century art, the Rijksmuseum holds several works by the artist herman de vries. Among them is an exceptional white wall relief from 1967 measuring more than six metres across, on long-term loan from Wageningen University & Research (Environmental Sciences Group). *random objectivation v67-36c* was created as an art commission for the then newly built accommodation of the Instituut voor Toegepast Biologisch Onderzoek in de Natuur (ITBON), where de vries was working as a research assistant at the time. The relief belongs to an extensive series of artworks de vries called *random objectivations*, conceived on the basis of mathematical tables of objective-random numbers used by de vries in conducting biological experiments and subsequent evaluations. As revealed by the authors' research in the ITBON archives, the nature of de vries's scientific activities during these years centred on the study of ecological networks, an approach first developed in the late nineteen twenties as a new paradigm in the field of biology. By examining the scientific context in which de vries's relief was created, the authors arrive at a more focused interpretation and ecological contextualization of de vries's *random objectivations*.

NOTES

1 In the list of works found in herman de vries's archive, the work has not been assigned any resolute title of its own. In *herman de vries: werken 1954-1980*, exh. cat. Groningen (Groninger Museum) 1980, for which herman de vries did the final editing, the relief bears the title *toevalsobjectivering v67-36c*. In the aforementioned list of works, *v67-36a* is the title assigned to the design drawing (see fig. 12), and *v67-36b* to that of the scale model (see fig. 13).

2 Cees de Boer, '*de wereld is mijn poëzie*: Enkele momenten uit het leven = werk van herman de vries', in *herman de vries: Oeuvreprijs 1998*, Amsterdam: Stichting Fonds voor beeldende kunsten vormgeving en bouwkunst, pp. 8-53, esp. pp. 22-24. Cees de Boer, *herman de vries: overal stroomt mijn oog*, Zwolle 2014, pp. 33, 100-07.

3 Rob de Windt's first encounter with the ITBON relief occurred when serving as a member of the art committee at Wageningen University & Research. An increasing familiarity with herman de vries's work was thanks to Nico van Breemen (emeritus professor of Soil Formation and Ecopedology in the department of Social Science and Geology at Wageningen University & Research). On the day of his university farewell speech, Nico opened the Galerie Wit at his home in Wageningen, where he regularly presented herman de vries's work. We are highly indebted to Nico van Breemen for bringing us together and moreover supporting our research both in word and deed.

4 This will be the main perspective in the coming exhibition of herman de vries's work, titled *all this here*, Rijksmuseum Twenthe, Enschede, from 17 May through 2 November 2025.

5 Jörg-Heiko Bruns, 'konkretes aus der wirklichkeit des herman de vries. kindheits- und jugenderinnerungen. nach einem gespräch aufgezeichnet von jörg-heiko bruns', in *herman de vries. aus der wirklichkeit*, exh. cat. Ulm (Stadthaus) 1998, pp. 103-10; Vince de Vries, *herman de vries. bron*, Jan Willem den Hartog and Alex de Vries (eds.), The Hague 2021, pp. 22-24, 29, 35.

6 Van Wijngaarden and de vries very likely knew each other through the NJN. de vries recalls that, prior to being hired at the PD, he paid a visit to Van Wijngaarden in Wervershoof, this upon learning that Van Wijngaarden was doing research on small mammals in the Wieringermeerpolder, a subject that also interested him. (Cees de Boer, interviews with herman de vries, Eschenau, 20-22 January 2024.) Between 1953 and 1967, de vries published twenty studies on small mammals, including the mouse, brown rat and water vole, written in collaboration with Van Wijgaarden and other authors but also autonomously, which appeared in periodicals such as *De levende natuur: Nederlands tijdschrift voor veldbiologie*.

7 An important reference for Van Wijngaarden's research was the research by Charles S. Elton (Oxford), published in *Animal Ecology* (1927), *Voles, Mice and Lemmings: Problems in Population Dynamics* (1942) *The Ecology of Animals* (1946). Thanks to Elton, the statistical methods of population dynamics became operational for the perspective of ecology in the late nineteen twenties.

8 Cees de Boer, interviews with herman de vries, Eschenau, 20-22 January 2024.

9 Rob de Windt, interview with Peter Gruys, Lavardens/Gers, 24 October 2014.

10 Arnhem, Gelders Archief (henceforth NL-AHGLDA), Rijksinstituut voor Natuurbeheer (RIN, acc. no. 1145), inv. no. 4. Notulen dagelijks bestuur ITBON, 23 March 1959. Formalization of de vries's transfer: Notulen dagelijks bestuur ITBON, 3 September 1963.

11 The ITBON was formally part of the Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek (TNO, Netherlands Organisation for Applied Scientific Research), established in 1932 to conduct scientific research in various areas, with an emphasis on the practical applications of research results. Biological field research was highly regarded, in respect to both agricultural and natural reserves. TNO was an important advisory body for both the Ministry of Agriculture and Fisheries and the Ministry of Economic Affairs, and others. See also the working plan (in all likelihood compiled by Voûte, c. 1940) concerning the founding of the future ITBON. NL-AHGLDA, RIN 1145, inv. no. 214 Werkplannen van het ITBON, 1940-1961.

12 During this period, the American marine biologist Rachel Carson sought contact with Briejèr. He was an important source for her book *Silent Spring*, published in 1962, that would prove to be a milestone in raising awareness about environmental issues. Nicholas J. Briejèr is currently writing a biography on his grandfather, in which Briejèr and Carson's correspondence will also be published.

13 NL-AHGLDA, RIN 1145, inv. no. 214 Werkplannen van het ITBON, 1940-1961, Document TNO/ Nationale Raad voor Landbouwkundig Onderzoek, 18 September 1958.

14 The role of these two forgotten Dutch luminaries in the field of scientific-ecological research and the emerging environmental activism of the nineteen sixties will be addressed elsewhere.

15 NL-AHGLDA, RIN 1145, inv. no. 9. Werkplan van het ITBON 1963, description of research in progress. PhD Pieter Gruys, 24 June 1970: *Growth in Bupalus piniarius (Lepidoptera: Geometridae) in relation to larval density.* […], published as Verhandelingen no. 1 of the Rijksinstituut voor Natuurbeheer, Wageningen, 1970. In the edition at hand during the PhD process, Gruys thanks herman de vries in the unpaged 'Acknowledgements' in the following manner: 'I am grateful to Mr H. de Vries, who provided technical assistance throughout the investigation and whose active interest contributed to its success.'

16 Rob de Windt, interview with Peter Gruys, Lavardens/Gers, 24 October 2014.

17 De Vries 2021 (note 5), p. 49. Cees de Boer, interviews met herman de vries, Eschenau, 15-21 June 2024.

18 *notitieboekje 0,* via http://tobeallways.blogspot.com, under 18 and 29 January 1957.

19 For herman de vries's first participation in a group exhibition, titled *Natuur en kunst*, Stedelijk Museum Amsterdam, 5 April-6 May 1957, see De Boer 2014 (noot 2), pp. 65-67. See also *notitieboekje 0* via http://tobeallways.blogspot.com, under 29 April 1957. Curator Willem Sandberg hung two of herman de vries's *collages trouvées* (fragments of a wall with posters in Paris) next to a display case that contained Japanese utilitarian objects made from natural and retrieved materials. For de vries, this was a positive confirmation of his fascination with the unity of philosophy and aesthetics conveyed in the concept *wabi-sabi*, about which he had read in Daisetz Suzuki's essays and other publications.

20 Dutch Artists Henk Peeters and Armando realized a comparable reduction and anonymization in their artworks. de vries cited this development explicitly in his written manifesto '0=nul', published in the first issue of the magazine *0=nul* (editors: herman de vries, Henk Peeters and Armando, 1961). For versions of the manifesto's text, held in herman de vries's archive, see http://tobeallways.blogspot.com under 0=nul.

21 The German-language text of the manifesto '0=nul' characterizes 'zero art' in the following terms: *stupide*, *objektiv*, *normlos*, *inhuman*, *ausdrucklos*, *absolut*. What this means is that perspectives, hierarchies or other values are no longer to be expressed in the work of art, with the artist moreover expected to minimize any mirroring of his role in the artwork. In the second half of the nineteen fifties, herman de vries developed a predilection for the work of Jackson Pollock and other abstract or lyrical expressionists. In these artists' works, all visual elements had become equivalent in value. de vries saw this as a useful visualization of: a. nature's characteristic chaos, in which no hierarchies were to be discovered, and b. the relativization, and when possible, abolition of hierarchies, i.e. the constructed power structures by which people were controlled or allowed themselves to be controlled. De Boer 2014 (note 2), pp. 54-57.

22 See *notitieboekje 0* (note 18), between 2 July 1956 and 22 October 1956: 'kunst – een levenswijze. de hoogste vorm: mondriaan noemt kunst vervangingsmiddel in overgangsperiode. [daarna] het leven zelf in een hoogste vorm.' (art – a way of life. the highest form: mondrian calls art replacement medium in transitional period. [thereafter] life itself in a highest form.)

23 Partly because geometrical-abstract and concrete art in the spirit of Van Doesburg experienced a strong revival in the art of the nineteen sixties and seventies, particularly among artists who placed importance on social engagement in art.

24 Theo van Doesburg, 'Base de la peinture concrète', *Art Concret* 1 (1930).

25 See note 11.

26 Slegers's sculpture *Groei '68* (Growth '68), measuring 220 x 305 x 70 cm, was specifically made for this location; see Jaap Bremer et al., *Piet Slegers*, Arnhem 2004, p. 60. Our thanks to Alex de Vries. Slegers was a nationally renowned sculptor who lived and worked in Velp, nearby Arnhem. In 1998 – two years prior to the building's closure as a consequence of the ITBON's integration as part of Alterra/Wageningen Environmental Research – the sculpture was relocated to the campus of Wageningen University & Research; see https://www.beeldenvanwageningen.nl/artworks/detail/6347703.

27 'onze kunstenaars de heren De Vries en Mulder in de gelegenheid [te] stellen iets voor het nieuwe gebouw te maken.' NL-AHGLDA, RIN 1145, inv. no. 11, p. 5, Notulen dagelijks bestuur ITBON, 14 June 1966.

28 'Mr Mulder' refers to Wim Mulder, an artist living in Otterlo, whose function with the ITBON is unclear. (Interview Cees de Boer and Rob de Windt with Sim Broekhuizen, Doesburg, 1 July 2024. As of 1 August 1966, Broekhuizen succeeded Gruys at the ITBON; herman de vries became his assistant.) This perhaps played a role in the fact that herman de vries was chosen, because as early as 1967 – even though not yet known among the broad public – he had already required a certain reputation due to his participation in the Dutch 'nul' movement and the German 'zero' movement. See the chronological catalogue of works, publications and exhibitions at www.hermandevries.org. Our thanks to Lilian and Co Seegers-Hendriks for their time and effort in mapping out herman de vries's oeuvre.

29 The available budget for herman de vries's artwork was set at fl. 3.400. See Eschenau, herman de vries archive, Offerte van herman de vries aan de Rijksgebouwendienst, 26 August 1967; Overeenkomst van Aanneming, signed 30 October and 8 November 1967, including the promise/obligation that the relief would be delivered as of 1 February 1968.

30 All sketches and calculations retrieved up to now are based on XV sectors; in the list of works and their programmes (Eschenau, herman de vries archive), one can see that with work number *v67-36c*, the change from XV to XVI sectors is clearly registered.

31 Eschenau, herman de vries archive. herman de vries, '*v67-36*. relief voor het itbon gebouw. korte toelichting', undated, enclosed with the ITBON board's letter to the Rijksgebouwendienst Directie Gelderland en Overijssel, dated 10 June 1967.

32 Eschenau, herman de vries archive, long explanatory statement, photocopy.

33 '30 elementen van 2 x 2 x 2 cm of een veelvoud daarvan'.

34 See *Restauratierapport* (restoration report), compiled by Lisa Elbers (Utrecht), 20 August 2006. Wageningen University & Research Library, Special Collections. Our thanks to Anne Zaal and Joke Webbink.

35 See note 30. A comparison of the realized relief with both the first design drawing comprising XV sectors and the surviving photo of the maquette of sector XII confirms that the ultimately executed relief with XVI sectors differs from the design drawing and the scale model. For the realization, herman de vries read the table in Fisher and Yates (see fig. 4) a second time, on the basis of the same programme.

36 'extra, serieel verlopende, variatie factor'; 'stuwende indruk'; 'eenheid van beeld'. Eschenau, herman de vries archive, brief explanatory statement (note 31), photocopy.

37 Compare *notitieboekje 0* (note 18) under 8 October 1957; De Boer 2014 (note 2), pp. 54-55; De Vries 2021 (note 5), pp. 47-55.

38 'de wet van baas becking: "alles is overal, maar het milieu selecteert" is ook van toepassing op schoonheid. (en dus ook op kunst).' *notitieboekje 0* (note 18) under 8 March 1957; Lourens G.M. Baas Becking, *Geobiologie of inleiding tot de milieukunde*, The Hague 1934, p. 15. See also Rutger de Wit and Thierry Bouvier, '"Everything is everywhere, but, the environment selects"; what did Baas Becking and Beijerinck really say?', *Environmental Microbiology* 8 (2006), pp. 755-58, accessible via https://doi.org/10.1111/j.1462-2920.2006.01017.x.

39 Cees de Boer, interviews with herman de vries, Eschenau, 20-22 January 2024.

Eschenau, herman de vries archive, long explanatory statement (photocopy). The new building entered service in August 1967, with the handover taking place on 22 January 1968 and the official opening on 9 May 1968.

40 See notes 30 and 35.

41 'belangrijk is: de vergelijkbaarheid van manifestaties van dingen. eenmaligheid van processen. ik kan een proces beschrijven van vegetatie: van onkruid tot een hoog bos. planten zijn sociologisch definieerbaar, maar de individuele geschiedenis in het proces is eindeloos.'; De Vries 2021 (note 5), p. 49.

42 For the history of the concepts 'species' and 'individual' in biology, see Paul L. Farber, *Finding Order in Nature: The Naturalist Tradition from Linnaeus to E.O. Wilson*, Baltimore 2000.

43 'kunst is, geloof ik nu te kunnen definiëren … philosophische betrachting in beeldende of verbeeldende (verbeelde) vorm'. *notitieboekje 0* (note 18) under 3 March 1957.

44 *Leonardo: International Journal of the Contemporary Artist* 1 (1968), p. 86.

45 Here de vries argues in support of his definition that art is visual information, in part by means of a lengthy quotation from the chapter A.D. de Groot, 'De programmering van het creatieve', in H. Baudet, E.W. Beth and P. Baffort (eds.), *Mens en computer: Automatie, industriële en culturele revolutie*, Utrecht 1963, pp. 158-76.

46 'onmiddelijker ervaarbaar'; 'een kunstvorm die objectief zou zijn en van algemene geldigheid'; 'In deze periode van werken was ik bij het onderzoek op het laboratorium bezig met het opzetten van een proef met een random-verdeling. De mogelijkheid om deze objectieve verdelingswijze te gaan toepassen op beeldend materiaal'. Eschenau, herman de vries archive, long explanatory statement, photocopy.

47 'ordening door middel van het toeval [duidt erop] dat orde en on-orde (toeval) in wezen geen tegenover elkaar staande grootheden zijn, maar evenals in de natuur integrale delen van een complexiteit.'

48 'veranderlijk naar eigen wetten en in zichzelf gelijk, als de natuur'. Eschenau, herman de vries archive, brief explanatory statement (note 31), photocopy.

49 Compare note 20.

50 In 1964, the artist Armando described the intensifying of one's experience of reality in the following terms: 'Niet de Realiteit bemoraliseren of interpreteren (ver-kunsten), maar intensiveren. … Werkmethode: isoleren, annexeren. Dus: authenticiteit. Niet de maker, maar de informatie. De kunstenaar, die geen kunstenaar meer is: een koel, zakelijk oog.' (Not to moralize or to interpret (to art-ify) Reality, but to intensify… Working method: to isolate, to annex. Therefore: authenticity. Not the maker, but the information. The artist, that is no longer an artist: a cool, objectivist eye.) Quote according to Sjoerd van Faassen et al., *De nieuwe stijl 1959-1966*, Amsterdam 1989, p. 18.

51 Cees de Boer and Colin Huizing (eds.), *herman de vries. to be all ways to be,* exh. cat. Venice (Biennale, Dutch pavilion) 2015, p. 51.