

In 1758, the British mathematician Francis Maseres
professed that negative numbers:
“... darken the very whole doctrines of the equations
and make dark of the things which are in their nature
excessively obvious and simple.”

Deyan Ginev
email to the W3C MathML Working
Group, 26 May 2022

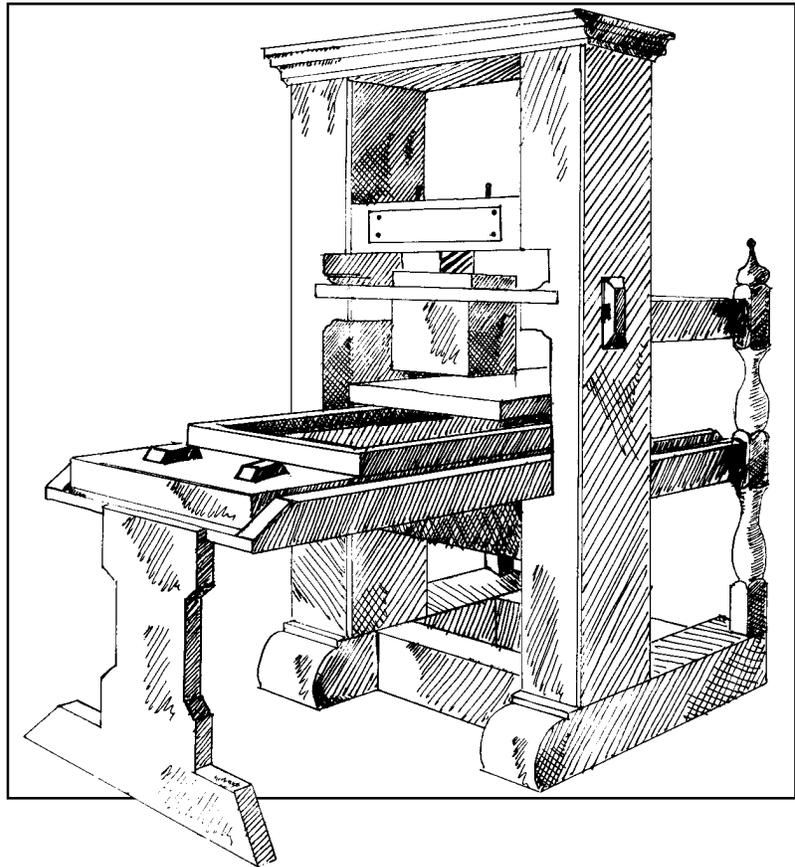
TUGBOAT

COMMUNICATIONS OF THE T_EX USERS GROUP
EDITOR BARBARA BEETON

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TUGBOAT

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An artist's journey on a TUGboat

Tine Wilde

Abstract

How does a coloured bird end up on a TUGboat? This is the story of an artist who studied philosophy and combined her skills in a PhD at the University of Amsterdam (NL). In order to write her dissertation, she had to learn the \LaTeX typesetting programme. Many years later, she still makes art and still writes down her thoughts in \LaTeX , with the Memoir class and $X_{\text{q}}\LaTeX$ as first choice. Always trying to stretch the limits of the programme to her convenience.

This essay is not a technical article written by a developer conjuring up ingenious innovations to the \LaTeX programme. By contrast, it discusses the relationship between \LaTeX , art (photography) and the concept of ‘measurability’ from the perspective of a philosophising artist.

1 Introduction

After working as a visual artist for some time, I decided at some point to take my work to the next level with a study in philosophy. I only planned for a Master's degree, but things would turn out differently. Thanks to my supervisor Martin Stokhof, I got the opportunity to extend my research in a PhD project which would enable me to combine my artwork with philosophical insights through the ideas of Ludwig Wittgenstein. Since the study of Wittgenstein was part of analytic philosophy, and analytic philosophy was part of the Institute for Logic, Language, and Computation (www.i11c.uva.nl), I was housed together with logicians and computer specialists. A preliminary condition was that every doctoral candidate would write their dissertation in the \LaTeX typesetting programme. Thus, so did I.

While most of the PhD students used the \LaTeX programme to typeset mathematical or logical formulas, i.e., the scientific writing stuff, I was allowed to employ it freely and without any limitations. Excellent, yet I had no idea of any typesetting programme to begin with. I had written my Master's thesis in Word. A programme I disliked, mainly because of all sorts of instabilities. An alternative was highly appreciated, but . . . what was \LaTeX ?? I started out by buying *The \LaTeX Companion* [6] in which numerous issues on fonts, tables, colours, and abbreviations were spelled out. The book is still on my desk after all these years and now reads more like a bible, although much can also be found online on the internet these days. Subsequently, I installed TeXShop and

$\text{BIB}\TeX$ on my Mac so that it began to look like a complete typesetting programme.

What helped and still helps me most is the way in which the programme forces one to structure the writing, and, by consequence, the thinking. Although it took some effort to learn how everything was set up and could be utilised, I loved the outcome. The results looked great, and, no instabilities in contrast to the Microsoft Word programme. Another quality I had never encountered elsewhere was the fact that I could add text without actually showing it in the final PDF file. A wonderful feature for storing remarks that were intended for my eyes only. Furthermore, the $\text{BIB}\TeX$ bibliography turned out to be a marvellous tool. But what struck me most was the fact that all this was open source: made to be used — not to be bought and sold. A concept that needs to be cherished, in my view. There was just one problem left: the artistic world and more generally the world outside academia were by and large ignorant or reluctant to adopt the \LaTeX programme and its benefits.

Printers specialised in art usually work with the Word programme and transfer the text, after editing and proofreading, into InDesign. For them, a \LaTeX programme is beyond their scope. To some, it is a serious threat, while others declared it something weird from Mars. And me somewhere in between, being tossed around on a TUGboat. The two worlds clashed on this issue. I was keen on working with the \LaTeX programme, *and* I wanted my dissertation to be printed by a renowned printer specialised in art. In the end, the printer and I agreed to use the \LaTeX files instead of InDesign, but not until after some fierce discussion and deliberation [7].

I kept using \LaTeX after having finished my PhD, and extended my \LaTeX skills with the Memoir class and $X_{\text{q}}\LaTeX$. Playing with the system and producing all kinds of templates to make life easy since my projects, merging philosophical insights with artistic outcome, are complex and more often than not take several years to complete. In order to keep track, I need text in which I can add many references and cross-references, as well as private considerations. In case I have to apply for funding at multiple organisations, these elaborated texts help me get my insights across concisely.

Yet, there is another way in which the typesetting programme is helpful. It stimulates me to think about the ideas concerning creative processes, the nature of ‘reality’, and the concept of ‘measurability’. In the next section, I will give you an illustration of how the \LaTeX programme intrinsically has found its way into my artistic practice.

2 Measurability

Within my research into the nature of ‘reality’, what fascinates me as a visual artist as well as a philosopher is the notion of measurability. The boundaries between fixed and fluid; between sharp and vague; between coloured and non-coloured; between love and hate. In short, I would ask myself: when does one state of affairs turn into the other? When is something still measurable? And: is it important for something to be measurable at all? Trying to shed light on these questions, I merge art (photography) with philosophy and theoretical considerations from physics. Allow me to give you an example by highlighting a project I have been working on since 2020.

Project Zero Point

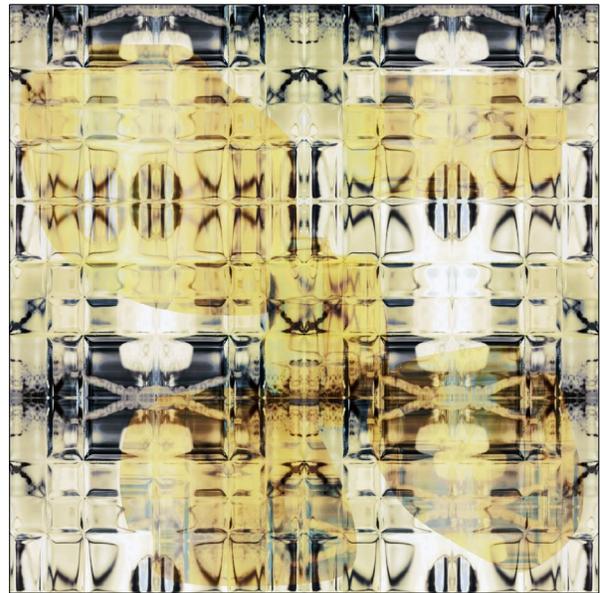


ZERO POINT #S2021-03k. Picturework, dimensions 71x71cm.

One single piece of glassware was taken as a starting point for transformational processes, in which photographic images were changed into thirty-eight multi-layered compositions distributed over four series. Pictorial spaces that are variable and subject to change in an experimental, unconscious method of choice, inspiration, and demolition. The results of split, remodel, and repeat invite you to explore and contemplate the notions of space and time as a dimension in which meaning remains something definitely unfinished, but in which measurability is crucial. After all, when there is nothing to hold on to, you have to choose a point of departure from which you can (re)organise your life.

The most significant literature and validation for project Zero Point is the work of David Bohm (1917–1992) with his research into the underlying

meanings concerning quantum theory. As a theoretical physicist, he was one of the founders of quantum physics who worked under Oppenheimer on the Manhattan Project and collaborated at Princeton with Einstein. In an attempt to combine relativity and quantum theory, he discusses in *Wholeness and the Implicate Order* [3] in what ways reality lies beyond appearances. Speculating that the proton takes the form of a wave collapsing inward in and expanding outward from all space, rather than being a solid, continuous particle in spacetime.



ZERO POINT #S2021-03l. Picturework, dimensions 71x71cm.

There is a hidden regime of reality, Bohm says, that is and always will be inaccessible to us. From this deeper order he calls the ‘implicate order’ the ordinary notions appear in the ‘explicate order’, i.e., the world as we know and experience it with our senses. The model for this proposed implicate order is not based on ‘things’ considered as objects, or phenomena in a Cartesian space-time order, but rather a lens-like flowing of simultaneously enfolding and unfolding dimensions between an implicate and an explicate order.

Simply put, the implicate order is the ‘ground’ within which the entire universe is enfolded at each ‘point’ in spacetime, manifesting itself in an explicate unfolding order of a world we can see, hear, smell, touch and feel. It is an explicate order and for us actually present as a direct surface order. Underneath, there is a deeper, for humans only indirectly knowable or inaccessible order. A multidimensional sea of energy as an implicate order from which particles and spacetime can arise. This underlying reality and the explicate order as we experience it daily are

intrinsically interwoven, amounting to one non-local, non-analysable breath breathing system, enfolding and unfolding at every moment into a complex, never fully knowable totality.

Bohm's concept of 'hidden variables' [1, 2] operates at the boundary of spacetime: "We come to a certain length at which the measurement of space and time becomes totally indefinable. Beyond this, the whole notion of space and time as we know it would fade out into something that is at present un-specifiable. So, it would be reasonable to suppose, at least provisionally, that this is the shortest wavelength that should be considered as contributing to the 'zero point' energy of space. When this length is estimated, it turns out to be about 10^{-33} cm. This is much shorter than anything thus far probed in physical experiments (which have gone down to about 10^{-17} cm or so). If one computes the amount of energy that would be in one cubic centimeter of space, with this shortest possible wavelength, it turns out to be very far beyond the total energy of all the matter in the known universe." [3, p.190]. David Bohm called this calculation the 'zero-point' energy for a point of space. Here, he predicts, will be found a boundary separating an outer, explicate order.

In a 1987 paper [4], Bohm suggests that there may be multiple explicate orders as suborders of a single, infinitely connected implicate order. "A kind of universal process of constant creation and annihilation, determined through the super-quantum potential, so as to give rise to a world of form and structure in which all manifest features are only relatively constant, recurrent and stable aspects of this whole." [4, p.43]. Further elaboration on this topic would exceed the scope of this article. A good introduction to Bohm's thoughts on the subject is now recorded on film and can be found at www.infinitepotential.com. On this website, you also will find additional illuminating interviews with Roger Penrose and Basil Hiley, among others.

David Bohm's search for a new notion of order amounts to a 'no final form' of insight. He urges us to view the world not as being constituted by basic objects or building blocks, but in terms of a universal flux of events and processes. Each relatively autonomous and stable structure should be understood as a product that has been formed in the whole flowing movement that will ultimately dissolve back in this moment. How it forms and maintains itself depends on the place and function in the whole.

Photography and Philosophy

We, as human beings, are placed on a planet where we are made up of, but also are dependent on, our

ability to recognise patterns on the basis of similar differences and different similarities. First perceptually: 'unguided' we recognise patterns in the blots on a brick wall or on wallpaper. Leonardo da Vinci already pointed at this faculty as a starting point for all art. Or in rituals in which a particular organisation of lines and forms produces a mesmerising effect, like a mandala or a kōlam. Second, as an attempt to make human knowledge measurable through 'information', that is, every amount of data, code, or text that can be preserved, sent, received or manipulated in any medium. Consider, for example, the mathematical numbers and proportions that can be grasped by the mind. Plato stated that these abstractions were of a higher order than the phenomena. According to him, the senses merely produce opinions, whereas the abstractions deliver certain, that is, 'true' and 'perfect' knowledge. In later times, this idea was refuted and certainty was exchanged for probability. We have now reached the point at which we are slowly coming to understand that true knowledge means insight. Insights that are neither true nor false, but continuously illuminate different aspects of specific regions or frameworks. In consequence, we will never reach crystal-clear conclusions.

The all-encompassing truth about the universe, then, is enclosed in the possibilities and constraints of the human powers of imagination. In the end, even a scientific system is but a free play with symbols according to (logical) arbitrarily given rules of the game — a free invention. "Thinking without the positing of categories and of concepts in general would be as impossible as breathing in a vacuum," as Einstein would put it [5, p.674]. Our concepts are tools, of which we have to assume that they will behave differently in different domains. On the other hand, rule following constitutes a general framework in which it is possible to compare various (language) games, according to Wittgenstein [7]. Experience and knowledge are interconnected and undivided activities, and, as a result, continuously susceptible to change and adjustments.

Already at a very young age, I was fascinated by the patterns that could be detected on the medallion wallpaper of my aunt. At that time, we spent our summer holidays with a reformed family who were living on the south coast of the Netherlands. There was only beach and sea and family members — no newspaper nor any radio or television set. Bored stiff, I began to use the small camera my father had bought me as a possibility to escape the somewhat restricted atmosphere. Catching the various patterns on the wallpaper on camera — whether distorted or not — made me invent all sorts of landscapes, faces,

ghostly suggestions and the stories that came with them. I did not think these were of the same quality as the stories told by Star Trek or The Jacksons — for me the ultimate TV series back then — but at least they provided a way out of boredom. It was only much later that I began to appreciate these lonely holidays and the ways in which my imagination had been triggered by camera and wallpaper.

It is no coincidence, then, that later in life my favourite medium to work with as an artist became photography. More specifically, the ‘digital patterns’ that make up for the images. It is the main reason why I call my photographic work ‘pictureworks’. Not questioning the image as we perceive it in documentaries, reports, or events, but investigating *how* an image may appear to us. As a result, no single decision is conclusive, but understood as part of a series of clear and explicit ‘quantum-decisions’. In this conception, the ideas of the photographer are intrinsically tied up with the hard-wired, pre-programmed ‘information’ inside the camera, amounting in a joined venture to the final results.

Consequently, the pictureworks are not representations, but rather the energy of an unseen and unknown world in which the camera acts as a concentrated point of consciousness, trying to locate the unknown in a reciprocal poetic resonance between the explicate structures of the ordinary world and the implicate processes of the human soul. In the dynamics between the explicate and the implicate, just like between the seeing and the thinking, pictureworks, whether they are presented as a single work of art, a choice sequence or an installation, are not a point of view, but a field of perception and cognition that tries to connect us with the deeper levels of life: the big unanswerable questions, the mysteries. From this, then, photography is understood as a reflective and analytic ‘philosophical’ medium. The pictureworks have nothing to do with reports, stories, documentaries, registered events, and the like. Rather, they originate in images, taken from everyday reality and used as raw material, to be transformed into works of art that seek to touch upon the viewer’s infinite number of subtle feelings.

More thoughts on the subject are in a paper I wrote in 2021 for *Pari Perspectives* [8]. The paper as well as a short video about the making of project Zero Point can be accessed from my website.

3 Open Source–Open Mind

Within the undivided wholeness of flowing movement, we make a move and move around, constantly creating some order that structures our everyday life. More or less in the same way as the L^AT_EX typeset-

ting programme structures my thoughts into words and sentences and orders them into a comprehensible whole, so as to be able to communicate with others. Therefore, a huge THANK YOU to all the developers and people who in one way or another contribute to the open-source environment of the L^AT_EX typesetting programme, offering their spare time to adjust, improve, and alter the typesetting system. In the end, L^AT_EX is not about a system, or any language for that matter, but about creative people, trying to come up with solutions which will make the world a somewhat more open and more interesting place to be.

Pictureworks

Zero Point #S2021-03k and Zero Point #S2021-03l were printed by courtesy of the artist ©2022 Tine Wilde c/o Pictoright, Amsterdam.

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