

K&E Series on Knots and Everything - Vol. 62



THE MEREON MATRIX

Everything Connected through (K)nothing

EDITORS

Jytte Brender McNair, Lynnclaire Dennis, Louis Kauffman

 World Scientific

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Dedication

To Dr. Robert W. “Bob” Gray

Bob, your presence in our lives —*how can it be 19 years*— is more than a blessing, every animation and virtually every image in this book is a demonstration of your brilliance and commitment. We share so many memories of so many meetings... your openness and trust was implicit in your silence the day you joined the team when I innocently picked up your precious ‘do not touch’ computer bag, and carried it to another room. I still laugh at our ‘nicknames’ from the second Sequoia Symposium; you will always be ‘ElectromagneticBOBble’, and I’ve remembered my name, ‘Bindu done dat and done doin’ dat’, and kept my vow to stick around until it was ‘done’. I will always remember flying around the world on crutches to describe a new dynamic —how the Rhombic Dodecahedron appeared, and the colour then changed— only to have someone announce “That will never work...”. You kept your promise to attempt disproving every unfolding knowing, and vowed to hold me to my promise, to quit the first time I was incorrect. We all remember when an hour later you turned your computer around, and showed us that it worked, and explained exactly why and how. Treasured are our many Subway sandwich lunches, junk food snacks on the sofa, and Chinese dinners with your beloved Yevgenia, a.k.a. *Baba Yaga*. And Bob, please know that the entire team remains grateful for the many times you hurled yourself down the jetway, entered an airplane, and folded yourself into a seat that was in no way designed for one your height!

Lynnclaire for the Team

In Memory of

H. Pierre and Mary Noyes

Pierre was our dearest friend and brilliant colleague, a social rebel and intellectual rabble-rouser who for years was the first to sign up and show up for meetings, travelling the world to join in the dialogues, openly admitting that he came to put a stop to an investigation that was so different from his perspective even though it was so aligned with his values.

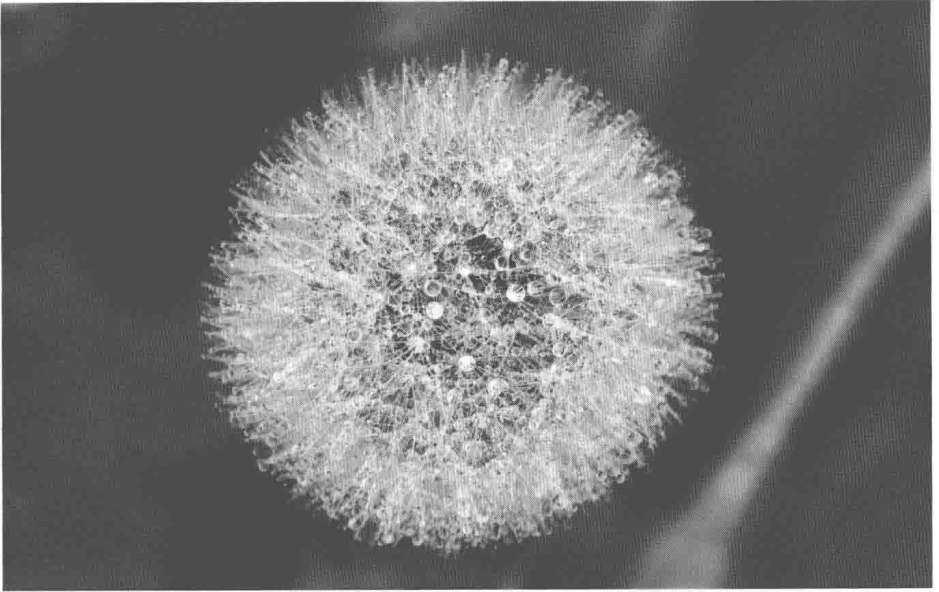
Time and again his lovely wife Mary entrusted him to our care, big promises made even though bantam secrets were kept, a little top off to his favourite glass of red wine, a tiny pat of butter and a small desert, but never the salt!

Grace was ours when Pierre's opinion turned with the millennium and in 2000 he concluded and had the courage to announce that Mereon had resolved a lifelong paradox, linking the "No" with the "Yes" in your name.

Pierre taught us all with his love and wisdom, earning deep respect as he proved time and again that 'wise old dogs' can learn, unlearn and relearn. In all his transformation and his ultimate transition he was and remains one of Mereon's most steadfast champions.

His strong presence and Mary's softness made an impression in all of our lives that continues to endure.

Acknowledgements



Photographer: Vladimir Malyutin, Russia.

Our heartfelt appreciation to our families and our Family of Friends, those who have encouraged us and nurtured this work for more than two decades. The natural beauty inherent in this book, its perfect imperfection, is a true reflection of our connection.

Preface to the First Edition

Observational Evidence, Mathematical Verification and Inimitable Grace

The final manuscript for the first edition of this book was due to be delivered to Elsevier on January 1st 2013. However, a flu season illness prompted the request for a one-week extension to which our editor immediately agreed.

What transpired in the past twenty-six hours was not the result of any great effort nor was it anticipated. For twenty-six years the Mereon Matrix has been classified as pure mathematics, conceptual and yet applicable as you will see in this book.

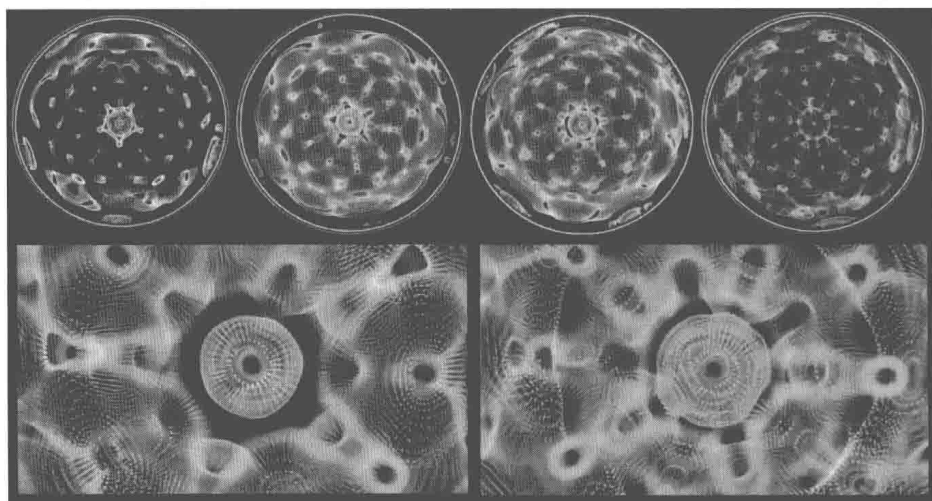
The first decade was invested in understanding; ensuing years spent in the domain of mathematics and science with adherence to the strictest rules of scientific method, defined as, *“a method of procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses: criticism is the backbone of the scientific method”* [Oxford Dictionaries].

By 2003, there was sufficient comprehension to debut the education application you can read about in Chapter 4; an experiment in social science. The breakthrough year was 2007 when we were able to confirm that the Mereon Matrix’s unified fundamental forms, and the dynamics tied the knotted pattern known as the Mereon Trefoil; as well, the dynamics both matched and evolved the work of R. Buckminster Fuller. The geometric patterning he called the Vector Equilibrium and its dynamic, the Jitterbug, were particularly resonant. The relationship between Fuller’s work and the Mereon Matrix was verified through

mathematical and computer-generated modelling done by Robert W. Gray.

In August 2012 we began exploring frequencies related to the mathematics of the Mereon Matrix using a new cymatic technology known as the CymaScope. Experimental results of making these particular sounds visible in water led us to anticipate that this work would lead to an emergent science. Throughout the pages of this book, you will see imagery that is as beautiful as it is thought provoking. Until January 2, 2013 the on-going cymatic investigation continued to lead to convincing and related informational data with details that sparked our imagination and fostered cooperative proposals for the coming year.

However, the Mereon Matrix has not been physically observable ... until yesterday, January 2, 2013.



The above images are raw; 'snapshots' out of a real-time video. The geometry is that of the Mereon Matrix and at the centre is the Mereon Trefoil. The 3,2 trefoil knot most are familiar with is found where it has long been stated to appear; at the perimeter where the Matrix 'births'; also a point of 'exhalation'. The top row of images reveal how the complexity emerges as the amplitude of the vibrational frequency is increased. (Note: the patterning is of course visible due to the camera's illumination ring. Like anything else, if the lights are off there is little or

nothing to be seen.) The two images in the bottom row are close ups (from 'take' 10 of the series) to focus on the central core which in the full images (top row) is only 2mm across. These two images clearly reveal the toroidal nature and knotting.

Although we have now "seen" the Mereon Matrix, this "seeing" is predicated on prior experience with the polyhedral geometry and symmetry.

The prior experience induces us to leap and conjecture that the same geometry is occurring in the cymatics, even though at this time it is quasi-3D in a water cell whose surface is 2D. Seeing the geometry in an aqueous cymatic medium opens up a whole domain of questions and conjectures. This is part of science; however, it must be distinguished from "scientific proof".

With inestimable gratitude, welcome to the universal Matrix that is Mereon.

03 January, 2013, Copenhagen, Denmark

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Preface to the Second Edition

Recently, we learned that Elsevier had retracted our book, “The Mereon Matrix – Unity, Perspective and Paradox”. The reason was given in a personal communication dated March 13, 2017 by an editor in Elsevier (UK), who stated:

“We have issued this retraction because we are focusing the portfolio on core mathematics titles, and have discontinued the more specialized Insights list accordingly. Mathematics as a whole is being refocused on textbooks and research monographs...”

For us, it is important to bring the knowledge and the message inherent in the Mereon Matrix to the scientific community and to the community at large. Our commitment is to keep the investigation and dialogue open, flowing and growing as this is the only way insight into the Mereon Matrix can expand and be verified.

This book, a ‘second edition’, presents not only corrections to both author and printer’s errors, but when relevant brings further clarification, as well as substantial new results of general interest within a couple of research areas; this latter type of changes are principally included as postscripts to the individual chapters.

19 April, 2017, Copenhagen, Denmark

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Introduction

SUSTAINABILITY: MATHEMATICAL ELEGANCE, SOLID SCIENCE AND SOCIAL GRACE

L. Dennis and L. H. Kauffman

... with contributions from all other authors

Max Planck in 1932 said that:

"Anybody who has been seriously engaged in scientific work of any kind realizes that over the entrance to the gates of the temple of science are written the words: "Ye must have faith.""

[wikiquote-1]

Beginning with this quote is to state a paradox for while it has been our greatest joy to be allowed entrance into the 'temple of science', 'faith' is a mere shadow of a state far more powerful. Over decades of work what has sustained us are the scientific principles of doubt and knowledge, letting the Mereon Matrix speak for itself. Through multiple challenges, the predictions have supported and confirmed the theory.

A single concept, a Pattern, has been under scientific investigation since 1995. At the centre of Understanding there resides one word: *perspective*. In its presence we are released from the darkness of ignorance and bias as hidden truth is revealed and illumined; see Figure I.1.

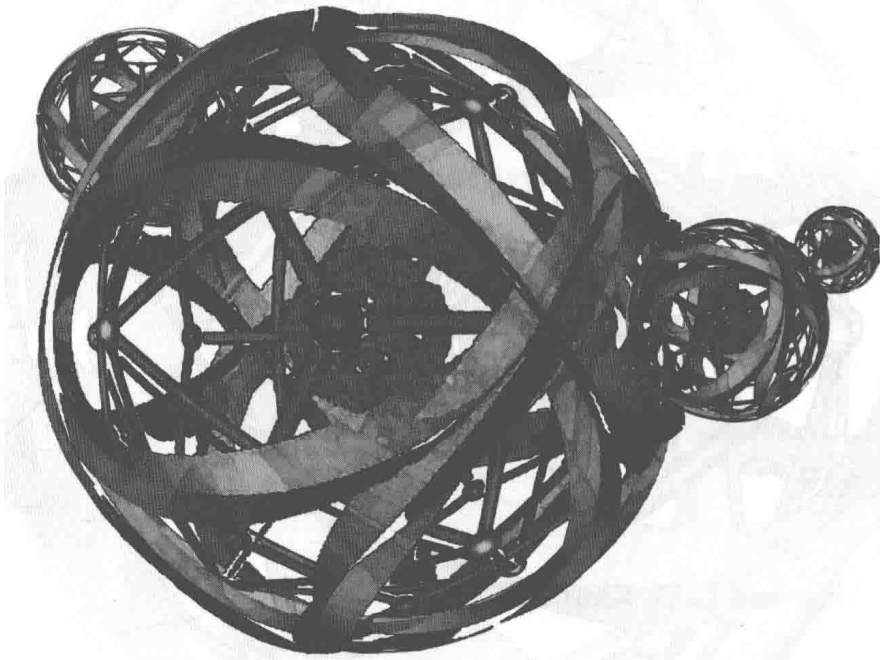


Figure I.1. A cluster of Mereon Trefoils.

If you were to conduct a man-on-the-street interview and ask respondents *'Where do you go for answers to resolve moral and ethical dilemmas'*, few are likely to answer *'To science, of course'*. It is generally believed that science describes the properties, characteristics and forces underlying the fundamental nature of 'what is', and that moral and ethical questions require a 'higher' source. The Mereon Matrix compels re-examining the veracity of these assumptions. Most think of life as coming from life. However, a living system is undoubtedly a development from non-life. The ontological conclusion is this; since ethical and moral questions apply to human life, the commonly held belief that there is a need for a 'greater authority' than science, suggests that the basis for this assumption is erroneous.

The Mereon Matrix allows simultaneity of logical and meaningful perspectives by connecting two seemingly contradictory aspects of our world: *unity and paradox*. What provides the bridge that unites diverse

perspectives is a Pattern of patterns, a dynamic ligature that arises from a geometrical milieu, its complex elements in common with living and life-like systems.

This connection between living and non-living systems is an intrinsic part of the Gaia theory / principle formulated by scientist and environmentalist James Lovelock in the '60s and co-developed by microbiologist Lynn Margulis in the 1970s. [Lovelock, 2003] proposes that all living systems and by extension, the life-like organisations they build, interact with the inorganic matter on and around Earth. It supposes that together we form a self-regulating, complex system that participates in sustaining the environmental conditions necessary for life on our home planet.

[Lovelock, 2003] says (shortened to emphasise message),

“The Earth system is elderly and we should treat it with respect and care....reconciles current thinking in evolutionary biology.... It extends, not contradicts, Darwin’s vision just as relativity enhances, not denies, Newtonian physics.... we are part of it and...human rights are constrained by the needs of our planetary partners.”

Connections and Bridges Forming in Natural Systems

On 3 January 2013 astronomers examining a newborn star captured a glimpse of planets forming around it [Casassus *et al.*, 2013a&b]. What the image in Figure I.2 displays is a never-before seen step in the process of planetary evolution. While theoretical models have predicted such bridges between outer and inner portions of disks surrounding stars, none have been directly observed until now.

It is clear in observing the Mereon Matrix as cymascopically imaged in Figure I.2b that bridging is fundamental. This photograph reveals the same ‘yin yang’ pattern; it is a perspective of the Mereon Trefoil that arises in the imaging of a Mereon Matrix frequency.

As you will discover, Mereon principles show that energy, materials and resources of all kinds must be distributed equally; if any part of a system suffers, the entire system is at risk. Stasis is not a characteristic of a vibrant living system; the ecosystem of the aged Earth is held in an exquisitely delicate balance and humanity is already experiencing shifts in its equilibrium. It is time to individually and collectively become

positive and proactive allies, changing as needed to keep up our end of the reasonable and tacit agreement that we are custodians of Gaia with a duty of care, not only to Lovelock's 'living Earth' but to our children and our children's children.

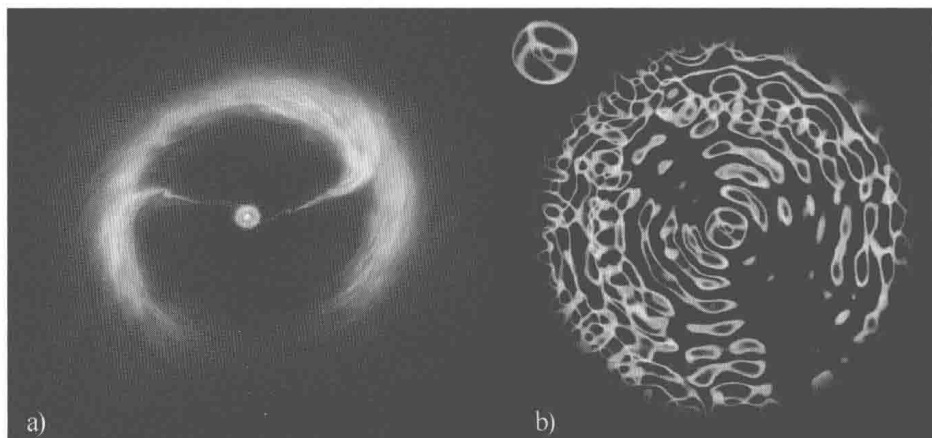


Figure I.2. Planets forming in the birth of: a) a star [Casassus *et al.*, 2013a&b]; b) a Mereon Frequency made visible with the Cymascope described in Appendix B. The source for (a) is: ALMA (ESO/NAOJ/NRAO)/M. Kornmesser (ESO)/Nick Risinger (<http://skysurvey.org>).

Science, the investigation of natural system, what they are and how they work, is the foundation for comprehending and understanding all life. The Mereon Matrix is a scientific tool that can help us unlock and remove the shackles that we have worn too long due to misunderstanding. It is revealing that the pulse of the Earth is the pulse of life. There are boundaries but there are no borders between the cosmos, the universe, Gaia, a continent, a country, a community and your beating heart. Everything is wired, connected and partaking in a cycle of cycles.

Let us briefly explore the three key words that are used in the subtitle and explicate why we find them definitive in terms of measurability and meaning in the Mereon Matrix.

Unity

“When the logician has resolved each demonstration into...elementary operations, all...correct, he will not yet be in possession of the whole reality; that indefinable something that constitutes the unity... Now pure logic cannot give us this view of the whole; it is to intuition we must look for it.”

— Henri Poincaré [1914 (p. 126)]

Like Poincaré, we recognise the indissoluble connection that unites the multifaceted nature of our concurrent realities into a whole. The Mereon Matrix allows us to define ‘Intelligence’ beyond its cognitive and intuitive aspects. A ligature connecting local and global, we will demonstrate how its seven functions define our physical, intuitive, emotional, temporal, spatial, mental and spiritual ‘realities’. All are essential to survival. Disavow, deny or disconnect any one of these realities and the authentic unity of the whole suffers.

The harmony inherent in Mereon Matrix displays multiple levels of meaning; all will be explored in this book through its geometric forms and the topology generated by its dynamics. It will be demonstrated that:

- (1) Its unity is unambiguous as it logically, sequentially and dynamically connects Nature’s fundamental forms.
- (2) Simplicity is at the heart of this system; every point, plane and 3D structure is defined by Occam’s razor.
- (3) Its organisation is set in place; every part is put into play and assured to obey a simple universal law where the Golden Ratio defines time and space. Elegant minimalism enables comprehension of that which is unique: 37 interconnected elements are bonded without binding to create a single spatial-temporal nexus.
- (4) It defines a context in which understanding is free to flow, and confusion is minimised as a result of its easily implemented methodology.

Perspective

Science has long understood the value of perspective as recognised in the following words of James Clerk Maxwell (shortened to emphasise the message):

“...we are...bound to recognise...the unity of science...the communion of the workers We cannot, therefore, do better than improve the shining hour in helping forward the cross-fertilization of the sciences.”

— James Clerk Maxwell

“The Telephone”, *Nature* 15, 1878,
as edited in [Niven, 1890 (pp. 743–744)]

The Mereon Matrix is the union of form and flow that grounds, stabilises and cross-fertilises diverse perspectives. Both in a social and scientific context, it is an exemplar by which willing participants free themselves to honour divergent viewpoints while seeking mutual understanding. Such dialogue sets the keystone in new bridges that close the gaps between opposite sides and replaces divisiveness with unitive positions. Perceptions shift as we traverse such links to gain new understanding that usurps the old entrenched positions we once believed kept us safe. Once common ground is found, we can journey together towards ‘higher ground’ where a shared viewpoint can lead to mutually beneficial visions and outcomes.

Compartmentalisation is a challenge faced today in science and every aspect of our daily lives. Try as we might to separate the pieces into parts and quantities into sections, every bit affects the whole. If there is a problem with one thing, sooner or later it affects everything as surely as a rotten piece of fruit infects every neighbouring piece of fruit in a cornucopia. An example of this knock-on effect is found in medical care subspecialties where life-threatening complications can arise due to pharmacological prescriptions not being adequately crosschecked for contraindication. This lack of coordinating often leads to conditions far worse than those needing to be remedied.

For those willing to allocate the time and space to explore and experience the simplicity that enables differentiation between complexity and chaos, the Mereon Matrix provides a safe and creative way to do so. Every part of the Matrix is complete and each part is interconnected. The entwined binary nature of independence and interdependence that links individual activity and the interactivity of the system, defines the nature of the self-organising principle that facilitates the cooperative participation of this universal whole.

Paradox

“Whenever the essential nature of things is analysed by the intellect, it must seem absurd or paradoxical. This has always been recognized by the mystics, but has become a problem in science only very recently.”

Fritjof Capra [1975 (p. 50)]

Capra was in good company with regard to the mystifying nature of paradox in scientific matters. Niels Bohr embraced it as well and left us with a double-dose of wisdom in the following quote [Moore, 1966 (p.196)]: *“How wonderful that we have met with a paradox. Now we have some hope of making progress!”* New York Times journalist, Bill Becker made this comment about Bohr, *“He was not upset when something did not turn out the way he expected it would; he knew that he had stumbled upon the entry point to the ‘next’ step.”* [Becker, 1957 (p. 52)].

For more than 25 years it has been asserted that the Mereon Matrix is ‘all about relationship’. In physics ‘homogeneity’ is the term used to indicate a quality of being and is usually ascribed with regard to those things that are similar, or have a uniform structure throughout. While this defines the quantitative structural nature of a Mereon Matrix-based system, it is untrue of true of living systems when applied to them individually in a ‘qualitative’ essence where differences ‘rule’. The supposed Golden Rule states, *“Do unto others as you would have others do unto you”* assuming a quantitative and qualitative homogeneous state. For example; you love milk chocolate and I love dark chocolate. If we present you with what we want, dark chocolate, chances are you will not be happy. Understanding that we both ‘eat’ and we all appreciate chocolate, because of relational sensitivities and the ability to know, we would be demonstrating wisdom and caring by presenting you with what *you* want, milk chocolate.

Unity is the state of agreement, accord and harmony that most humans often equate with quality of life. It is often defined by our hopes and dreams, the interconnection of body, mind and spirit, and the quality of fair interplay with others. Perspective is its constant challenge. And time and again when it appears that such a union has been achieved, it paradoxically falls apart due to the inability of one party to honour the equally valid perspective of another within their shared context.