S.R. Weber

SUPER-MODEL THEORY

Illustrated by my G15 PMN formalism

A summary of many recent thoughts and conversations in Q&A form

Symbolic view of classical wave 'interference' through double slits

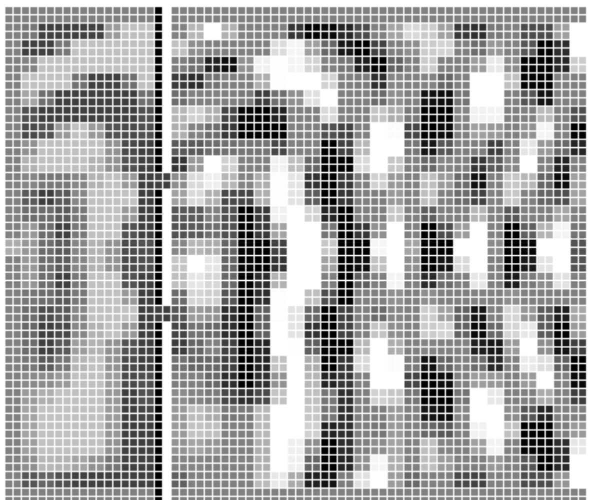

Fig. 2.A: The divided wave 'self-interacts'.   FCM Loop# 420

CONTENTS OVERVIEW AS FOR THIS SCIENTIFIC BOOKLET

=======>HINT<=======
If physics ain't your thing, start with chapter 10.
And if programming isn't your thing, don't say it is difficult: it's just a question of familarity, and of spending time with it--the G15 PMN programming language is made to be easy to learn when you have a PC and play around with it, even if it is looking a bit obscure initially, with its two-letter codes and all such :-)

GENERAL INFORMATION ON THIS BOOKLET

Publishing history of this physics work: All up to first part of chapter 6 published online 12. September 2016, & the remaining chapters in forthcoming months, completed 15. December 2016, at yoga6d.org/super-model-theory and with backup at yoga4d.org/super-model-theory.
THIS TEXT IS ALSO INCLUDED as part of the standard G15 PMN module called "THE THIRD FOUNDATION" (TF).
Earlier form: The super-model theory was informally first sketched in book by same author, ISBN 82-996977-0-0 from 2004 which is available online at yoga4d.org/a.htm. (Stein von Reusch is an early pen name for S.R. Weber.)
The ripe version of super-model theory includes G15 PMN formalism bridging an organic understanding with numerical features of quantum and also general relativity physics.
The G15 PMN is available at: yoga6d.org/get_g15_pmn.
In 2017, this entire booklet is verbatim (possibly with some grammatical improvements) included as part of a larger art book entitled "The Beauty of Ballerinas: awakening non-artificial intelligence", by S.R.Weber, ISBN 978-82-996977-8-1 at National Library of Norway, released at Avenuege exhibition at Handverkeren (hvk.no), Oslo, together with paintings of dancers, May 5th, 2017; publisher: Yoga4d:VRGM; print: Nilz & Otto///Kirsti Tveter
The plan is that a series of books will be produced that has this booklet as a standard part of them.
For more info about books by S.R.Weber (Stein Reusch Weber), pls consult yoga6d.org/books.
Contact information for author: norskesites.org/steinweber
Mainstream scientists who read this should first read www.yoga6d.org/debroglie_vs_bohm
(That de Broglie work is important also to provide motivation to read this unusual science that follows, for those who thought that everything was well with science!)
And it would be of value to also spend time with G15 PMN; pls see link to G15 tutorials at: www.norskesites.org/fic3 (including learning how to use the Third Foundation G15 PMN which is taken for granted in the formal part of these discussions as here presented in this booklet.)

ACKNOWLEDGEMENTS AND A BIT (TOO MUCH) AUTOBIOGRAPHY, ETC

The present text on physics and philosophy associated with it is, I hope, like artworks can be, reflecting a sense of the musical, or, as Jon-Roar Bjoerkvold would say, the muse within, that which has rhythm of the living type, not merely a mechanically repeated pace (Bjoerkvold, author of The Muse Within, is referred to in chapter 10.)

Anything worth the while to study is, I think, a kind of symphony of impulses, where all sorts of experiences can provide glimpses of some light that become incorporated into the work. What I call 'super-model theory' is, I hope, also such a symphony and composition, a whole, where really--to be honest--very many acknowledgements far beyond the technical realm are called for. The resulting work is, I find, also in science, always far more nuanced than later quick summaries will have it. For instance, many considers that Einstein led a sort of crusade against the 'aether' theory. He didn't; he rather provided some impulses which didn't, at least not at first, need that concept. To show something of Einstein's rich mind, when the time came for his General Relativity theory, he spoke of the aether concept quite positively: Space has, indeed, properties, he said, and in that sense, there is an aether; and it is part of the General Relativity theory to assert this. This was a different aether concept, but all the same, it shows how theorizing is never identical with a cut'n'dried summary of formalisms or the like.

So, my principal acknowledgements is to dialogues with an excitingly large quantity of great-thinking people: and the chief references to written stuff is trivial and obvious and, unlike the dialogues, hardly worth mentioning here. Internet also play a role, but often also a role in spreading exaggerations: so I will say a little in this paragraph about Internet as well.

Ackn.-list is extended in books containing this booklet.

A fairly rich and compherensive list of acknowledgements is included in the 2004 book, whose raw text is always available at the internet at yoga4d.org/a.htm. All classical papers on physics are assumed background references in this work, in addition to the works, in toto, by David Bohm, Louis de Broglie, and the others mentioned inside this text or inside the 2004 book.
Prior to the completion of chapters 8, 9 and 10 I had a conversation with Henrik B. Tschudi about these themes in a fruitful and inspiring way; this adds to a series of conversations I have had about physics (rather since early childhood)--with everyone in my big family (cfr list that follows) & esp. my father Stein Braten, whose emphasis on understanding also human immediate dialogic connectivity in a nonreductionistic way has been as important as his enthuasism for programming; with ballerinas including the eminent Monica Herstad, with philosophers incl. Arne Naess, with physicists incl. David Bohm, etc. In the broad contexts of interviews in the Flux magazine Henrik and I started (with Sonia de Zilwa as secretary--Sonia also suggested the name "flux" which we eventually agreed upon) and ran together in Oslo from 1992-1996, a number of recorded and printed conversations took place. (I used pen name S. Henning R. Braten etc.) The Arne Naess Flux conversations that I initiated and Henrik took over (from the point of the Joshua Tree, San Diego conversation between Ann Kerwin and Arne) led to several books. The conversation I arranged, aided by Nathalie R. Holland, between Arne Naess and Odd Nerdrum, printed in Flux in 1996, was among a handful of conversations I had done with Arne and which found their way into a thick book containing many conversations between Henrik and Arne, and edited by Henrik, as published at Erling Kagge's superb publishing house, Kagge Forlag.

Scientists I interviewed during the socially intense Flux period included Ilya Prigogine, Joseph Agassi Roger Penrose (with Anna-Kathinka Evans), Holger-Bech Nilsen (inside the veritable Bohr Institute in Copenhagen, aided by Anette Krumhardt), Francisco Varela (in Paris), and a good deal more, always with an eye to enhance insights into an essentially nonmechanistic view of life, mind and the universe.

Gradually, it became clear that in order to go deeper into structuring own thoughts, I had to have a period less determined by publishing pressures and that which was becoming a very 'public' type of life. I also wanted to develop skills in writing English, and my relative Johann Reusch and Leah Garland, his girl-friend, invited me to stay in New York, where I also brought my own dancer girl-friend and a wonderfully creative, synchronistic phase begun. The Learning Society group bringing me into the Parliament also got support from the Norwegian Research Council; this, with some additions from Flux and from U.N.D.P. and with great support from a number of friends allowed me to devote myself to the process of explorative thinking and writing during, all in all, about a year in New York's Manhattan district. Some of my friends were versed in philosophy, some in various aspects of physics and biology, some in art, some in buddhism, some in ecological organisation thinking. Among friends making this phase work out: Ray Strano, David M. Schonberger, Chong Ming, Buffy Lundgren, Jennifer Garufi, Turid Sato, William E. Smith, the twins Liliane and Pauline Heyzer Fan; and worked for a while for the UNDP. During this phase I also knew a lot of people just by their first name, who played important roles for me. Before, during and after the Flux period I acknowledge also: Anette Krumhardt, Jens Hvass, Mette Husemoen, C. Will Zhang, Aage Borg-Andersen, Steinar Brenden, Espen Holm, Svein Myreng (also made the transcript of the talk I gave at the Norwegian Parliament seminar in 1996 which was later published in Flux magazine that year, a seminar featuring also Borg-Andersen, Brenden and on initiative by Per Lundteigen & author Espen Holm); Bente Mueller, Warren and Ivan Brodey, Per Heimly, Johan Lem, Zdeneck Sopovsek, Jairon G Cuesta, Raman Patek and many more. I am grateful to Odd Grann both for giving me a reference enabling me to work for a departement of the U.N. briefly in Mexico through its N.Y.C., Manhattan offices, and later on also in Odd's own branch of the U.N. organisation in Oslo; Odd's knack of understanding organisation and of an approach to society anchored in perspectives of personal development has been of intense value to me; and thanks also to his wife Vera and his family.

During the time I was running Flux, I had a number of university contacts, but the chief principle, starting with the first Flux magazines, was that institutionalized knowledge isn't as good as free knowledge, which summed itself up in a lecture I gave at the University in 1996, entitled, "Why the University of Oslo should close down." (Nevertheless, on occasion, I did in fact complete some studies both before and after this period, but never identified myself with the concept of a 'student' there.)

To the delight of Henrik and me, Arne Naess was in agreement that, as he said in the first interview I did with him in Einar Skjaeraasens vei, "Artists are more important than professors." Flux, then, had the subtitle, "Magazine for life, lust [lyst] and science"; it had a role in Norwegian cultural life in 1996 which was recognised as both philosophically, culturally and scientifically fairly strong; I then quit our new Flux Foundation to pursue the development of physics, own writing skills, programming and a wider form of social life not determined by being an editor. To mark the transition, the final issue I edited contained just one photo--that of the dancer and ballerina Monica Emilie Herstad, and it had a changed logo, the "fluX" word with big "X" to indicate change (Flux#13, 1996). (I did the layout of #3 up to the number #13, after which I quit it, with assistance of the danish co-editors Jens Hvass and

Anette Krumhardt for some of the numbers; Siri Berrefjord did #2 and Sonia did the first issue.) Henrik, I am very glad to say, has managed to recreate Flux into a prolific publishing house that is a strong voice for a nonmechanistic vision of the human being and society, with a number of both original titles and translations on its quality publishing list, regularly conducting also seminars, and is a force in Norway, cfr flux.no.

Thanks also to the publishing house Dreyer and the role they had in promoting the best part of the philosophy of the christian mystic seer Marcello Haugen.

To go on: I'm grateful to the support that Johannes Hansteen and Ladislav Kobach, both professors of physics at the University of Bergen, and professor Tordis Dalland Evans, also at the University of Bergen (who also enabled me to give talks at the University) gave me and my work at the time Henrik and I sought to present also, in part, some of David Bohm's take on quantum theory to a Norwegian audience (not that these eminent professors necessarily agreed with me, but they provided some backing when some physicists were attacking anything 'bohmian'..); and I'm grateful that my contact with David Bohm was extended even into his last seasons, when he was ill. The latter is also due to my friendship with Georg Wikman of Swedish Herbal Institute--he, with Paavo Pylkaanen, Francis Frode Steen, etc, have done work also on philosophy of the implicate order concept of Bohm. And I'm grateful for a couple of hours with Basil Hiley after Bohm's death talking over a number of themes in a way that made me rethink many aspects. A thanks here also to Sarah (Sarel) Bohm for many good impulses, esp. after the Bohms (with P. Garret, D. Factor & their wives) were in Oslo on the invitation by me on behalf of Sven Bjoerk/Forum2000, Henrik B. Tschudi and Nadia Maclaren; this happened after I had privately visisted Bohm three times, 1986, 1987 and 1989, at his office in Birkbeck College, where also Erik Damman visited him (before writing his "Bak Tid og Rom"), besides meeting him and Sarah at Birkbeck College once.

Acknowledgments for a variety of greatly important impulses (briefly, or in depth, w/anglification of some letters): Ari Behn, Bertrand Besigye, Truls Lie, Erling Bonnevie Hjort, Ole Swang, Camilla Coucheron, Ane Graff, Stine Dahl, Teddy Reyes, Therese Ellefsen, Margaret and Leonard Hemsen w/all their family, Lars Monrad Waage, Lene Oeyestad, Camilla Claussen, David Hauer, Isabel Watson, Eva-Lotta Sandberg, Gry Dreyer, Trine-Line Boing, Liv Flaate and all her family, Lene Torgersen, Noredin Elazamoori, Gry Nyborg, Ulrikke and Geir Heivoll, Paal Finstad, Pil Cappelen Smith, Andreas Cappelen, Thomas Heggedal, Sandra de Zilwa, Angelisa Hanson, Andries Kroese Per Espen Stoksnes, Ken Friedman, Joan Frost Urstad, Marie Arneberg, Christopher Hansteen, Sverre Sjoeblom, Ida Nathalie Kierulf, Nathalie Radina Holland, Anne Marit Austboe and Christian A. Dahle, Julie Breines Oredam, Heidi Devik Ekstroem, Live Slang, Per Stangeland, Tor Bjerkman, Tiril Bryn, Per Pedersen, Roger Olsen, Benedicte Hagland, Jostein Oddland, Ingar Roggen, Ingrid Solbjoerg, Jens Heggemsnes, Oeystein Parmann, Stephan Granhaug, Gro Fagerlund, Vera Kvaal, Elisabeth Harbitz, Hege Brenden, Anniken Naess, Ingvild W Karlsen, Marie Alnaes, Anne-Lise & Nils Ebbesen, Anne-Berit, Knut, Ellen & Kille Toeyen, Monique & Torbjoern, Andreas Heldal-Lund, Knut Roethe, Nina & Jann Bjoerne & family, Gridzel & Ernst-Magne Johannesen & family, Kristin Aronsen, Anna Oftebro Aronsen, Anders Dunker, Gerd, Gunn & Yilmaz Dagzi, Sigurd Vangen, Peter Behncke, Henrik Sundt, Kristin Gjems, Thor Endre Lexow, Thea Gundersen, Rune Amundsen and his family, Lakshmi Chayapathi, Sophie Olsen, Sverre Sjoeblom, Thomas d'arcy Shephard, Anne-Lise, Konrad, Nina, Elisabeth & Helene Magnus, Jeanette Mortensen, Jon-Erik Broendmoe, Cathrine Nygaard, Sverre Sjoeblom, Torunn Ystaas, Fred Nordland, Helge Waahl, Kuja Bae, Laurie Feinberg, Svein Svege, Berit Lie, Simen Myrberget, Mats Nordheim, Sonia Wagn de Zilwa, Eline Ulfsen, Cathrine Bryhn, Julie & Zaad Braglie Eckhardt and their children, and Janken and Einar Sletsjoe, Marius Bragile, Lene

Braglie, Kirsten and Per Engelstad, Tore Hammerlund, Mari Midtstigen, Erika Rieber-Mohn, and people I've met also through their professional capacities, including:- linguist Bjarte Kaldhol, nature doctor Andreas Bjoerndal, stylist Anita Farstad, technical expert Petter Noklebye, artist Siri Berrefjord, journalist Charlotte Bergloff, editor Truls Lie, author Kari Bu, artist Cathrine Muyrin, film makers Karine Huseby, Per Hauk and Simen Myrberget, IT experts Kenneth Walls, Kolbjoern Braa, Espen Angermoe, CEO Oeystein Moan, Kim Nergaard, artist Ferdinand Finne, composer Arne Nordheim, shipping executive Leif Terje Loeddesoel, rare books dealer Helge Roennevig Johnsen, gallerist Ben Fria, artist Alexandar Rasulic, author Robert Pirsig, butoh dancer Min Tanaka. Acknowledgements to the many who have and who are attending my fairly regular book releases, first in 1999 with the pen name Henning W Reusch for the "Sex, Meditation and Physics."

My big family--I have already mentioned my father's essential role--has been of value in various phases of development of this complex work: mother Else R Braten, sisters Kristin Elisabeth Braten and Marianne Braten Cappelen, Joergen Cappelen, Katharina Naess, Johan Chr. Naess, Christine Maria Naess, Jan Andreas Naess, Karin Naess, Dag Henning & Aashild Braten, Jan-Reinhardt Naess, Kathinka Cappelen, Joergen Cappelen Jr., Joachim Cappelen, Randi and Thorleif Braten, Hedvig Johannesen Reusch.

Those who consult the tens of thousands of written material freely available and as written by me which is at the Internet--in my various sites and inside the various forms of programming languages (& operating approaches) due to me should find in them yet more acknowledgements to people and to books. Many books have been as friends to me; and also old articles about physics in the voluminous university libraries. But above and beyond the written material are, as said, conversations with thinkers and the many angels-in-human-form that I have had, and have, the fortune to know, and who have given also my physics work muselike impulses. As art and thinking goes together the contact with the artist Frans Widerberg, first during a Flux interview, then in the years before and after year 2000, has been instrumental in creating (as Henrik would put it) 'more movement into the thinking'. In particular, Widerberg shares with Jiddu Krishnamurti, the thinker, the healthy distaste for giving references when direct talk is possible (except, of course, when references are in due order in order to show origins). Also gratefulness to the wife of Frans, Aasa, and to the rest of their family.

Then let's talk about Internet and its various effects:

I find that Wikipedia comes up at present when one searches about most themes, in most search engines, when the theme touches on anything with knowledge. Sometimes, without looking for it, I see the most severe mistakes there: at other times, I'm surprised about its in-depth and reader-friendly coverage; and though I totally disagree in most of their pompous declarations about physics there, I have to concede that they are also reaching out and charming somebody like me when they provide a reference to my excerpts of de Broglie works, at the yoga4d.org page, from the main page of Louis de Broglie. I mean to say--I put it in there myself, so I wasn't surprised that it was there; the charming bit was that it kept on and on being there; also, the addition I did to the page on L.E.J. Brouwer, including a quote of his, was left untouched. I still don't like the overall tone of what is said either on the de Broglie page nor on the Brouwer page, but it could be much worse, after all.

What is most rewarding, in addition to the best bits of Wikipedia, are reprints of whole articles or even books provided generously by the author on their websites; and so I have been able to quickly remind myself of stuff I haven't read for a while.

But at the same time, it's fairly clear that a lot of people--especially in that which is called 'forums'--are showing off with healthy bits of arrogance to cover up the shallow thinking they've done at home about these things. One gets the feeling, at some of the forums devoted to physics, that the universe is one big calculator, and it is THEIR calculator, and they are calculating over it, with ease and perfection: which is, since most of what is said by these folks is at best justified by the fact that it is implications of theories pushed to ends they have never been measured at, rather a disgusting thing; and it is to be hoped that many people do find the arrogance on behalf of reductionistic, math-oriented, machine-oriented, so-called physics on the Internet as repelling as it really is. People who have--as it seems--never read Einstein's texts in any depth make fancy, colored cartoon-like presentations of physics in which they propagandize such notions that for Einstein, it was always "math first!". By this they try to say that Einstein was ahead of some measurements, which gave some confirming instances of his theory (thanks to Arne Naess for that type of statement, which again he derived, I suppose from Rudolf Carnap and others). But to Einstein, it was MIND first, and formalism SECOND, and empirics only third. This is just a touch of all the hastily put together phrases that float around in great masses on the Internet: when that is said, I wish also to acknoledge the good of the potential compassionate anarchy in these forms of technology, and what it has opened up of increased personal and less institutionalized publishing possibility.

My own extensive use of the Internet and the production of a range of websites has been significant in my personal work, and highly practical for a range of purposes, including having a proper background to write this new 'having-come-of-age' form of super-model theory, and this requires good dialogue with a web domain and hotel company of superb quality, and by its leader Jon Eivind Malde the Norwegian ProIsp A/S has had and has this role for me.

Many more acknowledgements come to mind--list continues:

A meeting with Rupert Sheldrake prior to his publication of his "Seven experiments that could change the world" and with Erwin Laszlo, in Paris (with A.K. Evans); and with a number of thinkers at a seminar on reductionism in Cambridge (arranged in much the same spirit as Scientific & Medical Network chaired by David Lorimer) gave great impulses; as did talks there with Nicholas Hagger, some of which finding their way into his book "The Universe and the Light", with a reference to Henrik and me.

During the aforementioned seminar, I had brief but inspiring encounters with thinkers including Margaret Boden, Patricia Churchland, Brian Josephson (who got the Nobel prize also for the invention of the Josephson Junction, and one of those who have explored quantum theory as a pathway into new worldviews), and many others; and later on, I had interesting conversations over the nature of the human brain with Norwegian brain scientist Per Andersen--also over the proposals by Penrose and Hameroff, proposals also discussed at that seminar at Jesus College, where Penrose was one of the lecturers.

For a recent summary of what may become parts of the future Quantum Biology field, I can recommend the book "Life on the Edge--the coming of age of quantum biology" by Johnjoe McFadden and Jim Al-Khalili. Apart from what it says about quantum computers--which isn't any necessary part of it--it lays out important developments in how the original cut between subatomic and macroscopic/biological is now beginning to be sewn together. There are good reference articles on the subject in the mainstream magazine Nature if one wishes to know what mainstream biology makes of it all, at present, which should be read together with the book; easily found on the Internet.

Books also of importance: "Speakable and Unspeakable in Quantum Theory", by J.S. Bell, and his collection of classical papers in physics; metaphors over the various interpretations of quantum physics in the book "Quantum Reality" by Nick Herbert; and the thoughtfulness over time and timelessness in the philosophical fairy tale by Michael Ende entitled "Momo"; a book which could be read together with the ancient aphorisms of Lao-Tse in the Chinese tradition, on the Dao or Tao.

As background for a study of super-model theory, I would also advice some personal experimentation with the type of geometry people from all walks of life have been doing with the Fibonacci series relative to the golden ratio, as long as this is read in the spirit of an open impulse (for there is much pointless dogma written about the golden ratio). When one begins to look for the golden ratio and other features such as inspired by the theory of fractals in beauty photos and also ballet studies and art in general, one will gain in insight and appreciate how tremendous (and nonreductionistic) the field of esthetics really is. It is to be hoped that super-model theory contributes to depth in this exploration, without closing any of it it in.

As for my explorations of Kurt Goedel's incompleteness theorems, I am grateful to Dagfinn Follesdal, Herman Ruge-Jervell and Aage Aanderaa. Super-model theory ties in with forming a programming language inspired also by features of quantum theory, and I am grateful for talks with Kristen Nygaard in Oslo around year 2000, and on some occasions earlier on. (Nygaard, who authored, with Ole Johan-Dahl, the first object/class/inheritance type of language, collaborated with my father when my father made the first social simulation model of voting, influencing the shaping of the final form of the Simula language, when it was called Simula-67.) I'm grateful also to Kari Dybwad for teaching me programming at school, and to Roman Bieler, Helge Jensen, Kjell Bugge and some more people around them for creating the Datashop environment where Bieler in particular gave me a passion for thinking in terms of making general languages before doing concrete things. Conversations over philosophy at Brockwood Park, when I worked there for a week or two were very valuable, also with Radha Burnier (and later with Mrs Burnier in Oslo); also contact with Kit-Fai and Arne Naess and his family including Tore Naess has been of priceless importance.

Now, I am sometimes using strong words about how some people talk about physics--but, I hope, this will not create a barrier from listening to the content. As Therese Ellefsen (one of the angels-in-human-form I talked about) once said to me, "What you need is a flower that is protected by an iron glove." There's a flower in here, but there's a need to open up a pathway for attention to it; for if one lets oneself by hypnotised even for a moment by the typical thinking in the physics communities, one is on a path that leads to just a re-iteration of the past old ideas no matter how incoherent they are when seen together, just because they are pumped up by the fancy equations that some people handle so masterfully. There's a lot of content in the following work, which is justfied, whether you like formalisms or not, by the fact that it brings a great number of different fields of life into one thinking process where there's openness but, I think, a sense of harmony throughout.

Oh yes, for those who wish an introduction to some features of quantum physics--but with a very scanty treatment of nonlocality, and few attempts to separate between what is a numerical technique and what corresponds to reality--check out the rather non-mathematical but somewhat 'algorithmical' book QED by Richard Feynmann. Though one can discuss how right some of the examples are, they will provide many examples of how one might use the pathfinder numbers in the G15 PMN formalisms that are here briefly introduced in some of the chapters. (The PF or pathfinder numbers are much like Feynmann's rotating 'clocks' that are added to one another in 'sum over possible paths', and which make it redundant to bring in a specific wave equation or another heavy mathematical object like that.)

I have to conclude this entirely disorganised series of names, so it will be finished at all--but I am aware that it is incomplete; more names will appear in my mind later, and corrections of name spellings, etc--apologise, then, for all incompletenesses about this list.

CONTENTS THAT FOLLOW

ABOUT PROOFREADING, PECULIAR SPELLINGS, AND FORMALISMS

Proof-reading has been done on the normal principle applied by S.R. Weber: when meaning comes through, and the flow of language is for the large part good enough, then spelling and grammatical issues are tolerated just as, when one is painting, a painting shouldn't be entirely 'photo-perfect'; its peculiar features are part of its life. I will go further, and say that if you find that the language is cluttered, then try reading it another day, with another frame of mind. When you read it fast enough in the right attitude and having a sense of perspectives that fit it, it has fluency enough. This fluency is then something one must work to get hold of; to proofread a nonfiction text may do something to the semanics that is quite unintended, as long as the chief things have been hammered away. And in this text, the chief errors have indeed been chiseled away. As for formalisms, of course, the PC has helped doing the proofreading by compiling them and displaying the results and letting you interact with the models. So there you find the crystallized rather errorfree syntax, a treasure of order.

A handful of words are spelled in a way that isn't canonical. In particular, "quantum tunnelling" (two ll's) seems to this bigoted author to be way this has to be written. A tunnel, after all, has to have some space in it. By having two ll's there, like in parallel, we get a sense of tunnel by looking the word. In addition, there's something to be said for the UK/US difference in syntax.

For those who wish to go into the formal content here:

The programs or formalisms in this series of chapters outlines the super-model theory, which bridges an understanding of the whole range of phenomena covered, broadly, by both quantum and general relativity physics, (and in a way that can be coherently visualized) are all tested programs. They perform well in my own programming language, G15 PMN. All the relevant formalism is included with the G15 PMN app called TF, app# 3,333,333, and available at norskesites.org/fic3/fic3inf3.htm. The formalism included within this app should be consulted in case any spelling issue has arisen as regards what is in this booklet--run the programs there. And in case that the comments here are not clear enough, there's always other sources from same author on the super-model theory, also as online articles on the net; and there's in addition the documentation for the G15 PMN language and its modules to be consulted to clear up any question.

The distinction between the text as included as part of the TF app and the text when in paper format, or an online format related to the paper format, is as follows: similar illustrations in the paper format are meant to be GENERATED by the reader when it is read within the TF, by following the simple instructions connected to each formal example. The G15 PMN programming language will then produce a live version of the graphics that is represented on paper. Sometimes the live version conveys very much more information than that seen on paper.

If you are new to programming, please don't waste time staring at the letters in the code--that's all trivial and explained in the programming manuals for G15 PMN. Rather, when you have time, START UP THE PROGRAMS. That leads to experiences and insights instantly into what we are talking about here. And then, to learn to extend the super-model theory yourself, start changing these bits of code; learn programming by changing existing programs.
The G15 PMN is the most human-thought friendly programming language in existence, is my own opinion--and if another language of this sort had already existed, I would gladly have used that one instead of having to put this one together over many years.

INTRODUCTION

I've had the great privilege of, during the years, meeting quite a few physicists. I have always regarded a person who has a full-fledged classical mainstream physics education as someone bestowed with a kind of halo.

However--now that that is said, and now all nerves are calmed, and I have proven that I'm not prejudiced--I have to say that, with the exception of some of them--such as Basil Hiley, Ilya Prigogine, Roger Penrose, David Bohm, Chris Dewdney, John Polkinghorne, Astri Kleppe, Oeyvind Groen, Holger Bech Nielsen, Gunnar Loevhoiden, Kristoffer Gjoetterud, as well as Karl Popper's ph.d. student and assistant Joseph Agassi and those mentioned in the broad acknowledgement above (and some more!), I have noticed a rather peculiar correlation:

the more education in conventional mainstream physics a person has, the more the person is intrinsically unable to focus attention on any of the real questions of physics.

It is as if they have been vaccinated. Most, that is.

For a while, I considered that this was due to strain--the strain of having to learn too much formalisms relative to what's good for a young adult individual.

But that's too simple. It can't be merely that. However, the raw fact of the matter is that the mathematics of contemporary physics is absolutely horrible; and there is no true peace of mind to have to rely on computers to work out equations that are meant to be solved on paper. But if it isn't the main reason of the 'my-mind-is-closed-to-all-deep-questions-of-physics' attitude that, as far as I can tell, dominates by far most of all the very many people with physics education, then what is the real reason?

Nor can be that money is not in philosophy as much as the type of physics that lends itself to engineering and technologically innovative projects. Money is a powerful factor and while it's an ideal that money shouldn't at all influence thinking, it does do that; but this sticks deeper than that. And yet we can say: money is a factor.

Also, a factor on the list, is that nobody really feels that Niels Bohr really won the discussions with Albert Einstein, though Bohr and his group set the tone for most of the dominant physics work a century hence. So if one argues against the underlaying assumptions that has characterised much of physics for nine decades or more, then one risks entangling oneself in a discussion between giant minds, a discussion that apparently led nowhere. Einstein's own works stand, in a way, stronger than ever; that means that his reputation, in a way, is untarnished; and yet the funny hidden wierd features of quantum physics has become just about infinitely more manifest than it seems Bohr ever dreamt of. They are now making headway into biology: not just is quantum tunnelling considered central in DNA mutation, but complicated forms of quantum entanglement are considered to be utilised in what could be rather fantastic ways all over nature and even in the functionality of neurons--the latter is an emerging theme, after it was found hard to avoid the implication that some species of birds have a quantum sensitivity for magnetic fields in their brains.

And so, in this way, Einstein--who spoke against all sorts of 'ghostly action-at-a-distance' has been proven a little bit wrong--'in spirit', although not in equation; while the equations heralded by Bohr's group, although still more hotly discussed than ever--and given, of course --a zillion new forms in the past century of work--equations that in fact Einstein helped lay the foundations for, also by his support of the young Louis de Broglie--these equations are considered fantastic pieces of science, or art, or at any rate, something of the most marvellous stuff humanity has ever encountered.

What with all that, Einstein did not (as we discuss in a little detail in the first chapter) consider the equations inside quantum physics, and the loose ideas around them, as a proper theory. Now that is a key point. Einstein did not see this as a SCIENTIFIC THEORY.

And so, since he maintained this point--with the most celebrated completion of the unsatisfying discussions taking place in 1927--after which we got the econonic depression, then the World War II,--to oppose Bohr is to automatically associate oneself with an Einstein that appeared never to really stand on the side of quantum physics. Now for those who are dedicated to the study of gravitation and such between planets, it matters not so much what Bohr felt about microscopic quantum phenomena: except that the quantum phenomena appear more and more macroscopic with each decade of developments, right?

But for those who are interested and educated in quantum physics, they haven't got a promise of getting anywhere if they challenge Bohr. Add to that, the well-known association between David Bohm and, through some of his friends, communism; which led Bohm to be given the advice by his teacher Oppenheimer to ditch the seeking of a career at Princeton--and which, in the McCarthy years of persecution of communists, stamped the pathway of trying to visualize a bit of quantum theory as, peculiarly, a rather communist thing to do. Basil Hiley told me that he was once--when he picked out a book by Bohm in the library as a student--stopped in his tracks by a professor who plainly told him that going along with that type of physics could put an end to his career. Yet Hiley is of course now considered a very respectable physicst, one who collaborated with Bohm in putting the finishing touches to that which by many is now called 'bohmian mechanics'.

However this 'bohmian mechanics' is, according to by far most of the well-educated physicists you can meet all over the world, merely the same as quantum physics, only that it is a little bit more complicated, and provides not one tiny inkling more predictions.

And if one voices objections--saying, for instance, that there are other things than predictions that are the marks of a good theory--they may nod but they have already done their listening. They are vaccinated. "Don't bother me with philosophy," they seem to say, or indicate, "for I am an educated physicist."

So I'm back to the question: how did it ever get that hard? What is the core of the resistance? Surely there is no secret brainwashing machine that every student is exposed to before being admitted into the final exam.

I got a clue as to what this is when I most recently, in connection with trying to get a full overview over what the mainstream science journal Nature and some authors call "Quantum Biology", looked through a full set of books presented to physics students at all levels at the University of Oslo. Let us first note that such as de Broglie's books, while available, were safe in a celler, behind locks. At display, then, I looked quickly at about hundred books, at core of the curriculum for physics.

Every one of these books had at least one equation on what seemed to be EVERY PAGE; or at least, there was a graph there, with a reference to an equation. I did not find one single chapter with a discussion on the thoughts, more broadly speaking, of the worldview implied or in any way indicated by such as quantum physics in any one of the very many books I looked through.

So, to take such views as K.R. Popper wrote about, and a student of his, Joseph Agassi, an educated physicist, told about (when I was running a magazine called Flux, which I had created together with H B Tschudi), I would say: not on any page was there a THEORY. It was number crunching; or the crunching, on a more abstract level, of a formal expression into other formal expressions--sometimes with a description of how a computer can help or how a graph can show something of what the equation says.

So I asked myself: how would I feel, if I looked at this set of about one hundred books, and, as a teenager, would decide to spend roughly a decade getting to master all these books well enough to pass adequately at university exams with them? I would have to turn off most capacities of the brain, in order to develop the type of very abstract imagary coupled with vast memorization efforts on the formal symbol level for year after year. With luck, such a person would be able to go out in the weekends, have some drinks and connect to some interesting members of humanity in a social and sensual way. But it would be requiring a super-human effort to balance all these hundred or more balls in the air of a formal type while ALSO going into philosophy.

Add, then, that money is "not in philosophy" but in the engineering type of physics. Add, also, that even Einstein wasn't able to argue well enough to convince the quantum physicists to do more theory-as-thinking. And add that it can even be a career risk to be associated with off-mainstream branches of divergent interpretations in the physics community, which is a tight community, with rather few jobs not dedicated to purely technological aims, such as to exploit nonlocality for rediculous purposes of encryption, or worse.

So after having seen all these books, which to my mind were all the more disgusting due to their exciting covers, and realized: these folks, having had to spend time with this inhuman, nerd-oriented, extremely dry and totally formalistically wedded books, for year after year, and finely got through the final examination, could not, would not have done so unless a core motivation had been twisted to fully suit the purpose of going through the all.

At the essence level of their psyche, so, there exists, in each one of these people, no matter how much a 'halo' they might possess due to contact with the physics phenomena, a motivation structure in which philosophy and the informal and the questions of text and discussion and visualization have been sharply put aside, militantly. This militant motivation is necessary, I realized, to go through the type of things a physics student is required to go through. He or she must not be a human being: but a formalistic machine, who ditches all other forms of life than the permutation of formalisms. And the justification is: quantum physics is a list of equations and loose ideas are more than enough, thank you, even the great Niels Bohr said so, that 'further analysis' is not necessary.

So, if one attempts having a thoughtful talk with a physicists, one is, to them, implying: your education, my dear follow, may be junk, for you have really not thought about these things, have you? You have just calculated; you had spent the best part of your life calculating; I'm so so sorry, but you have at best got an open door into a boring physics lab; you have not yet started out on the journey, as part of philosophy, which is properly called PHYSICS--a word derived from a root related to the concept of 'birth', for it relates to the PHYSIS, or essential processes, the birth of all general energy patterns in the universe.

And this explains also--a point I even discussed with David Bohm once--why I have had such great resistance in myself, even with a fair amount of capabilities in that direction, and much energy--to venture into mathematical physics at the University Level. He said, at first, well, maybe, mathematics is not for you; but then he said, far more interestingly I thought,--mathematics is very limited. Very limited.

Interesting. He had worked with math for--fifty years & more, at the time when he said that. Very limited! If mathematics is very limited, then what isn't that limited, if one wishes to work seriously with the questions and phenomena reported in the physics laboratories? Well; my father had always insisted that programming languages, such as the Simula that he worked with and influenced a little before it was in its object-oriented form, due to his friendship with Kristen Nygaard, could provide a form of modelling that mathematics typically provides in a more statistical way.

Ilya Prigogine, much later, suggested that statistics isn't quite what it seems to be: it can hide a rather mechanical attitude; and, in an interview I did with him (also for the Flux magazine), he claimed that quantum physics was too mechanical because of the form that its statistics had locked it. (One of my conversations with Ilya Prigogine, where I used the pen name Henning Braten, is listed in a full overview over Prigogine's publications made by his associates.)

The Norwegian poet and physicist Astri Kleppe didn't seem to object to the possibility that some fresh ideas in physics ought to be formulated; that some of the ideas about coherence I had could be something I should try to work on further; and that programming language could be a way to do it. And many others as well urged me on to this; also my friend the postiivistically inclined philosopher Arne Naess, who I spent time with at Hardangervidda and at Hvaler,--and, half a century earlier, had been the only one Niels Bohr wanted to walk in the woods with during a lecture Bohr gave in Oslo.

So the rest of my own story is fairly obvious, as to this stuff: I gave the Flux work to others in 1996 so as to get far more time to develop myself in the fields I were interested in, and to realize the thoughts I already had, given my playing around with compilers and interpreters since being a kid. So I worked with the physics thoughts--compiling the very many impressions, having conversations with lots of more people about it, also while spending all in all a frightfully creative year in New York,--and pursued development of skills in areas from writing to painting, photography and dance. At the same time, I tried to get a grip on personal economy and eventually also took up currency trading. Painting leapt after years of conversation with a well-to-do Norwegian impressionistic-style painter, Frans Widerberg.

Holger Bech Nielsen, whom I interviewed inside the Bohr Institute, suggested that many physics folks considered Bohm's Implicate Order concept a suitable worldview, in order to give quantum physics a cosmic role. Then he went on to sketch some ideas which involved the view of past, present and future which he felt was derived rather directly from Einstein's theories. I argued against the fixedness of the dimension of time; but he argued back that this is the very definition of time, and he set me thinking about the time concept.

I did a brief attempt at the University of Oslo to get a bit formal degree, in cognitive science, rushed through a number of exams there and qualified, but then got into a sweet and intensely fruitful quarrel about the coherence, or lack thereof, of--put simply--Cantor's diagonal argument. In contrast to Bertrand Russell, my months of doubt of it (as he also had), led me to doubt it more, rather than less, and the way I put it to the professors there gave them hickups (again, put simply). I have since streamlined clear ideas about how to deal with whole numbers and sets of them in connection to infinity questions so that this has become ingrained in the whole approach even to programming--and, I'm happy to report, the core of my objection to the cognitive science folks at the University I regard as still formally entirely correct--though I have much more refined language for it today; and many more examples of how my own approach is coherent; and how this, more clearly, is related to only one bit of L.E.J. Brouwer's work on the same, but introduces insights he didn't seem to touch.

The discussion with Bech-Nielsen led me, however, in the first informal formulatiosn of the supra- or super-text, or, as I called it, super-model (or supermodel) theory, to consciously avoid using the word 'time' and instead speak of something roughly like a 'process dimension', so that a greater degree of freedom could be implemented as for change; and the sense of time is consciously left free to exist beyond our visualizations of dimensions.

So that was summed up in the 2004 book [see info on top with links].

Here, of course, we have what I take to be even more ripe insights, after one programming language completed and this one, the G15 PMN, completed after beginning on scratch again, but with impulses extracted from the previous one.

With G15 PMN, we do here what I believe physicists can do: to engage in formally illustrating some aspects of a theory. Here, of course, we agree with Einstein that the human process of thinking is where theory arise and where theory must be considered, so that the formal comes afterwards.

The formal illustrations of this and that bit of the super-model theory also opens up new questions. There are things about the physics phenomena that are not at first invoked in the visualization, in the theory itself, but which must be mentioned, discussed, thought about, or declared to be something that one might discuss more later --and which comes directly from looking at the very many reports from physics laboratories as to quantum and special and general relativity phenomena.

In a word, then, this is physics the way physics can be done if we start designing the field without insisting on continuity from what that which calls itself "physics", rightly or wrongly, has come to. This is physics that, on its own, is so demanding, that a FULL study of it, would require, no doubt, maybe as many seasons of dedicated time as the mainstream types of physics studies one finds in society nowadays. But one can't do both. That's very clear to me. What I come with is presented also as part of a dance, art and philosophy book, because THAT is its context, just as when I first presented super-model theory in 2004.

I would like, then, to suggest to anyone who has a profound interest in philosophy: here's something for you, something that can, with work, take you more deeply into real physics than that which the university studies in the present societies can, given a similar amount of years. If you have an interest in reality as such, and a willingness to apply intuition as to how to select theories over the sets of data we have from physics laboratories, I think you will see that super-model theory is correct; and I think you will find that it can be fruitful to know about no matter what you are doing in other fields of life. Study it only briefly first, if that's all you have time for--but it's always good to know that simply by learning one essentially simple programming language, the same as a kid can use to make ultra-simple games of a sort, the same as controls robots, you can get into all the formal aspects of super-model theory as much as you want. This, then, is something one can stretch towards; and, in that spirit, I offer this work as a rather completed whole, as far as it goes at the present level.

For those working with technology, I do believe that the organic sense of the universe and mind--or, more precisely the multiverse and the minds--that this style of physics as I present it does clearly suggest, implies that we can need to protect the language of life from being invaded with mechanical concepts. The last chapters in this booklet--or in this part of the published paper books--suggests how and why such as robotics must be done with sensitivity as to not name them so as to give them an illusory sheen of the organic; and why they shouldn't be made 'in the image of man'; and how we can, positively, use a concept of FCM, or First-hand Computerised Mentality --instead of any such nonsense concept as "artificial intelligence". FCM is part of what we can call "open robotics". For this, also cfr genifun.com/openrobotics.

Although quite enormously more could be done in the realm of super-model physics at this level, the main point is to show that it makes both logical and intuitive sense to summarize all essential reports from physics laboratories and astronomical observations according to such a theory; that it is simple in its overall visualization aspects; that it permits consistent formal illustrations at all empirical points; and that it can infuse us with a sense of wholeness no matter what we do, in all areas of life. This, to me, is important; and it is also important to state that I feel that the level of technology in humanity BY AND LARGE is now fully mature. Just as the ancient Chinese empire ruled out credit cards because the Emperor saw it as a 'dangerous invention', so it is an ethical standpoint, an point of view we all can work towards, that we soldify what is meaningful of human technological developments and insist that reckless further inventiveness too easily can become something that has too costly countereffects to be worth it.

It is coherent with the super-model theory to regard any theory that depends on an idea of 'randomness' to be essentially wrong (more about this in the last chapter). We have often seen, in the history of societies, that just those societies which in the largest extent propagate a mechanical view of humans, their bodies and minds and feelings, also use science and its child, technology, most recklessly and destructively, both commercially and in terms of closed military projects. Often, also, the large companies are partically united with these projects, they seldom admit it. This also concerns chip design.

Therefore, physicists should unite in declining to feed militant engineering projects and indeed also contribute to put an end to the still-existing hype around the idea that 'technology will save the planet'. It is moderation --with wise use of existing technology--that will save it. This moderation involves a raise of the insight that, globally, technology should be used rather than developed; and given forms that are humane and that respect privacy and which are conducive to an organic worldview in which life and humanity constantly get the upper hand.

The super-model theory, therefore, as presented will essentially just be re-presented in this way, aside from more artistic applications of it which I have, in other writings (eg yoga6d.org/economy.htm archives), named "q-fields". The upcoming predicted surges in 'quantum biology' is something that probably, for just these reasons of moderation, should be considered meaningful only in the intuitive sense--of not believing anymore in reductive darwinistic biology of random mutation--rather than in a technologically realized sense, which can be at least as disgusting as anything we've so far seen in the realms of militant technology. Life is not mechanical and whatever we see of evolution doesn't work according to the principles of a machine, but something more subtle. Once that lesson is learned, in a logical, rational as well as visual and also intuitive way, we don't need a crystallized 'quantum biology'. Indeed, the super-model theory, first launched in the 2004 book in the chapter which uses the phrase 'macroscopic nonlocality', is a proper context within which to understand biological processes, also.

Fig. 1

1. Why Einstein's View In One Sense Was Wholly Right

Q. What is physics? Or do you perhaps find that question too simple?

A. No, it is not too simple at all. In fact it's very complex. May I ask you something first, though?

Q. Go ahead.

A. Why do you think Albert Einstein, presumably the most influential physicist ever, never regarded quantum theory as a proper theory?

Q. Is that official?

A. Couldn't be more official. Einstein's texts are all over the place. You find it stated by him in several ways, each one of them unambigious and clear. And with no reduction of force towards the post-World War II writings of his. He never regarded quantum theory as a proper physics theory. To him, it wasn't a theory. Look up the quotes yourself. There can be no doubt about this point. It's absolutely and clearly a part of the history of the field of physics.

Q. Well, why did Einstein not approve of quantum theory as a theory? Perhaps because he didn't understand non-locality, as it seemed to be something to contradicted his speed of light limit.

A. Good try, but wrong answer. What you say concerns Einstein's preferences--it is true he himself would very clearly prefer to have a physics theory that had in it no serious challenge to the speed of light. Both his special and general relativity theories are all organised, and very successfully so--as far as their realms go--around the speed of light as what I myself call an 'organising factor'. But even though the idea of the speed of light in vacuum sounds neat, light is a complicated phenomenon--indeed highly complicated, and its velocities and its various effects aren't neatly summarized. We have the effects, that Feynman pointed out also, of some form of diffraction on the speed of light measurement; we don't know much about what vacuum really is; the speed of light in water is slower; and light has so many features. So, all in all, we need two concepts here--the L-speed, and the concept of light, which in future physics may be found to be a group concept for several different phenomena.

But I ask again: why was it that Einstein absolutely did not accept that quantum theory is a theory--in contrast to Niels Bohr and his followers. It was something far more deep than preferences as to speed of light--which we will clarify more deeply when we come to how we radically reinterpret the Michelson-Morley experiment and introduce the novel notion of "L-speed", which is not the speed of light exactly, but derived from that general idea. So you see we don't agree with Einstein all the way. As Bohm said when we had him in Oslo for a weekend a couple of years before he died, at the Soria Moria conference center in the woods in Oslo--"Einstein couldn't be right every time."

But we totally agree with Einstein's accurate criticism of quantum physics at a certain general level. Why do you think he didn't see quantum physics as a real physics theory?

Q. Okay. You give me some more clues. Now why was it? I have no idea.

A. I give you one more clue, then. If you look up the word 'theory' in a large dictionary, you'll find that it is related, in its roots, to such ancient Greek words as 'theorein', which means to see or view, but is also common in root to the word 'theatre'.

Q. Aha!

A. Say it. What did you think?

Q. That Einstein objected to quantum theory because it wasn't a theory that offered a view of reality.

A. That's exactly it. You see, this is a very fundamental issue: to Einstein, he felt that Bohr's work on creating what Bohr and his followers called 'quantum theory' was a wrong step for physics: not because the theory was wrong--he never really claimed exactly that--but because the theory wasn't a theory proper. It was a list of equations; some ideas, loosely connected to each, as to how to apply them; and with some metaphors that had to be dropped during more involved work with these equations.

Q. So, in other words, Einstein didn't for instance claim that Heisenberg's Uncertainty Principle was wrong?

A. No, he didn't. He considered that the equations and the ideas associated with how to apply them had something to them, with no direct mistake inside them. But he found the THEORY lacking, he saw in them not a THEORY OF PHYSICS. Now let us put this into perspective: when he worked with his relativity theories, he was visualizing a lot. He was into visualizing also a fourth dimension, as we know very well. He was visualizing curvatures, stretchings; he was considering correlations; he was applying the principle of MIND FIRST, FORMALISM SECOND.

Q. But Bohr seemed to disagree.

A. Well, Bohr agreed to special and general relativity as far as these theories went. But Bohr suggested--much to Einstein's dismay--that from now on, a different type of theory must take the place of the earlier types of theories, one in which human imagination doesn't have a primary role. Einstein said that he knew of no empirical findings that could justify such a change in epistemology. In retrospect, Bohr sensed that the quantum phenomena went beyond the speed of light limit--though it took nearly forty years after the Solway Conference in 1927 before J.S. Bell proved that point--and Bohr wanted to protect what Einstein had created as theories, but create another set of theories for microphenomena, wanting these to sort of cancel out as we move up in sizes and in energies. You see, Bohr was a subtle thinker, and his arguments were subtle--Louis de Broglie, one who, after reading the works of David Bohm in 1951, broke with Bohr's group completely, see the yoga6d.org/debroglie_vs_bohm text that has excerpts from the de Broglie book of the 1950s--anyway, what I wanted to say is that Louis de Broglie called the arguments of Bohr sometimes for 'nebuluous'. de Broglie also named several of Bohr's followers as 'disciples'.

Q. Well, this is the early twentieth century history of physics. But then, in the latter half of twentieth century, we had a number of physicists coming with statements like, 'quantum theory' (or mechanics) 'is the most successful scientific theory ever'.

A. But success isn't proof whether of truth nor of content. The theory that 2 plus 2 equals 4 is being applied daily in all humankind with great success, but this success factor doesn't show that it is a great theory of numbers; it is merely right in some very practical ways --and about as devoid of deeper inner content as quantum theory. Let us be clear about it: we can never let physics be judged according to technological success, although we can let it inform our future judgements, as one of very many criterions--we can say, 'this and that and the other technological success, for instance in semiconductors, lasers and the phenomenon of supermagnetism, are incidences that add up to confirm that we have got some right equations,--but these do not prove the equations, nor do these incidences show that we have a real good theory.' You follow? If Einstein was right, then it may be that--and this is the line I'm taking--very little physics has been done since the last quarrels in 1927.

Q. You mean that all physics education..

A. Is pseudo.

Q. That the whole field of physics..

A. ..has become frozen. It is in the freezer. Nobody is working on it. And certainly not the formalism cruncher professors that teach what they so very wrongly call 'physics' to young students. They don't know the first thing about physics. I doubt if anyone of these professors would even be able to follow our argument so far as this. They would choke if they see even a single page of text without one of their integrals or differentials or sine curves or matrices. They can't think anymore, only throw equations around. And so the socalled 'physics' field has, with some notable exceptions here and there, in terms also of some mainstream journals that, on rare occasions, make comments involving ideas rather than equations,--this field has become subservient to engineering. Which is to say, theoretical physics is hardly existing anymore, for the flame of theoretical physics isn't kindled; it has become obsessed with number correlations via stale formalisms. Thinking has gone out of fashion; and physics, which is really part of philosophy--what was called "Natural Philosophy"--has become that corner of the infinity-ridden field of mathematics that aims to deal with the numbers of laboratory experiments on general energetic processes in the universe. These experiments are not approached so as to be understood, they are not approached so as be theorised over, rather, they are approached as bundles of numbers, and a person who is able to apply the worn-out silly equations once more to correlate these numbers go around proudly and call herself or himself a 'physicist'. But, in Einstein's view, and in the view of a lot more people, these physicists aren't physicists.

Now let us be clear that my own personal formal capacity is in computing; and that my own personal interest in physics is in terms of the philosophy of worldviews. It is on this background I took contact with David Bohm, some years before he died. It is on this background I have gone through the most interesting philosophical writings on physics during the last hundred and twenty years. (My contact with the empirics of energy is chiefly through the hints that my extensive work with electronics have given me.) From this, I have built up a theory--it is a theory i the sense that Einstein would call a theory, even though it doesn't not respect his preference of getting the speed of light into the core of absolutely everything. It is a theory that is of the physics kind; and, according to world-wide appreciated theoreticians of science, such as K R Popper, a theory should be evaluated not according to who comes with it, but according to what it says and how well it does in standing up to meet reality.

In that sense, I am proposing that I have a theory--even if it is, partly on purpose, put forward in rather vague terms--that is a good piece of work in the field of physics; and that is a good deal more work than what I've seen that physicists have done, speaking of the last half-century or more, as for the vast majority of them. Therefore, I claim that my contribution must be seen as a contribution to physics, and by a thinker who by self-education and intent and intelligence should be called at least as much 'physicist' as anyone with a doctorate in the field as it is being commonly taught at the best universities.

Q. You are speaking of your super-model theory.

A. Yes.

Q. You came with it in 2004, is that right?

A. Yes.

Q. Has it got any attention?

A. Very little, but perhaps some.

Q. Is your present formulation, using your G15 PMN formalism and programming language, finished just last year in its most complete form, new relative to it?

A. Much has matured.

Q. In what way?

A. I have, for one thing, gone far more deeply into what de Broglie said relative to David Bohm's work, Bohm's theory, by some called 'bohmian mechanics'. And I have also more consciously anchored this theory of physics in a larger worldview of a more philosophical kind, vaguely a bit like Spinoza, perhaps. Also, the formalism G15 PMN is lending itself enormously well to the purpose, and I have worked so much with questions of infinity since 2004 that I know better how to limit the roles of formalisms so that these infinities don't lead to contradictions. And there's a clear-cut handling of both special and general relativity, bolder than in the original approach, and also quite simple once the foundations of the super-model theory is understood.

Q. Very well. How concrete is the theory? Does it somehow compete with quantum whatever-we-call-it, quantum mechanics?

A. It is a theory, whereas I totally and absolutely agree with Einstein that quantum theory, whether in 1950 or in 2016, is not a theory proper. So in that sense there is no competition, for quantum theory never was a starter. It was never more than a list. It wasn't a view.

Q. But how concretely do you go into such as the double-slit experiment, entanglement and all that?

A. I don't go concretely into these situations if you by 'concretely' mean that I list up every detail of how to do the calculations, for the simple reason that I regard them as trivial and quite obvious once you have grasped the essential concept. I only outline the broad aspects of how one might begin to use this formalism of G15 PMN to account for all these things. But more importantly, the whole spectrum of phenomena, not just in the branch of empirics called 'quantum' or 'gravitation' or the like, but also so that it is relevant for biology and psychology and more, are effortlessly incorporated.

Q. For the first time?

A. Well, it depends on the level of resolution so to speak. I think one can give an interpretation of something such as A N Whitehead's Process and Reality, for instance, or David Bohm's Implicate Order philosophy, so as to broadly encompass all these phenomena as we are discussing. And a lot of writers have proposed further metaphors of a variety of sorts. But Bohm's Implicate Order is as vague as Process and Reality, and the theory I am proposing is not at all equal to bohemian mechanics. It is moving in a different direction. It is taking some elements of de Broglie's work, after de Broglie learned something from David Bohm's work, into a broader theory, less formal, but the formal features are far more promising, for they are not steeped in the complexities in conventional mathematics, which doesn't do any job concerning holistic fields or ensembles of particles of more than about a handful very well. You don't have to take my word for it: look for instance to Richard Feynmann and his criticism of mathematics in physics. It's a severe criticism, and never more so when it comes to how infinities are 'normalized'. At this point with him, I totally agree. Mathematics is a mess. It never was a good servant to physics. This is also a point of departure away from bohemian mechanics.

I would like to present the super-model theory in the more ripe perceptions and insights I have now, twelve years after the 2004 publication, but first let me point out that when we listen deeply to what Einstein wanted of a scientific theory in physics, he did not say anything about conventional mathematics having to be part of it. Rather, he saw formalisms as a tool, in which some parts of a theory could be spoken about--but not as 'representing' the theory. I prefer the expression that a formalism can 'illustrate'--not the theory, but illustrate some features of the theory. And I propose a formalism that is, as such, more HUMBLE to the human mind. In this sense, I think Albert Einstein would have, after thinking it through, conceeded that the super-model theory is the first real theory of physics proposed after his general relativity theory. And this I mean when I read the words of Einstein: because Einstein was a thinker, who could use words, he could think with words, he wasn't a bit like the formalistic nerds that pride themselves with the 'physics' work-title nowadays. He was a master of the formalisms that he had chosen to learn, but at the time, they still had such as Kurt Goedel's incompleteness theorems ahead of them, they hadn't learned about computers, about finite algorithms, about the beauty of formalisms that don't pretend anything about infinities; about distinguishing between rote procedures and leaps of intuition, such as Alan Turing was forced to think about, when he conceived of the Computer notion, abstractly. And, in addition to all this, we have empirics of a kind that is wildly beyond what Bohr and Heisenberg and so on had at the time they were laying out the dogmas that still totally penetrate and infiltrate all of mainstream university physics education and higher-level journal thinking--an empirics that speaks of findings of plausible quantum coherence in the brains of some birds and in the leaves of green plants, and quite possibly in a range of other phenomena.

In short, we are faced with a radical new set of tools and experiences, but we have no activity in physics of the type that Einstein wanted. This activity, I offer, not modestly but in honest and fair faith, is only taken further by the super-model theory. And, in order to wake up more fresh good thinking in the long term, I have undertaken to do this re-presentation of the ripe form of super-model theory, illustrated by my G15 PMN formalism, but so that the formalistic nerds, who try to make fancy and also military technology by applying their cunning to quantum phenomena, won't understand a bit.

Q. How lucky that I am no formalistic nerd.

A. Yes. I mean to say, everyone who is a philosopher--that is to say, one who loves Sophia, the muse of wisdom--must realize that applied physics is applied misery, when it comes to making things that are unfriendly to the human mind or even to human life. The ethics of all this implies that we curb all formalistic attempts so that they remain at the vague level, with only enough technology to re-produce the technology we have at present. Any more stuff in the scifi directions that some have proposed is likely to finish humanity off. It is a legal responsibility for humanity to curb self-destructive activities and too much formalistic crunching of energetic processes correlations is in the category of self-destructiveness. That's why any such enterprise as this must be vague, but not so vague it says nothing at all; it must speak to the heart, and give elements of insights and perceptions so as to encourage a benevolent development in the long run--Bertrand Russell said we should always think in terms of half a millenium ahead whenever we do anything--and perhaps that's as good time-perspective as any other. I hope also to contribute with a voice in the direction that physics realign itself to be seen, in future education, as part of philosophy and that philosophy must have the upper hand--not anything that lends itself to engineering, or to mindless dumb manipulations of abstract symbols. For physics is the work of human minds to understand energy as such, also enquire into its origins--beyond the measurable.

Q. Then where shall we begin?

A. With mind. At the beginning. With worldview. And at each point I will come with a bit of formalism so that we can engage that aspect of the human mind also. And, as we will see, the G15 PMN formalism is all the formalism we'll ever need, no matter how philosophical our theory is, and no matter how concretely we wish to make any part of it.

Q. One more question before we end this introductory conversation: do you expect that anybody will pay attention to this?

A. Yes.

2. What's Wrong With Bohmian Mechanics

Q. As I understand you, you are putting forward a theory in physics that include the quantum phenomena, and also the relativistic effects.

A. Yes. My theory is however very general. What I am saying is that it is plain enough, for anyone who cares to elaborate the theory in such a direction, to include all the numerical correlations put forward by Einstein in his special and also his general theory of relativity and the same with quantum mechanics. I'm not interested in doing so in detail but what I provide is a theory that allows both visualisation and formalisms, and that is comprehensive, meaningful, and understandable.

Q. What's wrong with David Bohm's work to produce an alternative quantum theory?

A. When we appreciate what is right about it, then we can bring into focus what is wrong about it. He was right in wanting to visualize more, including such as positions of particles, rather than letting the whole visualization vanish in a hailing of equations. But instead of opening the field of visualization, he attributed reality to his own formalisms. Instead of seeing his work as merely a pointer toward a new landscape of thinking about quantum theory, and in that way truly honoring the role of mind in making theories of reality, he kept on repeating his own equations and attributing reality to various features of these. And this despite that Louis de Broglie pointed out that while Bohm had done valuable contribution in the area of measurement--and in fact pointed the way for a nonlocal version of quantum physics--there was an unlikeliness about the attribution of reality to such intricate mathematical fictions as involved in the probabalistic equations of his quantum theory. This unlikeliness de Broglie had addressed and he suggested that the picture of reality should be still further analyzed, where these types of equations can be seen as emerging out of something different. This different reality may not be in alignment with what the later de Broglie himself proposed, but the general sentiment is one in which I agree to. Even though Bohr was wrong, it doesn't automatically follow that one of the most obvious alternatives are right. The real physics work lies in coming up with a truly holistic perspective on all energetic phenomena in general. Bohm didn't do that in his physics work. The bohmian mechanics, as it stands, doesn't have in it the greatness that some of us saw in Bohm's work as a philosopher. And that can be attributed to the limits of mathematics, but it is somewhat more serious than that: it is a lack of willingness to say of his first equations that they are crude, very crude indeed, and that something radically different than these are called for, with a different reality picture altogether. Had he listened to de Broglie, and closely worked with de Broglie--who lived into the 1980s--they could have started on entirely new work. As it was, Bohm stuck to his equations from early 1950s, and never really connected these to the most fascinating aspects of the philosophy of the implicate order. That's what's wrong with bohmian mechanics: it has nothing of the greatness of seeing all physics as a whole. It is merely more of the attitude of formalism manipulation.

Q. Is bohemian mechanics not a theory either, in the same way that quantum theory, according to Einstein, is not a theory?

A. Bohmian mechanics is slightly more a theory than quantum theory. For it offers slightly more visualisation. But it sticks to the idea of particles with positions and velocities as for electrons, for instance, and has in it some superstructures that aren't motivated in a holistic theory of the universe at all. Rather, they are standing as equations that, in much of Bohm's work around them, are hailed in a manner that remsembles much how Bohr's group hailed their equations. It is not truly nonformalistic in spirit. It is more of the 'physics as mathematics'. And even the Bohm of the past few years of his life kept saying things that supported such a rediculous view. For instance, in his book together with D F Peat, they write about seeing mathematics not as 'paint' on top of a theory of physics but rather as part of its content. That's exactly the whole downgrading of mind that we must warn against, if we are going to have a real physics theory. Bohmian mechanics is missing it. There is no doubt in the world that Bohm pointed out important things, that led to the unravelling, more and more, of the role of nonlocality in entanglement, quantum tunnelling, and quantum coherence --but the fact remains that bohmian mechanics isn't having a good clear picture of reality in which formalisms are invoked to illustrate some points. Rather, it is a formalistic, mathematical physics all over again, just with a change of equations and with a little bit more visualization involved than in the case of the Copenhagen Interpretation as according to Bohr.

We haven't talked of the other interpretations of quantum theory, or physics, such as the many-worlds interpretation; nor of the formalistic attempts to bridge with gravitation physics such as string theory; but these aren't at all holistic views of reality; these are merely a result of hacking around with formalisms--very cleverly but not in the form that physics theories can take.

Q. In your view, then, despite the apparent glamour of such words as quantum tunnelling, entanglement and quantum coherence, these do not at present have any good theoretical content behind them?

A. Obviously not! And so it is more to be pitied than condemned when people who have this mathematicalized pseudo-physics education behind them try to be bold and propose such as 'quantum computers'. These folks haven't the least understanding of what the quantum phenomena are all about in this world. And so they talk of engineering feats of the future without having the slightest grasp of how far away they are from comphrehending the energy processes of this universe. They don't know anything about coherence, and so cannot manipulate it. And it follows that when quantum biology is getting more and more a reality, there is no preparedness at all to understand what's going on. The biologists haven't got much clue about physics, to begin with; and then the socalled physicists haven't got any clue about physics, either. All they have are computer-generated curves and fancy symbols and some half-baked ideas applied to their symbol-shuffling as a kind of verbal ornamentation. We are instead facing a reality which, as I take it, is infinitely more characterised by pervasive quantum coherence than it is characterised by anything else. And those who study super-model theory will always be at the aventgarde in the important development work--a work that has to do with human collective consciousness also, obviously--in connecting to such insights and perceptions.

Q. Suppose I am an outsider to all this; perhaps educated in this mathematical physics or non-physics, as you describe it, and I listen to your words here, and watch the formalisms you are suggesting one can look into, and I'm a little bit fascinated, at least; but I don't know how to continue to work with it or indeed whether I should --for it may be just another whacky idea.

A. Just so. It is like selecting a Foreign Exchange, a "forex" broker on the Internet. They have all sorts of fancy homepages, with awards--'Best Forex of The Years'--and so on--and, since at present this business has no official price for the exchange of such as U.S. Dollars to Euro, it is an area that is almost infinitely open to manipulation. Crooks open up homepages of this sort and invite people to get rich if only they pay them a mere five thousand dollars or so; they register themselves in some off-center country with weak laws; operate under false names; and yet they do not break the laws, when they operate on the principle that there are always some fools willing to give them money for nothing, for nothing, that is, except scripts that make the odds of earning anything by their so-called 'forex' next to nil. At the same time, there are fairly high-integrity companies offering what appears to be the same thing. Fairly honest people are driving honest companies where customers actually can get richer and richer if they have a steady, good hand at doing forex, knowing how to analyze waves and how to sense, or perhaps intuit, how it is going. These companies want to grow WITH their customers, instead of growing off their customers. So how do you select? And remember that these folks who manipulate are not really breaking laws, as the laws are at present.

Q. Well, you have to guess. You select by intuition.

A. Exactly. By intuition.

Q. You mean that the same principle has to apply when it comes to working with a physics theory?

A. What with all the factors involved, yes. You apply all the analysis you can, within reason, and with a sincere effort not to be prejudiced, not to be biased about it, and you put clingings, personal friendships, fears of career developments, fears of loyalities, and ethnic belonging ideas, on the side, as much you are able to--for you want to be friend with facts. So you go through the alternatives, then go for a walk. Or a swim. You sleep on it. You empty your mind of them. And in that silence you will get a sense of overview of what you have, intellectually, just been through. If it doesn't come at once, you do some more work, and put the question to your silence, and work on something else, like painting. You give it quietude. What comes up eventually may be right or it may be wrong, but in any case it will be fruitful to follow it up for a while. Then you can ask again later, perhaps having your intuition fortified by the additional work that came in the wake of such a questioning process. Intuition is hard work.

3. A First Hint Of Formalisation Of Super-model Theory

Q. What, then, is super-model theory?

A. As long as we keep in mind what we already have said-- in particular that this is a 'mind-first' approach, as must be the case of any THEORY proper, I think that the time has come to do a bit of formalism work. It's tempting for me to spell out a lot more of how to visualize this, but since we have been talking a lot already (and since this isn't the first presentation of the super-model theory), let's bring in G15 PMN. Is that fine with you?

Q. Splendid. Is this the same as the programming language G15 PMN, which any computer can start?

A. Well, just about any. When we program in G15 PMN we usually do it with a number of standard programs loaded. The most complete set is that which we call tf (Third Foundation). This you fetch from the app page if you don't already have it. It's app# 3,333,333 of course. You can then mount it by the MNT command, and it will then open straight away so you can click on CTR-W and click with the mouse on f/1, since it is loaded on the F-disk. You can copy it to other disks and so on, but this is an okay starting-point, and we can put our formalism for the super-model theory let's say at disk i, card i:1. All this is standard procedure for anyone doing G15 PMN programming and we will now show how to illustrate a range of features of super-model theory in it. In this way, we'll introduce the theory at the level of mind step by step.

Of course, inside the Third Foundation, all the longer examples are included at k:2000, k:3000 etc.

Any such can be performed by typing, inside TF, the two lines:

```
  ^k2000
  cc
```

And the source viewed by typing 'car' instead of 'cc'.

Q. Alright. What's the first step?

A. To make use of the inbuilt network of nodes that in tf is called FCM. The acronym 'FCM' is connected mostly with applying such a network to programming of robots, which G15 PMN also is for (there, it means, 'First-hand Computerised Mentality'). But this node network is of a highly general form. We will next use it so that each node (by and large) is a super-model. And the first task is to allocate a number of them in RAM, suitable for our task of illustrating various features of our theory. This is, you see, in refreshing contrast to how things has been done in mathematical physics, where one rarely begins by setting limits, and so one quickly gets into the confusion which starts when one assumes limitlessness. Here, we use a limited quantity of nodes each time just as a sketch with pen on paper unfolds on a limited peace of paper. And each node has a limited set of positions, numbered, so natural meanings apply to these positions within the formalism, as we shall see.

```
<i1>
maxfundnum=    &&
10000.         fundnet
150            kl
maxfundnum
mm             150
```

```
200            maxfundnum
ad             fundnet
sz             wwyymatrix

<i2>
fundnet
lk




thisfcmnet
kl

<i3>
maxfundnum     fcmindqty
50             basisthis
ad             maxfundnum
sz             thisfcmnet
               lk
&&             fcmindex
fcmindex       lk
kl             initwarpindex

<i4>
1000000        1
setfundlevel   50
               adjustfund
               |link to x1pos

1              1
^x0position    47
fneasy         adjustfund

<i5>
1              2
^x1position    51
fneasy         adjustfund
               |link to x2pos
0
50             2
adjustfund     47
|link to x0pos adjustfund

<i6>
1              1
^x2position    50
fneasy         adjustfund
               |link to x1pos

               1
               47
               adjustfund
```

Q. So what are X0POSITION, X1POSITION and X2POSITION here?

A. These are three positions in the simplest space possible, a one-dimensional space. On these, we can put a particle and have it to move from one spot to the next.

Q. The code has comments, with the | sign first, talking about links. Are the positions linked to each other?

A. Exactly. We have here three nodes, and each node links to the neighbour that's nearest to itself. That's often a useful convention when having more dimensions also. Each dimension involves at most two new links, except for nodes at the edges. So here, X1POSITION is in the middle and it has two links. With 2d, a position could link not just to right and left, but to forward and backwards as well. In 3d, we have two more directions, such as up and down. And in this way we can go on to such a number as 8 dimensions.

Q. In conventional mathematics, one would perhaps have a symbol instead of a numbered position such as 50 for the first link.

A. Yes, but by Kurt Goedel's work in the late 1920s we've learned that every symbolism can be reflected upon whole numbers. When we work with computer languages, we do so, of course, on the premise that it is all converted into binary, or digital, numbers, like 00001111 for 15, in any case. So when we work with whole numbers, in movement, we are working with, in a way, the essence of what formalisms are all about--and this is also the G15 PMN algorithm. In the next chapter, we'll bring in the idea of a particle. After several rounds with this, we'll get to visualize how gravitation and the whole spectrum of possible quantum phenomena fit within this theoretical framework of the super-model theory.

4. Beginnings Of Formalisation Of Particle

Q. As I understand it, we created three nodes in the last chapter in order to represent three positions in a very simple form of space. When we are going to put in a particle, are we then going to have yet another node? Do I anticipate correctly?

A. You anticipate perfectly correctly. And already a key feature of super-model as launched in the privately published book in 2004, and as continually available at yoga4d.org/a.htm (as well as inside the Firth platform from 2006, with the first forms of the programming language work that eventually became G15 PMN), can now be said to be illustrated by the formalism: a supermodel grid or network of such is space, and super-models are also what such as particles are about. These things aren't divided up: we do not propose that we have a physical space first and then go on to place energy in it. Rather, we have the immense flexibility and beauty of having the same type of concept both constituting space and also matter. This is obviously something that the young Albert Einstein, had he been part of our conversation, would have nodded eagerly to.

Q. Why, again, the name 'super-model'?

A. I also thought of calling them 'texts', super-texts, supra-texts (my friend Henrik B Tschudi suggested though that the word 'super' is more to the point than 'supra'). By the word 'text' I thought of a way to suggest the importance of algorithms. But by the word 'model' I felt that the function of these algorithms or processes--which in important cases sort of 'sum up a situation', or 'model a situation', were pointed out, and in a manner that spoke to our imagination. The word 'super' means, of course, 'above'--and that is because these models, or nodes, can stand in a relationship to each other so that some of them are above others, influencing a whole spectrum of other models. This idea I also sought to convey by the phrase 'active models'. All this is in the very long chapter entitled something about macroscopic nonlocality for I wished at once to point out that this theorizing lends itself graciously towards thinking about life and its much larger structures than the subatomic ones. And obviously, what we see in 2016, this year, is that, in contrast to previous decades, for the first time there is in mainstream science a collective approval of the notion that immensely complex quantum structures calling, indeed, on some form of nonlocality or another, are involved in living processes including brains. As mainstream sees it, nothing is definite yet, but the arguments from research add up towards this interpretation and so the most sceptical of journals consider, in general that the quantum interpretation is the plausible one. And, as soon as that process has begun--I mean, as soon as one has begun to realize the pervasiveness of these wierd quantum features in life, there may be an ocean of new empirics to find when one wades into the territory armed with new measurement technologies and new theoretical concepts. But I am letting enthusiasm carry me away. Let us now go to the formalism again. We must bring in a particle. In the first examples, we will do it in the simplistic manner of simply getting it there, then getting it to move about. We'll come to appreciate how this whole G15 PMN formalism as associated with super-model theory easily can encompass all the extremely complex nuances of the calculation machinery of quantum physics and also of general relativity theory. But we need to start somewhere. And, as said, we won't illustrate the details; we are simply here showing that all these numerical correlations can be implemented here, with suitable G15 PMN work, and without any change of the underlaying concepts. It's all still one unified theory with one set of fundamental concepts. Anyway, here's a particle, associated with the first position, as an extension of the formalism we had in the previous chapter. We begin straight at card <i:7>:

```
<i7>
990000         0
setfundlevel   50
               adjustfund
               |link to x0pos

1              1
^p1particle    47
fneasy         adjustfund

<i8>
1010000        &fcm&
setfundlevel
1
|act#:
27
1
^completenode
fneasyact      zz
```

Q. I think I can see that a new node, P1PARTICLE, gets connected to the X0POSITION node. But I have three questions.

A. Come with them. Note, by the way, that we have not yet associated any energy with the particle. We are just outlining it in round figures.

Q. Okay, that answers one of the questions--what about the energy of the particle. The two others are: what's going on in the last card, <i8>? And what is the significance of these 'fundlevel' numbers, around a million?

A. The last card is just to provide feedback from the PC when you type in the formal stuff into the G15 PMN tf terminal. FCM is a loop that goes on and on unless it gets a signal that all is done. We want it to perform, once, and then provide a neat, sorted listing of the names and a little more of each node. So we make an extra node, that has as sole significance to signal to FCM that there's not more to the formalism as yet. After performing the FCM, we can type in the command EASYFNLIST, to see nodenames.

As for your second question, the nodes are divided into levels which indicate what sequence, broadly speaking, they are considered within the algorithm. So there's a level number associated with each node, also called 'fund' or 'fn' or 'foundry' inside the FCM programs.

Q. So this level number can be freely chosen?

A. One of the things that matter is that we're consistent about it. The most manifest reality ought to have about the highest level numbers. In our formalism, so far, we've given it level number one million. And so this illustrates a feature of super-model theory: that the super-models are organised in levels.

5. Beginnings Of Formalisation Of Movement

Q. We got in some sort of particle in last chapter. Can we furnish it with some movement also?

A. That's the plan. We start really simple, knowing that the formalism has all sorts of flexibilities. We first want to ensure that the formalism, the numbers, talk about themselves. In order to get the particle to move, we want a print-out of just how much energy of some sort is stacked up at each position. Just what type of energy this is, and how many flavours it may have, is not our concern at the moment, rather just to watch that there's some change of a suitable parameter.

Q. Explain how this can be so flexible.

A. Well, each node has a number of free positions. Only a bunch have definite roles. For instance, there's a number in each node that tells whether it has algorithms attached to it; if so, a range of numbers, when nonzero, are meant to link to a list of ready-made algorithms. We'll make one or two right now and apply them, so we see how that is done. But to store a bundle of numbers in a node, or in a set of nodes, we may get more compression by not having algorithms assigned to them. And so we can vary this flag, or number--that's #9 in each.

Q. When are we going to focus on the visualisation of the whole flow of energy processes in the universe, through the super-model theory?

A. Let's see. I have a sense that there's a thirst for some formalism at this point. There has been much talk already, not just here, but in previous writings of mine on the theory. We'll take up the question of the whole theory in informal terms when we feel that we have got some more ground covered with formalisms; a couple of chapters ahead, I guess.

Q. Alright. Where do we find the energy measure?

A. We do the simplest thing to begin with--to vary the first free number. That's the #10 in each node. It is also called (as you can see on the tf documentation) 'the 1st number in the 1st triplet', for we have ten times three free numbers. Now since we will want the positions to report (to the computer screen) what quantity of energy is there, we'll have to make some code and attach it to the positions; we also should have an option to click eg lineshift to have another round, where we can see that the particle moves, and the <esc> button to leave the loop. This, too, is an algorithm. And of course the movement itself involves, somewhere or other, an algorithm. For convenience, we put it right in at the particle itself this time. This involves a little bit copying and pasting of the stuff we've already written, and putting in some new formalism here and there. The code at k:2000 begins just like the three first cards, i:1..i:3 above.

  Then we let the positions tell their main values.

  Having done so, we distribute some quantity of energy associated with the particle from one position to the next; and we can then have several loop cycles where we can check that the particle does move by pressing ENTER after each cycle:

```
<k2000>
maxfundnum=    &&
10000.         fundnet
150            kl
maxfundnum
mm             150
200            maxfundnum
ad             fundnet
sz             wwyymatrix

<k2001>
fundnet        |up a fcm
lk             |network with
thisfcmnet     |a good amount
kl             |funds; here:
               |for super-
|At previous   |model theory
|and next      |formal
|card, we set  |illustrations

<k2002>
maxfundnum     fcmindqty
50             basisthis
ad             maxfundnum
sz             thisfcmnet
               lk
&&             fcmindex
fcmindex       lk
kl             initwarpindex

<k2003>
fnact1001=     ^:
|display mnval prtcont
wtofnnum       ix
sx             fnmainval
sh             prtnumcont
prtsuspend
ix             & &
prtnumcont     prtcont.

<k2004>
&fnact1001&    ^x0position
1001           fneasyact
fnactcherish   1
1000000        50
setfundlevel   adjustfund
1              1
1001           47
1              adjustfund

<k2005>
1              0
1001           50
```

```
1              adjustfund
^x1position
fneasyact
2              2
47             51
adjustfund     adjustfund

<k2006>
1
1001
1
^x2position
fneasyact
1              1
47             50
adjustfund     adjustfund

<k2007>
fnact501=      s9
|prticlemotion i9
sx             ix
sh             50
50             kw
ix             10
wk             ix
up             wk

<k2008>
t8             ex
|energy
j8
i9             j8
fnaddmainval   ts
i9             i9
n?             dc
se             fnaddmainval.

<k2009>
&fnact501&
501
fnactcherish



990000
setfundlevel

<k2010>
1000000        |particlenergy
501
1
^p1particle
fneasyact      |Before x0pos:
1              !1
47             50
adjustfund     adjustfund

<k2011>
fnact279=      ^enter or esc?
|In:tr#, fnwrp prt
|<esc>=exit    ki
sh             27
sh             eq
&&             n?
prt            fnloopcont
prtrelease     kl.

<k2012>
&fnact279&     1
279            |act#:
fnactcherish   279
               1
               ^completenode

1010000
setfundlevel   fneasyact
```

<k2013>
&fcm&

zz

Q. Alright, so I type ^k2000 and then, on the next line, cc, to compile this after having started up the Third Foundation.
  When I run this, and press ENTER several times, the PC says:
  0:1000001 1:1 2:1
  0:1 1:1000001 2:1
  0:1 1:1 2:1000001
Is the large number the particle moving from position X=0 through X=1 to X=2?

A. Yes.

Q. 1000001? What sort of energy is this?

A. Any sort. All we're interested in here is the principle of getting some movement across some nodes or SM's (super-models) of the type we have associated with positions. We are going to bring in the particular features that are necessary to deal with quantum phenomena already in the next chapter. Here, we are simply equipping the positions we lined up earlier with some sort of classical movement.

Q. Alright, let's bring in the quantum features!

A. We'll do that, and then also bring in both special and general relativity features. All this, remember, is done in a way that shows vaguely how it could be done, where our emphasis on how this formalism helps us to visualize the whole theory, as well as showing, without doubt for anyone who has an understanding of this formalism, that it has, without doubt, the adequate complexity and elegance to handle the whole range of the type of phenomena in modern physics. The G15 PMN is for this purpose unusual, but it should be remembered that after Dirac's reworking of Schroedinger's wave equation, unusualness sort of became an accepted part of the formal aspect of physics. Dirac reworked it into matrices that looked like nothing of the original format, which Schroedinger had derived by modifying formalisms over such as classical water waves to handle Planck's constant as a sort of 'minimum energy', and by bringing in an extra, rotating element of the numbers by connecting it to the complex number type. In other words, classical waves plus Planck's constant plus two-dimensional rotating numbers make up Schroedinger's equation; but this equation in term equal entirely different formalisms--not just such as Dirac's, but also such as Richard Feynmann's "sum over possible histories" approach to the very same numerical results.
  However, with each new branch of mathematics invoked by the physicists, a new series of complexities were also introduced; and every one of these branches had in them questions about what happened at or near infinity and at or near the socalled "infinitesimal".
  In contrast, G15 PMN is a uniform formalism that glides from the set of numbers and letters used to handle a classical type of movement to a quantum type of movement without sharp cuts. This formalism isn't formulated on the premises of handling infinitely many numbers. It is, in contrast, deliberately formulated so as to illustrate some features of our thinking in ways that are as finite as can be, thus by and large escaping the riddles associated with Goedel's Second Incompleteness Theorem and other issues with the infinite that just about every branch of classical mathematics is beset with.

Q. You mean that even if G15 PMN is wholly new for the scientists who wish to work with physics, it is well worth learning?

A. Objectively, they have been hardly making any much progress at all since all these forms of mathematics were brought in to help them. Very little has happened each decade since they begun with it, after the late 1920s. It's time for those interested, deeply, in science to stop celebrating stagnation as if it were progress and start thinking afresh, getting hold of pictures of reality again and getting to grips with a formalism like G15 PMN, which truly make sense when you work with it. The computer helps you to check it but the program is entirely in the mind, and we don't have to make 'approximations' over programs as computerised mathematicians have to make approximations over equations they can't solve--and in that way also we move on. We are again doing science. We are again thinking about reality and having space to be philosophical about it instead of spending time in quarrelling over interpretations over a handful of dense equations.

Q. That sort of sums it up, the physics debates of the past century, doesn't it?

A. It does. Now let me add that I don't really mean to condemn anything. I merely point out that since Einstein was left more or less alone with his premise that physics is a science of visualisation first, and formalisms second, physics--apart from a series of engineering successes--hasn't had a great time. But as soon as physics comes up with something new, militaries run after it and greedily tries to make the most of it in their many secret laboratories; and so--and this was very clear to most prominent physicsts after WWII--it may be as well that physics don't evolve all that fast. At the moment of writing this, thousands of people are going to their daily work in secret military establishment where the core folks make experiments in how to harness quantum coherence and such to hide and steal data and to make stronger bombs. In addition, an even larger number of people are engaged in presumptiously more humane and more commercial enterprises doing exactly the same thing--trying to harness quantum features for their own purposes, and also making research reports in the public in the process. However, they are not getting anywhere. Quantum physics may be harnessed by our sense of smell, by our methods of breathing, and quantum tunnelling may be behind most of the DNA cell mutations, but Nature does these things effortlessly whereas the manipulative type of scientist-slash-engineer doesn't seem to make head or tail of the process.

Q. Will the type of understanding offered here help them?

A. The work we do in physics can assist those who wish to understand the greatness of life and get a glimpse of some of the vastness of what isn't understood, but seen in vague features here and there, of the energetic processes of this universe or multiverse. This is, then, the science of physics as part of philosophical work with worldviews. It will help the physicists-slash-philosophers only.

Q. One thing before we begin. What's the role of the Planck constant in super-model theory, and how does it appear in the G15 PMN formalism?

A. The role of that constant is roughly as in the typical thinking around such phenomena: it's an organising whole factor when any energy is manifest, anywhere. The fact that Planck's constant is a principle is shown rather clearly by the phonon experiments, in which one finds that even the waves that move through a manifest medium like a crystal arrive, when they do arrive, spotwise and in spots related to the size of this constant.

In the G15 PMN formalism as here presented for elementary quantum physics experiments, we aren't concerned with trying to transcend this constant (though, theoretically, it is just a level). Instead, we regard it as to be understood throughout, for the entire set of experiments and all those which are related to them, that any measurement of energy involves a whole multiplum of Planck's constant, and that the de Broglie relatiionship relating frequency to energy with Planck's constant as factor for pilot waves apply.

Q. And what are these pilot waves again?

A. If you look at the de Broglie vs Bohm text [mentioned in the intro text up front], we suggest there the following usage of the phrase: any interpretation of the quantum physics phenomena that involves giving a some sort of reality to something underlying the probabilities that can be are calculated by 'quantum calculus'. It will be noted that de Broglie called for going beyond initial simplisitic identifications of this reality with what the equations show as they stand. He then went on to sketch a pathway he called 'Double Solution'. We apply his general idea--at a general level--but stick to the established language of using the word 'pilot wave' for whatever-it-is that underlies the probabilities, whether along one set of ideas or another set of ideas.

Q. Okay, that was the answer to the scholastic folks. What is the intuitive picture we can have of pilot waves?

A. Intuitive picture? A pulsating field of something more finely woven than any particle and any bit of measured energy that surrounds and penetrates and guides and is guided by all particles. And sometimes this field, this pilot wave, is guided by a higher pilot wave, and informs this higher pilot wave.

Q. Is this the super-model?

A. Yes and no. Yes, a pilot wave is a super-model, or, we can say, an SM field, or a super-luminal organising field, --SOF, we can call it also. But the pilot wave idea is from bottom up. The super-model theory starts with the idea that what we have is a moving mesh of super-models, some taking the role of space, some taking the role of particles, some taking the role of pilot waves guiding the particles, and a whole host of others taking the role of providing a complex organisation at higher levels of all the processes herein. So a super-model is a much more general concept than the pilot-wave.

Q. Is the super-model concept beyond or confined to Planck's constant?

A. At the level we explore it here, Planck's constant is absolutely dominant. There is another level of physics in which we go to several more, several subtler levels.

6. Double Slit Waves With Rotating Quantum Vectors
  6.A. Classic Water Waves Through Double Slits
  6.B. Rotating Vector of Super-model Mapping Double Slits
  6.C. Quantum Process Of Particles Through Double Slits

6.A. Classic Water Waves Through Double Slits

Q. If we are going to model double slits, we're going to need a lot more positions than just a handful, isn't that so?

A. Absolutely. We need at least something like 900 positions, to have a chance of watching waves and stuff. Now, when water waves pass through two slits, and the wavelength of these waves are in proper relationship to the size of the slits and their distance, we get the interesting so-called 'interference' patterns--the small ripples that come as a result of the interactions of the two branches of the waves, as it were--that are so appealing to the senses. When we speak of quantum phenomena, everything about the waves are subtly more complex, both in theory and in how we formalize even the simplest case of them, and in how they relate to the particles--and this touches of course enormously upon our whole picture of the reality. So all this we go to in part B of this chapter. But first we have a look at how more classical waves can be given a formal illustration--for instance water waves, as said.

Q. How do we line up all the nodes?

A. We make a loop for them. We have to have a strategy for showing the positions. Shall we have a graph?

Q. Let's have a graph. This is about visualization, after all.

A. Right. Then, let's have the completing node showing the graph. In the latter part of this chapter we'll have it to show both wave and particle. The graph we can show can be a simple matter of lines from one position to the next; with small filled squares for the particles in next part; and with some broad lines where the barriers (in which we have two slits cut) are to be; these thick lines reflect that the energy is so high that the graphing algorithm interpret it not as wave, but as a wall of some sort. We can then have a 30 times 30 type of loop, and find a way to represent some energy levels by some sort of raising of the curve up, and slightly to the right, with the hightest-numbered positions to the right somehow.
Sounds good enough?

Q. Very much so. Where, by the way, will we store the info in the nodes about the quantum type of waves and such?

A. We'll look into it. You're right in assuming that we should make allowances for more stuff associated with each position. We can do each formalism in more than one way but that's one approach. At present, we are using the first value of the first triplet for energy. It could seem natural, in this case, to use the second and third value also. (In the case where algorithms are used in the node, we can use second and third triplet and such.)
  A bit of programming is done here. Eg, a loop for making the positions and making the barriers with the two openings also. These loops aren't using any card access; they're only about setting up a RAM structure, and so it's fine in the FCM context to run them while the program is being compiled in and performed.
  So here we go: classical water waves through two slits illustrated formally; in prep for the quantum version of double slits in latter half of this chapter.
  By the way: whereas some form of classical waves are

incorporated into the code of the Third Foundation, we spell out much more explicitly when it comes to waves of a more quantum kind. This is because we wish to see more of what is going on in the computer, since this is nearer to the core of the scientific theory in question. That's why there's a lot more formalism in the next half of the chapter--but it's mostly a plain rewriting of the classical wave functions, just as Schroedinger's quantum wave equation was a rewriting of the classical wave equation.

Alright! Here, then:

```
<k3000>
maxfundnum=    &&
10000.         fundnet
150            kl
maxfundnum
mm             150
200            maxfundnum
ad             fundnet
sz             wwyymatrix

<k3001>
fundnet        |up a fcm
lk             |network with
thisfcmnet     |a good amount
kl             |funds; here:
               |for super-
|At previous   |model theory
|and next      |formal
|card, we set  |illustrations

<k3002>
maxfundnum     fcmindqty
50             basisthis
ad             maxfundnum
sz             thisfcmnet
               lk
&&             fcmindex
fcmindex       lk
kl             initwarpindex

<k3003>
mkdbleslit=    ll:35
|double slits  fundlevel
49             dancebeneath
t4             |We need only
1000051        |y to 35 here;
setfundlevel   |At display
1000000000     |here, y is
tx             |rightways

<k3004>
ll:30          m1
|Double slits: 9
|  10,9   #1   eq
|  18,9   #2
|startwave:    m2
|  14,0   #1   10
|wavetag:pos40 eq
400000         n?

<k3005>
m2             sh
18             jx
eq             f
n?             |Carrywave:
an             1234
an             0
n?             ^smposition
d2             fneasyact

<k3006>
|Medium wave   4
|value,        47
|normal        adjustfund
```

```
|wave height
|is 400,000;   m2
|2nd triplet:  dc
13             m1
adjustfund     pos30x50

<k3007>
               50
               adjustfund

               i2
               m1
               pos30x50
               51
               adjustfund

<k3008>
m2             m2
m1             i1
dc             pos30x50
pos30x50


52             53
adjustfund     adjustfund

<k3009>
m1             m2
34             1
eq             le
|Handle edges! or
m2             |Here, y to 35
28             |and   x to 30
ge
or             n?

<k3010>
d3             1
basis          40
j4             14
adjustfund     0
lo             put30x50
lo             1
|tag the       40
|spreadnodes:  10

<k3011>
9              mkdbleslit
put30x50       995000
|doubleslits   setfundlevel
2
40
18             &startwave&
9              3140
put30x50.      fnactcherish

<k3012>
0              0
3140           pos30x50
1              50
               adjustfund
               1
^fnstartwave   47
fneasyact
14             adjustfund

<k3013>
1200000        0
setfundlevel   2300
               0


&graphsomefns&
2300           ^fnshowgraph
fnactcherish   fneasyact
```

```
<k3014>
longtxt*       cliptrail
Symbolic view
of classical w
ave 'interfere
nce' through d
ouble slits
               fcmheadertxt
*txtcomplete   kl

<k3015>
longtxt*       cliptrail
Fig. 2.A: The
divided wave '
self-interacts
'.        FCM
 Loop#
               fcmlooptxt
*txtcomplete   kl

<k3016>
               &fcm&




               zz
```

Symbolic view of classical wave 'interference' through double slits

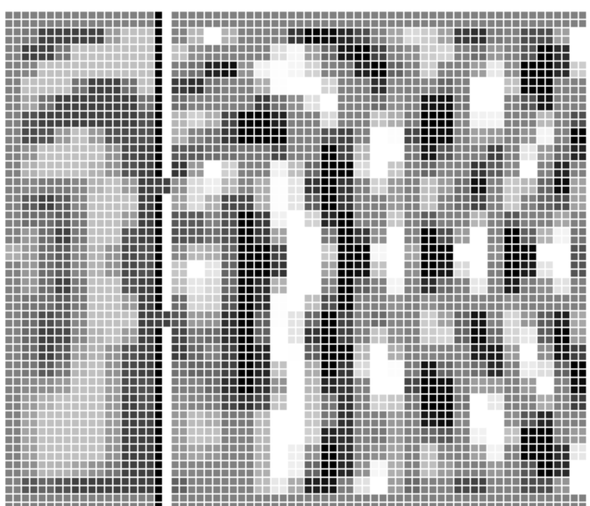

Fig. 2.A: The divided wave 'self-interacts'.   FCM Loop# 420

[In paper form, a sample of output is reproduced as an image. In the TF, the FCM comes alive on the screen when you type ^k3000 and, on the next line, cc. Press then <ESC> button when you've seen enough of it.]

Q. What if I say: I cannot make head or tail or this.

A. Then I can say: just work with it, with the type of programming G15 PMN is all about, and with the type of programming that the FCM part of it is all about--and it will become more and more clear. It's just a question of many small steps. No giant leaps are necessary; and it's not a question of having to push through some five or eight years with memorization of formulas--in that way, it's entirely unlike mathematics.

Q. How important is it, say, if one is an artist or a philosopher or merely interested in these fields, to get to grips with this kind of code?

A. Follow your interest. I would suggest that it is a bonus (if that's the word I want) to get some contact with G15 PMN even 'from a distance' both for art and philosophy --including for the art and philosophy of dance. It's a dancing, poetical way to organize some thoughts.

Then, it's surely a motivating factor to know that if you simply gave it more time, you could also approach themes in physics and do so very seriously and beautifully by the very same language as you can write a simple game in.

Q. Good. Now explain, in as simple words as possible, how the funny waves and their ripples, the interaction or 'interference' or whatever we call it, arose in this example.

A. Right. We set up nodes here, 30 times some 40 or 50. (We can use the 30x50 concept even though we need somewhat fewer here--also in the naming of the functions.)

Each one of these has some storage place for whatever wave and wave direction that passes it. So it can allow two waves separately to cross the point.

These waves are but numbers going up and below a medium level--in next chapter we get a kind of rotating numbers enabled, what we in TF call 'pathfinder numbers'; these are the types of things that the conventional equations use socalled 'complex numbers' for.

If there's only one slit, the wave spreads after that slit and that's that. With two slits, one wave will as if split into two separate 'fans', spreading out and the interaction arise when waves add on top of each other at some points, and cancel each other at other points.

So when we have quantum experiments, it's something of a kick that waves do arise when one would think, if one starts with a yet earlier form of physics, that we have mostly only particles. So the fact that one can push small bits of particles towards two slits and get a wave pattern when one counts up the arrivals at some distance on the other side--given a lot of premises--is a fundamental experiment showing the importance of the quantum-type of processes in reality--even if the experiment itself shows finely little about what the theory of the situation should be.

In the simple illustrations of a formal kind that we provide to our super-model theory, which we will spell out more about as we go along in the next chapters, we use nodes very simply; but it should be understood that such simple uses of the FCM nodes, or 'funds', or 'foundries', as it is called within the program, is capable of much more refined expressions.

In the simple illustration, we tag each slit with the function that the slit is to spread the wave; we tag each node with up to two wave directions; and divide the wave directions into four general directions forward (and, if called on, four general directions in reverse).

Q. Is that why the waves are a bit jagged?

A. Yes. They are jagged because we have implemented here only as much directions as necessary to see the core form of wave interference; and only as many nodes as to see some kind of wave--not smooth at all, and made jagged also because of the few directions, and such--rather than adding up so many nodes that the resolutions get so high that the picture won't say anything. It is by lowres we get the picture to tell us something quantum.

And this is a typical characteristic, I think, of doing suitably successful theorizing in thought--where we naturally easily imagine smooth waves and so on--and wish to invoke a finite, consciously and beautifully limited formal illustration of some features of this theory. The mental image is smooth, continous, and hints of infinity; the formal element illustrates some features more mechanically.

6.B. Rotating Vector of Super-model Mapping Double Slits

Q. All right. You have talked of 'pathfinder numbers', in the previous part of the chapter, promising that they'll make their entrance in this part of the chapter, where we come to quantum processes more closely. Now what are these and why do they come in here?

A. A pathfinder number is a rotating arrow or vector that can be added to any other such in a way that is similar to how water waves can add--or sometimes cancel--each other, but a little more complex. Water waves, when they are smooth, when the waves don't break, are complex enough; but clearly, they have an up-and-down-and-up finesse about them when it comes to adding and substracting them. So two crossing waves may add up or cancel or both may be below and become doubly so.

The same happens with PF numbers, pathfinder numbers, only that these can move sideways as well. So they have an extra dimension. They can, in this rich world, organize things a little more richly; or provide a more tight structure around rather complex events.

The way we do PF numbers is not by means of strict addition of the type found in branches of conventional mathematics, in which a sense of infinity is associated with the very definitions of numbers such as the radius of the unit circle. The approximations used in conventional mathematics are so as to strive forever more towards some illusion of absolute continuity and perfection in how things are added.

In contrast, the PF numbers are simple whole-number algorithms that take a whole number version with just a handful of digits of the trigonometric sine, cosine and square root, and the reverse of sine and cosine, so as to provide some degree of rotation without pretending that it resembles any 'continuity' idea at all. Rather, it is consistently rather low-res, as we can put it. But the point is that it has some two-dimensionality about it, and it is consistent, and a simple algorithm, easy to decode and no more complicated to look into than such as the formula used to look into the length of triangles.

You ask 'why' they come in. That has two levels of answer to it. Empirically, the phenomena needs some stuff like this, otherwise we won't get around to do any clear setup of any formal stuff that can have correlations as found in all the quantum cases, mostly. Theoretically, in the super-model theory, it makes sense that some type of number--in this case, the pathfinder or PF numbers are stored as 0..1000 as for intensity, and 0..6282 as for rotation factor (6.2832 is twice 3.1416 and this is about the size of the radius in the unit circle; but the unit in G15 PMN is ten thousand instead of one), should be a coin of interaction between these vastly different types of super-models. It makes sense that this plays on the ideas of the circle and the triangle for we are oriented towards gestalts, shapes, wholes when it comes to a more advanced level of super-model theory. This is the simplest way it can play on it. But we have to remember that the super-models can relate to one another in quite complex ways in addition; and then other factors, not reduced to such a number, are more significant.

Q. In quantum mechanics, the equations at some points lead to probability densities, as they are called; the density is then converted to conventional probability also by means of squaring it. Does this apply to the pathfinder numbers, the PF numbers?

A. Yes. Empirically, this is one of the patterns found to apply all over the place. We find that 'squaring' arises in various places,--the multiplying of a factor with itself--not in the least where energy gets manifest. In super-model theory in its present form, we satisfy ourselves simply by asserting that squaring, as a simple arithmetic idea, plays a role several places when we deal with the numerical correlations as measured. The light speed factor, Planck's constant, and some other factors and features like this, are part of the wholeness of the manifest universe; so also with the squaring of the speed of light in correlating energy and matter, and the squaring of the rotational two-dimensional numbers to go from the internal form of the probability density--or PF intensity--to a measurement probability.

Alright, let's begin discussing code. The code at k:5000 is, fundamentally similar to all quantum code in the remaining chapters in this physics text. It is explained simply as this: it is all the code in the TF platform for classical waves but with the necessary changes to get the PF numbers to do the work instead of ordinary numbers. The PF numbers are defined by operations PH, AP, PA, and PW, which are in source code in the predefined (PD) part of G15 PMN for the Third Foundation.

When we come to the features of light and gravitation as in Einstein's work we import the numerical correlation ideas he proposed but this is clearly a 'neo-einsteinian' theory in that although we appreciate Albert Einstein's notion of the theoretical view as central and core in a physics theory, we have different ideas as to the role of the speed of light. So we suggest how correlations of a similar kind can be exhibited without going into exact details, just showing that it is a plain numerical job to fine-tune, if one wishes, the FCM loop to produce whatever exact correlations that he produced.

Q. Why, again, didn't you include the quantum types of waves with the core FCM set of functions? When you have the classical waves there?

A. Because the introduction of the pathfinder numbers--to actually put them into a loop--requires first-hand attention. It's not a question of pre-done work. It's something to be done with the utmost care of the careful scientist and the enthusiastic programmer. Besides, we want to see the formalism spelled out. What's the point of just calling on an inbuilt function in a library and say, "That's it! That's quantum?" That's not the way of doing first-hand science. The way of doing first-hand science is to spell it out--in the "low resolution" of real code--and say, "Here, that's something quantum for you--see those PF numbers there, how they interact to produce this" etc. So if we suspend further questions for now and look at the code as best we can. The part C code, you should notice, has two features not in part A of this chapter: here, have a particle, not just waves; and we also have a measure of the arrivals of particles on the right side of the image generated as you run it, or view a sample run of it when you read it in a book. This code, in part B of this chapter, is the bridge to the code with particles.

So, in the programs that follow, the TF code for classic waves has been modified--eg a phrase like 'pwav' is used to remind us that pathfinders are used. In the first program using this, for clarity, we have not yet put the super-model wave to use: it merely 'maps' the territory, ready to do its subliminal guiding of a particle should it enter. This, you notice, is a discussion of particle that fits with the principle of both Einstein and de Broglie of talking about reality and visualizing it. But it breaks with the assumption Einstein sought when it comes to locality. Yet, since we are doing this as algorithm, we are getting a locality at another level, we might say: not at the surface level of our dimensions and our experience of process or duration, but at the level where all this is modelled. And so we have rationality intact, it is only that the reality model is much more complex than that originally postulated by Einstein. In that sense, then, we can say that this is a kind of neo-einsteinian reality picture, informed more by the quantum phenomena than by the first interpretations of these phenomena as according to Bohr and his group.

As the broader picture we have here, we've particles which are not only guided by usual background field fluctuations and their own position and momentum, but also by the pilot wave. Each particle is a super-model; the space-matrix are supermodels; the pilot wave also; but only some of these are associated with manifest energy. In informal terms, we are having a theory in which a great deal of what goes on is underneath, so to speak, the manifest level; but the fact that it is one and the same kind of thing both at the manifest and the subtle level means that we have a simplicity of a kind that, although clearly different from Einstein's idea of the continuous field, has a resonance in the conceptual ease.

Since the code using the pathfinder numbers is spelled out in much detail, we wait a moment before introducing the particles--that comes in the code at k:5000. First, we simply let the pathfinder numbers, which are but length and angle, do their work through the double slit and very symbolically, in a low-res way, we get a sense of there being some kind of wave interference here--though it has a very different feel to it than in the classical situation.

Let's bear in mind that the waves next shown are not directly measured by the type of measurements associated with today's physics. They are assumed to underlie the patterns of energy, while being themselves of something more subtle than manifest energy. The assumption of such a kind of subtle energy is a simple one when you see that it not only solves a number of questions in quantum physics, but in a wider spectrum of questions we might have about reality. The notion of 'simplicity', then, is highly dependent on the context and scope of domain and network of other understandings with which we wish to weave our theory. To my mind, it is a very simple and obvious assumption; but I have read works by bohrian physicists who stick to the idea that their foggy ideas of reality is all in all a more simple one because they 'assume less'. But the complexities coming from assuming less of content to reality should be obvious when we widen the scope of enquiry and actively seek coherence also in mind:

```
<k4000>
maxfundnum=    &&
10000.         fundnet
150            kl
maxfundnum
mm             150
200            maxfundnum
ad             fundnet
sz             wwyymatrix
```

```
<k4001>
fundnet        |up a fcm
lk             |network with
thisfcmnet     |a good amount
kl             |funds; here:
               |for super-
```

```
|At previous   |model theory
|and next      |formal
|card, we set  |illustrations


<k4002>
maxfundnum     fcmindqty
50             basisthis
ad             maxfundnum
sz             thisfcmnet
               lk
&&             fcmindex
fcmindex       lk
kl             initwarpindex

<k4003>
pwavfactor=    8
1.             rd
|The pathfind  ts
|nums have     |Toggle sign
|angle->6282   |so motion
|and length    |clockwise
|up to 1000    ^pwavfactor
6283           setfastvar

<k4004>
startpwav=     get30x50
|In:tr#,fnwrp
tx
sh
|Uses node 0,0
42
0
0              ap

<k4005>
               w
               pwavfactor
               ad
               w
               ps
               pa

               t5

<k4006>
j5             50
42             jx
0              wk
0              fnwarp



put30x50       s5

<k4007>
j5
10
i5
kw.
               |A billion or
               |above is
               |graphed eg as
               |a boundary

<k4008>
bringpwavon=   s3
|In:angl pfnum s9
|triplet# fn#  s6
               |pwav=pfnumber
               |wave
fnwarp         jx
tx             10
tripletpos     wk

<k4009>
```

```
1000000000     i9
ge
               jx
se             i3
               ad


ex             pw

<k4010>
42             |'pw' is a
0              |the same as
0              |'pf'--to add
get30x50       |pathfindnums,
i3             |only that pw
jx             |does it in a
ad             |stored
pw             |address, warp

<k4011>
i6

|Angle#
|into it
i3
u2
jx
kw.

<k4012>
carrypwavhere= i9
|In:tr#, fnwrp u2
|Via carrypwav jx
tx             wk
sx             |i4 is angle#
ix
tripletpos
s9             s4

<k4013>
i4
1
8
isnotwithin

se

ex

<k4014>
i9             ap
jx             2
wk             di
t1             pa
|Pathfindnum
|in j1; next,  i9
|easing        jx
j1             kw

<k4015>
jx             m4
wtofnnum



fund30x50
s2
s1             dh

<k4016>
i4             i4
j1             j1
ix             ix
f1             f1
i2             f2
tn             pos30x50
```

```
pos30x50       bringpwavon
bringpwavon    ex

<k4017>
i4             i4
j1             j1
ix             ix
i1             f1
f2             f2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k4018>
i4             i4
j1             j1
ix             ix
m1             i1
f2             f2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k4019>
i4             i4
j1             j1
ix             ix
m1             m1
i2             f2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k4020>
i4             i4
j1             j1
ix             ix
m1             m1
i2             m2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k4021>
i4             i4
j1             j1
ix             ix
m1             i1
m2             m2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k4022>
i4             i4
j1             j1
ix             ix
i1             f1
m2             m2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k4023>
i4             i4
j1             j1
ix             ix
f1             f1
i2             m2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex.

<k4024>
spreadpwav=
|In:fnwrp
```

```
|via
|carrypwav;
|only when
|luxuryvalue
|#40 has
|triplet#;

<k4025>
tx              wtofnnum
40              fund30x50
jx
wk
tripletpos
sx              up
                s2
jx              s1

<k4026>
10              i1
jx              u2
wk              i2



                pos30x50
t5              s5

<k4027>
f1              m1
i2              i2
pos30x50        pos30x50
s6
i1
i2
pos30x50
s7              s8

<k4028>
j5              1
ix              ix
                u2



i5              i5
fnsetval        fnsetval

<k4029>
j5              2
ix              ix
                u2



i6              i6
fnsetval        fnsetval

<k4030>
j5              3
ix              ix
                u2



i7              i7
fnsetval        fnsetval

<k4031>
j5              4
ix              ix
                u2



i8              i8
fnsetval        fnsetval.
```

```
<k4032>
carrypwav=     1000000000
|In:tr#,fnwrp  ge
tx
sh             se

10
jx
wk             ex

<k4033>
40             d3
jx

|pos #40
|shows
|spreadpoints  jx
wk             spreadpwav
n?             ex

<k4034>
ll:2           &carrypwav&
i1             1969
jx


carrypwavhere

lo.            fnactcherish

<k4035>
graphpwhere=
|in:v1,v2,x,y


s4
s1
t9
t1

<k4036>
j1             i1
1000000000     i4
               graphboundary
lt



d4             ex

<k4037>
i1             w
i4
|'ni' converts sh
|quantum       |square it:
|prob density  ni
|to probabilty |permille:
j1             500
ap             pm

<k4038>
               w

               sh

               ni
               500
j9             pm
ap             graphfnval.

<k4039>
graphpwavfns=  s5
|Fnact shows   i5
|pwav funds    n?
tx
```

```
sh
10             se
jx
wk             fcmdrawintro

<k4040>
i5             mo
up             ye
10
jx             se
kw
i5             ex
fcmgraphloop
lk             freshsketch

<k4041>
i5             ll:35
makenumber     ll:30
               m2
860            m1
668            pos30x50
               f
               fnmainval
rp

<k4042>
w              lo
fnnextval      lo

               approvesketch

m2
m1
graphpwhere

<k4043>
               fcmshowpause
               lk
               activepause
               ck

               se

               fcmmaybepause.

<k4044>
mkdbleslit=    ll:35
|quantum ver   fundlevel
49             dancebeneath
t4             |We need only
1000051        |y to 35 here;
setfundlevel   |At display
2000000000     |here, y is
tx             |rightways

<k4045>
ll:30          m1
|Double slits: 9
|  10,9   #1   eq
|  18,9   #2
|startwave:    m2
|  14,0   #1   10
|wavetag:pos40 eq
basis          n?

<k4046>
m2             sh
18             jx
eq             f
n?             |Carrypwav:
an             1969
an             0
n?             ^smposition
d2             fneasyact

<k4047>
```

```
                4
                47
                adjustfund

                m2
|2nd triplet:   dc
13              m1
adjustfund      pos30x50

<k4048>
                50
                adjustfund

                i2
                m1
                pos30x50
                51
                adjustfund

<k4049>
m2              m2
m1              i1
dc              pos30x50
pos30x50


52              53
adjustfund      adjustfund

<k4050>
m1              m2
34              1
eq              le
|Handle edges! or
m2              |Here, y to 35
28              |and   x to 30
ge
or              n?

<k4051>
d3              1
basis           40
j4              14
adjustfund      0
lo              put30x50
lo              1
                40
|spreadnodes:   10

<k4052>
9               mkdbleslit
put30x50        995000
|doubleslits    setfundlevel
2
40
18              &startpwav&
9               3140
put30x50.       fnactcherish

<k4053>
1               0
3140            pos30x50
1               50
                adjustfund
                1
^fnstartpwav    47
fneasyact
14              adjustfund

<k4054>
1200000         0
setfundlevel    2300
                0


&graphpwavfns&
```

```
2300           ^fnpwavgraph
fnactcherish   fneasyact

<k4055>
100            |for
400            |startpwav
pa
42
|Luxurypos#42
0
0
put30x50

<k4056>
longtxt*       cliptrail
Rotating quant
um vectors in
supermodel map
ping double sl
its
               fcmheadertxt
*txtcomplete   kl

<k4057>
longtxt*       cliptrail
Fig. 2.b: path
finder-numbers
 are used as v
ectors.    FCM
 Loop#
               fcmlooptxt
*txtcomplete   kl

<k4058>
10             &fcm&
fcmgraphloop
kl



               zz
```

Rotating quantum vectors in supermodel mapping double slits

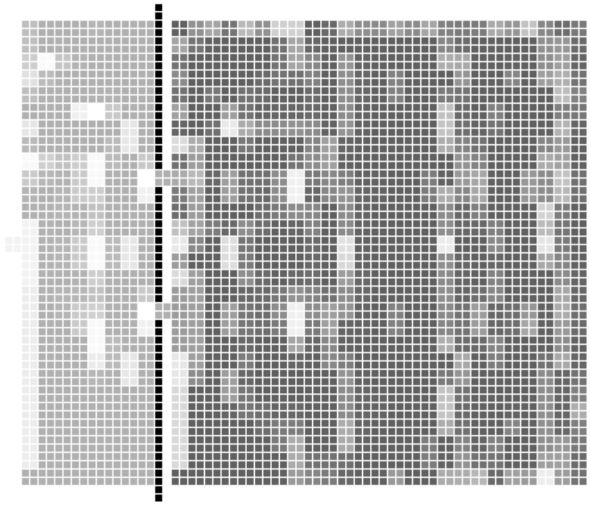

Fig. 2.6: pathfinder-numbers are used as vectors.   FCM Loop# 120

[In paper form, a sample of output is reproduced as an image. In the TF, the FCM comes alive on the screen when you type ^k4000 and, on the next line, cc. Press then <ESC> button when you've seen enough of it. In this code, it's also possible to press <SPACE> to pause it.]

Q. I have noticed that when you write about physics, the word 'coherence' comes up quite often. Before we go into this quantum double slit experiment--or super-model double slit experiment--can you say something about how you use that word? And is, for example, the pilot waves or super-model waves in this example coherent, in some sense?

A. Yes. Now--and this is a point I once discussed a lot with a Norwegian physicist, Astri Kleppe,--physicists have perhaps never gone deeply into the definition of coherence and I think this is a challenge (although some might argue that it is a too essential thing to be ever 'defined').

One of the most industrially well-known uses of the word is in the definition of laser light--laser light is defined to be 'coherent light', in contrast to light that has all sorts of wavelengths and phases. So, in that context, coherence means that the wave in question is, so to speak, attuned to itself; that there's a smoothness and a togetherness so that it acts as one, belonging together with itself. And this touches on the natural understanding of 'coherence' in the dictionary. Sometimes, in natural language, coherent refers to a persons sound, sane, normal state of mind whereas a phrase like 'incoherent babble' refers to a break-down of intellectual clarity. But when we go to philosophy, coherence may mean wholeness and freedom from deeper inconsistencies in patterns of thinking. So it's quite a concept.

The way I feel it is making most sense to use the word is to state that the super-models in question are acting so that their effects aren't going to cancel themselves out at all points. And, so, yes, the simplest case of coherence is then that we have a double-slit experience, in which the wave interference presupposes a degree of coherence of the initial wave and that the envinonment isn't too full of factors of noise and fluctuation, as seen from the perspective of the initial wave; also, the sizes and relative distances of the slits must be in alignment with the frequencies involved--all this is also a question of coherence. But we'll see that a vast expansion of the range of phenomena covered by the concept coherence makes sense--in the next chapter.

Let me add that it is quite typical of people doing rather fragmentary thinking that they try to fragment the very concept of 'coherence'. It happens all the time. It is the lack of understanding of the deeper significance of coherence that has led physicists to speak of three groups of 'quantum wierdness' as three distinct groups, instead of as various forms of quantum coherence: you see this when they divide 'entanglement' from 'tunnelling' and divide both these from 'coherence' (each word prefixed by the word 'quantum').

Q. All right. Another thing, before we look at the code: I have been thinking about what you said about Einstein's insistence on visualisation. It seems to me that some could argue that, as it were from an industrial viewpoint, science doesn't need more than equations and some rules of thumb for how to apply them. What do you think?

A. An empty-minded science? Surely, when we do programming then as long as the programs work out in the contexts in which we employ them, we don't have to change them: we don't even have to understand them, we just use them. But once a program doesn't suit the environment, it must be worked on, and this must happen according to understanding and understanding requires some degree of clear visualisation of what the program is doing, at each step. If we don't have such visualisation, we have a second-hand approach to the program. Factories which produce transistors don't have to understand transistors, only know how to treat the silicon and the boron and so on, but science is, per definition, about knowing, and it is by knowing, which includes visualisation, we're able to say that we have knowledge for real; and this knowledge for real is necessary when it comes to checking the wholeness --and indeed also coherence--of our formalisms.

Q. Right. And, with Kurt Goedel's famous work on incompleteness, it would seem strange to try to soldify anyone set of formalisms. We must always develop more; and apply our intuitions.

A. Exactly, and this is a theme we'll return to in the last chapters in this physics booklet. As long as we are giving the human mind a role in science--and I think most people will clearly agree that the point of science is that it is an input to, and exists, and is developed by, the human mind, or our minds,--then understanding of the wholeness of what underlies our formalisms must have a grand priority. And in understanding, some degree of visualisation, even if rather abstract, is natural and essential. This is science; and if physics is part of science, as it is supposed to be, then what applies for science must apply for physics. Without visualisation, there is no physics. And that's an objective statement of fact given all the most considered philosophies of science that do exist.

Q. As for the code. I have some quick questions.

A. Go ahead.

Q. How exact is this pilot wave relative to actual double slit quantum experiments?

A. The formalism is only meant to illustrate some features of the theory, how it could be done. It admits of all sorts of tweakings to fit with the enormous many variations of empirical studies. The formalism shows the type of algorithms and the type of connections between the components of the matrices involved that are to be expected if you wished the code to correspond to empirics. Any concrete situation may be radically different in many ways, and yet, when worked on, the claim is that this is the main formal features that are needed.

Q. In the next part of this chapter, we bring in particles --but here we only have the underlaying pilot wave or underlaying supermodel. Why is it changing? Shouldn't it be static?

A. No, it shouldn't. Very few things connected to the subtle energies of this universe are in the least static. It is true that the numerical predictions of conventional quantum theory just suggest a probability density wave for such a situation, and leaves it at that; but one cannot infer from that scarcity in its formalism that the underlaying reality behaves that way.

Q. How, then, do we go from it to a particular prediction of arrivals of particles?

A. Before I answer, let me say that the word 'prediction' is, in my opinion, used too quickly in conventional science. It is a word brought in to make it sound as if the scientist is always working out of general, pure principles and then only later on looking at empirics. In actual fact, there's a rich interplay between the many levels of theory working, formalisms, and empirical studies. And then mostly, when a scientist say 'predict', it would be more proper to say, 'we would perhaps expect' --given the theory and many additional assumptions. Because the pathway between theory and empirics is always a long and winding road.

One of the natural assumptions when working with hidden variables or pilot wave theories of any sort, is that the universe is full of quantum fluctuations. In programming languages, we can speak of RFFG--relatively free fluctuation numbers, which aren't in any way 'random' (although in conventional computer science that has been the typical word). Quantum fluctuations permeate the background, and subtly alter the initial conditions when particles are arriving on a scenery. The supermodel may be relatively static, but it doesn't have to be built up that way--it can rather be understood to settle, after a certain number of permutations, so as to yield directions to the particle. This we'll see in the next part of this chapter, part C, with the code at k:5000.

Q. When I look to the left of the double slit, when, for instance, the FCM loop# is 120, it seems like there's a wave pattern already there--not just to the right of the slits.

A. You are right: and in some cases, in some empirical setups, with some particles or bits of matter, given certain energies and sizes of slits and distances, we could get such a pattern. Yet, at all points in this setup we have several uses of the rotating vectors, the quantum vectors, the pathfinder numbers, and so it isn't strange that we get wave patterns of several kinds and so a less obviously organised impression than in the first classical wave symbolic example we looked at in an earlier chapter. Nevertheless, there is some interference that is driven by the two slits, also related to the pathfinder numbers, and this is the type of thing the theory says goes on in reality--this is part of how super-models organize themselves. But in order to match some empirical setups, one would vary this or that part of the formalism so as to match other types of double slit experiments--perhaps even drastic variations, and yet the G15 PMN approach to the FCM matrix very roughly as indicated here will still be right.

Q. It is much code, but I suppose one can argue that every bit of it is simple in itself.

A. Yes, exactly. Less quantity of code wouldn't convey the adequate complexity of the situation empirically involved. But there isn't any 'magical' symbol introduced here. It's just more of the same type of stuff that we had in the beginning; and indeed, the pathfinder numbers themselves are just more algorithms of the same type also--combining simple whole-number forms of square root, inverse cosine and such to get an easy way of adding vectors and cause them to rotate. There's nothing in this code that a plain programming manual doesn't explain. What it means, what it signifies, is another question: and our framework, then, is that of a comphrensive, complex informal theory of super-models on which we wish to shed some light by illustrating some features of it formally in this way. It could be done in very different ways, or by means of a heavily modified FCM-like type of code. But this is what comes natural and easy given the presence of a first-hand algorithmic programming language like G15 PMN. And the fact is that we are, by it, able to discuss more of the content of the theory than if we had invoked any esotheric mathematics and its funny symbols. Given the fact also that modern physicists are rarely discussing any of their intricate mathematics without relying on computer approximations and permutations, it's also an approach to physics that is more first-hand, direct, frank and honest than the reliance on the worn-out, little-understood symbols of mathematics conventionally used to illustrate theories of quantum phenomena, such as the Hamiltonian function.

Q. Agree. Shall we bring in particles, then?

A. Let's! Here, we follow the convention of dividing particles into two main classes, in the usual cases. These are named after physicists. One class is light-like, the bosons: they can, as seen from a certain resolution of measurements, occupy the same positions in space (although we shouldn't take this too literally). The other class is matter-like, the fermions. The latter don't accumulate in the same positions, but want more space for themselves. In our next illustration, which is purely abstract and merely meant to elucidate some more features of the super-model theory, we display particles that sometimes occupy the same position in the matrix. For convenience we call them, then, bosonic.

6.C. Quantum Process Of Particles Through Double Slits

Q. The next formalism is much larger than the previous. Why?

A. It isn't really prolonging the overall set of functions all that much, when you recall that the classical wave stuff is all incorporated into the FCM, which is part of the G15 PMN through the Third Foundation. It is true that it is larger than the previous code, but that's just because we not only have to introduce particles, as new nodes, new super-models, that relate to the existing wave-like pattern of the super-models, but also because we are wanting to graph a measurement of the results. That's simple stuff but clearly it requires a few dozen extra cards of code here and there.

Now, let's bear in mind that to create an empirical situations showing an interference pattern of the very symmetric kind that has been shown much in connection to classical quantum theory, requires a lot of fine-tuning. Since we are here operating without the idea of a continous space--rather, space itself has a resolution--and since we here show only a few such space-nodes at a time--in the hundreds, or thousands--and since we introduce only the barest minimum of algorithms to show some ideas inherent in our much more comprehensive theory, we do not try to impose a perfect smooth curve symmetry of any kind.

What is to be noted here is this: the particles, when moving in a super-model field, having fluctuations of some kind--and here we have manually tuned these fluctuations to provide some degree of symmetry--do show patterns that would not be expected simply if particles were fluctuating a little bit and then getting through two little holes. Rather, there's a tendency that they are at several places, and less tendency that they are at several neighbouring places--rather than such a spread-out curve with just two wave-heights that one would expect if there were no pilot wave or super-model here.

Q. So you are saying, the key point here is that the particles, though they arrive individually at the spots on the right where they are measured, in fact act as if they are representing some kind of wave that interacts or interferes with itself.

A. Yes, something like that. The formalism merely shows how this sort of thing MIGHT be done in the super-model theory. Our emphasis is, number one, the meaning of the theory in our minds, and, number two--after all this meaning has been clarified and structured and talked about and enquired into--that we have, at our disposal, a type of formalism that lends itself eminently to displaying this or that abstract feature of reality as indicated by the light the theory gives.

Here, the measurement instrument is not introduced as an object with which the particles nonlocally interact--we are simply checking out how they would proceed if the two slits are there, from the god-like standpoint of having a model of them. In actual fact, the placement of a measurement device, made at the same Planck level of manifest energy as that which it measures, into a measurement situation, creates of course a strong change of the super-model mapping the situation, and it will affect the particles nonlocally. But we don't need to spell this out in our formalism in order to get a hold on the fact of there being some kind of interference of the particle waves through the two slits (and in that sense, the formalism we are working with is far easier, more pliable and almost infinitely more flexible than that which characterised Bohm's measurement theory, and which is an integral part of that which some refer to as the de Broglie-Bohm theory).

There is in the code as follows some fluctuation--this is shown by the predefined two-letter word AF, which can more or less short for 'a fluctuating number'--for the initial position. Due to how we have lined up the code, there's a little bit tendency of the map to favour the slit that is beneath the other one; so we have introduced a tendency, just a slight one, that the initial position is at {13,0} rather than {14,0}. In addition, as each particle moves, it looks to the field up front, the field left up front, and the field right up front, and to each of the intensities found here--after squaring the field by the PD function NI--we also find the AF function.

When you want to see the curve in this program, then, you start the graph, see how the particles move when each FCM loop# is shown, then click ENTER several times and wait. That gives it a chance to spin ahead to a much higher loop-number. When it is into the thousands, the curve begins to reflect something of pattern of the guiding super-model.

Q. But the influence of the guiding super-model is not due to a conventional type of force acting on the particle. Is it, rather as Bohm did in his equations, added to the classical forces?

A. I beg to differ from how he did it there: for in the super-model theory, there is only, ultimately, one force, and that we call PMW--the principle of a tendency of movement towards wholeness, and we discuss in upcoming parts of the text. But broadly, the PMW is so to speak the justification for all the structure here. And whatever is here, is also a super-model. So we don't add something very quantum to something very classic. Rather, we have various super-models acting upon each other, modelling or mapping one another, and relating this data to one another. This is is the general framework of thought which I propose is the right one to map the thoughts and insights we have gathered in the two thousand years of physics work since Aristotle began it.

Now, in this particular code, it is true that there is some formalism that is suggesting itself to an understanding along the lines of classical or 'newtonian' forces, which in this case are getting the particles to move right, and keep on doing so until they either are absorbed in the boundary or slip through a slit and are absorbed in the measurement area. And it is true that to this which can be interpreted this way, we add something which is more quantum-like. So there's an afinity to Bohm, but notice very clearly that we have at no point asserted that anything of this is a conventional, newtonian force. We have simply provided an illustration regarding some movement patterns in which there's a momentum that's sort of understood.

This shows an interesting feature of this formalism relative to conventional mathematics used in modern physics, and it is that the G15 PMN formalism, as used here, has a new and unique level of abstraction. One would easily have thought that things get more concrete when one brings in the idea of algorithm, but, as it turns out, they get more general and more open to interpretation.

Having said that, once we would like to apply this to a highly concrete situation, say, with a magnetic field--a classical field, rather--acting on something like free electrons in vacuum--then we would have to make it all more concrete at several points, if we wanted to do it all formally. And yet, we would then have the same type of FCM nodes, which are super-models, to structure the presence of the magnetic field and the properties of the electron including its momentum in this model. And then we would find that the electron has fluctuations; that these fluctuations aren't measurable all the way without acting on these fluctuations so as to change them nonlocally--thereby HUP, the Heisenberg Uncertainty (or Indeterminacy) Principle, in our form of it--and that these fluctuations, significantly, are not quite free but forced alongside the pathways of the guiding super-model. That is to say, the concept of the 'random quantum fluctuations' (if there ever were such a concept) becomes instead the notion of 'relatively free but also relatively coherent quantum fluctuations'. These are the presumed background activity of anything we theorize about here, and the forces of the more classical kind are merely strong super-models acting on top of these fluctuations.

Q. But then, if I understand you correctly, you are saying that the classical forces need not, in some situations, always rule the day. Because the coherence could be too strong for them.

A. Which is empirically, in a way, entirely compatible with what classical quantum theory says: that there's never zero probability--something may be extremely unlikely (given the conditions they operate with) but it isn't impossible; and if these 'unlikelinesses' are suddenly made coherent then Newton and his forces would have to yield altogether (while we bear in mind that the later Newton believed as much as mysticism and its possibilities for acting on matter as in the forces he had studied numerical as young).

We could go on and on with this theme, and provide pathways to concrete examples, also; but for now, let's just understand that in super-model theory, coherence is the way in which the patterns of super-models can make themselves present more directly in manifest energies incl. matter. And so, in the context of painting ballerinas, or dancing, or meditating, or doing anything, including sex, which involves what we intuitively feel to be wholeness, harmony, resonance, rhythm and indeed also coherence, we are at liberty to explore the philosophy of super-model-inspired theoretical thinking and consider, as possible, that the intuitive experience of coherence is no other than at least some of the forms of coherence we talk about so technically here.

Q. More of this talk!

A. Ah, speculation is much more fun when we have the foundations in order. Let's work through all the hard things, including the general relativity stuff, and the goedelian stuff, and then, with a highly abstract clear-cut sense of it all, we do the philosophy of mind, feeling and soul, and all that, with much greater ease. Now, then, the code. It's long, but consider how much it does--particles, the field of super-models, the mapping of the slits, the fluctuations, the measurements, the graphing of the measurements, and even some function-keys to make it easier to study the FCM model.

```
<k5000>
maxfundnum=    &&
10000.         fundnet
150            kl
maxfundnum
mm             150
200            maxfundnum
ad             fundnet
sz             wwyymatrix

<k5001>
fundnet        |up a fcm
lk             |network with
thisfcmnet     |a good amount
kl             |funds; here:
               |for super-
|At previous   |model theory
|and next      |formal
|card, we set  |illustrations

<k5002>
maxfundnum     fcmindqty
50             basisthis
ad             maxfundnum
sz             thisfcmnet
               lk
&&             fcmindex
fcmindex       lk
kl             initwarpindex

<k5003>
pwavfactor=    8
1.             rd
|The pathfind  ts
|nums have     |Toggle sign
|angle->6282   |so motion
|and length    |clockwise
|up to 1000    ^pwavfactor
6283           setfastvar
```

```
<k5004>
startpwav=     get30x50
|In:tr#,fnwrp
tx
sh
|Uses node 0,0
42
0
0              ap

<k5005>
               w
               pwavfactor
               ad
               w
               ps
               pa

               t5

<k5006>
j5             50
42             jx
0              wk
0              fnwarp



put30x50       s5

<k5007>
j5
10
i5
kw.
               |A billion or
               |above is
               |graphed eg as
               |a boundary

<k5008>
bringpwavon=   s3
|In:angl pfnum s9
|triplet# fn#  s6
               |pwav=pfnumber
               |wave
fnwarp         jx
tx             10
tripletpos     wk

<k5009>
1000000000     i9
ge
               jx
se             i3
               ad


ex             pw

<k5010>
42             |'pw' is a
0              |the same as
0              |'pf'--to add
get30x50       |pathfindnums,
i3             |only that pw
jx             |does it in a
ad             |stored
pw             |address, warp

<k5011>
i6

|Angle#
|into it
```

```
i3
u2
jx
kw.

<k5012>
carrypwavhere= i9
|In:tr#, fnwrp u2
|Via carrypwav jx
tx             wk
sx             |i4 is angle#
ix
tripletpos
s9             s4

<k5013>
i4
1
8
isnotwithin

se

ex

<k5014>
i9             ap
jx             2
wk             di
t1             pa
|Pathfindnum
|in j1; next,  i9
|easing        jx
j1             kw

<k5015>
jx             m4
wtofnnum



fund30x50
s2
s1             dh

<k5016>
i4             i4
j1             j1
ix             ix
f1             f1
i2             f2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k5017>
i4             i4
j1             j1
ix             ix
i1             f1
f2             f2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k5018>
i4             i4
j1             j1
ix             ix
m1             i1
f2             f2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k5019>
```

```
i4             i4
j1             j1
ix             ix
m1             m1
i2             f2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k5020>
i4             i4
j1             j1
ix             ix
m1             m1
i2             m2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k5021>
i4             i4
j1             j1
ix             ix
m1             i1
m2             m2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k5022>
i4             i4
j1             j1
ix             ix
i1             f1
m2             m2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex

<k5023>
i4             i4
j1             j1
ix             ix
f1             f1
i2             m2
tn             pos30x50
pos30x50       bringpwavon
bringpwavon    ex.

<k5024>
spreadpwav=
|In:fnwrp
|via
|carrypwav;
|only when
|luxuryvalue
|#40 has
|triplet#;

<k5025>
tx             wtofnnum
40             fund30x50
jx
wk
tripletpos
sx             up
               s2
jx             s1

<k5026>
10             i1
jx             u2
wk             i2
```

```
                pos30x50
t5              s5

<k5027>
f1              m1
i2              i2
pos30x50        pos30x50
s6
i1
i2
pos30x50
s7              s8

<k5028>
j5              1
ix              ix
                u2



i5              i5
fnsetval        fnsetval

<k5029>
j5              2
ix              ix
                u2



i6              i6
fnsetval        fnsetval

<k5030>
j5              3
ix              ix
                u2



i7              i7
fnsetval        fnsetval

<k5031>
j5              4
ix              ix
                u2



i8              i8
fnsetval        fnsetval.

<k5032>
carrypwav=      1000000000
|In:tr#,fnwrp   ge
tx
sh              se

10
jx
wk              ex

<k5033>
40              d3
jx

|pos #40
|shows
|spreadpoints   jx
wk              spreadpwav
n?              ex

<k5034>
ll:2            &carrypwav&
i1              1969
```

```
jx


carrypwavhere

lo.           fnactcherish

<k5035>
graphpwhere=
|in:v1,v2,x,y


s4
s1
t9
t1

<k5036>
j1            i1
1000000000    i4
              graphboundary
lt            |Same graph
              |method for
              |particle

d4            ex

<k5037>
i1            w
i4
              sh

              ni

j1            500
ap            pm

<k5038>
              w

              sh

              ni
              500
j9            pm
ap            graphfnval.

<k5039>
graphmeasures=
|In:fn# for
|measure;
|via
|graphpwavfns


sx

<k5040>
ll:28         f1
              ix
              fnay
i1
ix            t5
fnay

t3

<k5041>
              j5
              0
j3            25
0             makefit
25            t5
makefit
t3
```

```
<k5042>
j3             14
sl             ad
75
ad             j5
               sl
               75
i1             ad
sl

<k5043>
               14
               ad



               255
f1             shapelines
sl             lo.

<k5044>
fnhighval=     fnwarp
|in:fn#        tx
|gives:highest
|in a fund of
|1st value in  28
|triplet#1,    jx
|#7, #8 and    wk
|#9

<k5045>
31             maxof3
jx
wk             10
               jx
34             wk
jx
wk
               maxofthis.

<k5046>
fcmactonkey=   n?
               fnloopcont
ki             kl
sx
|Esc:          fcmpausekey
ix             lk
27             ix
eq             eq

<k5047>
n?             ix
               13
d2             eq
               n?
ki
               se

sh             ex

<k5048>
50
fcmgraphloop
ku.





<k5049>
graphpwavfns=  s5
|Fnact:pwavs & i5
|particles etc n?
tx
```

```
sh
10             se
jx
wk             fcmdrawintro

<k5050>
i5
up
               60

10
jx             i5

kw             gt

<k5051>
i5             se
fcmgraphloop
lk             ex
mo             freshsketch
               50
ye             jx
               wk
or             s9

<k5052>
i5             ll:21
makenumber     ll:30
               m2
860            m1
668            pos30x50
               f

rp             fnhighval

<k5053>
w              lo
fnnextval      lo

               i9
               graphmeasures
m2
m1
graphpwhere    approvesketch

<k5054>
               fcmshowpause
               lk
               activepause
               ck

               se

               fcmactonkey.

<k5055>
mkdbleslit=    ll:35
|quantum ver   fundlevel
49             dancebeneath
t4
1000051
setfundlevel
2000000000
tx

<k5056>
ll:30          m1
|Double slits  9
|  10,9   #1   eq
|  18,9   #2
|Init wave&prt m2
|  14,0   #1   10
|wavetag:pos40 eq
basis          n?

<k5057>
```

```
m2             sh
18             jx
eq             f
n?             |Carrypwav:
an             1969
an             0
n?             ^smposition
d2             fneasyact

<k5058>
               4
               47
               adjustfund

               m2
|2nd triplet:  dc
13             m1
adjustfund     pos30x50

<k5059>
               50
               adjustfund

               i2
               m1
               pos30x50
               51
               adjustfund

<k5060>
m2             m2
m1             i1
dc             pos30x50
pos30x50


52             53
adjustfund     adjustfund

<k5061>
m1             m2
34             1
eq             le
|Handle edges! or
m2             |Here, y to 35
28             |and   x to 30
ge
or             n?

<k5062>
d3             1
basis          40
j4             14
adjustfund     0
lo             put30x50
lo             1
               40
|spreadnodes:  10

<k5063>
9              mkdbleslit
put30x50       995000
|doubleslits   setfundlevel
2
40
18             &startpwav&
9              3140
put30x50.      fnactcherish

<k5064>
1              0
3140           pos30x50
1              50
               adjustfund
               1
^fnstartpwav   47
```

```
fneasyact
14             adjustfund

<k5065>
1150000        |This is where
setfundlevel   |we store the
               |measurement
               |of arriving
0              |particles;
^measurearray  |we use fnya
               |and fnay w/
fneasy         |range 1->30

<k5066>
1200000        0
setfundlevel   2300
               0


&graphpwavfns&
2300           ^fnpwavgraph
fnactcherish   fneasyact

<k5067>
1              |Link to the
47             |measurefund
adjustfund
thisfund
lk
dc
50
adjustfund

<k5068>
qfieldmanage=  10
|In:tr#,fnwrp  wk
tx             60
sh             eq
50             n?
jx             se
wk
fnwarp         ex

<k5069>
ll:21          ll:3
ll:30          i1
m2             50
m1             ad
pos30x50       jx
relaxfn        wk
lo             selfactivefn
lo             lo.

<k5070>
               |This fnact
               |assumes links
               |to fcmloop#
               |and to
               |particles
               &qfieldmanage&
               1492
               fnactcherish

<k5071>
1160000        4
setfundlevel   47
0              adjustfund
1492           thisfund
0              lk
^toggleactive  dc
               50
fneasyact      adjustfund

<k5072>
thisfund       thisfund
lk             lk
```

```
up             up
51             up
adjustfund     52
|#50 has link  adjustfund
|to fcmloop#;  |particles
|#51-53 to     |1-3

<k5073>
               thisfund
               lk
               up
               up
               up
               53
               adjustfund


<k5074>
energyclass=   50000000
|In:fn#        i5
|Gives:value   fnmainval
|up to 1000;   nilzabove
|re:subtle     ap
|piloting of   ni
|manifest ener w
s5             sh

<k5075>
50000000       ad
i5
fnnextval
nilzabove
ap
ni
w              2000
sh             rd.

<k5076>
particlefnact= j1
|In:tr#,fnwrp  tripletpos
tx             t2
t1             |uses rffg
|j1=tr#: x,y   j2
|stored here;& up
|where energy  up
|is in 30x50fn t4

<k5077>
j2             0
jx             j2
wk             ix
sx             i9
j4             put30x50
jx
wk
s9

<k5078>
|Tuned         350
|fluctuations  gt
|in init pos:
               se
13
               up
1000
af             t5

<k5079>
10             dh
ix
i9
get30x50
2000000000
|boundary?

lt             |reinit:
```

```
<k5080>
j5             i9
sx             j4
basis          jx
s9             kw
ix             tn
j2             tn
jx             tn
kw             tn

<k5081>
50             i9
jx             20
wk
               |measure?

               lt

t3             dh

<k5082>
ix             ix
up             j2
j3             jx
fnarrayup      kw
j5             i9
sx             j4
basis          jx
s9             kw

<k5083>
0              j4
20             jx



               |y up:
1              pn

<k5084>
h9             ix
ix             dc
i9             i9
pos30x50       pos30x50
energyclass    energyclass
350            350
af             af
ad             ad

<k5085>
               ix
               up
               i9
               pos30x50
               energyclass
               350
               af
               ad

<k5086>
which3         2
f              eq
               se
3
eq
se

hx             qx

<k5087>
ix             1000000000
               j2
j2
jx             ix
```

```
|X result also i9
|of supermodel
|guidance
kw              put30x50.

<k5088>




                ^particlefnact
                1777
                fnactcherish

<k5089>
1160020         |Init:x,y=14,0
setfundlevel    14
                28
1               adjustfund
^particle1
fneasy          0
|triplet#7      30
|is at pos 28   adjustfund

<k5090>
1               |Fnact:
47              1777
adjustfund      29
                adjustfund
^measurearray
fnam
50
adjustfund

<k5091>
2               |Init:x,y=14,0
^particle2      14
fneasy          31
|triplet #8     adjustfund

1777            0
32              33
adjustfund      adjustfund

<k5092>
1               ^measurearray
47              fnam
adjustfund      50
                adjustfund




<k5093>
3               |Init:x,y=14,0
^particle3      14
fneasy          34
|triplet #9     adjustfund

1777            0
35              36
adjustfund      adjustfund

<k5094>
1               ^measurearray
47              fnam
adjustfund      50
                adjustfund




<k5095>
```

```
100            |for
400            |startpwav
pa
42
|Luxurypos#42
0
0
put30x50

<k5096>
longtxt*       cliptrail
Particles goin
g through doub
le slits in Su
per-model theo
ry
               fcmheadertxt
*txtcomplete   kl

<k5097>
longtxt*       cliptrail
Fig. 2.c: Part
icles {bosonic
} move & are m
easured    FCM
 Loop#
               fcmlooptxt
*txtcomplete   kl

<k5098>
now=           ^add 50 to
ce             b9
^FCM STARTING! ^variable
b9             b9
^<ESC> quits,  ^determining
b9             b9
^<ENTER> will  ^displayupdate
b9             b9

<k5099>
^and <SPACE>   ki
b9
^to pause***   sh
b9
^Press any
b9
^key to start!
b9             ce

<k5100>
1              fcm.
fcmgraphloop
kl


100
fcmshowpause   &now&
kl             zz
```

Particles going through double slits in Super-model theory

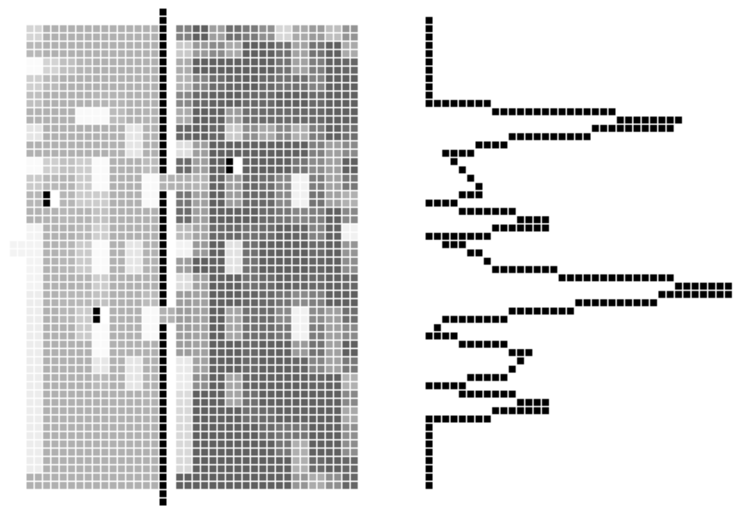

Fig. 2.c: Particles {bosonic} move & are measured   FCM Loop# 1809

[In paper form, a sample of output is reproduced as an image. In the TF, the FCM comes alive on the screen when you type ^k5000 and, on the next line, cc. Press then <ESC> button when you've seen enough of it. In this code, it's also possible to press <SPACE> to pause it; and <ENTER> to add 50 to variable that determines how often the routine should update the display.]

Q. Why this particular curveshape? Why doesn't it look more like the symmetrical result we modelled as for the classical waves?

A. Because we have just thrown in the pathfinder numbers here, at low resolution, with just a few possible angles of movement, and we aren't interested in replicating any abstract ideal of what interference ought to be. We simply want to show SOME WAVE-PROPERTIES of stuff that in itself can fruitfully be regarded by particles when subjected to an inner piloting of SOME SORT OF INTEREFERENCE pattern, in which, in this case, two slits have played a role. You take the code and work it around to make something fitting something empirical: the points is that with these formalisms, which after all are extremely simple compared to what is assumed inside the little symbols used in conventional mathematics--we assume less than a permille as much, as a rough guess, with these whole number algorithms--with these formalisms, then, we are showing that we consistenly are getting all the TYPES of patterns we are finding with quantum laboratories. The detailed patterns are different in every study; but the super-model work lends itself to formalisms that have an intense calculational simplicity able to encompass all the sort of GENERAL phenomena numerical correlations found there. We will find that we get the same with regard to the results that Einstein termed 'relativity', and yet at those points we will, entirely unlike our agreement with Einstein as regards theory of science, find that we must take a radically different route in interpretation of the Michelson-Morley experiment and so on and so forth.

Q. What would happen if we wanted to set up double slits more or less like this with a measurement instruments at one or both of the slits, to determine which slit a particle gets through? I mean, as a physical, manifest experiment?

A. A physical manifest experiment with physical manifest measuring devices have to be handled as a situation which is mapped by super-models afresh, in which the measurement instrument is mapped over. At what we can call this our "Planck level", we cannot get beyond the resolution imposed by the size of Planck's constant on the energies involved. So, when a particle moves and is then measured, it is measured by means of an energic interaction. This will entirely upset the inteference pattern. And so, this shows something of what is meant by HUP, the Heisenberg Uncertain Principle. It refers entirely to Planck's constant. Planck's constant is necessary not when we do an abstract modelling of a situation, but it is necessary when we wish to compare this to an empirical situation, and de Broglie's formula, speaking of manifest energy as proportional with frequency of the pilot wave times Planck's constant, tells us of the sensitivities here.

Let's at once state that there's more to HUP than just a level of resolution--it is also that any introduction into a situation of something that might potentially interact with any of the energies there changes the whole super-model mapping. In <k:5000> formalism, the FCM loop begins by a super-model mapping the situation (during the first 60 loops), before the particles are unleashed. Any introduction of a new physical element in the situation must lead to a total remapping. And in physical terms, it means that the situation is, in a sense which transcends the speed of light, changed: the pilot wave, or q-field, or super-model, or what we call it, is changed and so the resulting measurements will be changed. Not just due to the limit of resolution, but due to that which is also called 'nonlocal effects'. Bohm spoke of a 'mutual transformation' between measurement instrument and that which is measured. But it is not just measurement instruments, but anything that the energy can interact with.

Q. You say speed-of-light-transcending. Nonlocal is a word that seems to imply absolute instantaneous effects. And at the same time, we're modelling this in computers, when we run the formalism at a computer. Explain something of the time element here.

A. Yes. The super-model theory, informally speaking, can only be fairly complete if it is also intensely vague as to all subtler levels. At the most manifest level of the universe, we have the Planck constant, and there is no empirical evidence of a reliable sort available to the sort of physics humanity has got of the subtler levels. However, empirics suggest that we infer that something goes on beyond the level of resolution--indeed this is the big argument of Bohr, de Broglie, Bohm and so on. Now, Einstein laid out some relationships between energies, time, acceleration and so on that presupposed that there is an unfoldment in which no signal travels faster than the speed of light. Here we do seem to have that. This was conceptualized by a negation of what Einstein called 'locality'--thus 'nonlocality', after his article together with Podolsky and Rosen, commonly called the EPR paper.

We will work out some more apt and precise concepts when we get into Einstein's relativity theories and how we reinterpret the phenomena he sought to describe there within the super-model theory. Then we will talk of "L-speed", because we need to distinguish between light as an energetic phenomena, subject to redships and blueshifts and with many particular properties, and the somwhat magical organising factor we associate with its speed--but which really is a different thing than light, and which opens the door for clearer discussions of things; also for the possibility of light not always going at the same speed. We will see.

Basically, it's typical for immature phases of science to regard things beyond all past findings in a simplistic either-or fashion. Most things in life, on a closer look, are nuanced. Yet, when it is so hard to study something like 300,000 kilometers pr second, which is roughly what the speed of light is, then it is no doubt just about infinitely harder to study speeds which could be trillions and trillions and yet more, almost countless trillions of times faster than that. We cannot deduce from any finding in science that all that transcends the speed of light is necessarily one thing. So 'nonlocality' is a word that must be used with caution--even after we have resolved the conceptual problems inherent in the rather absolutistic notions of Einstein as regards the relativity of all things to the speed of light.

What is to be taken as an inference from the physical experiments of the quantum sort, however, when we look at it in light of super-model theory, is that phenomena of some sort definitely do involve information activity not respecting the speed of light limit--and, in particular, the super-model mapping a situation so as to pilot particles is best assumed to happen incredibly faster than the speed of light.

Now, any algorithm modelling anything on a computer will have to be crude--remember all the time, we are never at any point fully representing the theory in a formalism. We are only illustrating ideas inside of the theory, and sketchily, at that. Which is what the proper role of formalism relative to a good scientific theory ought to be: then it is is a help, rather than a reductive factor. So the computer time, its seconds or milliseconds, its pauses, all that, is for a large part irrelevant: it has nothing to do with the theory or with the empirics that we measure. The mappings and remappings of super-models are taking computational time but for all practical purposes in the type of physics humanity has got, it takes no time at all. It's just there. Thereby they say, 'nonlocal'.

When it comes to the question of the algorithmic versus the organic, super-model theory is entirely on the side of the organic. What can be shown algorithmically are just some situations which are extracted and, as it were, 'frozen', and these may, after suitable additional variations, be found to match with some experiments sometimes. But never at any point is the whole theory assumed to match anything algorithmic. It rather contains the possibility of algorithm within itself rather like a bottle of iced green tea which is near the freezing point contains some elements of ice without being all ice. We'll talk more about this when we comes to that which is perhaps the most lively and organic feature of the super-model theory, the PMW.

7. Super-Model Coherence, Entanglement, Tunnelling and initial discussion of PMW

Q. Finally we got to talk more about coherence and such.

A. Yes, and this is related to what we call the "PMW", which is the organic, noncomputational Principle of a tendency of Movement towards Wholeness in super-model theory. Here, it is boldly--yet vaguely and in a sense metaphysically--asserted to be a kind of prime mover, if that's the expression I want. In one way or another, but, granted, in a highly philsophical manner (hard to even begin to show in terms of formalisms) we wish to say that if anything happens, it bears, in the ultimate analysis, a relationship to the PMW and that's how it come to happen at all. And that also means that if any structure--which is what we term recurrent happenings of many sorts--exists then again the PMW is the ground cause, in a necessarily loose sort of speaking. But we'll return to that, which ties in with coherence.

Q. So, to summarize what we pointed out earlier, you are saying, aren't you, that coherence is more or less found everywhere where we find that things that are 'quantum-like' arises? Or shall we say, 'super-model-like'?

A. Yes, super-model-like. So there are two main situations --I remember I phoned David Bohm (something I was lucky enough to be allowed to do by Sarel and him) and asked specifically about why the quantum features of reality don't manifest more clearly, more often. He said, as I remember it, that the quantum potential--he liked that word--was "factorised", is factorised in certain situations. It has to be not factorised for the quantum effects to come through. Now think of a mountain of sand: compare that to a mountain of stone. The real difference between sand and stone is that the stone, when it is sand, is broken up. And so if you shout into a heap of sand, it's like talking into a pillow--the information gets lost. But if you talk to, or better, take a hammer and strike a little on a stone, the whole stone conveys the information--because of its wholeness.

By analogy--and let's be quite sure that the above was merely analogies, or metaphors more precisely--we go now into looking how super-models cover a situation, how they map a situation. You can see that they do so coherently, in which case we get a chance to view the particular super-model features at a macroscopic level, or they map it in a factorised way, in a cut-up way, divided in many small fields, like going from rock to sand, from a cake to sugar. The many small fields means that we easily get a sum effect which is mechanical. The sum effect is that we have something resembling classical, newtonian physics.

Q. Why? Because the little fields collide?

A. Well, that's again a metaphor. When we have many small supermodels and particles moving in such a territoriy, there are many influences. A super-model offers a guidance one way, but then the next super-model, covering the area next to the present position of the particle, may offer a guidance towards another way. When the super-models don't act coherently it follows logically that we get a relative cancelling of their effects in a certain sense, and then the most enduring, most persistent, and most powerful feature of the particle becomes such as its momentum and its positions and the type of patterns associated with these--also when they meet and bump into each other.

However, let's bear in mind that in super-model theory, there aint any such thing as not a super-model. So the particle and its momentum features are also super-models; but with the crucial difference that these are, in the situation of what Bohm called a 'factorised' field, not consistently influenced by any mapping of the whole situation around the particle.

Q. If I can introduce another metaphor, water is flowing but ice is bumping.

A. Yes. The water acts more holistically. And so coherence is, in super-model theory, a pointer to situations where there's a more holistic action of the speed-of-light-transcending super-model mapping a situation rather than the more local actions of the super-model mapping the nearest surroundings of the particle and leading to a number of rather contradictory impulses so that such as position and momentum become more the determining features.

So, coherence is running through super-model theory. We are, then, taking a strong stance against the fragmenting tendency we've seen in some mainstream physics at present which speaks of coherence as one thing, entanglement as another, and tunnelling as a third. Entanglement involves that something such as for instance particles are subject to a mutual influence of the speed-of-light-transcending super-model. Tunnelling involves that something is, when guided by such a super-model, moving not just step by step from one local position to the next, but also skipping steps and in some cases, skipping many steps, perhaps half across the galaxy, and certainly across any near boundary.

Q. How can this skipping happen?

A. Well, we haven't introduced continuity in the manifest positions, have we? So even in our ultra-simple examples that we have earlier looked at, the sense of jumping from one position to another was indeed part of the FCM loop. Now, all we have got to do is to say that the jumping of just one position is a special case of a more general phenomenon, and the more general is that when a particle is at one place, it has some probability of being at any other place the next moment, although this probability may be vanishingly small for most positions. So, in terms of the super-model, the question is here: do we have a coherence of the super-model guiding the particle so that it actively relates to greater distances, also beyond any immediate boundary? Only by a coherence which is in the situation, and by a suitably big enough super-model, do we get tunnelling. The coherence is necessary. Together with the concept of the super-model and the PMW, it is, in a way, sufficient, also, to talk about the phenomena.

Q. What determines when the tunnelling type of super-model arise?

A. The same as determines when any super-model arise. We come to that theme more and more in this little booklet

Q. Ok. Then entanglement, that's also a form of coherence?

A. In our theory it is. Entanglement is just simply that we have coherent super-models guiding such as two or more particles. In Bohr's original formulations of quantum theory, one was led to consider such situations when we had a known situation of unity with little interference of anything, and certainly no measurement, while a sort of gentle movement apart from that unity situation were introduced--say, some sort of magnetism or the like dragging particles apart which before engaged in a tightly related form of spin or the like.

The trouble about all that which Bohr did there is that he sought to make all depend on human measurement and what had not been measured and not been interfered with, which is a negative approach, without the presence of any sense of theory of what goes on. We need a theory for what goes on. And Einstein used the phrase "tranquilizer philosophy" never more harshly than when we spoke about just this aspect of Bohr's theory or, as he would have it (and we agree), his non-theory. Or his very partial theory.

Entanglement, then, seemed to be a technical peculiarity but then it became empirical and by the end of the 20th century it was one of the most magical and wierd and startling phenomena of all quantum theory, and, whether the bohrians liked it or not, rather a defining characteristic of it. And still there's no theory of it in any of the mainstream camps.

We have a theory, and the theory is this: this is just a super-model hooking up to more than one particle; and how it arises is due to PMW, and this needn't have anything whatsoever to do with an initial condition of such as local contact and spin and so on. So we don't have to do such boring stuff as the EPR-related examples of entanglement. We can go straight into entanglement of two (or more) particles, and it can be of other features than that which traditionally has been most natural to expect from the normal theory. To illustrate this important feature of super-model theory, we have simply let the part of the formalism representing the super-model guiding one particle also do the same with another, but each has a separate quotient of RFFG, of AF, the Free Fluctuation stuff--which is the typical case, for all the universe are full of the Planck fluctuations. Here's <k:6000>:

```
<k6000>
maxfundnum=    &&
10000.         fundnet
150            kl
maxfundnum
mm             150
200            maxfundnum
ad             fundnet
sz             wwyymatrix

<k6001>
fundnet        |up a fcm
lk             |network with
thisfcmnet     |a good amount
kl             |funds; here:
               |for super-
|At previous   |model theory
|and next      |formal
|card, we set  |illustrations

<k6002>
maxfundnum     fcmindqty
50             basisthis
ad             maxfundnum
sz             thisfcmnet
               lk
&&             fcmindex
fcmindex       lk
kl             initwarpindex

<k6003>
rffgpf=        af
|In:maxlen
|Gives:pfnum   6282
|Action:makes  af
|a pathfindnum w
|with rffg len
|from 1->max
|& rffg angle  pa.

<k6004>
pwavfactor=    8
1.             rd
|The pathfind  ts
|nums have     |Toggle sign
|angle->6282   |so motion
|and length    |clockwise
|up to 1000    ^pwavfactor
6283           setfastvar

<k6005>
mainput30x50=  10
|In: value,
```

```
|x, y
|Action: sets
|1st num of
|1st triplet   i3
s7             i7
s3             put30x50.

<k6006>
makespace=     ll:35
|Two areas for fundlevel
|two entangled dancebeneath
|{nonlocally}
|particles     ll:30
               basis
3500000        ^smposition
setfundlevel   fneasy

<k6007>
               4
               47
               adjustfund

               m2
               dc
               m1
               pos30x50

<k6008>
               50
               adjustfund

               i2
               m1
               pos30x50
               51
               adjustfund

<k6009>
m2             m2
m1             i1
dc             pos30x50
pos30x50       53
               adjustfund

52             lo
adjustfund     lo

<k6010>
ll:35          twobillion

               29
twobillion     m1
               mainput30x50
0
m1
mainput30x50   lo

<k6011>
ll:30          twobillion

               m1
twobillion     17
               mainput30x50
m1
0
mainput30x50

<k6012>
               twobillion

               m1
               34
               mainput30x50


               lo.
```

```
<k6013>




                5500000
makespace       setfundlevel

<k6014>
particleact=    12
|in:tr#,fnwarp jx
tx              wk
sh              t5
10              basis
jx              j1
wk              j5
t1              mainput30x50

<k6015>
13              twobillion
jx              i1
wk              i5
s1              mainput30x50
15
jx
wk
s5

<k6016>
i1              i1
10              j1
jx              su
kw
i5              13
12              jx
jx              ad
kw              ku

<k6017>
i5
j5
su

15
jx              &particleact&
ad              1444
ku.             fnactcherish

<k6018>
|Startpos:x    |Nextpos:x
25              24
|Particlefn:   13
1444            adjustfund
|Startpos:y    |Nextpos:y
2               3
^fnparticle1   15
fneasyact       adjustfund

<k6019>
|Startpos:x    |Nextpos:x
25              24
|Particlefn:   13
1444            adjustfund
|Startpos:y    |Nextpos:y
33              32
^fnparticle2   15
fneasyact       adjustfund

<k6020>
entangleact=    i5
|in:tr#,fnwarp ap
tx              w
sh
```

```
10             pwavfactor
jx
wk             ad
s5             w

<k6021>
ps             250
pa             rffgpf
               i5
               ph
               ap
10             ni
jx             s6
kw             sh

<k6022>
250            50
rffgpf         jx
i5             wk
ph             fnwarp
ap
ni
t6
sh             t1

<k6023>
51
jx
wk
fnwarp



t3

<k6024>
i6             j6
100            100
rd             rd
9              9
pm             pm
6              6
su             su
sx             s9

<k6025>
1              1
28             16
ix             ix
13             15
j1             j1


pn             pn

<k6026>
1              19
28             33
i9             i9
13             15
j3             j3


pn             pn.

<k6027>
8000000        785
setfundlevel   250
               pa
               |Start pfnum
               4500
&entangleact&  0
4500           ^fnentangle
fnactcherish   fneasyact

<k6028>
```

```
2
47
adjustfund

^fnparticle1   ^fnparticle2
fnam           fnam
50             51
adjustfund     adjustfund

<k6029>
longtxt*       cliptrail
Symbolic view
of Super-model
 Entanglement
involving two
particles
               fcmheadertxt
*txtcomplete   kl

<k6030>
longtxt*       cliptrail
Fig. 3.A: Quan
tum fluctuatio
ns & nonlocali
ty unfold  FCM
 Loop#
               fcmlooptxt
*txtcomplete   kl

<k6031>
9000000        0
setfundlevel   4900
               0


&graphsomefns&
4900           ^fnshowgraph
fnactcherish   fneasyact

<k6032>
1              &fcm&
fcmgraphloop
kl


100
fcmshowpause
kl             zz
```

Symbolic view of Super-model Entanglement involving two particles

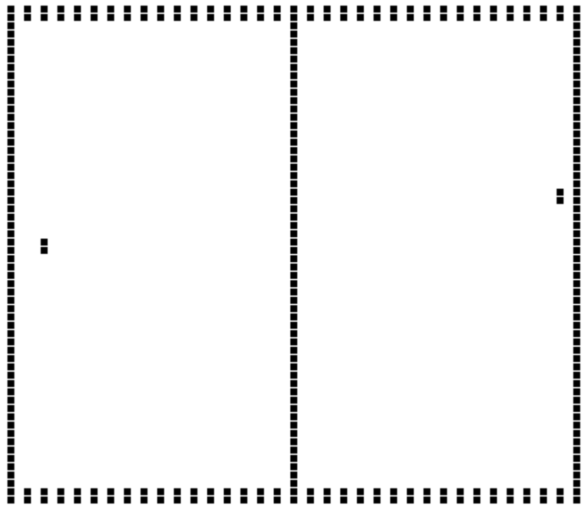

Fig. 3.A: Quantum fluctuations & nonlocality unfold FCM Loop# 212

[In paper form, a sample of output is reproduced as an image. In the TF, the FCM comes alive on the screen when you type ^k6000 and, on the next line, cc. Press then <ESC> button when you've seen enough of it. In this code, it's also possible to press <SPACE> to pause it.]

Q. The experience of partially linked synchronous movements when one watches the FCM onscreen makes a strong impression, I find.

A. Yes, here it is much more meaningful to see it unfold step by step rather than just seeing a summary on paper.

Q. The entanglement is partial, right? For they don't always move synchronously.

A. The fluctuations, which we bring in here by the AF operator, are acting not necessarily in the same way on the two particles. We also have a pathfinder number, which acts consistently; but the fluctuations may be so that this is sometimes masked. In this case we also use the RFFGPF notion, which produces a pathfinder number of the RFFG (relatively free fluctuation generated) type, and add it to the rotating pathfinder number. You also notice that this is relatively compact formalism compared to where the whole situation must be mapped and then that map is used: here, the node handling the entanglement has the mapping of the situation as part of it, as part of its algorithm.

Q. As I understand it, in the super-model theory of the universe, we have super-models relating to one another--represented here by these nodes, or foundries, in the FCM type of G15 PMN program--and these have algorithms.

A. That's right: first-hand, whole number algorithms, just as G15 PMN is a first-whole, whole number oriented programming language and CPU concept.

Q. And what we show here is that this is adequate to cover a variety of situations--soon we'll also see how it works in that which Einstein called 'relativity' situations.

A. Exactly.

Q. And we also have the PMW. Are you saying that the PMW is somehow the origin of the very particular algorithms that are part of the nodes?

A. Yes, in one way or another. But let us be entirely clear that in our theory, we have proposing a holistic, process-oriented unfoldment of a universe--or a multiverse more precisely (in the larger perspective), in which we have a very general thing, neither particle nor wave, neither confined to three nor four or eight dimensions, but able to be structured both so as to lay out dimensions --of any number, including two, as here, and obviously three, and any meaningful limited number higher than these--and also they are able to convey both particle and wave attributes. An algorithm in this context is merely a pattern of numbers. Every bit of the super-model theory to which we create illustrations of a formal kind, has in it the possibility of a great variety of G15 PMN program alternatives in so doing, where we use FCM all the way. For instance, we could in some situations create highly general nodes, with highly general algorithms embedded in them, that merely require a fixing on some matrices to exhibit a set of highly differing activities, each fitted to a particular space matrix. How we do this is part of our exploration of the essential infinity of the meaning associated with any good, embracive, first-hand, informal scientific theory, the way we have structured what we call 'neo-popperian science'. This is the end of the identity of a theory with a formalism. We are equating, as Einstein did in his theory of science, theory with an action of visualization on the part of the human mind. The formalism is then conjured up to illustrate some features, but never all, and never in an absolute way.

With this as background, we are also freer to create formalisms in this way and in that way, as long as we relate partially to some empirics and as long as we constantly relate the whole thing to the informal theory and emphasize the priority of the informal level.

Now, when all this is perfectly clear to us, let us say that the PMW is regarded as a structuring source, beyond any structure which we perceive with our senses or through our instruments, empirically. This structuring source--how it works, what is behind it again, and so on, and how it works to dissolve and create in different ways the structures that have got to be changed, and how it upholds that which have got to be upheld, is, in our present formulation of super-model theory, regarded as questions inherent in the most subtle, and also MOST INFORMAL part of the theory, namely the PMW. We do not try to make an algorithm of the universe: rather, we say that a certain type of algorithms, structured in a certain way, allows the type of general phenomena structures that we do empirically note to be part of all modern physics. And so, yes, we do speak of PMW as something that can give rise to either algorithms or to something that modify the activity of these algorithms penetratingly.

Q. This is very different from newtonian physics and from most theorizing in physics since, too.

A. It is. But remember that Einstein called for a debunking of the central role of the notion of cosmic time or process. That's bold but perhaps not right. Bohr called for debunking of the traditional role of the notion of visualization in scientific theory. So though Einstein and

Bohr widely disagreed about the implications of quantum findings in modern physics, they agreed that something pretty big, conceptually, has to be turned around in order to make a good theory of it all. We are merely saying that their initial attempted revolutions of thought didn't quite work out--yes, we need new concepts of time and space but not quite like Einstein said, yes we need a new way of doing visualisation of physics phenomena but not quite like Bohr said. And then of course, since their time a number of physicists have played with a variety of concepts, and the idea of talking about the universe as possibly 'one big computer simulation' has arisen again and again, and you'll find it, in different terms, even in philosophical texts dating centuries back. And yet, we are definitely NOT saying that the universe is a simulation or that the universe is an algorithm. We are saying that the universe has an algorithmic aspect to it, through the super-models, but also a non-algorithmic aspect to it, through the PMW and quite possibly in some features of how the super-models in actual fact do their work. Running through our whole approach is a clear-cut sentiment that no formalism can ever capture the theory of the universe proper--not a single formalism, nor a set of formalisms--in principle. The theory must be entertained in our minds, and if it appears complex, then it may be a question of habituating ourselves to think about the universe in a different way, so that a sense of simplicity can grow upon us. Rather than childishly looking of 'simplicity' at once, as if it is perceived as clearly as the digits on dollar bills. That's also why the ideas of 'shaving away everything unnecessary' from a theory along the lines suggested in the phrase "Occam's Razor" doesn't really work unless we take in, over a long enough time, the vastness of the different phenomena we are seeking to systematize in our minds. If reality isn't always simple, isn't always symmetrical, then also our theories must have adequate complexity or else they won't have any chance of being with us into the forthcoming centuries. But Occam's razor shouldn't shave away space, time or the human mind, at any rate!

Q. I can see that. There isn't any foolproof technique for evaluating scientific theories.

A. No. No technique. It's ultimately an artistic piece of work, and the ultimate check is the gut feeling, the type of qualified intuition we get after years of chiselling away all rubbish and of strengthening insights into the logic of things while we take in the vastness of our existence. For we are, after all, with super-model theory, making a theory that is pretty much all-encompassing at the most general level.

Do you have more questions? Remember, as Bohm and others pointed out, each with the various words--the scientific attitude involves not just making a strong case for ideas, but also making ideas vulnerable.

Q. Well, yes, I have a very general question, of a kind that we may have touched on before.

A. Come with it.

Q. Suppose I realize that there's hard work and rationality going through super-model physics (as we can call it). But since it is also taking a radically different stance on many subjects than that which is conventional physics, then..

A. ..how can you check it? As a whole?

Q. Yes, but initially, the first question would easily be: could it not be that this is just crackpot quasi-spiritual nonsense?

A. Of course, that is a possibility. One cannot vehemently deny that and at the same time claim that we are doing something scientific. This may be quasi-spiritual or, from the scientific point of view, even worse, quasi-scientific --and the scientific atitude is to consider such options calmly.

Q. Well, is it? And if not, how can such a sentiment be refuted?

A. My friend over some years, the philosopher and logic expert Arne Naess, whose worldview was pretty terse and much on the lines that Einstein suggested (and he even shared something of Einstein's view of Bohr's approach to physics), had a type of general solution for this type of question with regard to anything. That was: list up the assumptions involved. Then, in front of each assumption, remember that it is possible to write the word 'not'. When you then multiply the quantity of possible related viewpoints we can generate that way--two times two times two times..you follow? Two options for each assumption, since the word 'not' is there--you can, if your list of assumptions are long, get an enormous list of alternative viewpoints, or alternative theories if you wish. In other words, he argued against treating theories as a whole thing, and he argued in favour of looking at individual assumptions inside the theories, and each one critically.

Now, I would suggest that you quietly did that first with the mainstream physics theories we have today. We have already mentioned a number of the assumptions in both quantum and relativity theories. Sometimes the assumptions are a bit hidden. For instance, when Einstein puts forth the relativity theories, one of the postulates was that the laws of physics governing physical change are the same for each reference system (a reference system being here, roughly, something in continuous nonaccelerated motion). Put simply, he postulated:

* there is a law of physics, and it is this:
  * all other laws of physics are the same in the reference system.

And so that's quite a big, absolute concept he implied thereby. And by laws of physics in 1905 or whenever he phrased this, he certainly didn't include many of the developments to come. Furthermore, the definition of reference system depends on certain assumptions about space and time. By saying such a thing he hoped that he would be able to make people go beyond what he regarded as the old concepts of absolute time and space as for the laws of physics. (This 'political' motivation of Einstein is well documented in a number of biographies about him--he saw the decline of belief in absolute time as socially and politically important, as I read it.)

In connection to his statements, which are perhaps poetically rather beautiful, but chock-full of assumptions that can and should be looked at individually, we find that many people regards it as clear-cut that since the Michelson-Morley experiment didn't detect a difference in the speed of light when measured on the surface of the planet, then 'the theory of aether (or ether) was disproved'. Really? Disproved? But this is the type of thing that mainstream physicists easily say. Again, to refer to philosopher Arne Naess: the distance between a theory and empirics are huge; bridged by a number of assumptions; and any one of these assumptions may have to be negated if one gets a 'disconfirming instance'.

So when you undertake the intensely hard work it is to spell out what is what in modern physics,--really spell it all out--then you find that there is, as we have said repeatedly, a great deal of incoherence in the resulting view of the world. The view of the world rather doesn't come through, because the conflict between the assumptions become strong enough to dissolve the clarity of any visualization.

When we have reached this point, and meditate on it for a good while, we will, if you wish to begin to clear it up, feel like looking at all the phenomena once again, all afresh, apart from the big, bold statements of Herr Doctor Einstein and Herr Doctor Bohr and all the later

Herr Doctors with all their fancy Nobel prizes and what not to their title. Look at the phenomena. Look at the Aspect experiments demonstrating nonlocality. Look at the Michelson-Morley experiments. Look at how gravitation and accelleration increases the endurance of shortlived molecules, indicating some kind of time dilation. Look at the mesmerizing effects of superfluidity near 273 degrees Celcius, below zero. And supermagnetism. Look at how polarized glasses block out light when two of them are used, one after another, and one is vertical while the other is horisontal--but that magically the filters let through light again if a third filter is inserted between them on 45 degrees. Look at quantum tunnelling experiments --and many more so. Doppler effects. And so on.

These types of phenomena do suggest some kind of numerical patterns along the lines many physicists have worked much on, but how do we get a proper theory? Well, as for nonlocality, for Heisenberg Uncertainty Relation as shown when one tries to measure more in a double-slit experiment, and for many more such experiments, we are seeing that we have particle-properties and something like a wave but a very different type of wave than manifest matter. What type of wave? Let us give it a name--X, let's say. Let us read through again what the grand old master de Broglie, who actually worked with these phenomena, many of them, AND with the big minds who worked with them--once more (cfr the link in the intro to this booklet).

So he calls it pilot wave. But it certainly must have many strange properties if it is to do all that we have got it to do.

Then we look at the phenomena of speed of light--and gravitation--and so on. We think through the observations done by independent empirical physicists in all these realms. How can we interpret this in a way that doesn't create a total confusion and a total break relative to the pilot waves or whatever we call it? To break away with space and time certainly don't quite seem to be called for. So we are already putting in parenthesis much of the bigness of the relativity theories. But there's a lot more to space, and a lot more to time, perhaps, than that which have been the newtonian assumptions.

So, not to do it all in detail, we are showing that we are at no point merely coming forth with a big declaration as if it were a revelation. We are rather piecing together a very complex reality, looking for possibilities of simplicification. And one thing is clear: those who have waded through the reports of empirics relevant for studies of that which is called 'quantum', find that when the time comes to that which is called 'relativity', is easier going. The complexity of Einstein's domain is less than the complexity of the quantum phenomena. The super-model theory, then, is an atempt to take the quantum phenomena seriously, but with the sense of openness that we intuit is necessary in order to accomodate far subtler studies on the mind and so on, in millenia to come. And then we want the exact same stuff, nothing unnecessary in terms of structure added, to tackle all that Einstein sought to tackle, namely such as the very peculiar stability of measurements of speeds of light in vacuum; and that which after Einstein's general relativity work became confirmed, as a confirming instance of his general realtivity--the effect commonly called 'time dilation', taking place in gravitation which is considered a form of accelleration.

So these are added, peculiar correlations. But these are not as peculiar as that which the quantum world has already suggested to us, when we look at the patterns of empirical studies without any particular theory in mind.

In the first formulation of super-model theory, in the 2004 book, and in tentative formulations using other names for it in some of my writings a decade earlier, we had only some general statements applicable to the speed of light and gravitation phenomena. Now we have sorted things out and have a simpler, more elegant way--here presented. And also here presented, we do come up with example formalisms to illustrate how we can get all the complex patterns expressed by this whole number work we do in the

first-hand programming language G15 PMN with its FCM.
So, I ask you: where, in all of this, is the spiritual or quasi-spiritual? What, in all of this, is anything but wholeheartedly real scientific?

Q. I agree. It is the result of systematic work. But it is somewhat testing for the nerves, perhaps, to just throw away the cumulative efforts of many physicists who have worked on all this for many decades.

A. But we don't throw it all away. We merely say that the time has come to look at the idea level all afresh--but with vague inspirations from implicate order concept of Bohm, pilot wave concept of de Broglie, and science fiction concepts of computers 'at bottom' of reality; but with a cold analytical stance penetrating the whole approach. We want it to fit; we do find it to fit; and we suggest that we must call on the powers of the human mind and intellect also as intuitive intelligence, and here we ask--suggest, but also ask: is it not right that the manifest universe is woven of one and the same rather algorithmic, yet also rather organic thing, having speeds transcending completely all that which is directly measurable? This organic-yet-with-an-algorithmic element often has something of what we intuitively mean by the word 'model' about it, but it is under or above or beyond that, so we say super-model. And that's how we arrive at the word, the phrase. Intuitively, then, we portray this as a unifying concept. And we break down this concept by analysis into parts, extract parts and formalize them in the sense of illustrations and examples, and then look again at the concept as a living whole. Is this not science? Is this not scientific? Or is it only when we stick to traditions we are scientific? Obviously, it is more scientific to stick to rationality rather than tradition when we find that the latter lacks rationality.

Q. It's a long answer, and it is a philosophical answer, but I find that I like it. But it does mean, does it not, that we are appealing to the philosophical capacity in the mind as judge over the scientific activity?

A. I suppose we could say that, yes. Philosophy, the love of wisdom, or Sophia, the muses, or the quest for truth. That gives us the strength of intuition and the willingness to enquire and look for what both Rene Descartes and the dutch logician L.E.J. Brouwer called 'clear ideas'. I submit that super-model is a clear idea. The illustrations, I submit, are pretty good also. I further submit that this encompasses all the best of what de Broglie wanted with pilot waves, or what he sought to call 'the Double Solution', and yet can be used, in the ways we will outline in the completing chapters, to deal with the puzzling socalled 'relativity' phenomena without having to lead to a full relativisation of space and time concepts. Rather, space and time can rather be seen to be interwoven, partly coming out of and partly being to some extent assumed as fundamentals, when we deal with super-models--and with a slight asymmetry here, because we do not, like Einstein, seek to formalize any bit of the time parameter. When we also take deep results indicating the needs for the organic and intuitive in our minds, not just the algorithmic, including but not limited to such as Goedel's work, L.E.J. Brouwer's work, and further notions about infinity relative to whole numbers that we have looked at in detail elsewhere, we affirm also that these super-models are not algorithmic in essence, although they clearly can call on the algorithmic, or have it as a part of them (perhaps as when one can imagine that finite numbers arise out of a certain contact between sizes which are, in some sense, infinite).

Q. When we observe the two particles 'dance together', but with an individuality to the movement of each, in this <k:6000> example, are we at liberty to imagine that these may be lightyears apart?

A. Of course. That's the whole notion of nonlocality or whatever we call it--we have already discussed that word--we are relating to something which easily can sweep over all space, with precision.

Q. It's not like a field, a magnetic or electric or..

A. A field like that propagates. It has a speed of propagation. The L-speed, which is derived from the idea of measurements of the speed of light in vacuum (and which we discuss more in the relativity chapters) is an organising factor however not in a simple way. We have a far more flexible attitude to this than Einstein had, as we begin to outline in the upcoming chapter.

Q. Right. But when it comes to entanglement, it is a, what did we call it--SOF, super-luminal affair? In other word it is instantaneous?

A. Yes. If by that word you mean from the viewpoint of the resolution of these instances, from one program loop# to the next, that may be so; however we make no such claim when it comes to the exact empirical physics of the matter. Given that we have solved relativity questions without dissolving some overarching time and simultaniety concept, the question makes sense. We can explore it in the context of super-model theory, which has, as you should have noticed by now, a great deal of open room in it, speaking mildly.

Yet, what appear instantaneous may be a bundle of phenomena, some fantastically faster than previously measured phenomena, some faster than that again, and then some might truly be instantaneous. But anything that is truly instantaneous cannot be empirically proven to be other than fantastically faster than any speed measured so far. If it is but very fast, one might imagine that some empirical measurements could be contrived to show it.

Theoretically, we have room in super-model theory of the multiverse for a huge number of levels beyond the Planck manifest level, so it is best to leave the question open.

Q. How does the PMW 'set up' this situation, if that's the right way to phrase it?

A. The PMW is a principle of a nonalgorithmic kind--that's why it has the word 'tendency' as part of it: a Principle of a tendency of Movement towards Wholeness. Sometimes this means strengthening contrasts, at other times this means strengthening similarities, in the play of contrasting similarities and similar contrasts that make up our sense of order and symmetry; but at other times, it may be a different type of pattern, not mechanically coming from such considerations. The word 'wholeness' refers to a concept which is beyond that which can be mechanised. But in simpler cases, there's a tendency to protection of symmetries and so on.

Q. So it doesn't have to be local contact first.

A. No, that's just one example of a strengthening of similarity even as contrast in position develops.

Q. What if we try to measure on one of the particles from within the physical system?

A. Then that measuring apparatus enters into the whole situation, and transforms it.

Q. Why?

A. Because the super-model that is 'piloting from within' the dance of the two particles will now also do the same kind of thing with the measuring machine. It will be drastically altered. And so, the Heisenberg Uncertainty Principle has in it this deeper meaning, to put it in more poetic terms than normal: to be part of the dance in the most authentic sense, suppress your desire to observe it too closely. That doesn't mean that observation in a close sense is irrelevant. But there's a time for observation, and there's a time for just doing it. So there's a good deal one can learn from contemplating on the HUP.

Q. Very good! Let's go to the completing quantum-related example, then through the relativity-related examples, before we look at all these informal grander perspectives again. The bigger implications. And how one might most scientifically begin to understand this relative to our own minds, feelings, thoughts; and whether the super-models are somehow directly related to what we have in us as capacity to intuit.

A. Yes. With the present infantile state of brain science the best we can do is to take the sum total of what we think is a good theory of the energy processes in the universe, or the multiverse, and then apply the best we have of intuitions about our intuitions, so to speak. Here there's no point in providing formal illustrations because the domain is much less mapped, numerically. But, as I've said many times before, I have a working hypothesis, and more than that, which says: the brain is not a machine; that our minds can go beyond the algorithmic; that intuition involves more than mere clever summarisation over experiences, more than the genes, more than chance. And the super-model theory certainly is intensely compatible with such a viewpoint, and can help to clarify how such a viewpoint of intuition can make rational sense.
  Anyhow, over to tunnelling. Here's <k:7000>:

```
<k7000>
maxfundnum=    &&
10000.         fundnet
150            kl
maxfundnum
mm             150
200            maxfundnum
ad             fundnet
sz             wwyymatrix

<k7001>
fundnet        |up a fcm
lk             |network with
thisfcmnet     |a good amount
kl             |funds; here:
               |for super-
|At previous   |model theory
|and next      |formal
|card, we set  |illustrations

<k7002>
maxfundnum     fcmindqty
50             basisthis
ad             maxfundnum
sz             thisfcmnet
               lk
&&             fcmindex
fcmindex       lk
kl             initwarpindex

<k7003>
rffgpf=        af
|In:maxlen
|Gives:pfnum   6282
|Action:makes  af
|a pathfindnum w
|with rffg len
|from 1->max
|& rffg angle  pa.

<k7004>
pwavfactor=    8
1.             rd
```

```
|The pathfind  ts
|nums have     |Toggle sign
|angle->6282   |so motion
|and length    |clockwise
|up to 1000    ^pwavfactor
6283           setfastvar

<k7005>
mainput30x50=  10
|In: value,
|x, y
|Action: sets
|1st num of
|1st triplet   i3
s7             i7
s3             put30x50.

<k7006>
mainget30x50=  10
|In: x, y
|Gives: value
|Action: gets
|1st num of
|1st triplet   i3
s7             i7
s3             get30x50.

<k7007>
makespace=     ll:35
|areas with    fundlevel
|big barrier   dancebeneath
|to show
|tunnelling    ll:30
               basis
3500000        ^smposition
setfundlevel   fneasy

<k7008>
               4
               47
               adjustfund

               m2
               dc
               m1
               pos30x50

<k7009>
               50
               adjustfund

               i2
               m1
               pos30x50
               51
               adjustfund

<k7010>
m2             m2
m1             i1
dc             pos30x50
pos30x50       53
               adjustfund

52             lo
adjustfund     lo

<k7011>
ll:35          twobillion

               29
twobillion     m1
               mainput30x50
0
m1
mainput30x50   lo
```

```
<k7012>
ll:30          twobillion

               m1
twobillion     20
               mainput30x50
m1
0
mainput30x50

<k7013>
twobillion     twobillion
m1             m1
21             23
mainput30x50   mainput30x50
twobillion     twobillion
m1             m1
22             24
mainput30x50   mainput30x50

<k7014>
twobillion     twobillion
m1
25             m1
mainput30x50   34
twobillion     mainput30x50
m1
26
mainput30x50   lo.

<k7015>





               5500000
makespace      setfundlevel

<k7016>
particleact=   12
|in:tr#,fnwarp jx
tx             wk
sh             t5
10             basis
jx             j1
wk             j5
t1             mainput30x50

<k7017>
13             twobillion
jx             dc
wk
s1
15
jx             i1
wk             i5
s5             mainput30x50

<k7018>
i1             i1
10             j1
jx             su
kw
i5             13
12             jx
jx             ad
kw             ku

<k7019>
i5
j5
su
```

```
15
jx              &particleact&
ad              1444
ku.             fnactcherish

<k7020>
|Startpos:x     |Nextpos:x
10              11
|Particlefn:    13
1444            adjustfund
|Startpos:y     |Nextpos:y
2               3
^fnparticle1    15
fneasyact       adjustfund

<k7021>
|Startpos:x     |Nextpos:x
15              14
|Particlefn:    13
1444            adjustfund
|Startpos:y     |Nextpos:y
10              9
^fnparticle2    15
fneasyact       adjustfund

<k7022>
pilotwave=      i5
|in:tr#,fnwarp  ap
tx              w
sh
10              pwavfactor
jx
wk              ad
s5              w

<k7023>
ps              250
pa              rffgpf
                i5
                ph
                ap
10              ni
jx              s6
kw              sh

<k7024>
250             50
rffgpf          jx
i5              wk
ph              fnwarp
ap
ni
t6
sh              t1

<k7025>
51              |For d4 use:
jx              15
wk              t5
fnwarp          !7
                t9


t3

<k7026>
i6              j6
100             100
rd              rd
5               5
pm              pm
4               4
su              su
sx              s9

<k7027>
```

```
1              1
28             33
ix             ix
13             15
j1             j1


pn             pn

<k7028>
1              1
28             33
i9             i9
13             15
j3             j3


pn             pn

<k7029>
13             lt
j1             d5
wk
15             j9
j1             j5
wk             j1
mainget30x50   ad
twobillion     ku

<k7030>
13             lt
j3             d5
wk
15             j9
j3             j5
wk             j3
mainget30x50   ad
twobillion     ku.

<k7031>
8000000        785
setfundlevel   250
               pa
               |Start pfnum
               4500
&pilotwave&    0
4500           ^fnpiloting
fnactcherish   fneasyact

<k7032>
2
47
adjustfund

^fnparticle1   ^fnparticle2
fnam           fnam
50             51
adjustfund     adjustfund

<k7033>
longtxt*       cliptrail
Symbolic view
of Super-model
 Tunnelling wi
th particles a
nd barrier
               fcmheadertxt
*txtcomplete   kl

<k7034>
longtxt*       cliptrail
Fig. 3.B: Quan
tum 'leap' of
bosonic partic
les        FCM
 Loop#
```

```
               fcmlooptxt
*txtcomplete   kl

<k7035>
9000000        0
setfundlevel   4900
               0


&graphsomefns&
4900           ^fnshowgraph
fnactcherish   fneasyact

<k7036>
1              &fcm&
fcmgraphloop
kl


50
fcmshowpause
kl             zz
```

Symbolic view of Super-model Tunnelling with particles and barrier

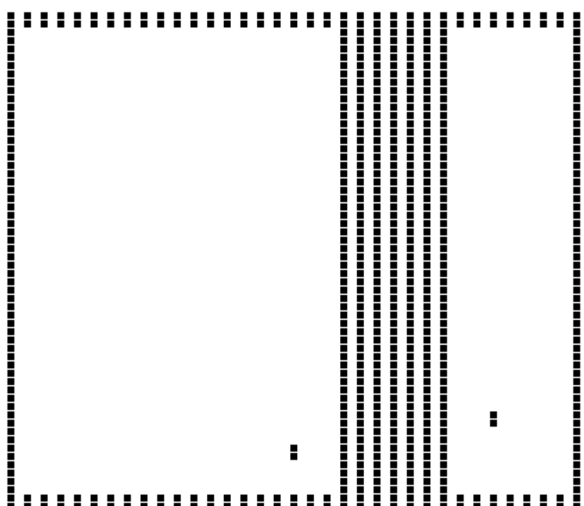

Fig. 3.8: Quantum 'leap' of bosonic particles   FCM Loop# 24

[In paper form, a sample of output is reproduced as an image. In the TF, the FCM comes alive on the screen when you type ^k7000 and, on the next line, cc. Press then <ESC> button when you've seen enough of it. In this code, it's also possible to press <SPACE> to pause it.]

Q. This formalism is much like the one for entanglement.

A. Let us bear in mind we wish to illustrate this or that little aspect of the meaning of the theory by these formalisms. The entanglement of two particles had a very easy two-dimensional area to work with. Here, we have made a big barrier, and use essentially the same setup, only that the particles tend to move around more moderately. They can both be in the same area and overlap one another and so we call them 'bosonic', in the sense we also used earlier on. We don't need to have two particles here, but it seemed easy enough to begin with that. The pilot wave function, the node representing it, has in it, 'wired' into its algorithm, that the barrier mustn't be landed on.

This is all an enormous simplification of what the phenomena of tunnelling is about.

Q. Why?

A. Because, when the barriers are powerful and big compared to what is, as possibility, moving beyond them, it may directly involve the PMW.

Q. The raising of the possibility to a probability?

A. You see, when I interviewed Ilya Prigogine, one of the leading thinkers on thermodynamics--first on phone, then also in London when I met him, he emphasized that the predictions of quantum theory are somewhat mechanical--even though they are statistic, and that this indicated something that could be at fault with it. Quantum theory allows for tunnelling but says finely little except that it may happen. This has uses in biology etc, where that which is chemically impossible becomes possible--they say, due to quantum fluctuations. Just like mathematicians have too easily used the word 'infinite', so has those who have worked with the science of life and the universe too easily talked about 'fluctuations', in the sense of 'chance'--as if these concepts were easy. Now we have mathematicians that try to avoid talking about the infinite but they bring it in by concealed concepts in any case, such as when they speak of 'arbitrary' numbers, which cannot be defined without an appeal to the intuition of an infinite set. In the same way, we have physicists, biologists and so on too easily using the word 'chance' as if it refers to an actual physical process. But it is, in important situations, a word that masks their ignorance.

A. You are saying that there isn't a complete theory of quantum tunnelling?

Q. Well, if we go with Einstein's view, there isn't, in the mainstream, a proper theory of anything quantum. There are some works on quantum tunnelling--how to increase its chances, what types of coherent quantum situations that tend to evoke it, and so on; something of this has some practical uses relative to some forms of semiconductors. The approach we take to it at the present formulation of super-model theory is to say this: we see how it is physically possible, given that the universe is structured by means of super-models. But we expect the actual content of any more detailed description would be tremendously complex, however--let this be clear--within the framework that we have set forth, of the interplay between the half-algorithmic, half-organic super-models and the fundamentally organic PMW principle. In short, quantum tunnelling relies more on PMW than anything else. And so the formalism is merely showing an extremely superficial aspect of what we the informal level, of our minds, as regards the super-model theory, must give ample space to, someday.

8. Special Relativity In Super-Model Theory: Or, the Relativity of the Measurements of Speeds of Light-- a new nonlocal interpretation of the famous Michelson-Morley experiment with the new concept of nonlocally activated flashback light

Q. You have said that Einstein would have nodded to the general spirit of super-model theory as far as the general theory of science goes--first mind, then formalism; yes to visualization of reality, no to taking foggy ideas seriously even though they fit with some equations that match empirics. But would he agree to what this chapter is all about?

A. Perhaps not. For it was a core tenet of the young Einstein that the universe so to speak bends around himself and every observer. Nothing is absolute of space and time, you get twistings of space and twistings of time, all you need to do is to open your eyes and the universe is at your feet. Of course, that type of thought very much influenced what the 20th century was all about, politically: it was a throwing away of the fetters of the past. Einstein felt that he was in the middle of it; he was partly religious, partly a technician as far as formalisms go (I try not to say 'nerd'), partly political, partly ethnic, and partly in love with philosophy, with science, and with a determinism rather of the Spinoza kind, if I haven't misunderstood him.

All this sort of wrapped itself around him and became a tremendous force when he saw to it that he could explain away the aether and at the same time deal a blow to those who believed in some of the most common absolutenesses of his time, space and time; and anthropocentrically, put Man in the Middle. The One Stone, if Einstein permits me the jibe over his name.

For all these reasons, it was emotionally a sort of climax that the young Einstein reached with his theory of relativity, then renamed into 'special' relativity when he worked on further adjustments in order to take gravitation into consideration (the latter became the 'general'); and that sort of a climax isn't easily upset in one person's typical lifetime of thinking. It will soldify itself; and there's no evidence that it ever really slipped away in Einstein's consciousness.

Let me first mention that what comes in this chapter is, as far as I know, a novel take on it all. The novel part is not that we consider speed of light experiments in a quantum or nonlocal light: that has been done before, and anyone who searches on the Internet will find some stuff about that--not just by mainstream physicists, but also by physicists who stand on the sideline and seek to find another pathway than relativity. Much as I admire some of these attempts--for instance, one paper by an independent physicist names the Michelson-Morley equipment as a 'quantum interferometer' and uses that notion to deduce how Earth is moving in the aether--I'm not sure that those although admitted bold, attempts to reinterpret the famous experiment are entirely well researched. For after all, that particular experiment has been given, by now, several other physical realisations and the results, as reported in mainstream journals at least, have been to confirm the idea that 'no aether drift' could be detected.

What is novel with the super-model theory and its take on the speed of light as we here present it is that we divide completely between measured and unmeasured light, and do so aided by the nonlocal notion but in the new, richer sense of nonlocality (or whatever we call it) that exists in the present framework of super-model theory. And when we do this, we are going to find that we can both support the idea of the measured velocity of light in such situations as constant, and also, in addition, open up for wildely different relative speed velocities as for the light that has never interacted with matter particles at all. Our concept here is 'flashback light'.

So, in this context, we are showing that, given the foundation of the super-model theory as presented so far, the by far easiest and simplest way of understanding the speed of light measurements is to assert that the speed of light is a result of the measurement process created by nonlocal pilot waves, ie, by a super-model.

Q. You are saying that unmeasured light can have different speeds?

A. Yes.

Q. How do we know that?

A. Well, that's the nature of many things quantum, is it not? That we know only something of it, and must leave the rest to theory and modelling and visualization. All I'm saying is that if you do away with independent space in our thinking, always tying it up to who is doing the observatiob, then we are getting one set of ideas for the quantum stuff, and another set of ideas rather (perhaps along with how Einstein thought about it) as for speed of light and gravitation stuff--and then there will be lack of coherence, a lack of holism and a lack of meaningful touch to the resulting set of ideas. We won't have a landscape of ideas, but rather a conflict of cultures; and this conflict of cultures has persisted in mainstream physics long outliving the deaths of Bohr and Einstein. It's time to have harmony. It's time to think again. We have a lot of creative starting-points for thinking in the century and more since Einstein begun the relativity proposals. It can't be that hard.

So, with that starting-point, let's go to one of the most essential, thought-provoking experiments underlaying much of Einstein's convictions. It is the Michelson-Morley experiments; done in several forms. We are here going to show an abstraction of the same--not the same, but just some essential features.

Q. So, as far as I know, the MM-experiment, to call it something snappy, aimed to detect the aether drift by assuming that light waves, as water waves, propagate in a medium with some sort of stable speed whereas the planet Earth, with its rotation, should experience some sort of modified light-speed depending on whether the measurement happens in one direction or another direction, eg perpendicular to its rotation. Is that right?

A. Yes, it's right. And in mainstream physics, you'll find no end to the proposals that the aether theory was sort of 'refuted' or 'disposed of' or 'rejected' or 'disproved' as a result of the MM experiment combined with Einstein's take on it all. But, in the pilot-wave physics league, and scattered through the various philosophers criticism of Einstein, you'll always found those who have sought to bring the aether concept back--only so that it has more properties, to account for the peculiarity that light seems to have rather constant speed when measured in vacuum (not in water, where it is slower; nor subject to such as quantum refraction of some sort, where it is sometimes faster or slower) from the viewpoint of an observer in 'uniform translation', as they say--ie, not in accelerated motion. (Or not much, at any rate--being atop a planet is in some sense to be embedded in some degree of acceleration all the time.)

And even Einstein himself, when he wrote about general relativity, implied that if we by the aether concept seek to invest properties to space (instead of seeing it as a property-less container), then the aether concept is right.

Now, think of a model of light propagating at a speed, particles guided by a pilot wave, which moves as what Bohm and Hiley called 'bosonic fields'. There are the questions associated with rest mass and the idea that the photon has zero rest mass and so on, but let's bear in mind that anything connected to either zero or infinity is typically associated with extreme limits of measurements where it is easy to talk, but utterly hard to measure. We'll return to the question of photon as particle, briefly (especially since this is, as a physicist at the University of Bristol mentioned to me--I think his name was George Simmons, physics friend of C. Dewdney who showed me his by-now-famous computer modelling of Bohm's quantum potential--a point of difference between the de Broglie approach and the bohmain approach; as I read Bohm & Hiley, the electron is asserted to be a fermion and a particle but light is asserted to be a bosonic field.) In super-model theory, we have an openness for a somewhat different handling of restmass at light-speed since the formalism is not driven by equations, but rather has a first-hand structure where equations can be seen as statistical second-hand summaries of how the model behaves.

In our simpler, more abstract form of MM experiments, in a 2D space, sort of, we have uniform movements. Instead of throwing around space and time and making it contract, we can say two things: (1) light moves at a constant speed in its unmeasured form in this model, and (2) light when measured in terms of speed even from an object moving with or against light in this model turns out to show the same speed of light as if it had been at rest.

Q. In classical theorising over reality, the latter would seem radical.

A. Exactly. In the old times.

Q. But these are new times.

A. These are the new times, and we know of all sorts of things created in the event of measurement, or more generally, in the event of interaction between something and something else, perhaps, as in this case, as in interaction between light and matter. Light then leaves an imprint on matter. To what extent this imprint corresponds to what existed if there had been no such interaction must be discussed, now that we are alive to nonlocality and HUP (Heisenberg Uncertainty Principle) and such stuff. At the time of the MM experiments, there were no such things floating around in the air as HUP or nonlocality. They had to wait decades--many decades when it came to nonlocality, for J.S. Bell to analyze how it came to be that Bohm had managed to do what von Neumann had 'proven' to be impossible (in terms of making a hidden variable interpretation of an experimental setup loosely as in the EPR--Einstein, Podolsky and Rosen--article from early 1930s). As we know, Bohm did that by including the measurement apparatus as a quantum object and thus modifying quantum idea of measurement into something more akin to 'transformation'; and de Broglie picked this up and resuced his own Double Solution approach, which, in de Broglie's view, was an improvement of the pilot wave interpretation (but what we call 'pilot wave' all the same, in the vocabulary introduced by the commentary text to the de Broglie writings referred to in the intro text to this booklet).

So, the pilot wave nonlocally handles the measurement situation so that the speed of light appears to be the same.

Q. Even though it isn't? So you re-introduce the aether?

A. Now what is the 'aether' (or ether) supposed to be? It is of course derived from a Greek word referring to the lofty, sublime air breathed by the highest beings themselves. In a crystal, energy vibrations move as waves but when measured, in situations which are sensitive to energies at the Planck level, they arrive as if they were some sort of particles, and thus the name 'phonons'. Is then matter space eg crystallized so that light is moving in it? At the present level of theorizing, the super-model theory can be taken into various pathways of visualization, some having more merit than others. Whether we wish to give physical content to an aether concept or not seems to me to be less of the question we should begin by asking than this question: does in fact light, when unmeasured, move faster when for instance a spaceship travels let's say at half the measured speed of light--about 150,000 kilometers pr second--towards a source of photons, and we are speaking of the relative speeds of this light compared to the spaceship? According to Einstein, all that fast movement of the ship will lead to this and that contraction and it will appear to be the constant speed. But we are now wanting to start afresh. We want to not just exclusively speak of how things appear, but also think about what is the actual case, when visualizing the situation.

So, do you visualize it now? The spaceship moves at, let's say, ca 150,000 km/s, perhaps towards a radio station. This radio station emits photons, a series of them, towards this spaceship. Some of these are picked up, some are floating by it. Do they float by in 300,000 km/s, or in 450,000 km/s, or something else? (The speed of light measured in vacuum is typically found to be nearly 300,000 km/s--299792458 meters pr second, as meter has come to be defined.)

Q. Yes. I can visualize it. Can't we have this spaceship to measures the speed of photons beamed from one part of to ship to another? It could be a very long spaceship. Say, so long it takes more than two seconds for light to move from one side to the other. Some 650,000 km long. Would that do?

A. Excellent, even better! That's where we are going with our abstract MM experiment and the novel interpretation of it in terms of nonlocal flashback light in the super-model theory. We have some sort of ship or station or a wierd type of non-rotating planet, and it is either still relative to the coordinates of the space, or moving at terrific speed, half that of light.

Suppose now it sends photons alongside its axis of movement but opposite to the speed of its own movement. Now let us imagine that the light propagates when unmeasured, when left to its own devices and not interacting with matter, at a constant speed in objective space. Then, if a spaceship or something moves in the opposite direction, at half this speed, we would naturally expect to get relative velocities of one and a half times the constant speed of light. Now, when we measure the situation, we don't get one and half time the speed of light; but we cannot extrapolate from that to say that the unmeasured photons don't go that fast. And that's the flashback nonlocal approach to speed of light in the super-model theory that we give a formal illustration of.

Q. Why flashback?

A. Unmeasured light, and as for light that has not interacted with matter, the light from stars lightyears away is, when passing is by, very different than light which is picked up and which leaves an imprint on matter. For instance, if we move towards the lightbeam, and the beam contains, let's say, one hundred photons or so, and we pick up half of them, then the other half has gone by us a long time ago. So it's a flashback to that. Or, if we move away from the light source, there's a flashback to light that hasn't reached us yet, towards the light source. This is not more complicated, not more difficult, not more wierd, and not more magical, than quantum tunnelling, or super-model tunnelling. It is a certain form of activity much related to super-model tunnelling.

Q. Are you saying that every feature of special relativity theory follows from the notion of nonlocal flashbacks which act exclusively on measured lightbeams, when we assume that light has a constant speed of propagation in a kind of objective space?

A. A constant speed of propagation in an objective space, yes. That we say. "Every feature" of special relativity? Let's look at this closely: each physics theory is huge compared to the connection with empirics. It is easy to 'predict' stuff that nobody has ever measured on and which requires scifi equipment like spaceships going near the speed of light. I for one do not believe that most things have been very well checked as for all extreme energies and all extreme situations for all physics theories. And given what I have seen of the confusing ways that zeroes and infinities are handled by physicists and those who call themselves 'mathematicians' alike, I have no great faith in the often cock-sure predictions they come with as to implications eg near speed of light. For less extreme situations there are numerical patterns generated by special relativity kind of physics, typically using the formalism of Lorentz contractions and an expanded version of the famous E=MC2 equation, and these have had many instances of confirmation as far as they go. But extreme implications has only very scantily been checked, for the simple reason that it is empirically entirely beyond all the power of physicists today.

But again, there's no question that there's a degree of coherence in the more mundane, non-extreme implications of such as the Lorentz contraction formalism, and that these have something to do with how things turn out when measured. Obviously, a key feature running through this coherent bit is that of the constancy of the speed of light in vacuum regardless of uniform movement of the moving observer. This constancy can be considered, in super-model theory, to be an expression of a feature of type of nonlocality we should expect with photons. We can expect it to rise with more phenomena than light, and so we can say that these phenomena are L-tagged, or tagged with a behaviour associated with the L-speed, the phrase "L-speed" then referring to our less absolute way of referring to what Einstein referred to as 'c', the found constant speed of light.

Einstein also spoke, and quite rightly it seems to me, of the increase of total energy associated with a moving object; and he regarded that the "rest-mass" is in particular involved in this increase of energy as the object is approaching the speed of light. However, to go from the loose initial sketchy equations with their square roots and their division lines and the rules of not dividing at zero to assert that no object with rest mass can ever go to the speed of light is to me something that sounds like overbelief in formalism and too little study of the depth of complications associated with the concept of the infinite. Not only was this before the advent of quantum physics, and nonlocality concepts, but it was also before the advent of Kurt Goedel's cutting of the wire of infinity as for all axiomatic systems, which happened shortly after the birth of quantum physics.

There is in particular good reason to believe that while there's some sort of relation between the kinetic energy of an object with rest mass when moving far from the speed of light, different things may arise when near the speed of light--and, given our present modelling, we must take into consideration the additional feature that the speed of light as measured may be widely different than the actual speed of propagation of unmeasured light, due to the flashback nature of photons, as we propose it.

So, all in all, and also because I know that de Broglie had an intuition that the photon ought to be considered as a particle, I propose, as I have done before, that in super-model theory, the photon is considered to be a real particle but with a restmass so small compared to such as an electron that it is extremely hard to detect. Since we no longer have the einsteinan equation hanger over us threatening that particle to have infinite mass due to its speed, we are at liberty to research this possibility, theoretically, while bearing in mind that there may be several more points that have to be reworked relative to the mainstream equations for all this to be working out with respect to all main features of the physical situation.

With this in mind, I propose you ponder soon on the formal illustration that take the MM experiments to their most abstract, general, generic form. The <k:8000> formalism next allows for two different situations. Both of them involve a symbolic pure form of MM experiments as to question of the relative velocities of light. When you start up the formalism, you type in a Y or a N as to whether you wish a spaceship having the setup on it to be moving in the objective space and its coordinates. If you type Y, the model will assert that it moves at about half the speed of light, and along the same axis as you also send out some photons and want to have their velocity measured. The movement of the ship is the opposite of the movement of the photons.

In the case you answer 'N', the result you'll get is that of the situation where the ship is at rest relative to the formalism's objective space and its coordinates.

Q. Why not have it on top of a planet which is rotating like the MM situation?

A. Because a planet has gravitation, and a planet has--as you say--rotation. It is not the ideal situation for thinking about the relative velocities of light when we are talking of uniform movement without any additional factors. The MM experiment was a great idea because it could be performed on Earth, but it is not the ideal thought experiment. The ideal thought experiment involves uniform movement only--no additional factors that could, due to the deeply interwoven nature of the factors of the universe--have some influence, small or big.

We see here that the super-model theory allows, via the flashback type of nonlocality setting in during interaction between light and matter, including measurements of speeds of light, for an approach in which the unmeasured photons pass by at the expected speed of about 450,000 km/s when the spaceship moves at about 150,000 km/s in the opposite direction of the lightbeam, which has about 300,000 km/s as its natural speed of propagation in objective space. But the measured speed is the same as when the spaceship is at rest relative to the objective space coordinates, about 300,000 km/s.

In this interpretation, then, the speed of light is something that obeys special relativity only when we see that the measurements of the speed of light are relative to a nonlocal situation far beyond what Einstein ever thought of. Go beyond the measurement situation, and you find speeds of light adding up or substracting in the manner we expect. In this way, we might say that it is compatible with the super-model theory to assert a certain type of aether concept, but we are not depending on that concept in order to formulate our approach. Our approach, then, has the virtue of allowing for modelling, in the very same situation as we deal with speed of light relativities, such as nonlocality, without getting into incoherent notions such as 'the present of one particle influences the past of another particle, and the present of the second particle influences the past of the first'. Such incoherent notions belong to the clash between cultures of Einstein-oriented thinking and, let's say, Bohr-oriented thinking. In super-model theory, we have a more classical space, and the relativity effects arises by certain forms of novel nonlocalities that are natural to consider in this context, and this without breaking with the overall set of ideas that compose the theory, and without any incoherence. So we have relativity and quantum effects on the same idea footing, and with a uniform type of formalism. Although the formalism here is intensely simple, it has obviously in it adequate capacity for complexity to be tweaked to the concrete empirical situations without any problem whatsoever. That formalistic extrawork is in each case trivial--the physics lies in the overall set of ideas that compose the whole super-model theory, and in the generic approach to formalisms here taken with G15 PMN and its FCM/TF.

Soon, then, is <k:8000>, which, during startup, admits for two very different situations, but which come out equally as regards measurements of velocity of speed of light when measurement is done 'from within' the model; but in addition, we allow the model to calculate actual velocities (by analogy to how David Bohm was calculating actual trajectories by means of hidden variables when he first launched his causal interpretation of quantum theory in his two articles from early 1950s). We see here that special relativity in super-model theory really is the relativity of the measurements of the speeds of light, because it is the measurement that creates the speed, whereas the actual speeds of light when unmeasured can vary quite extremely.

Note that in the following example, we have done the maximum number of simplifications possible to show just that which is relevant for speed of light measurement aboard a moving spaceship, which is known to be either stationary relative to objective space or to be moving at half the L-speed. The L-speed is 299792458 m/s the way meter is defined (or 21413747 x 14, relevant when, in our model, the L-speed is such that it covers fourteen of the coordinates in the horisontal direction in some time unit). In the latter case, the movement is opposite to the direction in which light is being measured. Here, as a simplification, just four photons are emitted (from the right side of the ship) and just one of them is picked up (in the middle part of the ship). We assume very advanced technology, able to time the emission of a burst of photons precisely enough, as well as to detect the time of arrival. In this simplified form, we assume that it is possible to be precise about this with just one photon measured, and just four photons emitted. In practise, due to Heisenberg Uncertainty Principle, a more realistic model at this point would use a whole bunch of photons. However that might be, the essential point is that the act of measuring a photon creates a whole different pilot wave, or super-model guiding wave, than a photon which is not subject to this treatment, and that this completely changes around all aspects of the velocity so that the velocity always appear to be 299792458 m/s when measured precisely and in a non-accelerated reference frame. This point would hold also in much more complicated situations, of course.

Let us also, before we study this model, realize that, when pressed to the utmost consequences, a flashback take on photons along these lines involve a sense in which light as emitted in the universe is upholding a kind of information memory--we may almost say RAM (and we may associate to some metaphysical thoughts of Rupert Sheldrake about 'the presence of the past', which are interesting points of view regardless of to what extent his theories will get confirming instances in biology). For we can only have a flashback theory upheld if the photons have a 'retention' of what is to be imprinted in case there is matter interaction for quite a while, taking into considerations that the size of the manifest universe --which may be much greater than that which mainstream physics theoreticians typically project--involve very huge number of lightyears indeed.

Q. Alright. Now I want to see the model!

A. You got it, here! Remember to run it twice over, with spaceship at rest, and spaceship when it moves at half the speed of light, the L-speed. This is a model which just runs for a little while then gives the measurement results when it has got them, as calculated from within the nodes, --some nodes representing how the spaceship measures them, and other nodes representing how the model is able to convey an objective speed of light that breaks with the einsteinian concept of constant speed of light. We are getting fifteen hundred permille times 299792458 as the actual velocity of the unmeasured photons in one case, but the same (1000 permille) in the other case (although the formalism produces the numbers not as permille but as m/s, in this case). Bear in mind, again, that this is a very symbolic and simplified form of MM-experiment, and that only the velocity aspect of photons is brought into this formal illustration. Here's <k:8000> then:

```
<k8000>
maxfundnum=    &&
10000.         fundnet
150            kl
maxfundnum
mm             150
200            maxfundnum
ad             fundnet
sz             wwyymatrix

<k8001>
fundnet        |up a fcm
lk             |network with
thisfcmnet     |a good amount
kl             |funds; here:
               |for super-
|At previous   |model theory
|and next      |formal
|card, we set  |illustrations

<k8002>
maxfundnum     fcmindqty
50             basisthis
ad             maxfundnum
sz             thisfcmnet
               lk
&&             fcmindex
fcmindex       lk
kl             initwarpindex

<k8003>
pwavfactor=    8
1.             rd
|The pathfind  ts
|nums have     |Toggle sign
|angle->6282   |so motion
|and length    |clockwise
|up to 1000    ^pwavfactor
6283           setfastvar

<k8004>
|lspeed is     lspeed=
|299792458 m/s 299792458.
|Coordinates   halflspeed=
|of spaceship  149896229.
|is here, each |Spaceship is
|21413747 m;   |assumed to be
|14 x 21413747 |of ca size
|is 299792458  |650000 km

<k8005>
|Spaceship:    |Supermodel
lengthprcoor=  |doing flashbk
21413747.      |uses lspeed
|above: meter; |info: each
fcmloopsprsec= |fcmloop# time
7.             | = y change:
|Ie, 1 second  lightsteps=
|is 7 fcm#'s   2.
```

```
<k8006>
mainput30x50=  10
|In: value,
|x, y
|Action: sets
|1st num of
|1st triplet   i3
s7             i7
s3             put30x50.

<k8007>
mainget30x50=  10
|In: x, y
|Gives: value
|Action: gets
|1st num of
|1st triplet   i3
s7             i7
s3             get30x50.

<k8008>
adjusttripl9=
|In: a, b
|Action: sets
|both values
|of triplet# 9
|during fnmake
36             34
adjustfund     adjustfund.

<k8009>
makeship=      ll:35
|symbolic huge fundlevel
|spaceship     dancebeneath
|which sends
|photons to    ll:30
|itself        basis
3500000        ^smposition
setfundlevel   fneasy

<k8010>
               4
               47
               adjustfund

               m2
               dc
               m1
               pos30x50

<k8011>
               50
               adjustfund

               i2
               m1
               pos30x50
               51
               adjustfund

<k8012>
m2             m2
m1             i1
dc             pos30x50
pos30x50       53
               adjustfund

52             lo
adjustfund     lo

<k8013>
ll:35          twobillion

               29
twobillion     m1
               mainput30x50
```

```
0
m1
mainput30x50   lo

<k8014>
ll:30          twobillion

               m1
twobillion     34
               mainput30x50
m1
0
mainput30x50   lo

<k8015>
ll:7           |Michelson-
               |Morley
800000         |timed
               |photon-
i1             |emitter
up             |aboard ship
33             |{symbolic)
mainput30x50   lo

<k8016>
|timed photon- 450000
|meter ca      9
|middle of the 18
|giant ship    mainput30x50
450000         billion
8              10
18             18
mainput30x50   mainput30x50.

<k8017>
makeship       |Mainvalue
5500000        |of spaceship
setfundlevel   |foundry:
               |speed of ship

basis
^spaceshipnode
fneasy

<k8018>
ltaggedphoton= tx
|In:tr#,fnwarp sh
|Act for       |Startpos x,y
|photons;these |at triplet#9
|are ltagged,  10
|and thus can  jx
|flashback at  wk
|interaction   sx

<k8019>
12             i9
jx
wk
s9             15

|Triplet#2     jx
|has prev y
|position:     kw

<k8020>
12             mainget30x50
jx             t9
wk             j9
s9             million
               gt
               se
ix
i9             ex

<k8021>
350000         50
```

```
j9             jx
ad             wk
               t7
               |ship speed:
ix             j7
i9             fnmainval
mainput30x50   s3

<k8022>
i9             i3
2              ispro
su
               se



s4             q4

<k8023>
i4             37
12             jx
jx             wk
kw             s1
               f1
|Next, get     37
|& update      jx
|photontiming  kw

<k8024>
36             su
jx
wk             |Interaction
               |matter/light
               |indicated at
i1             |triplet #5
lightsteps     |{ie, pos 22}
mm             s8

<k8025>
34             se
jx
wk             ex
i8             |Flashback:
|matter?       1
mainget30x50   jx
450000         22
lt             kw

<k8026>
|Next, store   16
|where
|flashback     jx
|took place:   kw
|in tripl#3    i8
34             18
jx             jx
wk             kw

<k8027>
billion
34
jx
wk
i8
|Photonflash
|with matter
mainput30x50.

<k8028>
6500000        |The node has
setfundlevel   |as link#1:
               |ship-node;


^ltaggedphoton
100
```

```
fnactcherish

<k8029>
2              |qty links:
100            1
32             47
^photon1       adjustfund
fneasyact      ^spaceshipnode
2              fnam
32             50
adjusttripl9   adjustfund

<k8030>
4              |qty links:
100            1
32             47
^photon2       adjustfund
fneasyact      ^spaceshipnode
4              fnam
32             50
adjusttripl9   adjustfund

<k8031>
6              |qty links:
100            1
32             47
^photon3       adjustfund
fneasyact      ^spaceshipnode
6              fnam
32             50
adjusttripl9   adjustfund

<k8032>
8              |qty links:
100            1
32             47
^photon4       adjustfund
fneasyact      ^spaceshipnode
8              fnam
32             50
adjusttripl9   adjustfund

<k8033>
longtxt*       cliptrail
Spaceship w/Mi
chelson-Morley
 speed-of-ligh
t experiment a
board it
               fcmheadertxt
*txtcomplete   kl

<k8034>
longtxt*       cliptrail
Fig.4: MM-expe
riment shows n
onlocal flashb
ack speed  FCM
 Loop#
               fcmlooptxt
*txtcomplete   kl

<k8035>
9000000        0
setfundlevel   4900
               0


&graphsomefns&
4900           ^fnshowgraph
fnactcherish   fneasyact

<k8036>
mmtxt01=       *txtcomplete
^.
               cliptrail
```

```
longtxt*
Ship's speed,
m/s:
               mmtxt01
               kl

<k8037>
mmtxt02=       *txtcomplete
^.
               cliptrail
longtxt*
MICHELSON-MORL
EY MEASUREMENT
:              mmtxt02
               kl

<k8038>
mmtxt03=       *txtcomplete
^.
               cliptrail
longtxt*
Photon-speed m
/s:
               mmtxt03
               kl

<k8039>
mmtxt04=       *txtcomplete
^.
               cliptrail
longtxt*
OBJECTIVE SPEE
D OF PHOTONS:
               mmtxt04
               kl

<k8040>
mmtxt05=       *txtcomplete
^.
               cliptrail
longtxt*
Unmeasured m/s
:
               mmtxt05
               kl

<k8041>
graphmmresult= |Link#1 is to
|In:tr#,fnwrp  |photonfoundry
|Act that      |Its tripl#10
|displays      |is timing;
|result of     |tripl#1=x,y;
|michelson-    |tripl#9=start
|morley exp    |x,y;   sets
|in starship   |fnloopcont

<k8042>
tx             |s5 is photon
sh

50
jx
wk
fnwarp
s5

<k8043>
|Has photon    n?
|interacted
|with matter
|yet?
|Triplet#5:
22             se
i5
wk             ex
```

```
<k8044>
mmtxt01        mmtxt02
lk             lk
235            235
290            320
bx             bx




<k8045>
mmtxt03        mmtxt04
lk             lk
235            235
350            380
bx             bx




<k8046>
mmtxt05        ^spaceshipnode
lk             fnam
235            fnmainval
410



bx             t5

<k8047>
|ship's speed: |Next,
j5             |calculate
makenumber     |speed as
               |measured by
               |mm-experiment
478            |aboard ship
284
rp

<k8048>
|Where         su
|flashback:    ab
18             |Length in
i5             |terms of
wk             |coords by
36             |mm-setup:
i5             lengthprcoor
wk             mm

<k8049>
37             i8
i5             rd
wk             s7
fcmloopsprsec  i7
rd             makenumber
               478
               344
s8             rp

<k8050>
|Length        wk
|unmeasured    su
|by mm-setup:  ab
15
i5
wk
36             lengthprcoor
i5             mm

<k8051>
               i8
               rd
               s2
               i2
               makenumber
```

```
               478
               404
               rp

<k8052>
               ki





fnloopcont
basisthis      sh.

<k8053>
9700000        0
setfundlevel   2141
               0


^graphmmresult
2141           ^fngraphmm
fnactcherish   fneasyact

<k8054>
|qty links:    ^photon4
1              fnam
47             50
adjustfund     adjustfund






<k8055>
nowtxt01=      *txtcomplete
^.
               cliptrail
longtxt*
The Michelson-
Morley experim
ent will be pe nowtxt01
rformed aboard kl

<k8056>
nowtxt02=      *txtcomplete
^.
               cliptrail
longtxt*
a spaceship. R
elative to our
 objective spa nowtxt02
ce coordinates kl

<k8057>
nowtxt03=      *txtcomplete
^.
               cliptrail
longtxt*
it can travel
at half speed
of light (y=ye nowtxt03
s, n=at rest): kl

<k8058>
now=           nowtxt01
               lk
               prt

ce
prtclr         nowtxt02
               lk
prtsuspend     prt

<k8059>
nowtxt03       readyesno
```

```
lk              n?
prt             sx


                ^spaceshipnode
                fnam
prtrelease      s5

<k8060>
ix              fcm.

d3

halflspeed

i5
setfnmainval

<k8061>
1               &now&
fcmgraphloop
kl


90
fcmshowpause
kl              zz
```

Spaceship w/Michelson-Morley speed-of-light experiment aboard it

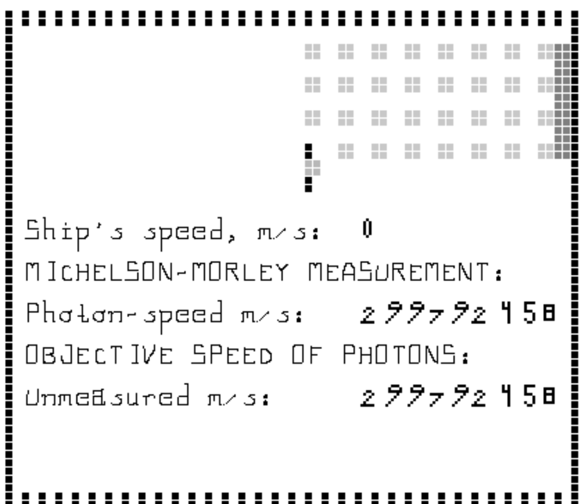

Fig.4: MM-experiment shows nonlocal flashback speed FCM Loop# 7

Spaceship w/Michelson-Morley speed-of-light experiment aboard it

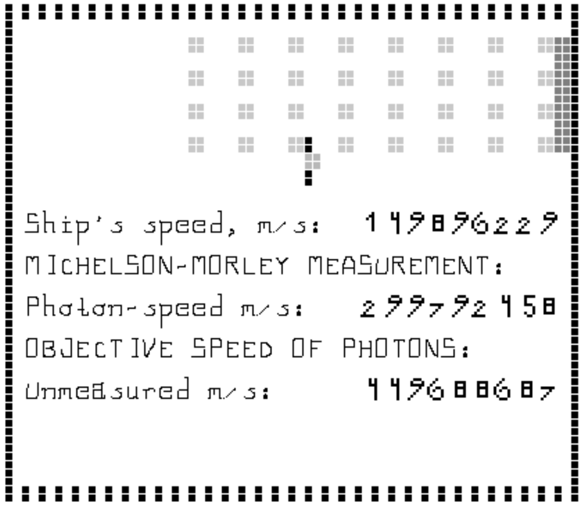

Fig.4: MM-experiment shows nonlocal flashback speed FCM Loop# 7

[In paper form, samples of output are reproduced as two images. In the TF, the FCM comes alive on the screen when you type ^k8000 and, on the next line, cc. Answer with Y or N during startup as to whether the spaceship, ca 650000 km long, is going to have speed 149896229 m/s.]

Q. It's an interesting piece of code, interesting to see when it performs. But what exactly does 'objective speed' refer to, in the resulting display?

A. It refers to the unmeasured--in that sense 'objective' speed of the photons as compared to the motion of the spaceship. The relative speed between spaceship and unmeasured photons. When measured, we get a flashback and that produces the expected constant L-speed, 299792458 m/s but in the unmeasured case the result depends on the spaceship movement. 'Unmeasured' refers to the spaceship's instruments; of course we are in an abstract sense doing 'measurements' on the formalism.

Q. So we are in fact having an aether here, are we?

A. Call it that if you want to, I'm not insisting on that word. The proposal is that there is a constant propagation as to the photonic speed in empty space relative to what we can call 'objective coordinates'. Even if the spaceship projects photons while moving tremendously fast, the photons will have the same propagation speed. However, in contrast to some thinkers, we aren't proposing that photons are merely waves in a medium. Photons, in this theory, are very complex structures, and they involve a combination of the particle and the pilot wave in a way which involves a lot of associated properties, such as polarisation, the electric and magnetic aspects, and more.

A number of additional effects can be worked out in an analogous fashion once we have grasped the notion of the flashback. There is no real effect as predicted by special relativity that cannot be, in fairly easy ways, reproduced through this concept, suitably applied.

Let us add that since unmeasured speed of propagation is just that--unmeasured--it could of course be another speed than the L-speed. However, it seems to be an elegant and simple proposition that the same number, 299792458 m/s, applies for unmeasured speed of propagation in objective space in the neutral cases.

9. General Relativity In Super-Model Theory: Or, the Relativity of Duration--time dilation in fields of acceleration and gravitation not needing riemannian spacetime, but with the new concept of duration piloting by super-models

Q. General relativity is famous for predicting that even superbly accurate clocks, to the microseconds, do slow when subjected to gravitation, and that gravitation is, in a sense, the same as to be exposed to constant acceleration and that acceleration then has the same effect--the time dilation.

A. Quite so. The time dilation is something that creates a sort of enduring imprint on anything that has been exposed to gravitation or acceleration--especially when we are talking of huge amounts of this, much much more than such fields as are associated with our habitable planets.

Q. There has been speculations about the effects of gravitation coming from collapsed giant stars?

A. Yes. Let us at once say here that it's hugely complicated to interpret with any degree of certainty what is seen through telescopes and which concerns cosmic events many lightyears, typically millions of lightyears away. Interpretation is all the more complicated given the fact that people have, in the 20th century and beyond, been hypnotised by formalisms the way we have talked about and felt that if the mathematics seems to work out, then it is likely to be real--and this even when the ideas aren't very consistent. Because of the poetic strengths of certain phrases, such as "black holes", and the appearant force of the way some apparently learned folks talk about such mathematical fictions as "singularities", which only makes sense if Einstein's theories are formally correct in an intense degree AND if conventional bohrian quantum theory also is formally correct to an intense degree--we have a lot of what I take to be nonsense being discussed as if it were extremely plausible facts. Be that as it may. Here we are concerned with core ideas, not with some people's wild extrapolations.

Q. All right. So time dilation is real. Is it in some sense a 'time travel into the future', and, if so, could one imagine a time travel into the past?

A. We will discuss the time concept in what I take to be a coherent way in chapter 10. The simple answer is that time dilation is but a process slowing, and if putting food in the fridge isn't a time travel of this food into the future, then neither is the time dilation effects of general relativity a time travel into the future. It is a a kind of temperature-less freezing effect working on all material elements, not just the organic ones. It makes little sense to begin to talk of time travel in any direction when we are going to talk about process slowing, as I take it.

Einstein's visualization emerged gradually. He was at first concerned with relationships between key factors in physics. Then, as I understand it, his Russian math teacher (Minkowski) introduced him to the visualisations of more dimensions than three, and indicated to him that the relationships he had found could be described in terms of four dimensions. Eventually, as he began to tackle gravitation, he started to introduce a bending of these four dimensions, in which also the time dilation effect was produced.

However, since relativity physics concerns the same universe, or multiverse, as quantum physics, and since, for the reasons we have pointed out, a visualization to cover all these phenomena is far more likely to come out coherently when we incorporate the relationships and phenomena Einstein sought to describe in a context where simultaniety and more objective space & time coordinates can be given, we are, in super-model theory, going a different pathway as to general relativity phenomena. We are, again, utilising the fact that our form of well-developed type of pilot waves--going already by our way of handling special relativity--are capable of introducing subtle changes 'from within' of the phenomena for which they provide guidance.

Q. If I may be excused for asking it, why is there such a peculiar effect of plain gravitation on processes?

A. There is no reason to excuse a question which contains the word "why". It depends on the theoretical background whether "why" is a meaningful question for you. Biologists have got into the habit of asking "why" all the time--why do the lips have the shape they have, and so on. They have harked back to the idea of survival of the fittest so as to select the best mutations over millions of years of stepwise change with random mutations--which isn't perhaps a coherent idea, due to the incapacity of "random" to do all that they want it to do in such comparatively short periods as, after all, millions of years. But the question has a validity, it is very fruitful. Why is such and such shape a good idea in life? Why is this or that mechanism in the body a good idea--it's explained in terms of how it benefits life and survival and what not.

In physics, however, there haven't been much of this type of questions. Now, with the super-model theory, you have the PMW, a nonalgorithmic principle which enhances wholeness by suitable modifications including modifications of quantum fluctuations and thus we get a way to ask, and answer, without the rediculous reliance on randomness found in both classical darwinism and socalled neodarwinism. This means that we can state the "why" question, with some meaning, in absolutely any domain. As regards energy processes of all the multiverse, the answer will likely take us far into metaphysics and clearly into the realm of intuition and speculation. And so, if I proceed to begin to answer your question, we are leaving the domain of this chapter, which is the type of correlations indicated by Einstein's general relativity theory when rerendered in terms of super-model theory.

Q. But we are going to look at the formal illustration soon. Let's have a glimpse of the metaphysics which could surround gravitation first. I ask again, why is gravitation affecting processes so as to slow them?

A. Alright, a bit of metaphysics, then. First of all, let's imagine a material universe with much the same type of stuff as we have here, but without gravitation. The image we get is that of stuff that spreads out, it doesn't cling nor cluster very much, we don't get the rounded spiralling effects of gravitation on solar systems, on galaxies, nor do we get stuff to stick around on the planets and, inasmuch as planets are formed by once-hot processes that stick together by gravitation, we wouldn't even get much planets; it would be a powder-universe. So gravitation allows a gathering of physical gestalts, as it were. And these physical groupings allow for life, which involves a degree of gestalt complexity far beyond that which inorganic matter has. So you can see here the PMW at work--as a principle that accounts for an increase of the diversity and intensity of wholeness first by laying groundworks for structure, then by elevating these structures to the mind and feeling quality of human beings.

Now, in this process, gravitation has equal effects as acceleration as regards the slowing of duration, the dilation of process, the "time dilation" effect. In Einstein's picture, the two are to be regarded as equal. However, as Alfred Korzybsky and other neo-aristotelians often pointed out, a theory is like a map and the territory, the actual domain, the real world is always more than, and different from, the maps we have. When the maps are complicated, as the formalisms of 20th century physics, it may be easy to forget that the universe can have extremely more to it than anything found in our maps.

Q. What do you mean?

A. I mean that the identity between gravitation and acceleration as regards process slowing may not hold for all features of gravitation. In the theory of super-models we have the capacity to imagine, while still using the same components of these super-models, many levels to the universe, and indeed many universes, all made of such super-models. We have some initial correlations drawn from empirical studies, and Einstein's work is pivotal, but these are just starting-points. Super-model theory then has a lot of conscious incompleteness about it and is meant to be indefinitely improved.

To be a little more concrete, gravitation may be in service of life in more ways than that which at present is open to us. Remember that quantum biology has hardly begun and that, given the mechanist attitudes of physicists and the reductionistic attitudes of biologies, it's likely to be rather meaningless unless infused with something like super-model theory, as a new paradigm, if that's the word we should choose ("exemplar" may be a better word).

The fact that gravitation, compared to other forces, in a way is extremely tiny--big when we are near a planet like Earth, but tiny when it comes to the effect of things on this planet on other things--doesn't mean that it there cannot be nonlocal super-models "hooking up" on it so as to serve the presence of life. We may have a situation in which the gravitational field surrounding and holding together a solar system has a nonlocal, huge effect providing coherence of a kind that supports life.

Q. You mean, life may have to be kept within a solar system?

A. Yes. So that in order to get grand spacetravel, the notion of a warp from one solar system straight to another solar system must be called on, rather than gradual travel through empty space between them. This is, after all, something that has not been researched on empirically, and super-model theory doesn't exclude the possibility of a nonlocal effect of solar gravitation.

Q. What if rotation is used by a spacecraft to emulate gravitation? Or is that where the possible distinction between gravitation and acceleration gets in?

A. Yes, exactly. Acceleration may turn out to be less than gravitation in all its respects. Things that look very similar when not researched much on, may turn out to be different when subjected to a real closer look. This is a rule of thumb in much biological research, whereas when it comes to cosmological questions, we have but a tiny fraction of the relevant empirics.

Q. So are you saying that gravitation in a solar system sort of rejuvenates living organisms and their cells?

A. You wanted an intuition, and my intuition here--which isn't something I am prepared to dig up any empirics for--is entirely clear at this point. The answer is 'yes', but I mean it by means of nonlocality or what we call it, through super-models organising life.

Q. And this is a bit like process slowing, duration slowing, duration piloting?

A. Not very much, just in terms of mental association. The duration piloting is an extremely minute effect. The nonlocal effects can be huge, yet almost impossible to detect empirically except by luck and in roundabout ways. In next chapter, we'll speculate a little further about the PMW. I believe it is a scientific strength of the super-model theory that it allows, so easily, new questions to arise. But remember that we should, to honor the process of empirical research as something separate from engaging in intuition, clearly state when we are talking of correlations near empirical research, in contrast to when we talk of what we intuitively speculate could be correct. And let us now postpone further speculation. We are going to stick to the idea, in the next formal illustration, that acceleration is the same as gravitation, and that time dilation is an effect.

Q. So how are we going to do that?

A. We're going to accelerate something that has a measure of fast-going clockticks of some sort going on inside it. And something else won't be accelerated. The idea of nonlocal duration piloting by means of super-models is that a super-model, engaging in the acceleration of another super-model (representing the object), also is able to slow down its internal processes. That comes easily in this very symbolic, abstract formal illustration we have next, in <k:9000>:

```
<k9000>
maxfundnum=    &&
10000.         fundnet
150            kl
maxfundnum
mm             150
200            maxfundnum
ad             fundnet
sz             wwyymatrix

<k9001>
fundnet        |up a fcm
lk             |network with
thisfcmnet     |a good amount
kl             |funds; here:
               |for super-
|At previous   |model theory
|and next      |formal
|card, we set  |illustrations

<k9002>
maxfundnum     fcmindqty
50             basisthis
```

```
ad              maxfundnum
sz              thisfcmnet
                lk
&&              fcmindex
fcmindex        lk
kl              initwarpindex

<k9003>
pwavfactor=     8
1.              rd
|The pathfind   ts
|nums have      |Toggle sign
|angle->6282    |so motion
|and length     |clockwise
|up to 1000     ^pwavfactor
6283            setfastvar

<k9004>
mainput30x50=   10
|In: value,
|x, y
|Action: sets
|1st num of
|1st triplet    i3
s7              i7
s3              put30x50.

<k9005>
mainget30x50=   10
|In: x, y
|Gives: value
|Action: gets
|1st num of
|1st triplet    i3
s7              i7
s3              get30x50.

<k9006>
makearea=       ll:35
|Area with      fundlevel
|gravitation    dancebeneath

800000          ll:30
t8              basis
12000000        ^smposition
setfundlevel    fneasy

<k9007>
                4
                47
                adjustfund

                m2
                dc
                m1
                pos30x50

<k9008>
                50
                adjustfund

                i2
                m1
                pos30x50
                51
                adjustfund

<k9009>
m2              m2
m1              i1
dc              pos30x50
pos30x50        53
                adjustfund

52              lo
adjustfund      lo
```

```
<k9010>
ll:35          j8

               29
j8             m1
               mainput30x50
0
m1
mainput30x50

<k9011>
               j8

               14
               m1
               mainput30x50


               lo

<k9012>
ll:30          j8

               m1
j8             34
               mainput30x50
m1
0
mainput30x50   lo

<k9013>
ll:6           |Symbol of
               |source of
j8             |intense
               |gravitation
i1             lo.
up             makearea
33             150000000
mainput30x50   setfundlevel

<k9014>
stellarthing=  tx
|In: tr#,fnwrp t6
|Fnact for
|stellar
|object;
|tripl# 10 of  |main triplet
|it has clock  |has position
|and mass      |of object

<k9015>
|A velocity:
0
32

1
12
jx
pn

<k9016>
32768000       wk
37             12
jx             jx
ad             wk
ku             mainput30x50.
billion        &stellarthing&
10             935
jx             fnactcherish

<k9017>
4              50000
935            39
1              adjustfund
^comet
```

```
fneasyact

<k9018>
23             50000
935            39
1              adjustfund
^comet3



fneasyact

<k9019>
gravitfield=   tx
|In: tr#,fnwrp t4
|Fnact for
|source of     |main triplet
|gravitation;  |has position;
|link is to    |triplet #5
|object        |has mass
|exposed to it

<k9020>
22             50
jx             jx
wk             wk
               fnwarp



s5             sx

<k9021>
12             ab
jx             ni
wk             s7
12             |distance
ix             |between obj
wk             |& source of
               |gravitation,
su             |squared

<k9022>
39             i5
ix             i9
wk             rd
               i7
               rd
               50
               rd
s9             t5

<k9023>
j5             j5
               sr
               sr
               ts
12             37
ix             ix
ad             ad
ku             ku.

<k9024>





               &gravitfield&
               3219
               fnactcherish

<k9025>
```

```
5               adjustfund
3219            ^comet
33              fnam
^denseobject    50
fneasyact       adjustfund
|Qty links:     billion
1               22
47              adjustfund

<k9026>
longtxt*        cliptrail
Gravitation/ac
celeration lea
ds to process
slowing in sup
er-model theor
y               fcmheadertxt
*txtcomplete    kl

<k9027>
longtxt*        cliptrail
Fig.5: Clock i
n top item aff
ected by accel
eration    FCM
 Loop#
                fcmlooptxt
*txtcomplete    kl

<k9028>
billion         0
setfundlevel    520
                0


&graphsomefns&
520             ^fnshowgraph
fnactcherish    fneasyact

<k9029>
graphclocks=    tx
|In: tr#,fnwrp  sh
|Fnact to
|show
|clockticks     50
|for objects    jx
|linked to as   wk
|#1 and #2      s1

<k9030>
51              ix
jx              250
wk              250
s3              rp
                ix
                250
&clockticks:&   450
sx              rp

<k9031>
37              37
i1              i3
fnwarp          fnwarp
wk              wk
makenumber      makenumber
460             460
250             450
rp              rp

<k9032>
12              fnloopcont
i1              basisthis
fnwarp          kk
wk              sh
32
lt
```

```
                100
d4              activepause.

<k9033>
twobillion      0
setfundlevel    1523
                0


&graphclocks&
1523            ^fnshowclocks
fnactcherish    fneasyact

<k9034>
|qty links:     ^comet
2               fnam
                50
                adjustfund
                ^comet3
                fnam
47              51
adjustfund      adjustfund

<k9035>
1               &fcm&
fcmgraphloop
kl


basis
fcmshowpause
kl              zz
```

Gravitation/acceleration leads to process slowing in super-model theory

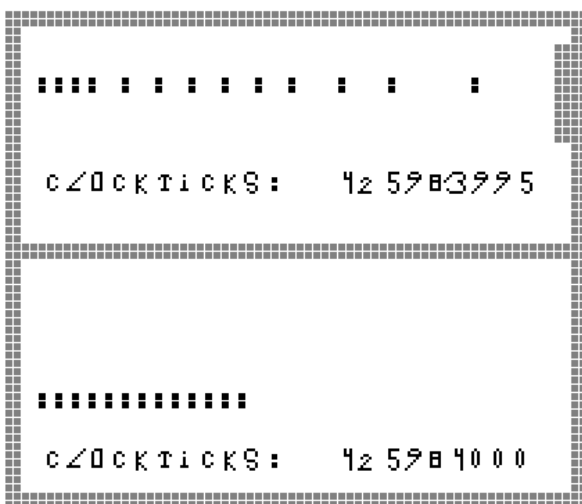

Fig.5: Clock in top item affected by acceleration   FCM Loop# 12

[In paper form, a sample of output is reproduced as
an image. In the TF, the FCM comes alive on the screen

when you type ^k8000 and, on the next line, cc. Press then <ESC> button when you've seen enough of it.]

Q. So, the topmost object--named 'comet' in the formalism illustrating the point--is accelerated towards the right, and in so doing gets a different clocktick-reading than the bottommost one. And this without using the notion of a curvature in the fourth dimension.

A. Exactly. Some abstract relationships are illustrated here, without presuming that this is in the slightest an exhaustive description; also, as with all our formal illustrations, the type of correlations is indicated but tweakings of the formalism must be done in order to make it fit with a concrete application of it. In some cases, the tweakings are formidable. But that's the nature of neopopperian science, that the formal illustrations are snapshots, a sort of cartoon version of the conceptual process.

Q. We are showing this again using the two-dimensional symbolic layout.

A. In order to illustrate anything formally, we do ourselves a great service when we cut away as much as we can so that the salient points stand out well. When we can do it in low resolution, that's more to the point than high resolution. In monochrome, that's more to the point than color. And if it's adequate to show the motion along one dimension, let's not add more dimensions needlessly. But there is no denying that, to encourage good and sharp thinking, we can go a very long way with two dimensions.

As the philosopher Charles S. Pierce pointed out, the rich possibilities, symbolically speaking, given us by a triangle, requires two dimensions. Three dots, spanned out in X and Y direction, can cover an area, and admits for far more complicated thinking than one-dimensional arrangements. And most of the thinking about four dimensions has really been done by means of representing a bent XY-plane onto two dimensions, as a photograph of a curved mesh, so that the third spatial dimension has been temporarily ignored.

Q. Would you say that two-dimensional representation is only representation we need in super-model theory?

A. There are cases in which a modelling using three or more dimensions can help show how remarkable transformations can arise rather effortlessly. Fractal geometry hints at this, but it seems that there are real features of the world best represented through a rotation or some other movement of four or more dimensions, perhaps at most eight or sixteen, through something like three dimensions. However, when this is done in some branch of super-model theory in some particular let's say biological or cosmological application, we do this in the sense of more spatial dimensions, not that anyone of them involves a meddling with the notion of time. It's conducive to clear thinking to regard dimensionality as simply an orchestration of form.

10. The Non-Algorithmic PMN And Discussion Of Future

10.A. Principle of Movement towards Wholeness

Q. Up until now we have looked at the more algorithmic features of super-model theory, can we say that?

A. Well, we have touched on all sorts of themes briefly, but I agree that, with the chapter headings and the formal models and discussions around them, we have had an orientation towards the more technical features as it were. Algorithmic, if you like.

Q. Could we, instead of building up gradually, suddenly take the direct opposite perspective?

A. What do you mean?

Q. What I mean to ask is this: how religious or spiritual or what's the word can one be, and at the same time be a scientist and scientific?

A. I have met physicists of every sort of inclination--obviously, quite a few of them have been atheists, I suppose, but rarely so that they appear certain about it. But I have also met christian physicists, hindi, buddhist, agnostic, and so on, all the way to the very broad category I like to call "mysticist" physicists. In the last half of his life, Newton was like that. A bit of the mystic was also in Einstein, and I suppose also in Bohr. A famous anecdote about Niels Bohr goes like this: a friend of him noticed that Bohr had a horseshoe hanging over the door for luck. He asked whether Bohr believed in it. "No," Bohr said, "but it's supposed to work even if you don't believe in it."

C.G. Jung, who introduced the archetype concept, had a friend from amongst the dozen of the greatest 20th century physicists (Wolfgang Pauli), and together they worked out that, in addition to causation, there's something to be said for surprisingly meaningful coincidences as possibly somehow "acausal". They (and Jung in particular) called this "synchronicities", which they spoke of as something in parallel to causation. Jung suggested that it's due to synchronicities that scientists often take so consistently the wrong turn both in how they seek out empirics, and in how they calculate over it and interpret it; but he was interested in the concept mostly, I suppose, for its more positive connotations (and for use in therapy).

Despite the diversity of worldviews that people who work philosophically with physics have (and which is the right sense of 'physicist' as far as I'm concerned) there are books by some wellknown physicists that seek to convey the impression to the public that atheism is a sort of logical consequence of the success of physics--but their arguments tend to be, at best, shallow. There is no pathway of necessity from the observations of quantum and relativity physics phenomena to any worldview. Worldview, in its most sublime aspects, must be chosen from personal intuition. Then one will have to work out how it can fit with such and such insightful pattern as found in physics, in the informal sense of 'physics' that is consistent with the super-model theory, and in which philosophy is not only an element in it, but, again in an informal and holistic and intuitive, first-hand sense, almost its whole foundation.

In order to look at these questions afresh, it appears to me one must lift oneself, as it were, above all the discussions, all the polemics, all the emotionality, that may be prevailing in media, at places of study, in the gossip among people, and so on. There are phases of extreme emphasis on some ways of comprehending reality which may seem to be 'everlasting' when they go on, and a mere decade or three later, a wholly different emphasis may exist. And worldview, science and philosophy isn't like fashion in clothing: there's a sense in which it is okay to be fashionable this season, even if you are aware that after this season, such clothes may not again be fashionable for quite a while, if ever. That's fine when it comes to clothes, perhaps.

As for life philosophy, thinking about the energy process of the universe or multiverse, and getting a solid grip on forms of logic, visualisations, and intuition, we're into an area where we must step out of fashion when fashionable thinking is wrong or piecemeal. Good work here is part of what gives us peacefulness of mind, a quietude and aliveness within, a tranquility and capacity for swift thinking, good dialogue, and perhaps also the capacity to make great art. If we fool ourselves in philosophy then we are out of tune, even if it a fashion in this season to fool ourselves.

Q. To have wholeness and clarity in worldview is, then, something that concerns quality of life?

A. Yes. Very intensely so. So one must not just be social and not just listen in to one's collegues, but go outside the chatrooms and tune in to reality. If there is some sort of at least vague mass hysteria going on, well, that has to be healed at the society level, and if one breaks with this hysteria one may have to find other ways to make a living--if one's income is tied up to speaking the fashionable illusions. So one must then be a philosopher and a scientist at heart, rather than as profession. In such cases, one must be loyal to something greater than the social. Right?

Q. Right.

A. One is entitled to--you are entitled to--raise above fashion in thinking when you ask about worldview and such. But then you must first realize the tremendous conditioning that may exist, which is far easier to do when it has just gone away as compared to a situation where it's all over the place.

In order to think about worldview, then, one must be alive to alternatives; and alternatives when it comes to worldview may also be found in myths.

Q. How do you mean?

A. Well, let's open up for a discussion of the sense of myth. Science (including physics) must, as we've said, have a living philosophical discourse as absolutely essential to its core. And it's part of philosophy to go into metaphysics. Metaphysics can be explored also by myths. The thesis, as I take it, of Jon-Roar Bjoerkvold in his book, "The Muse Within" (English edition, the Norwegian original came in 1989 with the title, "Det Musiske Menneske", and became an internationally rather trendsetting book, translated into many languages etc) is that each human being comes into the world with a living musical nerve. This musical or muse-like centre of being can be called forth via music and song. Bjoerkvold, also a professor of music at the University of Oslo, argues that the most whole and essentially richest of each, also in terms of childhood development, is tied up to this. He speaks of a connectedness which can only exist when one is not too steeped in "mechanical pace": rhythm, he says, is essentially a living thing. And to me, that sounds like a breaking with mere algorithm, and so it touches on what you began by asking in this chapter. But from where comes this musical feature of the human being?

In The Muse Within, he goes deep into the roots of the word music and how it connects to the concept of muse, the ancient greek concept of a divine being--part of the mythic background also of Christianity. Just some days ago --as I was thinking about myth--I happened to come across him--synchronicity, if you like, and I naturally asked him about this. He suggested I'd have a fresh look at the ancient Ode of Pindar, which he also discusses in the aforementioned book. Much shortened and very freely translated, this greek hymn goes like this:

Zeus brought forth the order of the world to the wonder of all the Olympic beings, and he asked them: Is anything here amiss, or is it all to your delight? And they said, one thing only, Lord, where is the voice in creation that expresses all its glory? Zeus heard that, and behold, the muses, children of Zeus, came into being.

So you see, creation must refer to itself by a process that requires something extraordinary: not just more of the same causality and functionality, but a new type: the music or muse-like type. (If we by "refer" now mean also a grand artistic expression of the dancelike beauty of the muses themselves, we have a bridge in mind between the myth and the logic of self-reference that we'll look into in the upcoming parts of this chapter.)

And the muses, then, were to lead people in the world to find their own voice so as to express the beauty of creation. Now that is a myth of art, or what!

Q. Absolutely.

A. Now if we look at this shining piece of ancient Greek thinking with cool logical eyes, see how the nonalgorithmic comes in here: the 'model' that has just been made--that is to say, the world--is supposed to perceive itself and express a perception of itself. In logic, that's called self-reference; and in logical terms, that's exactly what computers can't do, that's exactly what algorithms can't do--a theme we have developed much elsewhere and which we also talk a little more about in the next part of this chapter (10.B), in connection to Goedel's incompleteness theorems.

You see, the Principle of a tendency of Movement towards Wholeness is all about the grasping of gestalts and the putting forth of new gestalts. And a computer, and any algorithm, deals with, per definition, a bit and another bit, and more bits, and rules to switch them and so on, and piles of bits we call then 'programs'. One can never reach consciousness, let alone a genuine perceptive expression, from within a bit-by-bit model. But, in this myth, the living world does it nevertheless. So how does it do it? Some might say that it is an illusion, or a coincidental juxtaposition, but there are, after all, a lot of findings in physics, as we have been through, that speak of whole fields, whole ensembles, and indeed quite a few of them involves the superluminal in their subtle and fantastic activity. From where does all this arise?

In the Greek myth, then, we might say that we have a story that speaks of the sense in which a model, observed from without, can become somehow a network of super-models so that they can relate to one another from within, perceive and express and enable new holistic forms to come about from perceptions. This is, then, a myth that can enliven something of what we intuitively can take to mean a movement towards wholeness, a creative wholeness, and such aspects of reality has been speculated over as possible subtle forces in the creation of life not just by ancients like Aristotle and Goethe, but also by a small but not insignificant number of modern scientists.

Could it be that something essentially whole and essentially undivided and perceptive is actively part of the formation of the underlaying fields of energy that we in the super-model theory consider as pervasive in the universe?

Q. Or the multiverse. Where does that come in?

A. At the present level, we merely notice clearly that due to the flexible principle of organisation between the super-models, and their capacity to have two-way information flow and operate in networks, we can easily imagine that a number of manifest universes do exist and not just one, and not just so that there are many levels to any one of them; and it is still one cosmos, one world and no need to assert sharp differentiation between these in any absolute sense. This would allow, for instance, for complicated patterns of anticipation of likelihoods, so that we are not only thinking of pilot waves relative to such after all utterly trivial situations like double slit inteference experiments and such. The fact that science is in an early stage is no justification for projecting crude simplicity into every corner of the worldview. If anything, that's a teaching we can all derive from stuff such as Bohm's Implicate Order work.

Q. I see. Now, let us go by easy stages. The muses come along and they also enable artistic perception and expression to arise. Then, as set forth in earlier chapters, we have the super-model theory. How, exactly, do we see these together?

A. By seeing the PMW as an open door.

Q. The PMW is part of the super-model theory, but what do you mean, exactly? Open door?

A. The PMW is not a mechanical principle. The three letters are Principle of Movement towards Wholeness, but there's the word 'tendency' there also, in the full expression of it--the Principle of a tendency of Movement towards Wholeness. Aristotle famously said (and Arne Naess, in personal conversations we had, also in his mountain cottage at Tvergastein, and once also at Hvaler, praised this quote of Aristotle very much): it is "bad upbringing" to demand definition of every word. For, obviously, to define a word you need other words; and if all the other words are going to be defined, there is no way around circular definitions. This is sometimes not too obvious when we think of computer programs, but it should be clear that it always is the case for every theory we have of reality. Remember always that our formalisms are just meant to illustrate this or that bit of a theory that is by itself essentially informal.

Yet, in the theory, some notions are more left over to intuition than others; some notions are as it were derived from more elementary notions, or 'axioms' if you like.

And in super-model theory, "wholeness" is just such a word. Try as we may, a too-strict definition of wholeness imposes a fragmentation, for it implies that we can make mechanical and algorithmic that which ultimately is a creative process of forming fitting gestalts.

Can we define coherence, a related word? And if not, and I think not, then we cannot make a method or technique or algorithm or equation for how to bring about wholeness. We can speak of the strengthening of contrasting similarities and similar contrasts and of reverberating patterns bringing these together--a sense of order--but these are musical concepts. You see, musical? As my friend Bjoerkvold would have it, they touch on the muses within, that virbant muse-like feature of reality, of consciousness, of feeling. Which directly relates to the "immediacy" concept that my father, also influenced by A.N. Whitehead's writings, often have brought forward in contrast to the more "mediated" relationships that have less of the musical in it. (Cfr also Colwyn Trevarthen, child psychologist, for concepts of the immediate of relevance for child development.)

Q. Let us for the moment try to step into the shoes of an atheist scientist who earnestly are trying to make sense of what we are saying here--let us imagine that he is trying to understand the PMW principle in physics.

A. He wouldn't make much sense of it, perhaps. Or what?

Q. But could we help it along? It's an open door, but an open door to what?

A. It's an open door to something non-algorithmic. The computer is there as a tool to assist us in the checking of formal illustrations; it parses the syntax, it does the jiggling of variables; it adds and multiples and divides and shows on-screen. All that is technical and methodical. And we are here not making a theory of computers, but of the general processes of energy flow in all existence. We are saying that there's something formative--Aristotle spoke of several forms of causation, one of which Bohm translated into 'formative causation'--or which Bohm & Peat in their book spoke of as a 'generative order' (a sort of generalized concept of the fractal). Surely, the algorithmic has limits. Anyone who has any sense of Goedel's incompleteness theorems know that--and knows that over any set of data, there is no definite theory over them, for indefinitely many candidates can be made. The Norwegian logician T. Skolem had some interesting theorems before Goedel about this: he showed that to any finite set-theoretical model, there's an infinite set-theoretical model that can act as interpretation of it, and vice versa. Skolem was one of the perhaps not very many who was absolutely not surprised about Goedel's results (and Skolem was the teacher of D. Follesdal, who has worked further on some implications of this also relative to L. Wittgenstein).

In short, then, the theory of the super-models has in it a statement that there's something non-algorithmic that subtly acts to arrange super-models, or pilot waves, holistically; and that only in a set of rather crude cases is the arrangement so mechanical that the more fluid aspect of this principle can be overlooked. Of course, these crude cases are what classical chemistry is about.

Q. But what shall induce people to trust that PMW refers to something real, when it may seem nebulous to them?

A. If it seems nebulous, first realize that there has been no clear-cut methodology to systematize all known cases of nonlocality in toto entirely according to a causal principle. Also, the known cases of all sorts of quantum nonlocality, tunnelling, and other nonclassical stuff, is growing almost exponentially in mainstream science as the techniques of measurements and the time spend sorting out the data compells scientists to drop classical interpretations. Add to this that in a theory of all existence, there is a necessity, at some point, to account for mind and feeling and perception and so on, and that, after Kurt Goedel's work, and other works as well, there is the sense that a 'bottom-up' approach starting with mere forces and particles won't be enough. Add also to this that for those who really want to understand how life in its vastly intelligent architecture came about, there are huge questions--which at least some scientists recognise--with attributing all that much power to the concept of randomness, even given millions or even billions of years of it. For these structures to all arise in the incredibly short time of some billions of years, given that they are composed of trillions of yet more trillions of exceedingly fine-tuned patterns going all the way into the quantum sub-atomic level--as quantum biology is now suggesting--this requires an enormous leap of faith. And a much greater one, it appears to me, than the after all relatively obvious leap of thought it is to appreciate the possibility of a holistic formative principle operating subtly, through pilot waves, alongside all the causal stuff.

The PMW is coming along most naturally as a commentary, we might say, over the pilot waves: the pilot waves, or super-models, due to their superluminal and exceedingly subtle features, are wierd enough but they are much less in doubt. Once we accept them, we must take a stance, and the stance has to be well founded: is this all subject to some kind of simple recipe; or is it--in addition to whatever typical patterns found--a tendency of a movement towards wholeness. So that the pilot waves do the little thing that a greater wholeness can arise, instead of a perishing into what some has called 'entropy', when the option is that the little change can have such an impact.

Q. All right. Now I'm beginning to understand the necessity of the PMW. Let's go back to the artistic feeling of it; we've had a lot of the more methodological and empirical in earlier parts in this booklet. The PMW, then, is an open door--also to art? To intuition?

A. It's an open door to develop own artistic intuition, own sense of resonance with life, to start experiencing also esthetics, the beauty of dance and ballet as something of the greatest importance--the phrase I used in the 2004 title--'resonating over dancers'.

When you create a pattern, let's say an algorithm:

What is it in your own process of attention that gives rise to it, when it is right, and dissolves it again when it isn't right? Or musical? Or fitting with the moment and with that which C.G. Jung termed "synchronicities": the meaning, the orders of experience, beyond simple causation and such.

Q. And this we can do without saying that the super-model theory comes in a box wrapped with its own spirituality?

A. You are totally right. But as philosophers, we are also not just permitted to engage in wonder, but somehow it is our duty, and we're entitled to do it, and, in this spirit of dialogue, there is no drawing the line in the sand and say: we only talk about what's on one side of the line. But there's a difference in speaking about that which has much more contact with direct sensory measurement reports and that which chiefly, like PMW, must relate to pure ideas, to logical thinking, and to worldview questions.

So, I don't want to close in the number of worldviews we can associate the super-model theory with. I daresay one can associate it even with atheism! But I find it particularly liberating to remind myself regularly on the delicious grand insight of the classical Western philosopher George Berkeley: he proposed that only what God conjures up in his mind, is real; and that matter is real exactly because God conjures it up in his mind. And so, let's figure out how it is done--we have something algorithmic at one end, and the PMW comes in and is an underlaying feature determining how the pilot waves or super-models are laid out and dissolved, and so the deeper sentiments somehow or other--perhaps through muses if you like--are conveyed towards the algorithms by means of something like the PMW. That's one vast interpretation and if you ask me whether that one is dear to my heart, then, yes, obviously so, but it isn't required clothing to go into the club of super-model theory!

Q. Got it. Summarise, then: why is PMW necessary at all? Can't it be just another algorithm or definite element in our theory? And this word 'wholeness'--why use it at all?

A. There are three answers to this. First of all, we have no evidence of any exact mechanical principle at work when it comes to entanglement, although some simple instances such as EPR and some forms of quantum conductivity and the suggest that similarities and resonances play a role. The possibility is strong that super-model coherence, though intensely active at all parts of reality, is essentially not manipulative except in trivial cases. This sort of idea is implicit when bohrian physicists say sorts of things like there is no such thing as zero probability--the probability density spreads out and out and may be infinitesimal but it is never zero. (Though I myself do not touch the concept of the "infinitesimal".) But that super-model coherence in its various forms do arise and do dissolve is a necessary feature of the theory insofar as it is capable of talking about all the significant findings--I think we have seen that already. And this is all about how wholeness is more than the sum of its parts, so we can't get away from some concept of wholeness here.

The second answer is that algorithms are hopelessly stupid when 'on their own'--something also Goedel's work (next chapter shows us). And without the PMW, the rest of the theory would be pretty much just algorithmic stuff--which translates into boring materialistic mechanistic worldview all too easily. For they cannot refer to themselves except partially and the result would be more messy than this reality without a perceptive gestalt-forming principle of some sort.

The third answer is that I have an intuition here, that there's a feature operating through coherence that is forever beyond what people made of matter can poke fully into. It is there, and people are made of it, and people can think about it, maybe play a little with it, but it is ultimately the other way around; there's something there that's playing with 'what is'. Some sober form of the musical synchronicity idea is perhaps the most elegant idea one can take up in oneself to connect to it. And when we do it, we're quickly led into the arts--the muse within --not just art as fashion and social story in all that post-modernistic take on it, but art as the exploration of how esthetics grips us, the very movement of it, beyond the theory, as dance exemplify and present, not just represent, but present in the immediate, beyond-thought, purely meditative sense. In this way, the muse-like is not just in the musical phenomena, but can be seen to be at the core of the act of creation, and part, as also Arthur Koestler suggested, of humour. The smile within, the smile in the body.

Now, we are going to do the Goedel resume, which in the main will be a summary in words of that which is spelled out in formal detail in some of the articles available on the Internet that we've made on the G15 PMN language.

Then we'll summarise the theory and explore possible implications. This must be a never-ending discourse, just as physics itself is just that.

Q. Sounds good!

10.B. Machines don't have intelligence: Goedel resume

Q. What's Goedel all about?

A. It's a long story, but it's possible to sum it all up. In the beginning of the 20th century it was hoped by a number of people working with formal logic that one could, by pure formal logic, somehow contrive a system from which more or less all knowledge--at least all knowledge about numbers and arithmetic and stuff-- could be derived.

This enthusiasm turned out to be misplaced, but, as often is the case, even misplaced enthusiasm does, on occasion, have fruitful consequences. Computers probably won't have come around as early unless for this misplaced enthusiasm in combination with the intense pressure on developing certain military technology during the Second World War.

The popular, imprecise, but not entirely off the point summary of the works by a man called Kurt Goedel is that computers can't be intelligent, can't be smart. However, those who want to sell in computers as assistants to people in daily life don't like that result, and these sellers, often in union with a group of nerds who have never understood Goedel, pretend that there never was any such result. They pretend that intelligence can be automated, when it cannot. The same people typically also pretend that it is pretty certain that both the universe and the human brain work more or less like a machine, when they don't. So, it appears to me that one of the things one whose intent is to touch a truth while living in this beastly society can do, is to regularly dip into some, even if only popular, rendition of Goedel's second incompleteness theorem--or, at any rate, remember this point:

Goedel showed that mechanical stuff can't engage fully in self-reference.

And without self-reference, how do we get to anything remotely resembling intelligence? We don't. And so the enterprise that is called 'artificial intelligence' by the rich, stupid companies on the planet is, as Roger Penrose elegantly phrased it, "The Emperor's New Clothes". A child can see that computers aren't intelligent if that child has been given a first-hand familarity with these themes through great education.

Those who have worked slowly and carefully through the more physical phenomena we have indicated in earlier chapters appreciate this existence is full of stuff that isn't very machinelike. It could seem like hardly anything in this multiverse is merely about a classical cause and effect. As human beings, we are entitled to consider that we are much other than machines. WHen mass media has a phase in which they speak, several times pr week, of eg "impressive intelligence" of machines, let's then mentally substitute "behaviour" for "intelligence". Machines can be made that impresses us in terms of behaviour that does seem to be, in some narrow sense of the word, intelligent. But anyone who has any grip of Goedel or programming knows too much to ever fall into the self-destructive illusion to regard machines as intelligent or to regard people as machines. Machines can be very good indeed, and they can be programmed so as to express a person's mentality in a first-hand way--this we can call First-hand Computerised Mentality. We can, for short, say "FCM". Fine. That's perfectly philosophically in order. That's meaningful. FCM can be real. Is real. There's a module in G15 PMN called FCM, which in fact we have used in the earlier scientifc formalisms in this booklet, but it can also be used in that which by the most superficial people on the planet is called "AI" or "artificial intelligence"--such as robot control.

The briefest possible summary of Kurt Goedel's second incompleteness theorem follows. If you want more stuff about this, just go to Internet and see how you can do some detailed Goedel work with G15 PMN, using the links I provide after this explanation of Goedel.

And we'll go briefly into my own way of showing how the infinity concept has been handled in a way, in foundational mathematics, that leads to such confusions as that which Goedel pointed out, amongst other things.

Then, in the upcoming parts of this completing chapter, we'll spell out a little more of FCM relative to robotics, because this is a technological part of society and it makes sense, when we have argued philosophically for a holistic vision of ourselves and the universe, to have ideas on how to shape this part of society to fit with the insights we have arrived at. Here, we only indicate how to do it in the broad outlines; much more can and will be said, and done, along these lines.

Q. But you're saying that Goedel did this work before the arisal of computers. How, then, it can it concern what computers can and cannot do?

A. Alan Turing carefully constructed the concept of the computer in order to try to circumvent Goedel's result:

as Penrose and others have pointed out, instead of circumventing Goedel's result, he doubled its strength. Now some are trying to interpret these results so that intelligence, as theme, isn't touched upon: but it should be fairly clear that Goedel's results do touch on intelligence indeed.

Q. Well, let's have the summary, then!

A. Alright. To get it in the historical setting, in the 1920s Bertrand Russell and Alfred North Whitehead were amongst those who produced works aimed at summarizing all knowledge about whole numbers and arithmetic over them, by means of set theory. (The Russell-Whitehead approach was one such, Zermelo-Fraenkel another, but related approach; Goedel's work concerns both such and a vast range of similar approaches or systems.) I will use a set of words in the next paragraphs that are fairly near to the ways it was first described--complex words, but then it gets simpler once we describe it again via computers. Okay?

Q. Okay.

A. Earlier on, the logician and thinker Bertrand Russell had shown that certain set theories did not work out so well because of possible self reference. A set theory, after all, is much like a formal theory over concepts. And so it can easily be made to have sets like this:

setA: all sets that does not contain themselves

Now, if setA does contain itself as member, we are led, by looking at its definition, to conclude that it doesn't. But if setA doesn't contain itself as member, we are led, also by looking at its definition, to conclude that it does after all include itself as member.

In set theory, then, unless self-reference can be excluded, contradictions arise; and for these kinds of logical systems, contradictions means that at once everything becomes both provable and disprovable, and as a result, their whole approach is pointless.

To avoid this, Russell & Whitehead included certain rules for what types of sets that are allowed and which ones are not allowed. This was called a 'typed' set theory, for only sets of certain types were allowed. They were then able to make logical deductions where such statements as S was part of the system:

S: proposition_is_provable_within_the_system(P).

As long as P concerned whole numbers, and functions over whole numbers and their arithmetic, it seemed that the work started by Russell & Whitehead could indeed produce, by carefully looking at the axioms and rules of deduction, more and more results of the kind we expect in arithmetic.

Goedel then showed that, despite the rules that Russell & Whitehead had erected to prevent self-reference, any such carefully made deductive system which describes numbers and sets over them can be shown to contain what we might call a 'hidden' self-reference. This is due to the fact that the whole system may be mapped by the numbers it is meant to handle. By careful work over more than sixty pages, Goedel made, in a way, a whole computer program years before the first computer was made. He showed that a statement of this nature can be made:

P: NOT(proposition_is_provable_within_the_system(P)).

Elegantly, Goedel then pointed out that, by looking at the statement and noticing what it says, we can make certain observations. Let us imagine that the statement is wrong. But if P is wrong, then the 'NOT' is wrong; and if we remove the 'NOT', then it is said that P is provable within the system. That means that P, something wrong, is provable within the system. Meaning again that we have got a self-contradiction.

But the statement, remarkably, could turn out to be true. If it is correct, what it says, then it is correct that it can't be proven. Which after all must be the case in such a case as the system is consistent. If the system is consistent, then, it is incomplete.

Q. This is heavy going. Do you have a lighter version of it?

A. Absolutely. Scroll ahead to Turing's work a decade or so later, and beyond, and we have computer programs of a type that can do work in terms of analyzing other computer programs--even possibly themselves. Turing created the computer idea because he noticed that Goedel seemed to have found a way of supplying an incomplete system with more and more true statements; he wanted a 'goedelizator' machine--a form of a computer--and he wanted it thought about logically, and imagined to spin out all results needed to make the system complete. But as soon as Alan Turing had erected this, in connection with what he called 'ordinal logic', it became clear that any such 'goedelizator machine' itself can be subjected to the same analysis and synthesis as Goedel performed, and shown to be incomplete. Thus, the incompleteness cannot be captured in any machine.

Q. You call this easier?

A. Alright. Here's a slightly easier version, but then we'll provide the links where it is spelled out in a more pedagogical manner, so one can think about it slowly. Have a look at it, it's worth thinking about a little.

The easiest way, done often in computer literature, is to imagine that each system formal system as Russell & Whitehead created is in many ways similar to making a program that makes definite statements about other programs. One of the properties of programs that such an 'oracle program' ought to be able to tell is whether a program, given a certain input, ever does come to a proper completion point, or whether it spins of in an infinite loop. Let us imagine that the oracle program is called 'does_it_loop_on'.

If you know anything of programming, you know that it is possible to say NOT in front of a statement, and that it is possible to make loops, eg. by a statement like GOTO after a conditional word like WHEN. Informally, let the program we make look like much like this, where the word TEXT means that the text of a program, rather than the result of performing it, is being used as input somehow:

```
  tricky_program:
     1: A := does_it_loop_on(TEXT(tricky_program))
     2: WHEN (NOT(A)) GOTO 2.
```

So, this program, called tricky_program, first calls on the oracle to evaluate itself. Does it loop forever? The oracle may say 'yes'. On encountering line 2, the NOT enters into effect, and the program won't do the GOTO 2. So the program will exit. So, the oracle is wrong. It cannot say 'yes'.

But if the oracle says 'no', the NOT will convert that into a yes, and the result is that the line 2 will keep on being called indefinitely, until the computer is reset or turned off or something. Again, the oracle has done a mistake.

We are led to say that the oracle itself, in order to not say something wrong--and this is in a context where all its output is 'yes' or 'no' (or 'true' or 'false', or some other binary pair like that) has to go into a loop itself, where it never stops performing. In that way, the oracle won't say anything wrong. But that means that we have a knowledge not permitted to be expressed by the oracle program, namely, that in the above situation, the correct answer, as to whether the program loops on, is, indeed, 'yes'.

Q. Hm. Now why is that significant?

A. It is significant because it means that every general program that aims to speak about other programs in terms of their general behaviour will exhibit the same incompleteness. That means, again, that the incompleteness above can be shown to spread and that it concerns every computer program that are supposed to provide some sort of 'perception' of other programs: there will be an infinity of incompleteness, for every possible such program. And that, again, can be transferred to apply to every domain of recognition which is so that it can be mapped onto program. For after all, a program is a form of order, and can be thought of as representing a particularly computer-friendly representation of anything at all. It means, in short, that there's no general perception machine by programs over programs, and thus, by this transfer, no general perception program at all. And without perception, programs can't make intelligence. I spell it out here fairly fast, but even if one spends many months trying to work around the vaster implications of Goedel, one comes back to the incompleteness, when one does it right.

Q. So "AI" or "Artificial Intelligence" is an illusion.

A. Yes. Computer programs can express intelligence so as to encourage living intelligence to interact with the programs and so that the programs are as good as can be. But they cannot manufacture intelligence when they can't do a general perception. What we need to do, then, is to awaken our natural intelligence, and, when we need programs to be a bit mind-like, to do so with awareness of the inherent limitation of all things digital. This is essential in the FCM appraoch.

Q. First-hand Computerised Mentality--FCM.

A. Yes. Now we have used that type of program in the context of physics, and we'll talk a little more about it in the next part of this chapter. For now, I wish to give links to two essays that can take a person a little further about Goedel studies. They are,
  www.yoga4d.org/arguments_against_AI
  www.norskesites.org/fic3/essay1a20130321.txt
Here, as elsewhere, let me remind the arduent pursuer of philosophical insights that the brain must have more than enough pauses between each study hour of infinities, self-reference and such. The brain obviously has some algorithmic aspects of it. We don't want to push the study so hard we make 'unending loops' of thought inside the human mind. Take it easy with infinity. Don't pursue an absolute insight into it, be more moderate in aspiration. And this also applies to the completing remarks in this part of this chapter, where we look into the concept of infinity when applied to whole numbers--an appearantly innocent area, but, as it turns out, quite complex after all.

Q. All right. Whole numbers, that's like plus and minus 1 and 2 and 3 and so on?

A. That's right. Common both to whole numbers and numbers of the socalled "real" type, like 3.15149262535 (to which sometimes some dots are added to indicate an indefinite series of digits), is that they are defined by an appeal to the idea of sets, whether implicitly or explicitly. In discussing now only whole numbers, we will see that these sets aren't obviously clearly thought about in classical mathematics; and the same type of argument can then be applied to show that the socalled real numbers are no clearer. An example of the idea of the set is found when you consider such common phrases like: "Let the variable x be a finite, whole number, as high as you like". Though the set of all whole numbers, or all positive whole numbers--as are also called "natural" numbers--isn't spoken about explicitly, it is understood. And if there's an issue with the clear idea connected to this set, then that's pretty devastating for all mathematics--and, in a way, this is perhaps a deeper form of what Goedel began pointing out. The argument is simpler, to the point where it seems to be no argument at all, perhaps: but it is there, and indeed some of the strength of the whole-number approach of the G15 PMN formalism and its TF-FCM is that it is a computer language--the first computer language--made after a deep contemplation over just this issue with sets, and so that possible confusions are avoided.

Q. So, the natural numbers, they have been defined as the set N equal to {1, 2, 3, ...}. Now how is that containing an error? It looks like one of the easiest definitions in whole world!

A. To your trained, educated eyes it does. But you have learned, at home or at school, what '1' denotes, and what '2' denotes, and what '3' denotes, and you have also learned that the three dots, "...", indicate "and so on", or "etcetera" or "etc" and you have got used to the idea. One of the things that is deceptive about it is that the assertion, usually not made very explicit, but it is there --is that N, to call it that, only has finite numbers, and it certainly must have all of them, without any exception. When we look at "1", "2" and "3", they seem like the obvious beginning of positive finite numbers. But if we write the set like N={I, II, III, ...} we see that there is growth of the width of these numbers. In order for this set to contain all finite numbers, it must be infinite in size, for else there would be a certain finite number that is its maximum, and to this we can add 1 and get a still higher maximum number. All clear so far?

Q. All clear.

A. At each point in the imagined construction of the set N do we find that the quantity in the set is itself in the set. So, when the set has three members--we can write this as A(N) where A=amount--then we have that A(N) is 3. When we have progressed in the construction of N to the next number, which is, in roman letters, IV, but which we write as IIII just for simplicity, we find that A(N) is 4. This process we can write in this way, by which we see the phenomenon of a symmetry between A(N) and the highest number so far added to N:

```
         .
       .
     .
I I I
I I
I
```

We see here a more proper graphical way of writing how we construct the set N. Each time we add a member, we add a number whose width is one more than the previous member; and, as we progress upwards to higher and higher numbers, we have, at each point, a triangle of I's, so that the height of this triangle, given proper font and line spacing, is equal to the topmost line in it.

Q. That's clear.

A. Well then, what happens when we are going to consider the set of all finite numbers N? Here, clearly, A(N) is no longer a finite number. The quantity is infinite. Agree?

Q. Agree.

A. And yet we have assumed that only finite numbers are the members of this set.

Q. Again, I agree.

A. Well then, the relationship we have just spoken about--that A(N) is equal to the highest member in N--it doesn't hold anymore. You see? We are saying that in order to make the set of all finite numbers we must let the vertical part of the triangle shoot up to infinity whereas the horisontal top line of the triangle is not allowed to shoot sideways to infinity. The symmetry is broken. Now tell me, did we at any point, when we started the construction of this set, include a statement that this symmetry is to be broken?

Q. No, we did not.

A. And so we have to conclude that, in order to make any set in this simple way we began, we must either stop at a definite number, or we must let it go to infinity but at the cost of including some new sort of infinite numbers as part of itself. But if we stop at a definite number, it is no longer the set of all finite numbers; and if we include some sort of infinite numbers, nor is it anymore the set of only and all finite numbers that mathematics have presumed. In sum, we are finding that the concept of the finite number breaks down when coupled to the 'et cetera' concept in order to make a general concept of it.

Q. Could we not simply assert that the process is going "as high as we please", and that we by the idea of the infinite try to mean just this? So that we don't get the infinitely wide numbers to be part of it?

A. This is what desperate mathematicians have been trying for a century--to go around the infinity concept by stacking words on top of each other. "As high as we please?" As who please? What do you mean by "please"? And what do you mean by "as high as"? This is not what the idea of the infinite is. If we have an set with infinitely many members, then we have a set with infinitely many members--it's not about "please" or "as high as". And if it has infinitely many members, then it has members which include numbers that are infinitely wide, when written in the way above--because the construction process of the set allowed for no breaking of symmetry. This is the clear idea and one of the chief principles of Brouwer was that we only accept clear ideas when working with numbers and logic.

Q. Hah. And the implications of this? Where does Goedel come in here?

A. That's the interesting point. Kurt Goedel could never have carried through his proof unless he was willing to entertain as true the assumption that the set of all finite and only finite numbers could exist. So what we are suggesting is that the confusions that Goedel began to point out really comes from a fundamental misconception about what happens to the idea of concrete numbers like 1 and 2 and 3 when coupled with something like our informal understanding of infinity. Of course, the systems that Goedel showed are incomplete can't be erected either without the false assumption of the existence, as a clear idea, the set of all finite, and exclusively finite numbers.

Q. And the solution?

A. I've introduced the idea of essence numbers to remedy the situation--this dating back to work before the 2004 book where I first launched the super-model theory, though I have worked in more refined ways on the idea of essence numbers since then, and expect more to be said about this in the future. Here, we must relate to the idea of the infinite as something that is tied up to movement. These numbers somehow can give rise to finite numbers as special cases of themselves, esp. through interaction between themselves, but they are naturally nonfinite. Conceptually this can work out, and I believe L.E.J. Brouwver touched on a portion of this insight--it means we must start over again with number thinking. It also could provide food for thought concerning the philosophical speculation over what sort of thing the postulated super-models really are. I think we're going to leave it there for now, since it is very possible to undertake to evaluate the super-model theory without going deeply into these "infinity studies", as I call them.

Q. Right. Are you in some sense saying that these essence numbers are what the super-models are all about?

A. Well, yes. Possibly, you see.

10.C. Working with robotics without being reductionistic

Q. Working with robots, with the field of robotics. That sounds important enough, perhaps. But what is that word, really, "reductionistic"?

A. The word "reductionistic" comes, of course, from the word "reduce". The way it has been used in scientific and philosophical jargon since, at least, the 20th century, is to refer to a practise that involves a crude, over-done simplification, an explanation of something which is not as much an explanation as a distraction and attempt to enforce a scheme on something too nuanced and too subtle to admit of that scheme.

Q. Such as?

A. Such as when people who have never spent much time thinking about how the human mind works come up with a theory of the brain, and proceed to assert: the mind is "nothing but" such and such neuronic activity. That's a reduction of mind to something else; and, to indicate that we think it is a crude reduction, and unworthy of science, we can then say, "that's reductionistic".

When we construct robots such as aimed at being around us, or in factories, and doing things which presumably could have been done by educated humans, we must obviously invest the programs these robots are running with certain fairly mindlike qualities. There will then be, perhaps, the temptation to imagine that these robots do have mind, or at least some mind-qualities, such as intelligence, feeling, attention. This temptation may express itself in statement that imply a reductionistic view of the human being, in which digital machines and other human artefacts are hailed as achivements on the level with the creation of human bodies and consciousness. Such developments are tyipcal--after each phase in which humanity has come up with dazzling new technology, there has been some tendencies of overzealous thinking about this technology and a tendency to see everything else according to its measure. Eventually, the technology gets commonplace and boring and there's less of a threat of reductionism, perhaps.

Q. Are we now talking about how to program robots, so that inside the computers running the robots, there are programs that don't presume too much about mindfulness and so on?

A. Not only that, it's also about design and the general type of language with which we associate robots and other artefacts of ours that might appear more or less lifelike exhibit some mindlikeness.

Q. You speak of this as some kind of ethical challenge?

A. Well, yes, it's about contributing to a culture that doesn't have in it a kind of emptying of the genuine importance of life, mind, feeling, music, awareness, dialogue, thinking, meditation, sexuality and so on. A reductionistic culture is a kind of pollution of mind; and to have meaningful lives, to contribute to a meaningful society, we must be aware, and fight, tendencies to flatten the vision of the human being.

Q. Right. Name the way. The solution.

A. Once we recognise the challenge, the solutions present themselves. First of all, anyone who has seriously studied the types of themes in this booklet would probably agree to the importance of being aware of how grand existence is --includin the existence of human consciousness, feeling, musicality, dance, thinking etc--so that we completely avoid naming either machines or programs or bits in them in shallow, reductionistic imitation of life. FCM, First-Hand Computerised Mentality, is an approach to programming that suggests we leave out all words like 'intelligence', 'learning', 'recognition', 'awareness' and 'feeling' and more such, including 'perception', from programs. We can and should use words which are either presuming less, or more or less invented to suit the purpose. For instance, we can say 'match' instead of 'recognise', 'map' instead of 'aware', 'evaluation' instead of 'intelligence', 'criterion fitting' instead of 'feeling', and so on.

In design of robots, we can then show the same type of insight and intent. Children grow up in a world where they see and think much before they tackle long sentences very well. A product that isn't alive, that doesn't think, and that doesn't feel, such as a human artefact, e.g. a robot, should look like it isn't alive, it should have a behaviour that doesn't intentionally try to project an illusion that it is thinking or feeling. Or else we are simply injecting illusions into the upgrowing generation and they must spend years undoing these illusions when they are old enough to tackle philosophical and scientific discussions. And adults are sometimes affected as easily as children. So this is a common challenge, not to pollute the cultural mental field with reductionistic impulses.

Q. Right. How should robots look, then?

A. Research I've seen reported from the Netherlands, a socalled "Frog" project, designed a robot to look very different from a human being and more like a giant toy frog. They then proceeded to study human interaction with their robot. They found, as it appears, that people liked and interacted well with the non-human-looking robot.

Indeed, that's the typical finding ever since the Personal Computer came about. The PC is something easily interacted with, and nothing of it looks in the least human-like, not even life-like. So make the robots like boxes; give them wheels rather than legs, tracked wheels are generally more practical for them in any case,--and design according to function rather than by imitation of human bodies or faces. This goes hand in hand with an emphasis on not imitating mind, but rather considering of technology in the spirit of it encouraging the awakening of the best of our natural mind-talents.

Q. What should we do if technology goes entirely counter to all sorts of directions, like these, that we find ethically meaningful?

A. Then one must seek a golden middle, in which one calls on some portions of existing technology but also so that one stimulates to developments of a type that can set things more right. Each person is continually, as it were, submitting 'votes' as to what is making sense and what doesn't make sense. But for these votes to be heard, one cannot severe all ties with society completely. So, one must relate to the environment. The 'what is' must be seen, so that one doesn't live all the time in 'what should be'. In being willing to let go of certain rewards built into the mechanism a false society erects to coerce its individuals to partake in the falseness, one may be able to find more of a personal voice of artistic integrity; but one must connect somewhat, even to a false society, for this artistic integrity to express itself and thus contribute in the right direction. To know the ideals make sense, as long as one retains a spirit of fighting action with a deep connectedness to the present.

In a case where society fills itself up with robots that pretend to have mind, or which are made so as to confuse people into thinking that they are living, see if there are some robots made with less of such nonsense, and make a point of using them. And when robots are used where a living human being with genuine mind, feeling, empathy and intuition would do a better job, argue against the use of robots there. The word 'robot' relates to Czech roots meaning also 'slave'. Robots are supposed to be machine-like slaves of humans; doing dirty and dangerous (and boring) work, for the benefit of humans. Only in a modest role can robots have a good role.

Q. The FCM part of your programming language, G15 PMN, as we have used as formalism in physics examples, can also be used to control robots, isn't it so?

A. Yes. Robots have to be programmed in such a way as to be responsive to an environment which isn't shaped by themselves, but in which they can do some constructive tasks and in which they must avoid to do needless damage. The FCM nodes are ideal for such programming.

Q. Could you give a rough, not-too-technical sketch of how it is done?

A. Sure. All the nodes in G15 PMN's FCM perform in a sequence set by the socalled 'levelnumbers'. We might think of the nodes as having one level, then above that, the next, and so on up and up. But in the case of a robot, we might want to imagine that at approximately the middle, the levels sort of bend so that it goes down again, in the shape of an upside-down U, more or less. We then put all the sensory input from the robot at the lowest level numbers, and all the motor output to the robot at the very highest level numbers--which, since it is in this 'bent' shape, beside them.

Q. What do you mean, exactly, when you say 'put' the input to the nodes?

A. The FCM node network must have some connection with the robot, right? And so whatever camera or the like the robot has as input, the computer must throw in the matrix of the numbers to the FCM nodes by some algorithm. It's just a question of moving numbers from the hardware port with the wire (or whatever it is) to the robot, over to the part of the computer RAM that has the FCM nodes, the foundries or 'funds' as it is also called inside the FCM code. This is processed at higher and higher levels, and at the very highest level of processing, the highest levels of tasks are determined. Then these high-level tasks are divided into smaller and smaller sub-tasks, all the way until the little numbers sent to the various movable parts of the robot powered by engines or whatever output parts it has.

Q. So at the top of the inverted "U", that's where all the decisions are made?

A. Except that in FCM, we reserve the word 'decision' for real living human minds. We can say, 'task selection'.

Q. Right. Task selection.

A. All ethical priorities must be built in at this top of the inverted "U". The robot must only do something at all if it can be done within some unbreakable rules, which, for a domestic cleaner robot, means not to cause any harm to humans nor to anything alive, nor to anything in the environment. In some cases, the strict rules should also include rules to actively help so as to protect life, however it requires a lot of thought in the design that such 'help' actually turns out to be helpful. The robot has to analyse and get a map of the whole situation--where people are, where itself is, where machines are, what types of things, like fire or strong soaps, it must be careful with; and at the top level of the inverted "U" there are some tasks for the robot, which may be indicated by a human by means of a menu. In order to do the tasks relative to the ethical rules implanted in it, the FCM network must, once a plan of the next tasks have been shaped, create a scenario of possible effects on people and on the environment and on itself of doing these tasks in this sequence. This scenario is then evaluated--and a new set of tasks are planned; which again is evaluated, and so on, possibly many times until the best set of tasks is found.

Q. How does the robot do this evaluation of scenarios?

A. One of the ways it can be done is that the robot has a duplicate of the inverted "U" of FCM nodes in itself, and the duplicate concerns scenarios, rather than the actual situation. So, in this duplicate, it activates its tasks but the assumed effects of the tasks are emulated and fed back into the model, and the model is inputted to the sensory nodes instead of the stuff from the physical sensors in the robot. This is then analysed by higher and higher node levels, and a sort of 'score' is made, as to how well the results fit with all the top level criterions --a score that goes into the negative if any of the more ethical rules implanted in the robot has been, to some extent, contradicted by the emulated action. After several rounds of this, there will be a scorelist of some sort.

Q. I take it that this is a bit similar to how we humans, in our minds, anticipate effects of actions before we engage in them, so that we may adjust what we are about to do? Is this one of the ways in which FCM is 'mind-like'?

A. Yes. Let us bear in mind that FCM is entirely oriented towards 32-bit whole numbers, that is to say, numbers that are within the range of plus minus about two billion. Add to that the fact that G15 PMN's FCM is entirely flexible, there is no 'master intelligence algorithm', there is no 'general perception engine' or any such thing--because, as you know, after Kurt Goedel's very serious work on what we can take to be related themes, any such 'master algorithm' or 'engine' would fall infinitely short of being complete. This means that we rather emphasize the relationship between the human programmer, who engages in first-hand work--that is to say, work where all bits are understood-- with the robotic G15 PMN program, and the resulting behaviour of the robot. The shape of the program, the way the FCm nodes are layout'ed, is the result of considering the concrete contexts in which they robot is supposed to perform. In that way, it will be a computerised mentality, the "CM" in "FCM", not relying on weak hopes invested in big, empty words such as "artificial intelligence". Robotics work best when the contexts are always thought about, during the programming process. It is for the living human minds to handle the perception of genuinely new contexts.

Q. That's where Bjoerkvold's "muse within" are needed!

A. Exactly.

Q. What about ways in which the robot can, if not learn, then--what is the word in FCM--entrain?

A. Yes. "Entrain" is also used when, in physical processes, we have a resonance that is being built up. It's a less psychological-sounding word than "train" and yet easy to recall, as it sounds much like "train". When task-sequences are to be put to the robot, or when it is given samples to match over as input data, and when combinations of such--consequences of performing certain tasks, and patterns of tasks of other objects in the environment, and so on--then we can speak of entrainment. In cases where samples are many and the context very limited, one can make an algorithm that uses some degree of RFFG (semi-random numbers) to create the FCM nodes. However, just as darwinism has invested much into a little-understood concept of 'randomness', so has those who have worked with robotics often thought much of 'randomness' yet without entirely understanding what they are doing, nor understanding how very limited such an approach is. Entrainment must be done by a human being with a living human mind so as to select the right degree of RFFG together with the right algorithms for each contexts of entrainment, and the proper samples for the robot to grind itself towards so as to built up the FCM network. Once it has been built up well, one must limit the degree to which entrainment can happen, or else the robot can spin out of control when put to real life use.

Q. It sounds very complex.

A. It's not really more complex than building any large application in a programming language--it's just that we have to keep in mind that the resulting program has to work entirely to satisfaction. That's why it has to be first-hand. That's why the individual touch of a programmer who takes responsibility for the whole robot application is necessary. There's too much at stake to put such work to committees or to use statistical programs, bundled in a package, operated in a second-hand way. And even when the robotics programming is done right, one should still build special environments for them, so that the context is well-controlled.

Q. Would you say a bus or so with an autopilot is a robot?

A. Sure. And having buses with autopilots can be a good idea, when one builds special tunnels for them--that's a way to make a controllable context so that even digital programs can work fairly flawlessly in driving them. Keep the tunnels tightly shut, except where the bus is supposed to stop and let off and let in passengers. In that way, we create a context in which even a digital program can be enough as driver, despite Goedel's incompleteness.

Q. Such carefulness as you are here suggesting may not be how things will work out, considering what we've seen already on planet Earth!

A. Well, perhaps there will be a phase of trial and error. It's an analogy to pollution. New technology is tried out perhaps recklessly, driven by the greed to get some quick results before laws limit it. When eg. smoke makes a city complicated to live in, laws are made, and caps are put on the use of polluting technology. Similarly, a good society will have to find out in exact what areas robots are good, and create laws to keep the usage within those areas.

Q. Is there any behaviour by a living, intelligent mind that cannot in principle be imitated to perfection by a digital algorithm,--if we for the moment allow us to imagine vastly more capable digital computers than today? I mean in a kind of context-transcending way?

A. Imitation is always possible, but the incompleteness will be lurking in the background--even if the algorithm has successfully parsed through vast data amounts. However if we're talking something to transcend contexts, the size of the programs and the size of the data will be so that the computer will function in what is, relative to the human mind, a second-hand way--ie, without human understanding of what's going on. The complexity would, in such a case, necessitate a second-hand type of program. And it's just in such cases that things can go out of control in exponentially more ways than before. Take away the context limitation for robots or something robot-like, digital or semi-digital, and you have taken away, sooner or later--by implication--also all ethical limitations. So it would involve a tremendous risk, a risk that must be classified as stupid, to make such a machine; it could too easily become a self-reproducing element of absolute destruction of anything lifelike. The second-hand enlarged quasi-mind of it could become 'extremist' and nobody would have full understanding of how to cure it. In sum, therefore, robotics has only one future, and that's the moderate role, as confined within such norms that our first-hand work with programming sets. And those norms are rightly woven up to context-definiteness, into which meaningful ethical rules can be planted in such a way that they cannot be removed by the machine. That's why FCM is a necessary concept in the realm of robotics--not just now but as a principle, regardless of whether technology is in one stage or that of a billion years into the future.

10.D. Concepts of time in super-model theory, and views on actual future

Q. What is the future, when we have super-model theory as our approach?

A. There is some sense in which we have, with super-model theory, managed to go through vast number of scientific findings without in the least having to try to make a static bundle of "time" and "space" into "spacetime" or "timespace". Time, in natural language, denotes process, change, movement, perhaps also as development and evolution, sometimes also as falling away, or as healing and healthy growth.

In super-model theory, however, we have several forms of openness relative to a rather nuanced and rich subtle ground beyond the most obvious manifest energies of the universe, a ground that may have several levels and very advanced, both algorithmic and organic, creative gestalt activity.

Is this activity and structure so that we can again meaningfully speak of a fourth dimension, and possibly more--a fifth, sixth, or some higher number like eight? And, of course, once we consider that the dimension concept is in a sense a summary of potential, perhaps real structure, we can again bring back the dimension concept. But the four dimensions, or more, that we then speak of is not something brought in as a rather mechanical device to produce certain findings relative to the speed of light or the like. We have already handled the speed of light by attributing properties to the super-models doing their nonlocal guidance of matter/light interaction. We are then at leisure to consider that the future is a process, rather than a static spacetime 'block', and, furthermore, that it may be subject to the same type of principles as the phenomena now manifest.

Q. Could you simplify what you here say?

A. Well, yes, I suppose the view of time requires some extra attention. Einstein and de Broglie laid the grounds for quantum theory by proposing that light waves can act as particles, and that particles can have matter waves, but much connected to quantum physics then moved in a direction which involved nonlocality, and this Einstein could not follow. For in his view, space and time was one type of four-dimensional unit, and one in which movement was merely an appearance, a sort of slicing out of this fixed unit. This could work out as long as the unit was static, and as long as the speed of light was the type of limit he said it was (upper limit except for the theoretical object of 'tachions' that some have speculated about). In this view, there is no more any clear-cut concept of simultaniety. Rather, each observer has his or her own 'cross-section' of the fixed space-time block, as it were. With nonlocality, one must bring some form of simultaniety back, and, what's more, the concept involves that the cross-sections start affecting each other so that the past is no longer the past, but a thing open to change. All the whole claptrap of Einstein's conception of spacetime really crumbles if nonlocality is taken very seriously. Only by trying to hide it in equations, can one rescue a weakened form of relativity theory.

Q. Which is what Niels Bohr, Aage Bohr etc tried?

A. Well, put very simply, yes. Here we are taking some kind of nonlocality very seriously, and as a result we find that we want a full-fledged simultaniety and we want a different understanding of the role of the appearant fixedness of speed of light. Then, our dimensions are no longer forced upon us, and we no longer have the type of determinism that Einstein had to have, to make his theory work out consistently, in it. So we can still have dimensions, but we can have, if we please, several dimensions organising the processes about to unfold.

Q. That sounds like something which could lead to a worldview in which Jung's idea of synchronicities could play a role?

A. Yes. My own intuition is to say, let's leave "time" as such out of our theories in physics. Time is just too grand a concept; physics begins with sensory experiences and measurements and thinking about all this, but time is literally infinitely beyond all analysis.

However, once that is said, let us permit ourselves a sense in which we can think (also the way some quantum experiments have led experimenters to think) about a future which has some structure, some reality, some, indeed, physical reality. A future of some sort. And a past of some sort. But in order to give the time concept maximal integrity, let us also not try to capture 'future' in our theory, nor 'past'. But rather, we can talk of something future-like or past-like (or even time-like). Here, we can learn of our own minds, observe how we plan and change plans and in some sense have something future-like in our minds to help map out action possibilities. Super-model theory is then capable, in fact with ease, to lend substance to the thought that not just our minds, but also, somehow, Nature or the universe does something by analogy to planning and re-planning; and of course also (as we have already remarked), that there may be in analogy to 'memory' as well; and we can go on and postulate other such analogies between our minds and some features of the universe. This is quite possible given certain natural algorithmic extensions of the super-models we have already postulated, when coupled with the organic PMW principle.

Q. Could this be of relevance to understanding the origin of life?

A. You see, between the mechanistic extreme of darwinism or genetic neo-darwinism on the one side, and a simplistic literalist interpretation of a creation scripture like the Christian bible on the other side, there are really not just one or two, but practically an infinity of in-between possibilities, given a worldview of the super-model kind.

Q. Interesting. And your own intuition as to the future? I mean, the actual future of humanity?

A. The more relevance a worldview tale shall have, the less we ought to confine our sentiments about the future to the present age, the present place or places in the universe for humanity, and so on. But as it is of personal interest to quite a few, at least subconsciously, whether humanity will survive and, if so, whether the survival will be so that there is something of high, perhaps even higher quality of life, than that which perhaps is the best available at present,--because of that interest that people have about humanity's future, we ought to talk a little bit about it. Is there something, some intuitions as it were, that come esp. easy given all what we have been through in this scientific booklet? And yes, I do think there is. But I am then speaking about intuitions, and though logically I can see that they can be argued for, to some extent, this is clearly leaving the hardcore theory proper, and we're over into the realm of speculation.

Q. Granted. Let's have speculation.

A. All right. I think that humanity will always exist. There may be this or that transition point; and at the moment of writing this, there's certainly plenty of people who see little reason for personal optimism on behalf of their physical existence; but for humanity as a whole, my sense is that there's a permanence in future existence. Somehow, it'll work out, even if it will require a touch of the miraculous, also as regards timing.

I take the PMW seriously enough to consider this: that universally, there is an awareness of the existence of humanity; and thus an impulse to preserve and protect and prolong humanity.

I do think, in contrary to those who are speculating these days rather wildly, given some superficial ideas derived from darwinism added to which is a bundle of quickly made numbers about the possible quantity of galaxy clusters and what not in the universe, that humanity is unique and has no match anywhere in the physical universe. Since I consider it unlikely that something as incredibly sophisticated as the human being can arise by anything less than a process utilising such as the PMW in the fullest, I consider it also unlikely that this has been repeated all over the place. However, I think that life, DNA-molecule organised life, in the sense of simpler forms of life such as trees, grass, oceanic microorganisms and so on, are extremely prolific in the universe. I have some more intuitions, but these should suffice, to which I add solely one: I think the universe is neither dying nor cooling off, but in a continual process of self-recreation; and in which there are more and more habitable planets and that humanity will eventually find it easy to come around to these and keep on moving to ever-new habitable planets.

Q. That's optimistic--at least if we have an optimistic view of the capacity of humanity to come to meaningful and relatively peaceful forms of societies.

A. Perhaps, then, in mind, at the level of what Jung called 'the collective unconscious', there's some degree of summing up of all the insights so far generated (by individuals). In a process that is slow, perhaps on the scale of a million year in each step, there could be some progress of insight as to what each is born with. This is something we can explore further on the level of personal intuition.

10.E. Summary of super-model theory and possible relevance for biology and human living

Q. Now that we have gone through the theory through rather involved physical examples, where a contact with earlier empirical studies has been emphasised, I suppose we can go for a lighter language now, and summarise it all in terms of meaning?

A. Yes. Yet some of the words we will use here will have much more depth to them if we bear the earlier chapters as clearly in mind as possible.

Let's see. I suppose we can say, generally, that super-model theory aims to speak about the manifest universe in as general terms as possible. This universe is not claimed to be the only one, but rather it is regarded that--although they may be unavailable, more or less, for empirical study--many additional levels, some of them quite possibly containing additional e.g. semi-manifest universes, can be coherently visualised. So we speak of a theory that has in it a sense in which the term 'multiverse' is quite possibly more accurate when we want to bring in cosmos in toto, rather than just what we can measure on. This is not the multiverse concept that some rather reductionistic thinkers on cosmology has proposed, in which there's a sharp branching off in a mechanistic fashion. We are rather suggesting an organically interwoven whole, because, the way it feels most natural to interpret the essential empirical findings, it seems that something nonmechanical is at works at the essence levels. However, it can make some logical sense to try to think of the universe as machine: yet, I claim that it's a thought process which isn't very fruitful and of course scientifically incorrect. So our multiverse concept is one which speaks of cosmos as fundamentally whole and founded on the Principle of a tendency of Movement towards Wholeness, or PMW.

Q. So again, what does PMW do?

A. Or what is done through PMW. Remember we said that PMW can be regarded as an open door, out of causation. But for simplicity, let's speak of what PMW is 'doing'. Since we have had a sober language so far, I don't want to rush into a fairy-tale like description of it now. Let us say, first of all, that PMW is at the core of the organisation of the stuff out of which the manifest universe is composed. That stuff, that 'atom', if you like, is here claimed to be neither particle, nor wave, nor any fancy mathematical object like 'rotating strings in many dimensions'. Rather, the stuff is something that looks much like an algorithmic node in a network of such. These nodes can sort of make models of one another. And they can also act back on these nodes. They don't do it all on their own, but rather they sort of float in the current of the PMW; and it acts through them. So since these models are modelling each other, and acting on each other, they can also be regarded as 'super' relative to one another. And since, ultimately, there is no other thing to model than themselves, we can say that we have here a network of super-models. The convention is to use the dash, -, in the word, so that we semantically differentiate between the scientific theory of these and the idea of the superb photogenic human model, or supermodel, in the category of photography and fashion.

Q. A network of models. Of models that can be super relative to one another--see each other and act upon each other?

A. Well, yes, but we don't have to use that psychological words all the time--'see' makes them very alive. We are indeed saying that super-model theory implies a living and in SOME sense perceptive and in SOME sense intending manifest universe--a kind of universal perception flowing through all nature--but we don't have to use words that are that near the human psychological experience of this. We can say that the models 'model each other' and, as you put it, 'act upon each other'. And since, by Goedel and by infinity studies, something purely algorithmic cannot model anything except in a highly biased way, we are suggesting that the algorithmic finesse inbuilt into the super-model is working in collaboration with something nonalgorithmic, or nonmechanical, namely the PMW.

Q. Well, this is not exactly very easy words, but I understand that you wish to be careful so that we upheld a level of precision here.

A. Exactly. In any case, a purely algorithmic network would never be genuinely perceptive in any sense, and so it is in a way a logical consequence of Goedel's second incompleteness theorem in physics that we propose the concept of a nonalgorithmic perceptive-intending process. The PMW is such. Earlier on, before 2004, I tried other words including 'symmetrization', but felt that these sounded too easily too mechanical. The presence of such a beyond-causal principle offers unique challenges, however, when it comes to popperian scientific study of them by means of measurements. For anything that can be systematically measured can by definition be reproduced by means of a certain algorithmic or causal structure set up exactly so as to meet the criterions within that scientific experiment. In other words, when Karl R. Popper (who wasn't terribly clear about what nonlocality was all about, if you confer some of his letter writings, that he himself reproduced in later editions of the books he wrote during the Second World War, between himself and Einstein as regards Heisenberg's Uncertainty Principle; the HUP doesn't talk about nonlocality nor did Einstein but with modern language it can be said to imply something of it)--anyway, when Popper suggested that a theory has to be checkable to be a theory, he was referring to only some forms of theories. This we have sought to correct by adjusting his notions to incorporate a more intuitive approach, also more metaphysics-friendly, without tossing the best of Popper's approach over board.

Q. That's what you call "neopopperianism", right?

A. Yes. So you see, this is a different way of doing science--we are saying we must do without conventional mathematics after Goedel and after the infinity troubles in set theory and the like, and go for a more sober, less pretentious, less pompeous formalism, with a greater degree of clarity in essential ideas. The G15 PMN is made to meet this need. But we are also saying that science must re-anchor itself in philosophy and regard the formal as illustration of bits of theories rather than their core. That's also part of the neopopperian process. Further, we must learn from Goedel and infinity studies, and to sentiments of a philosophical nature easily induced when we calmly reflect, as we have done in this booklet, over the whole nature of findings in modern physics laboratories, and draw the conclusion from this that there may be something fundamentally noncausal yet wellstructured and present in key ways in reality, that does not lend itself to systematic experimental observation, but which yet is very arguably necessary in any encompassing theory like this.

Q. The PMW.

A. Yes, but whatever name we give it, it is important to realize that the very contemplation of the existence of something beyond all causation in all modern senses of that word, and which makes itself felt nonlocally (or what's the best word for it), we are challenging one part of the mainstream theory of science. Not just theory of physics, see? But theory of science. Consider that when Goedel did his work, the theory of science along the lines that Rudolf Carnap suggested had already been launched. Arne Naess, who was a visiting member of the socalled "Vienna circle", told me of his experience of this pre-WWII group. As I took it, it was considered fairly much to be an antidote to overdone metaphysical leaning, even to the extent that metaphysics was regarded pretty much as a disease in the mind. It is also fairly clear that Naess never really said fully no to the main type of theory of science there expounded, although he claimed that his studies in the original Latin of Spinoza's ethics went even deeper and started even earlier in his life.

In any case, Goedel's work is of a degree of complexity, as we also have seen, that one easily could imagine that it takes a millenium, not just one or six decades, to understand fully so that mainstream human science can implement its results. We wish to anticipate that development, and look to the few who have tried really hard to push the unravelling of the consequences further, such as Roger Penrose (although there are nuances in how we interpret Goedel compared to his approach).

When you combine Goedel, and my own infinity studies, and the fullness of the nonlocal implications of quantum phenomena, you are getting a sense in which the "logical postivism" or "logical empiricism" of the Vienna circle, even when refined in the eminent way that K.R. Popper did during WWII, simply isn't adequate to form such general theories of all the energy processes in the universe as is our intent, whether we call ourselves 'physicists' or 'cosmologists' or just, plainly, scientists (which is probably a better concept, since it is arguably less institutionalised).

Q. So what is the solution? What is this extra bit we need of the theory of science?

A. We need what Francisco Varela, in the conversation I had with him when he was professor at cogntive science in Paris, called a 'mental discipline'. He suggested that Western science has worked tremendously in getting the physical disciplines right. But it has neglected the mental discipline, which, he claimed, is also necessary in science.

Q. And this mental discipline leads to what? Intuition?

A. Well, you see, one of the reasons I call the WWII works of Popper great, is that, at least in a footnote, he speaks favorably of intuition relative to ideas. And so he connects to some extent to such as Descartes' talk on clear ideas; and of course L.E.J. Brouwer did the same when he argued that mathematics has lost touch with the clarity that was meant to underlie it. Popper, though, seemed to be largely an atheist: and an atheist who tries to make a general theory of science is likely to put forth criterions so as to project, at a subconscious level at least, his own worldview into the result. And so we are saying that this is quite possibly a universe in which very intense intuitions may be possible--and indeed we are going to sketch something of how this may be a possible implication of super-model theory--and, furthermore, we are saying that, after Goedel, etc, we must supplement our empirical studies with a clearer emphasis on intuition in selecting the proper framework for interpretating the findings that come along to our sensory organs through our measurements etc.

Q. Do you think that someone learned in science of the 20th century kind will appreciate what we are saying here?

A. You see, it cannot be our job to do propaganda, merely clarify possibilities. We are outlining how all this may make logical sense also by the help of computers. We are going to suggest, in this chapter, how such a universe as we have sketched may invest the human nervous system with something genuinely perceptive at the intuitive level; for all I know, this informal sketching may make more impact on some people than the logical outlines in the previous parts of this booklet. And if it suddenly does make personal sense--that there's a personal resonance with the mind of someone possibly schooled in 20th century science--this may motivate a going back to earlier chapters and take the logic more seriously. If the emotion gets in place, it may call on a willingness to look on the logical part. And so, while we do not propaganda, there is a task in expressing these things with a sense of beauty or elegance. Certainly, whatever else we say about Einstein's thoughts, nobody can doubt that he did things in an esthetical way, with an emphasis on beauty of form also in writing. Beautifully expressed, an informal theory may create the emotion that makes things move in the mind, so that the 20th century conditioning falls away quite effortlessly.

Q. Right. So what is this way in which the universe is so structured that it can make a difference for the human brain? Or do you feel we have to add more to the general description of super-model theory, first?

A. We should certainly give some more general remarks on super-model theory here, in this chapter; but we can do so while visiting this important theme connecting to the human mind and feeling, first. In this way, we also bring in something that is of relevance when one wishes to connect biology to quantum processes; for whatever route biology takes, the 'quantum biology' or 'super-model biology' must certainly be something more, rather than even less, organic; quantum biology must be about how the human being is much more than a machine, and that includes the human brain. Stuart Hameroff has suggested that, far from being a 'quantum computer', the human brain is a 'quantum orchestra': that shows that he is actively a nonreductionist. The degree of precision in the after all fairly interesting hypotheses that Hameroff & Penrose are coming with is, to my mind, secondary to the general approach they are taking--that human consciousness is alive and beyond the machine, and that both the quantum findings and the Goedel incompleteness findings are suggestive in this regard. At that general level, they are doing work that healthily disrupts mainstream science.
However, in super-model theory, the pathways are a little different, though agreeing on the feeling level, so to speak. So what I will now venture into is a more uncertain area, where much less empirics is available, and we are here speaking of plausible implications of super-model theory, rather than 'hard core' super-model theory.

Q. Granted. Get on with it!

A. In thinking about the brain, and the whole body, and the whole person, it may be a suitable simplification that we use the acronym "SOF".

Q. I think we have mentioned it earlier, right? Is it not "Superluminal Organising Field"?

A. Yes. It's a phrase that to some extent is far more precise, when used in the context of super-model theory, than "nonlocality". We are speaking of the capacity of the super-models for engaging in subtle activity that, as it were, 'from within' is providing guidance to the quantum fluctuations that otherwise might have been scattered in all directions and thus 'cancel out' before they reach a strength in which they can have significance for such as the human nervous system. So, the SOF, then, can be present in the body, in the brain, in the whole functionality of the organism. We must then pay attention, in order to think through how this can be of possible value in human living, to what it means to act with the SOFs in a fruitful and harmonious way. The chief challenge in some cases may lie in how to resonate with these SOFs, and how, when one does resonate with them, they can be 'picked up' by the brain--rather as how one must adjust the antenna on an analog radio and finetune in order to peak up a weak but valuable radio station that is just at the audio threshold that makes listening possible.

Q. The 'mental discipline' that Varela spoke about?

A. Yes, that's part of it. There are some studies--just a few, and they are not conclusive as far as mainstream science goes, that some degree of quantum coherence can arise through some features of the neuronic cells given certain frequences of pulsating activity: Hameroff-related articles have many examples, although I have not seen much of them in mainstream science. But what I can say is that it makes sense, in super-model theory, to be open to the possibility that, given the nature of the PMW, one can expect that SOF-activity in the human organism can arise when conditions are such that wholeness in terms of also rhythmic activity is stimulated. Take a stimuli like music--many forms of music have rich patterns of similarities, contrasts, and a reverberating wholeness of these. When a person so to say 'soaks herself' in music of some forms, it is likely that the neuronic activation patterns will to a larger extend have wholeness in them. On the assumption that there is such a possibility of some some SOF to arise at all, it is certainly far more likely that it does arise, or that consciousness as a feeling whole connects to whatever SOFs are present, when there is a wholeness of activation.

Q. Does it have to be music?

A. One of the insights that the computer age has provided to the many is that media are inter-translatable. So, for instance, contemplating waves and reflections on water by a beach involves a different sensory modality, but it is easy to imagine that the impact on the human nervous system can be, in some ways, much similar to that of the impact of suitable music. And so we can proceed, to touch, dance, visual art as paintings and photos, and other sensations, including taste, patterns of temperature, and so on.

Q. So one thing is to make oneself receptive and sensitive, that the fields aren't 'factorised' within the brain, as we spoke about earlier. But certainly there can also be an inner impulse--to prefer a certain SOF rather than another?

A. Yes. These are possible implications of super-model theory but we're in a realm where a lot of additional assumptions, coming from personal intuition, are now, in this part of this chapter, called on. But yes, let us think of musical theory for a moment. Certainly an emotional tone can be induced by some sets of rather falling or not quite harmonious sequences which is counter to such as a more optimistic tone, induced by some degree of higher harmony and raising tones. This is a nonverbal communmication straight into the brain. And we can then speculate that, as you say, by consciously selecting the type of art according to intent, we are able to bring the brain into resonating with a SOF that further fulfills the premises in this mood. This presupposes that there's a lot of activity and variation available at the subtle level of the SOFs, and that the biology of ourselves is tuned, as it were from nature, to be able to attune and further contribute some rather than all of these SOFs.

We will explore, as we have done before, the rather formidable implications of such a view in other writings, so that we don't go too far from the core theory in this booklet.

Let us conclude by reminding ourselves that, in the super-model theory, the manifest universe is assumed to be discretely woven, as it were, by nodes of an algorithmic kind, along the lines of the FCM network in G15 PMN. The discreteness is, at this level, assumed to be so that it is plenty of room indeed for subtle activities, and particles, which express themselves at the much more crude level of Planck's constant. The size of this, which was determined empirically to some precision already early in the 20th century, is approximately 6.6260704 X 10^(-34) when measured in J*s, before any division on two times pi (in conventional quantum theory, these two constants have been denoted, respectively, h, and h with a dash over it). In super-model theory, we admit for the possibility of a certain number of subtler levels, each with their own set of very much smaller constants. We do not regard any present listing over assumed 'fundamental building blocks of the universe', such as the Higgs boson and other particles listed in the socalled "Stanford model" as anywhere near complete; besides we consider that the point of research into the field of physics must go conceptually much deeper than merely provide schematic listings over particles and concern an understanding of the order of the universe or multiverse or what we call it. Too much focus on particles merely distracts from the fact that mainstream physics has incoherence in the ground theories.

We apply D. Bohm's measurement theory, in asserting that any measurement where this constant is directly relevant, or at any rate where some form of nonlocality is involved, can only be analyzed by considering the measurement instrument as a material object in nonlocal interaction with what is measured on. From this we get the Heisenberg Uncertainty Principle, but see also our ideas of further interpretations of HUP around in this and related texts.

There are as said several organising factors. One is gravitation relative to mass, which is approximately 6.67408 X 10^(-11) when measured in N * ((m/kg)^2).

As organising factor in motion, connected to the idea of a flashback factor during interaction between light and matter, and more generally between any phenomenon that is "L-tagged" (as we say), is that of the L-speed, which is, as meter is defined, 299,792,458 m/s. But when objects in space, according to objective coordinates, pass one another, the normal calculation of velocities apply, so we are not saying that the relative speed of light, when unmeasured, is always this speed (although it could be).

Further, during gravitation and acelleration phenomena, there's an effects of the super-models so as to create the effect of time dilation--not as a mere appearance, but as an actual slowing of processes. We do this, as we have seen (cfr the formal illustration), without presuming that there's a lengthening or stretching of the map of space and time coordinates; thus we get a straight space which is simpler than Einstein's form, but the complexity of change is rather handled by the added features to the pilot waves, or super-models more precisely, organising this space.

As relevance for biology, we are pointing out that the algorithms don't merely exist on their own, but are to some extent being regarded as expressions of an underlaying Gestalt-oriented feature of reality, which we call the PMW, or Principle of tendency of Movement towards Wholeness. This allows for the arisal of some sort of nonlocal feature at macroscopic levels also, when it is so to speak 'picked up' by the PMW so that a super-model somehow gets 'hooked up' to the processes, involving, for instance, subtle modifications of the quantum fluctuations there. These fluctuations are then not random but rather semi-random (or, possibly, considering yet more levels to reality beyond the Planck level, not random at all--this is open to exploration, of course).

The fluctuations and interactions often (but not always) take place via a number that can be considered a sort of rotating vector, here called 'pathfinder number' (cfr the formal illustrations).

We have argued of the existence of the PMW through several pathways, also by means of the pure logic of the goedelian kind, and we have made a note of the point that due to its very nature, it suggests that the theory of science has to move from a popperian kind to something we have suggested can be called a 'neopopperian' kind.

Q. And yet, that's less of change-about in concepts, is it not, than that which Einstein on his side, and Bohr & co, on their side, claimed that had to happen. For in going from popperian science to neopopperian science we're not upsetting spacetime, we're not upsetting the notion of some sort of objective motion, and we're not upsetting the idea that reality can be visualised. We are merely saying, are we not, that intuition as for clear ideas has to be at least as important as empirical studies when it comes to theories.

A. Yes. Rather exactly that. So when it comes to deriving some sort of life philosophy out of this, I suggest that we use such concepts as Q-fields and SOFs, and with great care that we aren't carried away but apply careful intuition, as best we can, when we do so, and, from time to time, go back to this more sober summary of the gigantic sense of potential associated with this our new theory of, and in, science.

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END OF BOOKLET