From Twisted Squares to Quantum Physics

M.S. El Naschie

Distinguished Professor, Department of Physics, Faculty of Science, University of Alexandria, Alexandria, Egypt.

Corresponding author email id: chaossf@aol.com

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Abstract – **Starting from some ingenious ideas due to the acclaimed Indian master of number theory S. Ramanujan, we are led to a deep appreciation of the unifying role of numbers as exemplified by the Pythagorean-Platonic school of Alexandria. Proceeding in this frame of mind, it is shown that the modern development of these ideas as reflected in the works of a host of pioneers such as David Deutsch, G. 'tHooft, R. Penrose and E. Witten logically and naturally leads to nothing less than a unification of Science, Art and Consciousness. The paper outlines the role of a powerful mathematical tool namely that of twisted squares in reinforcing the above. We also give a substantial number of References covering all the large number of aspects transacted and interconnected.**

Keywords – **R Thom's Catastrophe Theory, Deterministic Chaos, D. Deutsch et al Constructor Theory, E. Witten's M-Theory, D. Gross' et al Heterotic strings, G. 'tHooft Renormalization and Cellular Automata, Scott Olsen et al Unification.**

I. INTRODUCTION

Let us start this less than too narrow and serious and more than very personal introduction by reminiscing about many very happy and active times pertaining to the Author's youthful days in the Alpine Mountains of Bavaria testifying for his passion for skiing, hiking and mountain climbing. Those very "happy days" were also dominated by deep love for science, philosophy and classical music and the Author remembers with great affection till the present time the very strong influence which the great Werner Heisenberg had on all of us at the time when we were working on a relation to a Fuzzy-fractal like pictures of Nature and of how light can come in a miraculous way dispelling the darkness from more than one intellectual meaning of this fractal Cantorian spacetime picture [1-14].

In this context, it was more often the case than not that we would be skiing and climbing in the fog ridden lower part of a magnificent landscape of mountains and leaving Garmisch Parten-Kirschen under us soaking in deep misty white snow only to suddenly find the well-known sun-flooded cheerful and breathtaking beauty of blue skies and the charming upper mountain landscape of this part of the blue planet.

Translating this unique experience to our scientific frame of mind and our personal dream of finding a theory fusing harmoniously Einstein's relativity with the controversial new Bohr-Heisenberg-Schrodinger-Plank quantum theory is one of the major objective of writing the present paper [1-14]. As a matter of fact, one cannot underestimate the importance of the above in our scientific development [1-14].

These hopes may have been farfetched dreams at the time particulary for the Author who was trained as an Engineer and who moved on to the application of deterministic chaos and non-linear dynamics after some experience again with applying R. Thom's Catastrophe theory to numerous fields following C. Zeeman, J. M. T. Thompson and their school [1-14].

These were only few of the great minds and names of our times in the seventies and the guiding lights of an unforgettable time when we were searching for good applications of theoretical stuff but we were undoubtedly

also unconsciously searching for Spinoza's and Einstein's Gods in the hope that they may tell us where we are coming from and just as important, if not more, where we were going to.

On this long trip none of us, despite much effort and long nights' work, became extremely rich but my God we had a wonderful life and found ourselves in great company of likewise women and men and over and above all of that, we must stress the impact of two great men on us personally namely, the German-Russian genius George Cantor and the exceptional Indian master of number theory S. Ramanujan who opened our eyes to our Egyptian-Alexandria School of Science, Art and Philosophy i.e. made us aware of the fantastic Pythagoras' and Plato's golden mean number system.

Many are cited but very few are chosen and thank God we have had and are still having a magnificent life which Nature blessed us with regardless of any superficial materialistic considerations.

To all of those who supported us along the rugged terrain, we extend our sincere words of thanks and gratitude that we were able to see the light of the beginning of a true substantially complete and correct theory that unified Art, Science and Consciousness and found also the Author who was able to produce the first book on this subject namely, Prof. Scott Olsen whom the present Author is proud to call beside Prof. He, Prof. Marek-Crnjac, Prof. Helal, Prof. Nada and Prof. Harb as his truly good friends. In fact the Author will remain entirely grateful to all those who taught him how to think and research particularly J.M.T. Thompson, Alistair Walker, Roger Penrose, Herman Bondi, James Lighthill, David Gross, David Deutsch and Edward Witten [1-14].

With that the present introduction became also unintentionally an acknowledgement to which the Athor must add Lydia Thorsen, Mervat Heddini as well as the Author's children and grandchildren, Shareen, Sonya, Enayat and Evelyn Elnaschie and thanks them all from the depth of the heart and mind for their help and support. This is of course not to be the usual order of formatting a scientific paper but it is the true order for an unusual scientific account [1-14].

II. Retrieving the Vital Golden mean $f = (\sqrt{5} + 1)/ = 1.618033$ as an Approximate Solution of S. Ramanujan's Ingenious Formula

Because of the pivotal role played by the Indian master of number theory S. Ramanujan in our work, we return again to Ramanujan's formula connecting natural logarithms with the area of a circle expressed via a continued fraction in terms of the golden section. We can easily see how this is obtained in a logical and numerically excellent way from the famous formula of Ramanujan in the following manner.

Starting from the approximate obvious expression:

$$\phi \simeq \sqrt{\frac{(5+\sqrt{5})}{2}} - e^{\frac{2\pi}{5}} \tag{1}$$

then the second (negative) term is found from the first term i.e.

$$\sqrt{\frac{(5+\sqrt{5})}{2}} \tag{2}$$

$$= \sqrt{3.618033980}$$

$= 1.902113033....$

minus the negative term i.e. minus.

$$\frac{e^{\frac{2\pi}{5}}}{1+\Delta} \tag{3}$$

Consequently, if we neglect the small difference Δ , we find:

$$\begin{aligned}\Delta &= 1.902113033 - 1.618033929 \\ &= 1.902113033 - 1.618033989 \\ &= 0.284076341\end{aligned} \tag{4}$$

and presto one finds the remarkable value $\phi = 1.618033$ as first class approximate solution to Ramanujan's majestic formula.

The rest follows smoothly as shown in our previous and more detailed published papers on the subject.

III. A Very Simple Derivation of A First Optimal Approximation of S. Ramanujan's Magical Formula

Ignoring very small terms in Ramanujan's formula, we arrive at the following stunning result:

$$\phi = 1.902113033 - 0.2896095433 \tag{5}$$

$$\begin{aligned}&\simeq 1.618 \\ &\simeq (\sqrt{5}+1)/2 \\ &\simeq \phi\end{aligned}$$

IV. Noteworthy Connections and Important Relation between Different Theories with Bearing on the Paper at Hand

(1) The importance of π

The π which we would like to highlight here is not the well known $\pi = 3.141592654$ but rather the trans finitely corrected one which utilize the golden mean section number system used extensively in E-Infinity Cantorian spacetime theory. As well known from earlier papers, this golden π as we may recall it, is easily found to be:

$$\begin{aligned}\pi &= (6+k)/2 \\ &= 3.090169945\end{aligned} \tag{6}$$

In turn this may be written as,

$$\pi = 3 + \frac{1}{11 + \phi^5} \tag{7}$$

In other words, this golden π miraculously connects Hardy's probability of quantum entanglement with the fractal version of E. Witten's M-Theory namely,

$$D = 11 + \phi^5 \tag{8}$$

$$= 11 + \cfrac{1}{11 + \cfrac{1}{11 + \cfrac{1}{11 + ...}}}$$

(2) Connection to Ramanujan's mock modular function.

Recall that the first non-trivial dimension of the monster group have 196884 which is the sum of one plus 196883. Both of these facts are utilized by the Author in his E-Infinity Theory [1-14].

(3) The twisted square leads almost directly to the golden logarithmic spiral of fluid turbulence and the Pythagorean Fibonacci sequence and Tesla's vortex mathematics so that we move easily from number theory and Ramanujan's formula to quantum physics. We could write a verbal equation stating that the Fibonacci sequence is equal to the Pythagorean theorem and we stress that Tesla's 3-6-9 math is not voodoo fiction but fractal iteration based on physical models of reality [1-14].

(4) We should keep near to our heart and brain Neil Bohr's advice to his student W. Heisenberg: In German "Nur in der fulle liegt die Klarheit (Clarity lies only in fullness)" ergo in English "only in the abundance of phenomena lies the clarity."

The E-Infinity interpretation of twisted squares and Ramanujan's scientific numerology clearly follows Bohr's precious advice [1-14].

V. Conclusion

The present work is effectively the Author's scientific testament and probably his last and final words coming from and going to the youth of this magnificent and beautiful universe. In particular we introduce a powerful mathematical tool namely that of twisted squares which connects quantum physics with fractals, nonlinear physics, mathematics, arts and consciousness.

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AUTHOR'S PROFILE

Professor M.S. El Naschie, was born in Cairo, Egypt on 10th October 1943. He received his elementary education in Egypt. He then moved to Germany where he received his college education and then his undergraduate education at the Technical University of Hannover where he earned his (Dipl-Ing) diploma, equivalent to a Master's degree in Engineering plus being a professional chartered engineer. After that he moved to the UK where he enlisted as a post graduate student in the stability research group of the late Lord Henry Chilver and obtained his Ph.D. degree in structural mechanics under the supervision of Professor J.M.T. Thompson, FRS. After his promotions up to the rank of full professor, he held various positions in the UK, Saudi Arabia and USA and was a visiting professor, senior scholar or adj-
-unct professor in Surrey University, UK, Cornell, USA, Cambridge University, UK and Cairo University, Egypt. In 2012 he ran for the Presidency of Egypt but withdrew at the final stage and returned to academia and his beloved scientific research. He is presently a Distinguished Professor at the Dept. of Physics, Faculty of Science of the University of Alexandria, Egypt. Professor El Naschie is well known for his research in structural stability in engineering as well as for his work on high energy physics and more recently for his work in cosmology and elucidation of the secret of dark energy and dark matter as well as for proposing a dark energy Casimir nanoreactor and a fuelless interstellar spaceship. He is the creator of E-infinity theory, which is a physical theory based on random Cantor sets and can be applied to micro, macro and mesoscopic systems. Professor El Naschie is the single or joint author of about one thousand publications in engineering, physics, mathematics, cosmology and political science. His current h-index is 87 and his i-10 index is 814 and total citations are 43913 according to Google Scholar Citation.