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Hans-Peter Dürr's thought as a source for peace work

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A remarkable pupil of the great physicist Werner Heisenberg, the German Hans-Peter Dürr, born 1929, was granted the Alternative Nobel Prize in 1987 for his work in favor of peaceful use of high technology and is also one of the members of the Pugwash group of scientists that received the Nobel Prize for Peace in 1995. His scientific experience as a quantum physicist of the highest rank is the departure point of a philosophical thought with revolutionary consequences. This article tries to present the lines along which this very sophisticated philosophy develops, hinting at connections with modern and ancient thinking. The transformative character of Dürr's teachings opens the way to further elaborations in almost any field. This article is an invitation to anyone, but especially to peace workers, to join in this demanding but promising and highly enriching task.

Dürr's great regret, and one of the main reasons why he travels around the world giving lectures, is the fact that despite the successful scientific history and profound technological impact of quantum physics the ground-breaking view of the world that quantum physics entails has not been widely acknowledged. As Dürr constantly recalls,[2] after over 80 years since quantum physics started, the majority of today's scientists still think in terms of 19th century knowledge. This has consequences even for the understanding of the layman, whose mentality and way of living in today's modern world is significantly influenced by the discoveries and the general attitude of science.

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[2] S. for instance H.-P. Dürr, *Physik und Transzendenz. Reflexionen über die Beziehung zwischen Naturwissenschaft und Religion*, in *Das Netz des Physikers. Naturwissenschaftliche Erkenntnis in der Verantwortung*. München, dtv, 2000, p. 105.

The ichthyologist's net and the lack of an objective world of matter

To explain the resistance of many of his colleagues - meaning not only physicists, but also scientists in general – Dürr quotes the example of the famous astrophysicist Sir Arthur Eddington in his *The Philosophy of Physical Science* (1939):[3]

> Let us suppose that an ichthyologist is exploring the life of the ocean. He casts a net into the water and brings up a fishy assortment. Surveying his catch, he proceeds in the usual manner of a scientist to systematise what it reveals. He arrives at two generalisations:
>
> (1) No sea-creature is less than two inches long.
> (2) All sea-creatures have gills.
>
> These are both true of his catch, and he assumes tentatively that they will remain true however often he repeats it. In applying this analogy, the catch stands for the body of knowledge, which constitutes physical science, and the net for the sensory and intellectual equipment, which we use in obtaining it. The casting of the net corresponds to observation; for knowledge, which has not been or could not be obtained by observation is not admitted into physical science. An onlooker may object that the first generalisation is wrong. "There are plenty of sea-creatures under two inches long, only your net is not adapted to catch them." The ichthyologist dismisses this objection contemptuously. "Anything uncatchable by my net is ipso facto outside the scope of ichthyological knowledge, and is not part of the kingdom of fishes which has been defined as the theme of ichthyological knowledge. In short, what my net can't catch isn't fish." Or—to translate the analogy—"If you are not simply guessing, you are claiming a knowledge of the physical universe discovered in some other way than by the methods of physical science, and admittedly unverifiable by such methods. You are a metaphysician. Bah!"

This habit of restricting science to what falls under our capability of interpreting, measuring and understanding, appears to be the product of a wrong way of thinking. According to Dürr, its mistake lies first of all in the assumption of the existence of an objective world, the world of matter, that quantum physics has demonstrated there is not as such.

> Werner Heisenberg, Niels Bohr, Max Born and Wolfgang Pauli finally resolved the paradox of this "quantum physics" in 1925 with a radical re-interpretation of the dynamics. It demanded a revolution in what had been the classical view of the world, with the surprising recognition that matter is not really material at all, but a web of relationships, a kind of gestalt, or in a certain way "information" without any carrier. The assumed fundamental ontic structure of the world, based on a primally existing substance, was rendered invalid. It must be replaced by a "cosmos" where the first questions to ask are no longer "What is? and "What exists?", but "*What happens*?" and "*What binds*?" More precisely: Instead of the world assumed until then, a

[3] H.-P. Dürr, *Das Netz des Physikers*. op. cit. München, dtv, 2000, pp. 26 ff. For the original quotation see http://www.questia.com/PM.qst?a=o&d=62000178 (November 2008)

mechanistic, thing-filled, temporally determined "reality" (lat. res = thing), the actual Wirklichkeit (a world that wirkt, that effects or affects!) turned out to be "potentiality": an indivisible, immaterial, temporally essentially undetermined network of relationships that determines only probabilities, differentiated capacity (potency) for a material-energetic realization. The classical "reality" of material/object-like separated things emerges only through a coarsening averaging of the potential, thus turns into a holistic, temporally essentially open, immaterial, inseparable omni-connectedness.[4]

Let us paraphrase the astonishing assertions of the above quotations one by one:

1) Matter is no matter, but a web of relationships. This means, we are actually mistaken, if we try to look at single things as separated from the more general context (so general, that includes the whole cosmos), but

2) we are wrong even if we look at the cosmos as a fixed unity functioning according to certain rules (that we just need to progressively discover), like a giant clock as

3) everything is essentially undetermined, because constantly changing in a way that is only partly predictable (potentiality instead of determinism).

This other "reality" needs a new vocabulary to be expressed. The German word *Wirklichkeit* stresses the character of something indefinite, ever changing and capable of effecting/affecting an apparent solid world, a world that is essentially different from the one we perceive and on which we build our whole life, including our scientific assumptions. In fact, we need another language to describe a world of constant becoming and we need another set of mind to develop such language. The task is so huge that the Copernican revolution brought about by quantum physics is still being resisted and marginalized: the new world it tells us about is being dealt with by many scientists as "existing", that is effective, only on the level of the smallest particles. On the plane of our perceptions, instead, the Newtonian laws appear to most researchers to function well enough to justify our going on as if things actually are as they appear to be. Scientists seem to have little need for this paradoxical "new world", that for non-scientists is even unconceivable. Yet this is not always possible:

… most people regard quantum physics and its new insights as a phenomenon solely of the micro-world and whose consequences need not concern us in the comparatively huge meso-world of our daily life. But this is generally not permissible when the collections of atoms (or better: 'haps') are not in proximity to their stable (thermodynamic) balance. If they are very far away from these states of balance, especially in proximity to instabilities (chaos points), then the averaging is foiled usually on a number of levels; this makes the immaterial, information-bearing, pre-living connections that dominate the micro-world more or less effective on the

[4] H.-P. Dürr, D. Dahm, R. Prinz zur Lippe *Potsdam "Denkschrift" 2005,* Berlin, Vereinigung Deutscher Wissenschaftler, 2005, München, ökom-Verlag, 2005, also downloadable from: http://www.vdw-ev.de/manifest/denkschr_en.pdf, p. 3 (quotations here are from the online version).

meso-level. Instability functions as an enormous amplifying factor. This situation characterizes animate nature as we encounter it in everyday life.[5]

In simpler words: when change takes place (in fact it takes place every single moment!) this is in some way the consequence of what happens at the quantum physics level, where everything appears in a context of a general interconnectedness. Therefore, the micro-level does concretely matter; it is high time we start taking it into account.

Science and beyond

Dürr sees, like some other great physicists, that science has got to its limits, especially after the discoveries in the field of quantum physics. In the introduction to an anthology of writings called *Physik und Transzendenz*[6], in which he collected contributions of the greatest physicists of the 20th century, he writes:

> Physics and transcendence are now seen in the mind of today's physicists no longer in an antagonist, but in a complementary way… "Natural science without religion is paralyzed, religion without natural science is blind" says Albert Einstein.[7]

But even a conciliation of the two, science and religion, will not allow us to understand everything:

> The *Wirklichkeit* is not unlimitedly knowable. For this reason, also physics, as the
>
> foundation of every natural science, like other disciplines and forms of interpretation, ultimately can speak only in parables and analogies about a *Wirklichkeit* that is fundamentally ungraspable, not object-like, but describable mathematically (in terms of relations).[8]

And quoting an image of his colleague David Bohm:

> The world corresponds… more to… a stream of consciousness, that you cannot catch; only some waves, whirls… in it, that reach a certain independence and stability, are understandable for our fractionating thinking and become for us "reality".[9]

The idea of a "fluid" world that we cannot fully understand, for which neither science nor religion are possible clues - even if the "cooperation" of both can take us somehow further - is rather frustrating for the average researcher. Frustration is a psychological, subjective element that slips into the sanctuary of "objective" scientific attitude. Yet it is more and more becoming clear that "in the name of science" (as well as "in the name of God") is a dangerous justification, often hiding an omnipotent will, well defined by the ancient Greek word *hybris*. Scientific research is not holy in itself and must be accompanied by a sense for values and for limits:

> … this discovery of the character of the *Wirklichkeit*… forces upon us a modesty about what can be known in principle.[10]

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[5] idem, p. 5.
[6] H.-P. Dürr (Ed.), *Physik und Transzendenz. Die großen Physiker unseres Jahrhunderts über ihre Begegnung mit dem Wunderbaren*, München, Knaur, 1990.
[7] Ibidem, pp. 11 and 12.

[8] Dürr et al., *Potsdam "Denkschrift" 2005*, quoted, p. 4.
[9] Dürr (Ed.), *Physik und Transzendenz,* quoted, p. 17.

Modesty also does not belong to conventional scientific tools, it is another unwelcome guest in the still much too closed and narrow world of science. Accepting it as a value would mean for science even rehabilitating ancient and traditional forms of knowledge:

> The modesty demanded by the new insights teaches us that, in a certain sense, the new natural scientific knowledge and its consequences can hardly be called "revolutionary", as it might appear to many modern people whose patterns of thought are oriented toward important partial aspects of the Enlightenment and the reductionist science based on it. We find this "new knowledge" confirmed in one way or another in the broad spectrum of cultural knowledge, in the diversity and forms of expression of human life in history, and in the broad variance of living and cultural realms. We can thus regard the "new" knowledge presented here as an additional scientific confirmation of the diverse ethical and moral value systems.[11]

And so must the new thinking necessarily be much more open than the one of the ichthyologist in the example of Sir Arthur Eddington quoted above:

> A "new" thinking requires us to discover behind the apparent laws of nature, which were necessarily strict in the old thinking, precisely this pre-living diversity and openness that we lose in the coarsened, graspable oversimplification of statistical averages. Such a new way of viewing opens up the possibility of believing in a genuine creativity and gift for intentional action in relationship to the community. It provides the basis, on the one hand, for our striving for freedom and the development of individuality, and allows us to be different. And this, on the other hand, without losing the underlying omni-connectedness, which is expressed in a deep-seated tendency to contribute our specially developed abilities, in cooperation with others and "organismically", to a higher 'whole' – and to do so of our own accord and of our own free will.

Modesty and acknowledgment of our limits in understanding the world then, not as a giving up of legitimate human striving for knowledge, but as means for freedom and personal and collective improvement, is essential.

The "underlying omni-connectedness" clearly refers not only to other human beings, but even to nature, with evident consequences to be drawn as to our relationship to it. It makes a big difference to regard the natural world as a part of us or only something to be exploited for commercial purposes (and this we are going to learn – see for instance climate change - whether we want it or not). The dramatic actuality and urgency of this new thinking confirms and reinforces what natural science has discovered even without any reference to quantum physics, that we cannot destroy the world without destroying ourselves.

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[10] Idem.

[11] Ibidem, p. 5. Some would object here (as Giuliano Pontara, a philosophy professor and foremost expert of Gandhi made in a private conversation, May 2008), referring to a judgment of Hume, that one cannot draw any moral conclusions based on reason, but on sentiment. On the one hand, the purpose of such a writing as the *Potsdam Denkschrift* is certainly to move human's sentiment, but also a higher form of reason, given the fact that our reason (Erasmus would call it "folly") is destroying the world. On the other hand, Hume's judgment is a methodological one, based on what in the *Potsdam Denkschrift* is called "reality", a dimension in which things are separated (reason versus feeling, matter versus spirit), not interconnected and basically undistinguishable from one another and even not "existing" in the traditional sense as in the *Wirklichkeit* (a rather puzzling situation for our mind, that is true!).

> The dualism between matter and mind is… rendered obsolete. The alternative in the 19th century was between a "positivistic explanation of nature" and a "Christian Creator-God and world ruler". In both systems, humankind was contrasted with nature, which he could and was permitted to subjugate, whether justified by divine destiny or by evolutionary superiority. We leave this false alternative behind us, clearly also in the sense of the new access to a consciousness of omni-connectedness, a consciousness that the natural sciences open up for a non-dualistic view of the world. This makes it possible to recognize humanity in fundamental commonality with the rest of nature, without thereby falling into a conventional naturalism or simply invoking cosmologies that may have corresponded with the worldviews and ways of life of cultures that remain close to nature.[12]

In traditional thinking of different cultures we already find the fundamental unity of man and nature. The difference, or the enrichment given by quantum physics, lies in its uncovering how deep this interconnectedness is and in confirming the wisdom of mystics of all ages.

The confluence of science with mysticism

Dürr's view is definitely one of non-dualism.[13] Dualism is for him more a consequence of our inability of conceiving and verbally expressing a unity in what appears to be different. He sees no opposition between spirit and matter and considers the latter to be a condensation of the former.[14] This condensation happens continuously,[15] "in creative processes of a continuous differentiation and simultaneous or successful integration

of differences",[16] therefore: "Many other worlds are possible".[17]

Here we are in a tradition that goes back ages:[18]

> He is within and without all that exists, the animate and the inanimate; near He is, and far; imperceptible because of His subtlety.
>
> He, the Indivisible One, appears as countless beings; He maintains and destroys those forms, then creates them anew.[19]

Dürr's philosophy is then one leading to the Infinite and therefore a religious and – in a very modern sense – a mystical one. His collection *Physik und Transzendenz* has been already mentioned as a book exposing the reflections of great scientists on the borderline between physics and

[12] Dürr et al.: *Potsdam "Denkschrift" 2005*, op. cit., p. 6.
[13] S. H.-P. Dürr, M. Österreicher, *Wir erleben mehr als wir begreifen*, Freiburg i.B., Herder, 2007, pp. 128 ff.
[14] Ibidem, p. 129.
[15] Ibidem, p. 103.
[16] *Potsdam Denkschrift*, op. cit., p. 9.
[17] Idem.
[18] Unknown is the period in which the Bhagavad Gita, the verses of which are quoted here, was composed, certainly centuries before Christ.
[19] *The Bhagavad Gita,* Chapter XIII, vv. 15 and 16 quoted in: P. Yogananda, *God talks with Arjuna. The Bhagavad Gita*. Los Angeles, Self-Realization Fellowship, 1996, p. 888.

metaphysics. He more recently discussed the topic in a conversation with the theologian Raimon Panikkar. [20]

A colleague of Dürr, the Austrian physicist Fritjof Capra, became famous discussing the same subject in a book that brings together eastern thought and modern science. Particularly interesting is the fact that Capra, a learned scientist, has been lead to the study of eastern thought by a personal mystical experience:

> I was sitting by the ocean one late summer afternoon, watching the waves rolling in and feeling the rhythm of my breathing, when I suddenly became aware of my whole environment as being engaged in a gigantic cosmic dance. Being a physicist, I knew that the sand, rocks, water and air around me were made of vibrating molecules and atoms, and that these consisted of particles which interacted with one another by creating and destroying other particles. I knew also that the Earth's atmosphere was continually bombarded by showers of 'cosmic rays', particles of high energy undergoing multiple collisions as they penetrated the air. All this was familiar to me from my research in high-energy physics, but until that moment I had only experienced it through graphs, diagrams and mathematical theories. As I sat on that beach my former experiences came to life; I 'saw' cascades of energy coming down from outer space, in which particles were created and destroyed in rhythmic pulses; I 'saw' the atoms of the elements and those of my body participating in this cosmic dance of energy; I felt its rhythm and I 'heard' its sound, and at that moment I knew that this was the Dance of Shiva, the Lord of Dancers worshipped by the Hindus.[21]

Capra's *Tao of Physics* opened the way to a series of books, the strength of which is that are the work of a scientist. In Capra's books we find other subjects dealt with by Dürr: the necessity of a new thinking,[22] as well as the interconnectedness.[23]

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[20] H.-P. Dürr, R. Panikkar, *Liebe – Urquelle des Kosmos. Ein Gespräch über Naturwissenschaft und Religion*, München, Herder, 2008) deals extensively with the topic of the relationship between natural science and religion. In the title we find Dürr's favored word for interconnectedness: *Liebe,* t.i. *love*, which he actually prefers to express by the verb *lieben, to love*, to convey the idea of dynamic liveliness (so in a private conversation, March 2008) as the primal source of cosmos. How easy for Italians to recall Dante: L'amor che move il sole e l'altre stelle (The Love which moves the sun and the other stars).

[21] F. Capra, *The Tao of Physics. An exploration of the parallels between modern physics and Eastern mysticism*, London, Fontana, 1976, p. 11. Let us also take the strikingly similar testimony concerning another modern western thinker, Richard Maurice Bucke (1837-1901):

"He and two friends had spent the evening reading Wordsworth, Shelley, Keats, Browning, and especially Whitman. They parted at midnight, and he had a long drive in a hansom. His mind, deeply under the influence of the ideas, images and emotions called up by the reading and talk of the evening, was calm and peaceful. He was in a state of quiet, almost passive, enjoyment.

"All at once, without warning of any kind, he found himself wrapped around, as it were, by a flame-colored cloud. For an instant he thought of fire--some sudden conflagration in the great city. The next (instant) he knew that the light was within himself.

"Directly after there came upon him a sense of exultation, of immense joyousness, accompanied or immediately followed by an intellectual illumination quite impossible to describe. Into his brain streamed one momentary lightning-flash of the Brahmic Splendor which ever since lightened his life. Upon his heart fell one drop of the Brahmic Bliss, leaving thenceforward for always an aftertaste of Heaven." (In: *Proceedings and Transactions of the Royal Society of Canada*, Series II, Vol. 12, pp. 159-196, quoted in: R.M. Bucke, *Cosmic Consciousness*, New York, E.P. Dutton & Co., 1969, in: "The Man and the Book", no page indication).

[22] F. Capra, *The Turning Point,* New York, Simon & Schuster, 1982.

[23] F. Capra, *The Web of Life*, New York, Doubleday-Anchor Book, 1996.

Practical and pedagogical consequences of the new thinking

The question now is: given the fascinating (and, most important, scientifically based) ideas proposed by Dürr, how can we apply them in our lives? We might in principle agree with the view of omni-interconnectedness, i.e. being one with nature, universal brotherhood, peace, but how should we become capable of practicing and sharing them with others? Who has had the chance of meeting Dürr knows that he walks his talk and this very fact has already a transformative impact on those that are somehow prepared for it. However, the task of finding actual ways of living the new/old thinking he speaks about has to be fulfilled.

There are possibly two dimensions of the problem: 1) how to dive into such a deep view of life and make it part of ourselves; 2) how to convey it to others. The first one concerns everyone interested in it, the second perhaps mostly (peace) educators.

1) How to dive: yogic and Buddhist meditation are the most practical methods, with a history of thousands of years. They aim at detaching the mind from outer appearance (matter) and making aware of the fundamental unity of everything. It is a long process, but definitely shorter than trying to put into practice ideas not properly "digested".

   For the ones who do not feel comfortable with the idea of meditating, it remains Gandhi's recommendation: "You must be the change you wish to see in the world". So the point is: let us first change ourselves. It is essential to keep in mind that we have been born and have grown up in a one-sided deterministic world ignoring the subtler and more true level, the *Wirklichkeit*. By opening our eyes to a broader view of life and becoming familiar with it, we have the chance of living more fully and finding a way out of the quite difficult situation we, as human kind, are in.

2) How to convey: the methods of education for peace and nonviolence are best suited for this task. They are being continuously developed and can be applied to transmit at least some of Dürr's main ideas:

   - openness of life (potentiality, not determinism, future to be construed) and therefore:
   - confidence in the possibility of change (many other worlds are possible)
   - basic freedom within a much wider concept of natural laws
   - omni-interconnectedness (racism and any selfish behavior as self-damage)
   - …?

Is 2) above ever possible without 1)? Dürr's philosophy gives *Peace Studies* a deep foundation, the job has but to be done, starting with ourselves.

An interview with Hans-Peter Dürr[24]

Q.: You are a physicist, yet you maintain that matter, which is the subject of your work, does not exist. Could you explain this paradox?

Dürr: When we say that something exists, we normally think of something we can touch or which has mass. But if for example we ask ourselves if music exists and take a CD loaded with music and analyse it, we cannot find the music. Therefore that which we say exists does not exist in that sense, but behind the scenes there is something quite different. This is valid for all things we consider to be material.

Q.: Therefore you ask us to doubt all that is part of our everyday experience and which we consider normal, and that in reality it is not what it seems. That it is a convention, perhaps the fruit of the way we are used to see things, a perception born of custom.

Dürr: That's substantially a rough approximation: if we speak of the" Italian man" and say that he earns so much, that "man" is only a representation of a statistical average. And so it is with matter, it is a statistical average value of something which in itself is not matter , which is in between, which can be defined as a structure of relationships, like a electromagnetic field, which is not made up of matter, nor of mass, but of energy. And what could "something in between" possibly mean? To us there is "something in between" when we have two things, A and B, and between them there is a third. But in this case there is only that something in between, and our language is unable to express this phenomenon, or rather it could but only up to a certain point. If we say Perception, Hope, Life, language cannot help as all these have no existence, but if we use the verbs: to perceive, to hope, to live, we then understand that there is something, certainly intangible. A verb is intangible but we can understand what is being said, what it means.

It is from that which is in-between, from behind the scenes that is born the vitality, which changes at the very moment that I try to describe it, without any causal links, but at the same time being a link between all things. There is nothing in the world that is divided. At the most we think that this indivisibility is limited to physical exchange, but behind the scenes there are no physical exchanges, there is the primigenial, the primitive link and that which I call "me" does not reside in my body, but is spread out to everything, like a gravitational field. In religious parlance, yet within the limitations of language, of words, I would say there is no Matter, there is only the Spirit, which I simply call love, embryonic love, which gives shape to all the forms we see, just as the software in a computer, a simple sequence of symbols, generates the images that we can see.

Q.: Your exposition seems to be a proposal for reconciliation between religion and science.

Dürr: In principle, Science and Religion do not differ, but both of them make the mistake of taking themselves too seriously, that is they understand everything they have discovered in a fundamentalist manner. Scientific fundamentalism consists in declaring that objective reality is reality in all senses. And religions make the mistake of declaring that what has been written is the Truth. It is this fundamentalism, which is mistaken. That which is written and the conclusions of classical physics are only a kind of symbols, something indicating how things are, but not in an

[24] In: "Messaggero Veneto", Udine, 3/3/2008.

exact manner. What should be said to both of them is: keep it in mind that, that of which you speak is a symbol, which refers to something which in itself we cannot grasp. The circumference I draw with a pen is neither blue nor green; your being Muslim or Christian the circumference has no color, it is you who have put in the color, one blue the other green. Therefore the advice to both Science and Religion is: be humble, neither one nor the other of you can speak about what "is", you only speak of a mental construction, linked to language, which can only express that which is comprehensible.