Our Ability to Research Comes Before Understanding of What We Research

Dainis Zeps[1]

dainis.zeps@lumii.lv

Institute of Mathematics and Computer Science

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Abstract

Impact of quantum mechanics on physical science epistemology and science at all is considered.

We consider methodolically idea that science doesn't research its assumed objects but the ability to research, thus making itself not distinguishable from the cognitive science in the most general sense. Next idea is that what we discover firstly are the methods and the technologies understanding about which may come (if at all) much much later after we have learned to use these technologies in our life up to incredible level.

Instrumentality rather than objectivity should be researched in science. In this sense quantum mechanical impact on sciences should be assessed. Using this approach, quantum consciousness should be quested for.

Key words: mathematics, physics, quantum mechanical theories, technologies, cognitive science, motion as cognitive activity

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[1] Author's address: Institute of Mathematics and Computer Science, University of Latvia, http://www.lumii.lv/, Riga, Rainis av., 29, Latvia, LV - 1459

Introduction

In the most general sense, our abilities to research we discover when we research nature or whatever else that submit to our inquiries, augmenting in this way our experience to research and gathering it into scientific instruments and methodologies. The more we research, the more we discover our abilities to research and to discover. Whatever research requires much effort from side of researcher, and we know from our experience that the latter exceeds the former in the sense that effort always is required to much more extent to increase the effect. Thus, we may say that to get effect to whatever effort we must develop our abilities. We must recognize this as sort of axiom and actually we know this very well. But why we haven't developed this simple idea as type of all ambient scientific paradigm with corresponding conclusions? The answer is not trivial: we had to wait until quantum mechanics came to make crucial turning-point and breakthrough in this matter. Why quantum mechanics? We are going to enlighten this insight in this article – we are to come to the paradox: we think that we research nature but we research our abilities to research nature. How it turned that way round? Why it turned that way round?

Homo sapiens abilities as prespacetime

Human mind always has tended to observe what he perceived first with respect to with what he had perceived. Instrument of observation always took second place with respect to what for instrument was intended. Instrument was built in order to improve ability to perceive. Instrumentality is not first thing in language too, but first come objects and actions. This reveals our usual way of thinking, at least on the stage of development we are now. But instrumentality was necessary for us to become conscious beings. If we had to reach new level of development we would need to develop new level of instrumentality for that reason. Let us see sportsman, as example, or by learning new language, or by learning mathematics, or by acquiring whatever new ability. Retreat in instrumentality shows retreat in our aggressivity to develop.

Further observation was that we as human beings are also aggregations of instruments to perceive the world around us. We deliberately assumed that world around us exists in some or other way objectivity, as sets of objects, but ability to perceive anything in this world is secondary thing, and the same would mean for us as anatomical aggregations of instruments of perceiving too. If nothing else forced us to chose between instrumentality and objectivity, we did according our state of activity. Tending to be lazy, together with becoming more wealthy, we became more materiatistic. Idealist philosophers were first who posed the question – couldn't be that other way round may be inquired too, i.e., instrument is before observer (1; 2; 3)? But who coould decide who was more right – idealist or materialist, or positivist who tried to find indifferent position between both? That all stood behind philosophy. But the quarrel suddenly had to be solved, at least, what concerned physics. And resolver was quantum mechanics.

But we must come to this idea step by step. Physics discovered ways to look into nature more and more deeply. Nature was attacked on several fronts, i.e., using physical experiments, using mathematical methods developed into mathematical physics, using and implementing

physics discoveries into technological inventions, optical devices, electricity, radio. All together brought to discoveries of relativity and atomic physics in 20th century and at last to quantum physics. But then *homo sapiens* suddenly came to awareness that he doesn't quite understand what he is investigating, i.e., question of what were with reality came before him. Then Max Born discovered interpretation of wave function in quantum mechanics as sort of probabilistic nature of physical observables. To save the same reality, all aspects of quantum mechanical reality was put on its assumed probabilistic nature, but with this almost closing ways to deeper understanding of what had come before physical science actually. But indeterminism wasn't sufficient. Many interpretations of quantum mechanics came into existence, and all for one and the same reason – to save reality. Did this all save reality? Positivism was some convenient form to postpone the problem of what reality is actually, but only to postpone – not to solve.

Why we came to face this problem – to ask what is reality? Let us step a little back and ask: who said us that we know what all that around do mean for us except that we have given abilities to perceive this within our tentacles, i.e., abilities to perceive? Who said us that we have any means to inquire what reality is? Religions always had said to us that we live within grace of God that had granted all this in order to use it for our benefit and to thank God for it without inquiring where from this all come to us except directing this all as ability of God to grant it all us gratuitous, *gratis*, in Latin. It turns out that Bible simply warned us beforehand, before quantum mechanics, that all should come to this end just in this way. Actually, we do not know anything except that we have abilities to respond to all what occur in world around us but become socialized within that to the extend that all around us perceive as reality for our disposal and our intent. From time to time some natural phenomena remind us that we err, say, some seismic activity or sudden illnesses or economic crisis, but otherwise we remain as arrogant as possible. But, if we want to understand what we are to deal with in physical science and sciences at all, we must turn our look backwards asking where we firstly lost the objectivity about our positioning with respect to what could be perceived as reality. Starting with Aristotle? Or even earlier, (3)? Maybe, but more rational answer might be saying that we are not to blame either Plato, or Aristotle, or Thales, but ourselves: we have erred in the way going forward only taking rational ideas and abandoning whatever we conceived as irrational. Where we came? To quantum mechanics that told us: we did wrongly. We did correctly whenever we developed our abilities, but we did wrongly whenever we assessed wrongly our understanding about what is reality with respect to what is our ability.

How quantum mechanics solved the old quarrel? Quantum mechanics itself is aggregation of our abilities: mathematical apparatus developed to extend that gives us insight into depth of nature in way to describe physical experiment with incredible precision. We must mark that quantum mechanics is supported by experimental evidence where this same evidence doesn't allow to be interpreted otherwise as confirmation of correctness of quantum mechanics without ability to interpret physical reality as would be suitable for our desires to see the reality without quantum mechanics. Quantum mechanics is paradox for our wishes to see reality otherwise than it is predicted by quantum mechanics. With quantum mechanics we loose ability to follow what is reality, but with it we gain ability to perceive it to extend we do not need to ask what is reality itself. But, all these paradoxes are solved in moment we perceive that we are to deal with our ability rather than with our understanding about it what it might mean for us with respect to reality. We gain our ability to much deeper extend if we abandon the wish to ask what stands behind this ability. We gain if we say that ability is primary. To cut ends short we may say that this ability belongs to God. Saying so we gain

two-time: we both come to concordance with religions, and we abandon necessity to attribute ability to anything else except God Itself. For atheists, let them invent some other name for God.

Before quantum mechanics we assumed to live in space-time, what concerned out understanding of our physical reality. Taking seriously what quantum mechanics requires from us, we must abandon space-time as stage where all phenomenal world is enacted on, moreover, to abandon the space-time completely. We are to come to prespacetime what is perceivable in mathematical setting only and serves for us as incarnation of our abilities to inquire; and this is all. Where is reality? Stay there where you are, being contend with ability to reach this state, but not to go further, because going further means – nonsense. We love too much space-time? Well, use it but without connecting it with scientific inquiry. If you want to base you inquiry on science, you must take as granted that you live in prespacetime, the realm of quantum mechanics.

Homo sapiens as extension of his abilities

When we come to awareness that our abilities are the reality we live in we can start to apprehend this reality around us. The world we live in is instrumental by nature, that consists from sets and aggregations of instruments. The language of this instrumentality may be considered as informational, thus saying that we live in field of information would mean the same or similar thing.

Let us know that we live in instrumentality. What in that case is vision? Vision is ability to see and as such it is primary with what we before considered as objectivity, or sets of objects, or aggregations of objects, that all we can seemingly perceive via vision. What is vision – may be answered – it is way of registering what goes on in the world around subject who registers that via vision. The world from part of subject is what can be registered. If we build for us a physical picture with the propagating ray of light then instrumental reality may accept only points of departure and arrival of the ray as acts of registering light: the line between points is reconstruction that doesn't match with reality. We took for granted that light should somehow propagate: now we know – no such ray exists as quantum reality. Notwithstanding we are ready to do all to reconstruct classical picture and "draw light ray" as good approximation for what would seem to us reasonable picture of physical reality. Bohm's unaccomplished multitime approach allows us to be "scientifically" naughty and prankish in this way, not more, (4).

Using quantum mechanical theories we may start to try to build proper picture of consciousness with respect to vision as ability. Really, if we actually could build appropriate mathematical theory that covers sufficiently the ability to see, that may serve as some ground for further "reality" where we live in, we might come to real ground of how to build comprehensive theory of consciousness. We might state even more, physical theories allow us to perceive this "reality" as some field of information that consists from distinctions that comprise one common quantum distinction. See (5), for example. The meaning of these words should determine corresponding quantum mechanical theory, not the philosophy around the play of words. Actually, cone of light is the area where all starts and meets and goes on: light units live for ever there or, more suitably, time notion in traditional setting doesn't have any sense any more. If light unit starts in one moment of time and reaches goal in other, treating time traditionally, then in referential system of light unit itself these

moments are indiscernible, even more, for light unit doesn't matter where it started and ended – in reference of its proper time these moments are the same, as the same are all its time moments, as the same is time for all cone of light. The start and end points were distinct for the register of the light unit, using traditional physical picture.

Let us apply what we said with respect to vision to other areas of abilities of human beings too. Let us apply the same to the language ability, that we use to think and build scientific inquiry too. Speaking about the use of language, we don't need to wave off space-time, because the traditional science doesn't try to connect it with physical reality. Otherwise things turn out when we live in the world of our abilities: language ability comes as something comparable with vision. We gain directly. At last we have come to real world we live in, in the world of our thoughts that is inseparable from other world. Language ability and vision ability, both are closely related, and comprehensive theory of consciousness should take this into account. How to do this? Our experience is rather weak in this direction, but we should hold to what we already have, to experiences to build quantum mechanical theories. See for that Pitkanen (6; 7), e.g.

Let us turn our attention how human body works. The body consists from aggregations of abilities. Most of these abilities are not responsible directly to our commands, say, as moving hands or legs. For example, we can't directly command how our heart should function or circulation of blood or whatever else in our body. When we speak about these things we are used to describe them as objects, say, heart, liver, kidneys, blood, and so on. But actually we were to speak in terms of their functions, and of functionality. What are objects of this functionality? "Objects" more appropriately might be something collective apparata, similarly as we speak already about common subconsciousness. We already speak about One Man as collective designation of *homo sapiens* as reality, as spiritual reality, but maybe sometimes as physical reality too. We should speak about parts of human being too, common human heart or blood system, and so on. These simple consideration say us much about how far we are from real reality when we speak about our individual organs, say, heart. What is individual heart of a human being? Ink priests used to cut out human heart from prisoners to sacrifice to gods. Maybe this picture might be suitable? Medical people have to operate with living heart, even if outside human body in time of operation, if dead it ceases to be of any interest for them: the transition is **invisible** but more actual than any reality. Why this invisible reality was and still is ignored by science?

What we gain from consideration that all around us are rather abilities and their aggregations than aggregations of object ? First and main thing is to comprehend that all this consists from one stuff, one "matter", common functionality, that we may call functionality of life. Vision, language, thinking, human body – all is the same, i.e., functionality of life, only on different levels. Taking into account that vision might be considered as functionality of field of information, we might apply this to other levels of our functionality, or, in other words, ontology. We could say in place of ontology – epistemology with the same effect, because all this is with respect of field of information we live in.

Quantum mechanical theories would force us to speak about this functionality of life in terms of mathematics. Why? Actually we do not know what this functionality is if taken to some higher levels not accessible to us. But quantum mechanics tells us that we have some access to this functionality, at least to some level of this functionality, that we perceive as belonging to mathematics as we understand it today. What is on higher levels we do not know. Swedenborg spoke about language of angels, but this may mean to us only some wink,

insinuation, not more, if we want to speak about scientific inquiry. After all, who were who spoke with Swedenborg, persons of future that spoke with him in language of quantum mechanics? Maybe, but it is only some clues to try to connect our past experience with our contemporary experience.

The world of motions and one common Motion

What is functionality of life? Why we may with certainty to speak about it and attribute it to whatever in quantum mechanics? The joining aspect is the motion, see (5; 8). Quantum mechanics turns out to be more comprehensive if considered as description of world of motion and even one common motion, quantum motion that we designated by Motion, capitalizing this word (8). We must remind ourselves that our ancients used this term to greater extent than today contemporary physicists. They, *homines* of today, use too, of course, notion of motion, but only as some descriptive notion, and with end-used meaning that same as by Greeks, but without direct evidence as other notions, say, particle, waves and so on. For Greeks it was otherwise. Today physicists say: ancients used to speak about motion because they didn't have other notions as we have today. Actually this is not true. We departed from ancients when we extracted from Plato, Aristotle only rational, abandoning what seemed for us irrational, see (3). So, we have motion from Greeks to the extent of our understanding of rational part of the notion. Cutting short, we use motion mostly in connection with space-time. But quantum mechanics want us to live in prespacetime without space-time at all. We may loose motion together with space-time abandoning space-time? Not in the least extent. Motion doesn't belong to space-time. That was invention of that back number rationalism that should be abandoned with the era of quantum mechanics. Quantum mechanics enter new notion of motion, quantum motion, or Motion, in a single word. See (5; 8)

Motion (8), capitalized, may help us understand why we may gain so much in considering all what concerns our being, ontology, epistemology, as field of information (9).

Motion considered traditionally in contemporary physical theories are commonly considered as something visible, perceivable, in space or time, or both, in phenomenal setting as it is. Motion in general sense, as belonging to prespacetime, would mean much more: it is change in mathematical sense. But mathematics serves only as measuring instrument that fixes, registers the motion, behind what may stand there anything more general. Thus, motion shouldn't be only mathematical term, though we may capture it only in mathematical settings, what concerns quantum mechanical theory. But, similarly, as experimental equipment may capture change in some assumed "real world" similarly mathematical equipment captures motion in the world that is able to respond to.

Homo technocraticus

The new *homo sapiens*, *homo technocraticus*, together with the development of technological tools around oneself develops oneself in direction where he gets more and more abilities to organize oneself in highly structured society, but the same organizational structure shows how low is his level of understanding of what goes on with himself. Societies which we can remember, from times of Ancient Egyptians, are based on idea that *homines sapientes* are individual units who so little have in common. Almost nothing us turn to our common ontology, except maybe religious teachings, almost all making us to distinctive

individualities. This makes the ground of society, this makes our understanding of the world around as material.

What this gives as consequence? Society does not develop otherwise but with brutal revolutions. Wars are fathers of development, according Heraclites. Why? We are divided in our corporal bodies. Christ, other religious teachers, want us to be united? Rationalism and reductionism in science goes its own way. But *homo technocraticus* or *technologicus* develops oneself further and further. We have reached some assumed high level with computers and mobile phones. But otherwise, as social units, we are on level of our ancients. Bible for us still is collection of Hebrew tales. If not book of truth it might be at least book of wisdom – but not the case for our contemporary scientists, materialists. We predict end of world, and not without reason, because nothing shows that something would change mind of rationalistic thinking materialist that he is wrong in thinking that he is as separate personality and individuality as separate is his body from bodies of other human beings, actually what isn't true. But physics still have to come to understanding that separate human bodies doesn't have much sense in the very physical sense. What next? We have come to Paradise what concerns our abilities to produce material values, to perspectives to develop ourselves as *homines technologici* up to incredible level but without ability to live together due to weak ability to understand where all this we call society is going.

What does this say to us as *homines technologici*? We should turn into priests and advocate for other insights in where could be exit from this deadlock? But, what concerns scientific insight, we may turn attention to simple solution: first it is our consciousness that should be changed, and changed in two ways: first, we should become aware that we are not divided so much as we perceive our bodies. Second: we should apply and develop our theories into way that directly show that we understand where our mind stands. Thus, we should look on consciousness from within and from outside. But, do these pictures differ?

Consciousness as instrument of building theorem windows

How we think in mathematics? Do we something different than simply by thinking, (10)? Building mathematical reasoning we use objectivity in form of Motion and reveal its invariants and so on. But, when we come to state that we may say that we know what mathematical structure does we start to exercise something consciously what before we used only unconsciously, indirectly. May it be so that theorem windows we use not only for mathematical reasoning? See (11). However we must say definitely, as certain, "yes" to previous question because we can't use other way of thinking by mathematical reasoning than by reasoning for other reasons. What sense could have these words? In mathematics the tool and the content doesn't differ "by stuff they are made from". And by reasoning we receive the same. When we speak about reasoning as spiritual activity, not material, we don't turn attention to this coincidence, content and tool, saying, all is spiritual, all is imaginative, all are functions of nerve reactions, of quantum chemistry, but in functional its aspects, not in what could be looked on, or touched by hand, or registered by experimental equipment. When we come to awareness that reasoning is reality, then we should be startled by fact that tools and contend of their actions belong to the same environment. Thus, we come to idea that theorem windows both are tools and structuring elements. Thus now, we have to apply this for field of information where all this is staged on, as before we had space-time as stage for all physical reality.

Quartum organum – Fourth Organon

Reality as instrumentality – aren't we acquainted with such notion? It isn't right. Aristotle gave first us his *Organon*, in Greek. What does mean in Greek ὄργανον? Instrument. Next was Francis Bacon, who gave *Novum Organum*, in Latin. Next was Peter Ouspensky who gave *Tertium Organum* (2). Now we have order for *Quartum Organum*, or, Τέταρτον Ὄργανον, as we like. Who is to announce it? Quantum mechanical age did it by itself. We are only to recognize this fact. We are only to assess things correctly.

We have quantum mechanical theories that do this, though, only partly consciously. We have who do this already consciously, see (6; 12). We have approaches who are much ready for this, see (13; 14; 15). We have researches who inquire directly about these questions, see (16; 17; 18; 19; 20; 21; 22; 23; 24; 25). And still more (26; 11; 27; 28; 29; 30; 31; 32; 33; 34) and more (35; 36; 37; 9; 38; 39; 40). We have excellent mathematical and physical theories that are ready for all that, e.g. (17; 41; 42; 43; 44; 45; 46; 47; 48). At last we have more excellent works on general nature for that same task (49; 50; 24). We have quantum mechanics as main hero (51; 52).

Conclusions

We conclude that quantum mechanics requires us to see physical world rather from side of instrumentality than fixed reality. This may give keys how to unlock understanding of quantum mechanics itself, how to build QM based consciousness approaches, and how to assess history of science and history of society at all.

Role of three endeavors, scilicet, of Aristotle, of Bacon, of Ouspensky, to define instrumentality in science should be elevated and praised, and quantum mechanics as new instrumentality – as Fourth Organon – announced.

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