

THE ATTITUDE OF TEACHERS TOWARDS PHYSICS AND PARANORMAL PHENOMENA

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Abstract

The teachers' attitude towards parascience indicating their misunderstanding of the concepts of modern physics are critically analysed. The influence of quantum mechanics, modern cosmology and the Gödel theorem on the materialistic ideology has been discussed. The contradictions between the physical methods of investigation the parascience are pointed out.

1 Introduction

The paper by Stanisław Bednarek entitled "The attitudes of physics teachers towards paranormal phenomena" [1] is an attempt of description of the teachers' attitudes at the time when in Poland materialism ceased to be the only philosophy accepted, everything that finds readers can be published and the activity of people offering paranormal services became a profession. To make matters worse the parascientific literature is so mingled with scientific one that many readers can have problems with the right choice.

On top of that the level of physics taught at schools has considerably decreased, among others as a result of the unfortunate school programme reform. Even the best teacher is not able to get good results of teaching having only one hour of classes in a week. These facts should be considered against the very fast development of physics whose latest achievements to be understood require the imagination of the authors of science fiction stories. This fact is also reflected in the article by Dr Bednarek.

Let me begin this paper with some brief information on the achievement of physics significantly shaping the understanding of the world and the attitudes towards materialism, faith and parascience. I do not suppose that this article would stimulate changes in the meritorially unjustified attitudes, so I would recommend reading of the references cited.

2 What does physics deal with?

The object studied by physicists is the matter, its structure, the laws governing the phenomena taking place in the matter and its motions. In brief, the physicists look for the truth about the world. The great progress of physics in the last few centuries was undoubtedly related to the methodology of studies and the use of mathematics. In short the methodology of physics covers the following three steps [2]:

- The first is the observation or experiment, usually involving quantitative determinations in the conditions eliminating the disturbing factors.
- The second is the reasoning and formulation of hypotheses, usually expressed in the form of mathematical equations.

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- The third step is experimental verification of all conclusions following from the hypothesis accepted.

The criterion used to verify a given hypothesis or theory is experimental verification of all conclusions following from this hypothesis or theory. A negative result of at least one experiment verifying a given hypothesis means that it must be rejected. However, the experiment being the grounds for rejection of a given hypothesis may lead to formulation of a new hypothesis. This methodology eliminates mistakes, has an element of self-control and stimulates development.

It should be added that a physical experiment has two very important properties - it is repeatable and reproducible. The first means that if it is repeated in the same conditions we get the same result, while the second means that if it is reproduced at a different site using different instruments and by different people it also gives the same results [3]. Let me also explain what I mean by "the same result". Subsequent measurements of a given physical quantity practically never give the same numerical value. The results are considered the same if the differences between them are smaller than the uncertainty of the measurements. It should be emphasised that the physical laws and theories are not complete and absolute truth as:

- They are based on the induction reasoning that does not have to lead to the truth.
- The results of measurements have approximate character and upon reduction of the uncertainties of measurements they can prove inconsistent with a given theory.
- It can happen that new phenomena hitherto unconsidered will have to be taken into account.
- The cognitive possibilities are limited by the Heisenberg indeterminacy principle.

However, in spite of the fact that the physical laws are not the absolute truth they are correct approximations of the truth.

Although progress in physics leads sometimes to conceptual revolutions in the earlier adopted approaches to the nature it does not

lead to revolutions in the laws of physics. A good example is the principle of the conservation of mass postulated by Newton. For 200 years no deviations from this principle were discovered, when in the 20th century A. Einstein predicted the mass dependence on velocity. His hypothesis was fully confirmed and revolutionised the approach to mass. However, Newton's theory still is a good approximation of the Einstein theory for velocities small relative to the speed of light, whereas the mass dependence on velocity must be taken into regard when studying elementary particles (e.g. in accelerators).

To sum up the above considerations we can say that the laws of physics always make a very good approximation of the truth about the world and no new physics can be expected to be discovered as suggest the parascience supporters.

3 Quantum mechanics and comprehension of the world

Great success of physics in discovering the laws of the world already in the 18th and 19th centuries has led to a conviction that the human mind is able to solve all problems and "calculate" the past and the future and that the only hindrance is of the mathematical and technological nature. The prevalent idea was that the phenomena taking place in the world do not need anything apart matter for their explanation. The materialistic (or naturalistic) idea was also adopted in philosophy. Up to the present many research workers are fanatic advocates of materialism.

Discoveries of the 20th century have shown that the knowledge considered to make the scientific grounds of materialism is just a trifle scrap of the truth about the world. The confidence and effectiveness of the classical mechanics equations were shattered by the discovery of deterministic chaos [4] and the Heisenberg indeterminacy principle.

Further problems with comprehension of physics accompanied the formulation and development of quantum mechanics and cosmology. Quantum mechanics well explained the phenomena involving atoms and elementary particles and became the only theoretical background of chemistry and molecular biology. However, the procedures it implies are alien to our habits and everyday experience. For instance the classical mechanics calculations give reliable results (of course to

the accuracy of measurement uncertainties), so the probability of obtaining the result of the calculations in reality is 100%. In contrast, the quantum mechanical calculations give only a probability of realisations of different possible results, so a result obtained may agree with the outcome of experiments performed on a large set of events. For example the information that the half lifetime of a certain radioactive isotope is 60 minutes means that after one hour a half of a given number of atoms of this isotope will disintegrate. On the other hand, this information is useless when we want to follow the fate of an individual atom. The result of the calculations means that after one hour the probability of the atoms decay is 50%, after two hours the probability of decay is 25% etc., but we will never learn from the calculations when a given individual atom will undergo disintegration. This information can be obtained only on the basis of a measurement made by the so-called observer. At the moment of the measurement the probability becomes certainty. It means that jumpwise and causeless the probability changes to 100% for one of the possible results and to 0% for any of the other results [5].

Similar conclusions are brought about by the so-called single-photon Young experiment [6]. In this experiment single photons are incident on the set of two slits. Each indivisible photon individually falls onto the set of slits and is not able to interact with the preceding or following one. After some time the distribution of photons recorded on the screen is the same as that observed when a whole beam of light. Therefore, in the single-photon experiment each of the indivisible photons must in a strange kind of way pass through both slits. All attempts at experimental verification which photon passes through which slit lead to deterioration of the image on the screen. This result implies that in the time of flight the photon is present simultaneously on the two possible pathways, which in terms of quantum mechanics is known as a linear superposition of states. At the moment of measurement the probability collapses and one of the states in a jumpwise process gets a probability of 100% (result of the observation) while the other get a probability of 0%, however, this probability collapse happens only when the observer performs a measurement.

There is another problem with comprehension of quantum mechanics: its fundamental equations have been guessed. Many at-

tempts have been made at explaining the origin of the quantum mechanical equations. As yet the fundamentals of the quantum mechanics have been successfully derived from the completely unphysical assumption of the existence of omniscient knowledge [7, 8, 9]. It cannot be accepted by materialists and many physicists have tried for over 80 years to replace quantum mechanics with another theory, however as yet the attempts have failed.

To sum up this part it has been shown that quantum mechanics undermines the fundamentals of materialism by implying the necessity of introduction of a conscious observer and derivation of its laws from the metaphysical assumptions.

4 Other fields of science and materialism

Modern cosmology has proved long ago that the universe has developed from the primary singularity from which it has been expanding till today. The theory describing the origin of the universe is known as the Big Bang theory and a recent evidence of its general acceptance has been the award of the Nobel prize in physics for the experimental determination of the anisotropy of the background radiation directly following from this theory [10]. According to the Big Bang theory the universe had a beginning and will have an end [5, 11, 12]. There are only some doubts as to the details of its evolution, especially at the time zero and in a distant future.

Close to the time zero the universe must have been so small that its evolution must have obeyed the laws of quantum mechanics. If so, according to section 2, the state of the universe must have been a linear superposition of each of the possible pathways of its quantum evolution. Realisation of any of the pathways is described only by a probability. Only at the moment of appearance of an observer the wave function could have collapsed and one of the pathways got a probability of 100%, so our universe started to exist.

Mathematics, that has been neutral in the discussion about materialism, has been enriched in the Kurt Goedel theorem saying that each formal system containing the principles of arithmetic and logic includes a theorem that can be neither proved nor refuted within this system. The Goedel theorem can be also applied to computer programs. This unsolvable theorem cannot be discovered by the com-

puter program but only by man. Consequently, a computer based on logical systems will never match the human mind [5].

In the present times of great development of computer science, the notion of virtual reality is nothing strange. Using this knowledge the world can be imagined to be a virtual reality in which the central computer containing the rules of the game is God. Then we will assume that God generates in individual people (their souls) the image of the world. The transfer of information among people is realised only through a mediation of the central computer [9]. This interpretation is consistent with the Holy Scripture quotation "For in Him we live and move and have our being ... " (Acts 17, 28).

To sum, in consistence with the present state of knowledge in cosmology, the K. Goedel theorem and virtual reality, the materialistic ideology is only a faith.

5 What is meant by paranormal phenomena?

The paranormal phenomena by definition diverging from the standards are the subjects of concern of parapsychology [13]. The phenomena of this category include: spiritism, mediumism, mysticism, occultism, fortune-telling, radiesthesia, magnetotherapy and energotherapy. Dr Bednarek quotes many references on radiesthesia, energotherapy, magnetotherapy, spiritism and other paranormal phenomena, which is sufficient for our considerations.

For a physicist used to dealing with the ordered and unified knowledge about matter and objectively occurring phenomena, parapsychology seems to be the area in the state of unceasing "boiling", in which the subject of study and the methodology of study change continuously, and often hypotheses are formed on the spot to explain an alleged paranormal phenomenon. The interest in parapsychology has been substantially influenced by the commercial use of some of its ideas. A blend of magical, mystical and fantasy elements has been widely used in literature and film making (e.g. Harry Potter). On top of that let me quote K. Koch saying that : "... we do not know any parapsychologist who would be a truly believing Christian" [13].

Because of the complex and unclear contents of parapsychology it is impossible to adopt a single defined attitude towards it. Therefore, for the purpose of our study we will separate from it certain areas towards which it is possible to adopt a certain well-defined attitude.

- a) **Parascience.** At first we will separate the phenomena to which in principle the methodology of science could be applied. This group of phenomena comprises at least some questions from the field of radiesthesia, energotherapy and magnetotherapy. Often people working in these fields have tried to explain the apparent effects along the same lines as scientific explanations, therefore these fields are referred to as parascience.
- b) **Miracles** and paranormal healings. The second category of paranormal phenomena comprises the miracles known from catholic faith and healings assigned to different forms of therapy: energotherapy or magnetotherapy.
- c) **Fortune-telling** comprises astrology and clairvoyance.
- d) The last category includes **other fields** of parascience such as occultism, magic, telekinesis spiritism, satanism etc.

6 Parascience and scientific research

In contrast to science, in parascience there are formal restrictions on the observations and measurements made. For this reason the results are usually neither reproducible nor repeatable. Analogously as any result contradicting a given scientific hypothesis either refutes it or limits its applicability, resignation from the criteria of reproducibility and repeatability of results refutes the treatment of the whole parascience as a science. Scientific verification of the parascientific effects is based on a consistent use of the methodology of physics. We will illustrate it on the example of radiesthesia, understood as the ability of certain people to detect different objects and water in particular in the grounds and to detect inflammation centres in the living organisms [13].

The evidence for rejection of the existence of radiesthesia and radiesthetic abilities comes from the experiment performed by H. D. Betz [14, 15] quoted by Dr Bednarek. In the experiment approved by the participants they were asked to detect the position of a pipe with flowing water. The position of the pipe was set at random by an automatic device controlled by a computer. The subjects of the experiment were 500 volunteers claiming to have radiesthetic abilities,

from which 43 best were selected. Altogether 104 series of 843 measurements were performed. From the point of view of objectivity the measurements were correctly performed, but the final conclusion was anything but objective. Betz selected the best 3 series of measurements from among 104 ones and on the basis of these results he concluded that the radiesthetic abilities exist, although even the best 3 series of results contained the results contradicting the hypothesis. He probably did this on purpose to avoid formulating a conclusion refuting the hypothesis. As proved by Enright [16, 17], each of the three series selected by Betz was performed by a different person and each of these 3 persons performed a few series of measurements. All the results of persons selected by Betz proved to be completely random and thus provided a convincing evidence that neither of the 3 persons, or even more from the 500 persons studied, had radiesthetic abilities.

Results of our amateur investigation carried out with no funds have also proved that there is no information carrier that could carry the information from the object studied to the person performing the detection [18]. The geophysical methods that we have adapted to investigate the radiesthetic abilities of detecting water courses proved successful in archaeology [19] but were useless for detection of any objects of radiesthetic interest. The unreliability of radiesthetic efforts in the search for water and other natural resources had already been concluded in 1917 in the USA [20].

The same conclusions can be extended over all kinds of hypothetical cosmic energies to which the authors of parascientific works refer. If any other types of energy existed, the measurements would bring reproducible results and physical methods could be applied to study them. After their investigation they would be included into science.

Finally we can conclude that physical methods of investigation applied to the phenomena of parascience contradict the existence of the latter.

7 Miracles and paranormal phenomena

Persons holding materialistic views discredit the occurrence of paranormal phenomena. However, their discrediting is inconsistent with the objective truth. Miracles, defined by St. Thomas Aquinas

as "what God does with omission of the causes known to us" actually do happen and are related to the faith and religion. Dr Bednarek mentions such miracles and it is as he says that most of them eventually find rational explanation. However, there are always those that cannot be rationally explained. Such a miracle would be a documented disappearance of the symptoms of much advanced neoplastic disease. Miraculous healings accepted by the Church must be well-documented by medical staff [21]. The documents must include the results of examinations leading to the diagnosis made before the healing and the results of examinations proving no symptoms of a given malady after the healing. There are other miracles that can be witnessed for hundreds of years, like the Eucharistic miracle in Lanciano, Italy [21] or the history of appearance and results of examination of the Maria from Guadalupe image [22].

Great miracles have been happening also recently. An example is the fact that the sanctuary of the Mother of Good Health in Vailankanni, India, was saved in the tsunami disaster in 2004. The sanctuary lies on the flat coast of the Bengal Bay, the whole city around the sanctuary was washed off by water, leaving over a 1000 dead, whereas the 2000 persons taking part in the Holy Mass in the sanctuary were saved with no health damage [23]. It was a miracle like that of passing through the Red Sea described in the Bible (Exodus 14). However, the information about this miracle was not used by journalists in pursuit of sensations. The majority of media do not present the information on the miracles, or if such information is presented than its significance is diminished by depreciation.

Almost every person practising energetotherapy or radiesthesia can recall the results of his activity bordering on being miracles. However, I have never heard about convincing documentation of such events, such as are needed to recognise a medical miracle by the church. It cannot be denied that some successful healings have taken place. The majority of them can be easily explained by the susceptibility to suggestion. In many cases the healing is only ostensible and after some time the disease keeps developing or other ailments are produced, often accompanied by psychological changes. For this reason it is necessary to eliminate those who cheat on their patients and to confirm the effectiveness of the healers activity by medical tests and

examinations¹. Often the treatment by healers have brought negative results, mostly because patients believing them have stopped the traditional medical therapy, which can prove disastrous especially in neoplastic diseases, in particular in children. We should also add that practising of radiesthesia can prove dangerous for the its practitioners themselves. For example, Mr Z. Królicki [24] a practitioner of radiesthesia himself, writes that too intense practice in the area can lead to a mental disease. According to the description he gives this disease is close to possession. Hence, it can happen that the forces of evil are behind the successes of healers.

To sum up this fragment we can say that miracles and miraculous healings are known in Catholic Church but their recognition requires detailed medical documentation. However, no miraculous powers can be attributed to the healers practicing energetotherapy or radiesthesia.

8 Fortune-telling

The believes in magic, fortune-telling and astrology date back to long ago. Fortune-telling is a well prospering profession bringing good income to many clairvoyants and fortune-tellers. Modern astronomy and physics have proved without any doubt that stars or planets cannot exert any influence on the fate of people living on the Earth. In spite of that fact being proved, many people still believe in horoscopes and fortune-telling. A probable reason for this belief is not only the fact that people disregard reasonable arguments, but they tend to plan their activities to eliminate the possibility of undesirable events and give a chance of realisation of the desired events. For example, if a certain horoscope prediction is negative, the relevant matter can be avoided.

In the Holy Scriptures we often find prophecies. They appear in all books of the Old Testament and in the Apocalypses of St. John. Predictions are often included in the approved apparitions (Fatima [21]) and in the words uttered by the Church-recognised saints.

¹Medicine has developed its own methodology to test the effectiveness of a given therapy, which takes into account the man susceptibility to suggestion. Studies on the therapeutic effect of a given drug are performed on a few parallel groups including a control group. The patients from the groups analysed are administered a given drug to be tested, while the control group gets placebo. A drug is considered therapeutically effective when the results of the treatment in the group given the drug are statistically significantly better.

The prophesies are difficult for interpretation and sometimes they can refer to many repeatable situations. In contrast to fortune-telling the predictions often talk about the facts or events reluctantly accepted by the people to whom they are addressed and do not concern the fate of individuals. They are aimed at inducing people to live the lifestyle consistent with the principles of the religious faith. Often the prophets were not praised but persecuted. As exemplified in the Book of Jonas the prophesies when treated seriously can bring positive results - the conversion of the Niniva dwellers.

To sum up, the fortune-telling practices have no scientific backgrounds. Prophesies are something different have a character of conditional warning and are usually reluctantly accepted.

9 Other areas of faith and parascience

Certain areas of parascience border on the art of illusionism, e.g. telekinesis. Detail investigation of the apparently telekinetic effects have often led to discovering frauds, as mentioned by Dr Bednarek. For this reason the investigation of paranormal phenomena must be performed in the presence of illusionists who are best suited to discover cheating. Let me mention very important investigation of the objectivity of paranormal abilities offered by the Randi Foundation [25]. The Foundation will give an award of one million USD to anyone who passes the tests checking the objectivity of his paranormal abilities. Each week many candidates sure of their paranormal powers take the tests but in the strictly controlled objective conditions none of them has yet proved to be able to do what they declare.

There are areas in which neither fraud can be proved nor methodology of physics can be applied. I mean the areas related to magic and the world of spirits. The practices related to these areas are aimed at gaining powers over the forces of nature.

I will characterise some of these areas briefly on the basis of the material presented in the Encyclopaedia of White Spots [13] and Encyclopaedia of New Age [26]. Occultism or the secret knowledge assumes that it is possible to recognise and use the hidden forces of nature or cosmos, inaccessible to ordinary understanding and cognition.

Magic (witchcraft, wizardry) is based on the conviction that with

the help of spirits or demons it is possible to control the nature, the course of events or the fate of individuals.

Spiritism is the theory and practice of getting in touch with a physically dead person that is assumed to live in another realm. Satanism for Christians is the cult of the Satan as a real and personal being and enemy of God.

Satanism propagates magical and cult activities in order to gain the influence over evil spirits and win their support to realise one's own purposes.

These areas of parapsychology are used by different movements of religious or magical character of which I will mention two.

Scientology or Scientological Church is a type of new movement of more magical than religious character. It is considered as a destructive sect rejecting all humanitarian and moral principles, teaching the use of scheming, manipulations, mind control, blackmail, lies and cheating. For these reasons the activity of scientologists is forbidden in some countries.

New Age. Paranormal phenomena are also the field of interest of the New Age movement. The fundamentals of the planned World Religion of New Age is the Luciferic initiation ([13] entry New Age). In this ideology Lucifer known as the "angle of human evolution" is to become a being helping man to become god. Of course all Christians know who Lucifer is and what his aims are. His intelligence is much higher than that of humans so he can perform the deeds people take for miracles.

The occult, magic and satanistic practices can be accompanied by extraordinary events or phenomena that cannot be explained or investigated. These practices involve evil spirits and therefore, should be avoided for the fear of dangerous consequences.

10 Conclusions on the attitude of teachers

The attitude of teachers should be undoubtedly consistent with physics. Teachers attitude should be shaped by the present state of knowledge of physics. The present state of knowledge in physics goes far over the everyday experience in our culture. Therefore, teachers should always work on improving their knowledge and developing their horizons. In particular they should follow the progress in the

fields bordering on physics, religion and philosophy as they have been subjected to manipulations by journalists and politicians.

Results of the research in the fields of quantum mechanics and cosmology can hardly be reconciliated with atheism. It looks as if we witnessed a mutual merge between physics and theology, which has been expressed in the works of some physicists [5, 7]. As Bednarek mentions, many physicists are very critical of these attempts. It is understandable as the atheists assume anticipating attitude and look forward to new developments in the hope they will eventually support their materialistic views.

The parascience being in direct contradiction to physics along with the activity of all kinds of healers not confronted with medical science should be considered in the categories of charlatanry, deception and fraud, so the teachers of physics placed in the position of an authority in teaching the truth about the world should uncover and prove the wrongs of parascience by competent teaching of physics.

On the other hand, people repudiating any paranormal phenomena deny the well-documented facts and religious beliefs of the majority of our society. For the last 60 years we have lived under the imposed materialistic views and we have got used to questioning religious beliefs. This situation depreciating the catholic society must be amended. The radically materialistic attitude of teachers, openly adverse to religion should be also condemned.

The teacher of science should be open to accept all facts and approve the existence of those beyond materialistic explanation, like the miracles in the catholic faith. The teachers can be also confronted with other paranormal effects related to spiritism, mediumistic activities or some events related to the Far East culture, but these events can be attributable only to spirits. An indirect confirmation of the existence and activity of spirits has been the appointment and preparation of exorcists whose activity is aimed at liberation from evil spirits.

Unfortunately, after the last reform of education, the possibilities of teaching sound fundamentals of physical knowledge have diminished. The level of knowledge of science has decreased, as has that of religious knowledge. The media often confuse the true scientific knowledge with parascience, which often leads to depreciation of the traditional moral values. Similar are the consequences of other ele-

ments borrowed from the culture of Far East, like meditations, Hari Krizna, even the styles of martial art with the mantras used.

Finally I would like to emphasise that the physical knowledge has never been contradictory to the fundamentals of religion and Judaeo-Christian civilisation. The contemporary physics is fully consistent with the religious approach to the world and according to the words of John Paul II, the greatest Pole, the faith and knowledge make two wings needed for man to fly [27]. No bird can fly with one wing.

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