THE IGNORABIMUS-PARADIGM AND ITS RELEVANCE FOR CONTEMPORARY SCIENCE

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Игнорабимус — парадигма и ее значимость для современной науки

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Within this comment on the so-called «Ignorabimus-paradigm», one of the most important European scientific disputes about epistemological and ontological positions and basic methodologies in history, we will try to point out the past and the contemporary relevance of different self-conceptions and self-understandings of modern science and the worrying growing gap between natural and non-natural sciences. Basic conceptions on how research can and should be done have been established in context with the Ignorabimus discussions and are still shaping our scientific community nowadays. Especially in natural sciences new discoveries and research results, but also a feeling of limitation due to extreme sectoral specialization cause again questions to be raised about approaches, techniques and our own subjectivity. Two major different ways of facing these questions adequately seem to be possible: To pay no attention to any question that goes beyond the own field of research assures less vulnerability and risks but may lead to non-causal explanations and the need to ignore knowingly facts. The other way means to strike out in new directions, to accept linguistic, methodological and other severe differences as well as harsh critique and to really watch out for interdisciplinary research approaches. A glance at the almost forgotten historic controversies following the postulations of Du Bois-Reymond about blind spots and black boxes in science may help us to settle our own scientific self-understanding.

В рамках комментария на так называемую «игнорабимус-парадигму» (ignorabimus — термин переводится как «не знаем и знать не будем», введен Дю Буа Реймоном для обозначения границ возможностей познания природы), одного из наиболее важных европейских научных диспутов об эпистемологической и онтологической позициях и фундаментальных методологиях в истории, мы попытаемся показать прошлое и современное значение различных собственных концепций и пониманий современной науки и все увеличивающуюся пропасть между естественными и гуманитарными науками. Основные концепции о том, как исследования могут и должны проводиться, были приняты в соответствии с Ignorabimus — дискуссиями и сегодня все еще формируют наше научное сообщество. Особенно это относится к новым открытиям и результатам исследований в области естественных наук, но уже чувство ограничения из-за экстремальной секторальной специализации снова ставит вопросы о подходах, технологиях и нашей собственной субъективности. Два различных направления решения этих вопросов в равной степени кажутся возможными: не обращать внимания на те вопросы, которые выходят за рамки собственной сферы исследования, обеспечивая меньшую степень уязвимости и риска, но могут привести к необычным объяснениям и необходимости игнорировать известные факты. Другой путь — стараться идти в новом направлении, принимая лингвистический, методологический и другие существенные различия, в том числе — и суровую критику, и в действительности выявить междисциплинарные исследовательские подходы. Взгляд на почти забытые исторические противоречия, возникшие после постулирования Du Bois Reymond «белых пятен» и «черных ящиков» в науке, может помочь нам установить наши собственные научные понятия.

The Ignorabimus

In summer 1872 German physiologist Emil Du Bois-Reymond (*1818 Berlin — †1896 Berlin) held a legendary speech at the assembly of German natural scientists and physiologists in Berlin, laying down his strategic view on natural scientific progress in general. He postulated that there is still much to learn and investigate about our world but that certain questions will never be answered by scientific research at all: Following him, there are countless questions to science he calls «Ignoramus» — we do not know (yet) but we have the chance to get to know through scientific progress. And there are some «Ignorabimus» topics — questions we will never be able to answer (1).

8 years later he presented at the Leibniz-foundation of the Academy of Science his concept of the «7 World Mysteries» (1) of which — following him — 4 are not solvable:[1]

[1] own translation

1.	**The nature of matter and power**[2]	**(transcendent → insuperable)**
2.	**The origin of movement**	**(transcendent → insuperable)**
3.	**The origin of life**	
4.	**The obviously intentional and efficient establishment of nature**	
5.	**The origin of simple sensory perception: consciousness**	**(transcendent → insuperable)**
6.	**Rational thinking and the origin of speech**	
7.	**The freedom of will**	**(transcendent → insuperable)**

History of ideas

Emil Du Bois-Reymond was a student of Johannes Peter Müller whose influence especially as teacher on European science was enormous: Hermann von Helmholtz, Rudolf Virchow, Ernst Haeckel, Carl Ludwig, Ernst Brücke and only a few years later Ivan Sechenov were among the scholars of Müller and his think-tank that has to be considered the fundamental basis of modern physiology.

But Müller as the dominant mastermind of modern physiology of his time — whose merits for the development of natural science are unquestioned — was still a representative of German romantic physiology and teaching vitalism with a dualistic approach. Within electricity he thought to have found the «spirit» of a vis vitalis. When Helmholtz then spread the first law of thermodynamics about the conservation of energy (Helmholtz was the first one to formulate it undoubtedly), vitalism and any other physiologically provable Cartesian dualism of two co-existing energy forms were crushed once and for all. No energy form could be emphasized any more.

Müller's pupils left behind vitalistic ideas in different ways: Haeckel as strictly mechanistic monistic positivist, Du Bois-Reymond and in the end also Virchow and Sechenov as scientists and physiologists who wanted to substitute vitalism with a physiological Neo-Kantianism: Some kind of a neutral evolutionary monism overcoming any need for a vis vitalis and excluding religion-related questions.

Thus two competing monistic world views tried to set an end to the body-soul-dualism and got established within scientific community within the second half of the 19th century: a dominant materialism on one side and different forms of scientific idealism on the opposite side. These two extreme variants are building until nowadays the basis for the division of natural from non-natural sciences or — in the Anglo-American parts of the world — the incompatible difference between 'science' and 'arts and humanities' — a fatal distinction! Wilhelm Dilthey who decisively influenced this differentiation in the Anglo-American sphere at this time, opposed the positivistic and deterministic ideas of e.g. John Stuart Mill or Herbert Spencer, and tried to determine the differences between natural and non-natural sciences only in accordance to their basic principles without taking into doubt their legitimacy as scientific subjects: Following Dilthey for natural sciences the principle of explaining a process is the goal, and for non-natural sciences the principle of understanding a process should play the key-role. — This essential separation of sciences outlasted him but the original background got lost.

Social, political and religious influences

Du Bois-Reymond's slogan provoked an enormous echo within scientific community not only in Prussia but became an internationally discussed item. In the midst of these — from a scientific, social and industrial point of view — revolutionary decades in the second part of the 19th century, the position of Du Bois-Reymond was highly appreciated by religious and anti-evolutionist scientists and particularly opposed by atheistic, positivistic materialists within and without scientific community (2). The extreme positions taken up immediately by all opponents do also explain the often martial and emotional tone leading the debate. Theologists and clergy for the first time in history stood alone without a strong political backbone and were exposed to extreme pressure — not only by Darwinism. An often little reflected flailing was the answer. On the other hand materialists did not accept any opinion coming from the religious corner.

So Du Bois-Reymond's Ignorabimus immediately meant a lot more than only a scientific debate. (3, 4) A discussion about social, religious and moral principles in general had been launched, very often misleading the cause Du Bois-Reymond struggled for.

We can assume that he was looking for a pragmatic solution for the also politically influenced argue between idealism and materialism, between epistemological opposing parties of a positivistic and an ideational approach of science. To have caused a general discussion about religion and world views to such an extent most likely was a surprise also to him.

To understand the importance of the following dogmatic quarrels we should remember that within the decade of the 70^{ties} of the 19th century:

[2] Albert Einstein did alter the first enigma postulated by Du Bois-Reymond by defining matter through energy and movement (and vice versa): $E=mc^2$. Hence this Ignorabimus should be formulated different today: The nature of energy Pre-March Era or Biedermeier initiating with the Congress of Vienna in 1815 and ending with the revolutions of 1848 own translation Laplace daemon is an allegory for the epistemological and ontological conception that it would be possible to foresee (calculate) every past and future state of every particle in the whole universe when being aware of all natural laws and all initial conditions. The daemon of Laplace is the prototype of a perfect machine model of our universe.

— Industrialization and urbanisation reached a climax

— The pope was not able to prevent Italy from becoming a national state (1870) and lost his sovereignty as well as his entire land property. The first Vatican Council failed its purpose and during the German culture struggle («Kulturkampf») Roman-Catholic influence was diminished tremendously.

— France became — after being defeated by Prussia — again a republic (1871)

— Prussia crowned its first German emperor (1871)

— Telegraph lines connected mega-cities like e.g. London and Calcutta

— Charles Darwin published his sexual selection theories

— Schliemann found the supposed Trojan Priamos treasure

— Nikolaus Otto developed the four-stroke engine

— Bell patented the telephone

— Expeditions into the Polar Regions and the heart of Africa started

— Edison presented the phonograph, the first constantly burning light bulbs and founded the journal Science

— The laws of thermodynamics were developed

— Pasteur initiated with rapid vaccinations and Robert Koch discovered the tuberculosis bacillus

— ...

The amount of discoveries, the technical progress and the importance of science, especially natural science, was enormous and omnipresent. Limits, so far mostly considered as invincible had been extended and every day new scientific news were born. Within this ambience of cross-border scientific success, the arguments of Du Bois-Reymond were considered as reactionistic and future-antagonistic.

The first decades after the revolutions of 1830 and 1848 in Prussia, Austria, France and England that led to an end of the Holy Alliance and Metternich's dominant conservativism, were socially and politically shaped by the broadly based secularisation. The new national constitutions reached for the first time in history a climate for science, where Christian religion could not interfere anymore directly as it had done for hundreds of years.

Immediately ontological counter-positions based on already existing philosophical concepts of La Place, Diderot, Leibniz and Descartes were officially represented by heavy-weight scientists like Auguste Comte (Positivism), Ludwig Feuerbach (Materialism), Karl Marx (Historical Materialism), Friedrich Engels (Dialectic Materialism) and many others more. Their (simplified) dogma was: Any observable and non-observable process and phenomena has to be directly reduced to matter and no other phenomena do exist or are at least not relevant for any serious research activity.

Du Bois-Reymond's negation of this unlimited power of natural sciences to explain our world was seen as an attack against science's new born liberty from the church and an artificially placed border to the knowledge gaining process.

The strong rise of positivism has also to be seen, especially in German territories, as a countermovement to German idealism that arose from the romantic era in literature and had been established also in sciences during the reactionary restauration phase following the defeat of Napoleon.[3]

Are non-positivistic research approaches generally unscientific?

The leading Western European representative of materialistic-positivistic science in the seventies and eighties of the nineteenth century and declared opponent of Du Bois-Reymond, Ernst Haeckel, disqualified him, but also other leading scientists like Rudolf Virchow and even Immanuel Kant, as scientists whose «ability to comprehend has been dimmed by their age» (5). Haeckel adds that there may have happened some «regression in their brain activity» (5) observable in old men.

In his most famous book «Riddles of the universe» (5) — a direct response to the seven world mysteries of Du Bois-Reymond — published a decade later and behind the bible the most printed book of its time, Haeckel wanted to demonstrate that Du Bois-Reymond's riddles were already solved (→ Darwinism) or were on the way to be solved.

As most of Du Bois-Reymond's opponents he interpreted the Ignorabimus as rigorous scientific scepticism only and tried to show Du Bois-Reymond in the light of religious reactionism. But this was not the intention of Du Bois-Reymond's thrust.

The real hot spot yet was the question of the demarcation line between the scientific and the non-scientific sphere — in this case mainly religion. This very desirable distinction and final disentanglement of science from religion — after hundreds of years of suppression and blood-shed — was unfortunately also accompanied by a deep fraction between natural and non-natural sciences. Du Bois-Reymond stated himself that from religion no answers are to be expected but on the other hand that science is not capable to give ideal answers. Thus, where the borders do cross each other is not deducible. Du Bois-Reymond's intention was to prove that every scientific prediction is limited — that there are no ideal answers to be made. A slight support for his position came from Ludwig Boltzmann: «The possibility of a mechanistic explanation of the whole nature is not proved, well, it is hard to believe that this goal can be reached totally.»[4] (6)

[3] Pre-March Era or Biedermeier initiating with the Congress of Vienna in 1815 and ending with the revolutions of 1848.

[4] own translation.

As already discussed by Descartes the body-soul-problem arose again. Du Bois-Reymond himself stated that science could be working only within accessible limits and e.g. the concept of a soul would be outside the accessibility of sciences — simply because of its subjectivity.

A materialistic-mechanistic and monistic point of view as represented by Haeckel: «Consciousness, like feeling and willing among higher animals is a mechanical work of the ganglion-cells, and as such must be carried back to chemical and physical events in the plasma of these.», prevailed dualistic and vitalistic ideas, but left hardly any scope for non-materialistic phenomena or explanations and therefore tried to set an end to any non-natural oriented sciences, especially theology and philosophy. Regrettably most of the ontological and epistemological arguments presented by non-natural scientists were disqualified and put into one line with reactionistic religious arguments or pseudo-sciences. Rudolf Virchow — who as an elder man changed his opinion on this point — stated in his younger years triumphantly versus physiologists asking for non-material qualities, that even if he had dissected so many corps, he was not able to discover any soul in none of them.

Following the hunger for materialistic causality, still valid methodological instruments for natural sciences were developed — lacking linguistic prerequisites and epistemological and ontological background. Darwin and natural sciences itself were (are?) considered the ultimate answer to everything — Laplace's daemon[5] seemed finally to be born.

A Modern Ignorabimus?

But even if a daemon following Laplace would exist knowing the objective nature and position of each molecule in our universe, he would not know what a thought is, because the nature of a thought is dominated by non-physical properties and obtains his existence and importance through the assignment of meaning. The answers of positivistic science to such questions are mostly marked by the fact that such topics get ignored at all. Positivistic aligned research is capable to solve lots of our most important questions, but excludes quite a lot of topics a priori because of its epistemological and ontological limited orientation. Reductionistic basic approaches exclude any possibility for a synthesis.

Newton stated in his principia mathematica: «I do not define time, space, place and motion, as being well known to all.» And: «But hitherto I have not been able to discover the cause of those properties of gravity from phænomena, and I frame no hypotheses. ... And to us it is enough, that gravity does really exist, and act according to the laws which we have explained, and abundantly serves to account for all the motions of the celestial bodies, and of our sea.»(7)

To measure everything that is measurable! This maxim postulated by Galilee has enabled all those splendid attainments and insights which natural science and engineering gave us. However: «It is understandable but not to be hailed, that following our thinking frames hence [this maxim] became a postulation which is extended these days on all aspects of our existence.»[6] (8)

It may be understandable that in the 19th century, in the midst of methodological and technological development of modern science, it was accurate (and also pragmatic) to believe in an exact, objective and observer-independent «ideal» natural science. But it is not anymore today. Positivists state (or even more often) do really believe that observer-independent statements are possible — this is pure nonsense but still a problem for natural scientists.

Quantum physics shows us that there is no observer-independent reality: Newest publications in Nature (9, 10) clearly prove that entanglement, spin and even locality of quanta is influenced by the observer. Other examples of phenomena totally rampaging our common understanding of «objective» natural science telling us clearly that natural laws are useful instruments but not valid in any case, can be found in modern astrophysics or epigenetics. We have to remember that the quantifying method does not describe reality but a reductionistic model. What can be observed depends on our measuring instruments.

Secondly every scientist was and is embedded in his era and his educational background and has to consider his most personal interests, finances, his career and lots of other personally highly important factors. Selecting his research object and asking it his scientific question, he already takes his first very subjective decisions. Using a certain method — always a simplification — he aims at a subjective goal, and interpreting his data he finishes providing a subjective (hopefully in Popper's sense inductive or deductive, reproducible and empirical) answer on how to understand our world. So his results get in the best case accepted and consented by the scientific community — at least as long until they are falsified. This is nothing new and since Weber, Popper, Gödel etc. good scientific practice. With the postulate of absolute objectivity this has little to do. Following the still not understood epistemological mile-stone set by Albert Einstein, every scientist has to accept that there is no final scientific explanation, but that «every theory is a free invention of our human mind» and serves as a simplification for us to get a better understanding of the world we live in.

[5] Laplace daemon is an allegory for the epistemological and ontological conception that it would be possible to foresee (calculate) every past and future state of every particle in the whole universe when being aware of all natural laws and all initial conditions. The daemon of Laplace is the prototype of a perfect machine model of our universe.

[6] own translation.

The Fifth Ignorabimus

Turning back to the Ignorabimus conflict unfortunately the main dispute remained on the segregation of science from religion, was therefore a more moral and social conflict, and did not consider sufficiently non-religious scientific arguments.

Till today — see e. g. the Qualia-discussion — one of the fundamental questions: How to explain consciousness?, keeps alive (in the background) this traditional paradigm-dispute started by Leibniz who negated already in the 17th century the possibility that consciousness could be produced through material processes only.

This fifth mystery of Du Bois-Reymond — one of the Ignorabimus-riddles considered by him as transcendent and therefore not solvable — was the most disputed one and had also a major impact on the intellectual Viennese circles of the late 19th and beginning 20th century. Following Wittgenstein who stated in his Tractatus Logico-Philosophicus «The riddle does not exist. If a question can be put at all, then it can also be answered.» (TLP 6.5), the extremely positivistic circle around Ernst Mach stated in their manifesto that within the scientific conception of the world no unsolvable mysteries are admitted (Verein Ernst Mach, 1929, 15).

Not only in Germany, France, England and Austria [see also Hilbert's famous radio-address in 1930 (11, 12)] natural sciences decided to simply neglect asking questions touching any kind of Ignorabimus and focussed consistently on Ignoramus questions («we don't know yet but there is at least the opportunity that we will know») and their preparation. Over decades these reductionistic epistemological principles were used and taught — with vast success and constant and overwhelming progresses. But these enormous achievements of natural scientific techniques can be misleading. Questions not to be handled by this methodology get either declared as irrelevant or we try to answer them nevertheless with positivistic methods. This leads in the first case consequently to absolute materialism or in the second case to some kind of esotericism or other rather confused constructions. Often also a strange mixture of both can be found. (8)

Also this is nothing new: Haeckel for example attributed in connection with «whatever holds the world together in its inmost folds» (Goethe, Faust I) a «crystal soul» to each atom (13) — without really ranging in this non-materialistic component in his otherwise so rigid ontological framework.

Absolute materialism is nothing else than creationism with reciprocal signs. Darwin's Rottweiler Richard Dawkins (14) and Stephen Weinberg (15) as in our time leading representatives and vanguards of the revival of monistic atheism in the severe tradition of materialistic-positivistic reductionism seem to fall for the same mistake.

Thirty years ago a small essay of Thomas Nagel caused in philosophical circles a renaissance of the Ignorabimus discussions. Nagel asked the fifth question of Du Bois-Reymond in a slightly divergent way. He stated that natural sciences focuses only on external observation and neglects any experiencing: We will never know «what it is like to be a bat» (16) was his provoking message.

Today plenty of consciousness-related research gets published especially in popular scientific publications. The general interest in investigating this phenomenon is rather big.

A basic paradigm of modern science

Nowadays, for example modern medicine has made incredible progresses and natural sciences serves especially in this field as an invaluable source, but lots of phenomena are observable that get constantly and willingly neglected. Ask e.g. a physician if he can explain you why the placebo phenomena really works and how?

In the end we have to state that medicine as every other natural science-related application is treating our material body only and does not reflect very much on the influence of factors like consciousness, social and cultural facts etc. The medical treatment of a homo sapiens living 30.000 years ago would be exactly the same as the treatment you would give to any now living modern human. Their enormous non-physical differences would not be considered at all.

The Bologna-process taking place in Europe these days is uniting the educational levels and degrees of universities world-wide. So, young natural scientists are no longer studying for a doctor's degree as highest possible academic title but — ironically — for a PhD — a Philosophical Degree. Within this practice-oriented education they get hardly any epistemological background at all but they get almost trained not to ask certain questions and to focus on a high degree of specialization within their matters. Uprising questions involuntarily launched by genetics or quantum physics are hushed or get discussed in newspapers but not in scientific communities. Peer-reviewed natural scientific journals — because of their impact points the real essence of existence of a natural scientist — rarely print any articles related to cognition-oriented scientific thoughts, but study-results only. Why something is or works, seems to be no question anymore, only if.

Conclusion

The nowadays leading opinion that natural sciences are in the position to offer us a conclusive and exclusive view on our world needs adaptation. But regrettably the Intelligent Design discussions arriving from the United States and their often really — from a European point of view — funny argumentation lines seem to be the

only real opponent of the direction modern natural science goes to!

The question if there are unsolvable mysteries about our world is not answered yet. The response will always depend on our ontological frame and our methodology, but just in the same way attention-grabbing is the question: Are these mysteries still of interest for modern scientists?

Apart some publications in the field of philosophy (Kurt Bayertz and Walter Jaeschke published a very notable book (17) about the Ignorabimus-dispute in November 2007), the Ignorabimus topic for example is not discussed any more.

Walter Kofler calls it a basic paradigm of modern science that certain questions related to idealistic aspects of our world's nature like individuality, creativity and spontaneity are excluded a priori (18). This is to be criticised and also Sechenov opposed clearly this preliminary exclusion of such a mass of vital questions for science.

Anyway, this kind of facing — or better said ignoring — the Ignorabimus discussion has been a very pragmatic manner in the past centuries. Not because there wouldn't be sufficient demands scientists encounter, but because it became a social question within and without scientific community. Thus, the question should be allowed if the creation of «Untouchables» — let's call it Ignorabimus-subjects — is really a method to deal with scientific progress and the idea of knowledge acquaintance. Remember that you may easily get banned from scientific community when looking beyond your own nose into a perforce interdisciplinary territory.

An honest response of a 100%-natural scientist to Emil Du Bois-Reymond's or Thomas Nagel's questions nowadays is: «We don't know what it is like to be a bat, we don't even know what it is like to be a lung cancer patient — and we don't want to know — Ignoremus!»

An alternative would be to take in an application-oriented neutral monistic position that does not exclude a priori non-observable attributes of the research object.

A prerequisite for any research is an epistemological grid and to exclude a priori possible knowledge may be a big mistake. Avoiding the problem through non-causal explanations on behalf of statistics and simply neglecting single cases and causality itself may — in the long term — be even more than a mistake. The method defines which questions can be raised and which answers can be found.

Application-oriented positivistic science does not need any ideal answers and nevertheless solves so many issues, its applicability is decisive. Therefore an obvious elimination — a self-limitation — is legitimate, but it does not come up to all our modern expectations and needs: networked questioning, globalized efforts, sustainable solutions are the demands of our time.

Education and open-minded interdisciplinary research including a working communication platform seem to be the best guarantee for future development. Globalization forces us, wanted or unwanted, to very tight social, economic and personal collaboration, science should not stay behind. «It is not important to continue the old argue between church and science, nor is it important to settle this dispute. It is important to pose different questions.»[7] (19)

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[7] own translation