

Errors and Lapses of Insight in the History of Physics

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During the past twenty-five years, I discovered 25 errors and lapses of 'insight', or 'understanding', which usually results in the lack of important knowledge applicable in the science of physics of today. Of course, all of the errors and lapses need to be corrected. And exactly this is the aim or purpose of my present, and maybe last ever to be offered, paper.

1. Introduction

I have presented papers in each of the NPA meetings I have ever attended. All of these papers referred to errors wide-spread in the teaching of the science of physics, not only recently, but existing for more than a generation [indeed, more than a century. Ed.] Recalling this history has inspired me to recollect all of my papers in this respect. And I decided to republish their results, not one-by-one (as they were discovered), but in easier to understand 'lumps'. There are 25 such 'lumps'.

That many 'lumps' need to be organized in some reasonable way. I believe that organizing them by 'time slots' is practicable. I select the following: **2a)** prior to 1900; **2b)** 1900 to 1920; **2c)** 1920 to 1940; **2d)** beyond 1940. This makes four sub-lessons of the total lesson of 25 items. The counting system to be applied will be 'upwards' in time: F1, F2, etc., the 'F' signifying 'failure', or 'fault'; i.e., error or lapse.

2a: Prior to 1900

One item of erroneous teaching in physics still 'en vogue' today had its origin in the 1700's: The childish explanation – or theory – by the German philosopher Immanuel Kant allied with the French mathematician Pierre Simon Laplace, of solar system creations from 'interstellar dark matter'. Several astronomers had discovered the existence of such 'clouds of dark matter' in the 18th century. But the Kant-Laplace 'theory' is an entirely impossible idea – to be numbered **F1**, because both amateurs in physics lacked any idea of nuclear energy, or, for example, a solar fusion reactor, necessary to generate the huge amount of energy radiated off by our Sun in the 4.9×10^9 years of its existence so far, and the almost equal time interval predicted for its future existence. And this is true for absolutely all of the 4×10^{22} other Sun-like stars in the Universe.

The next relevant item, **F2**, happened in 1865, not as an error, but as a lapse, committed by J.C. Maxwell (1831-1879; JCM), famous for his ingenious four partial differential equations, which do indeed cover the total field of electromagnetism. Shortly after the publication of four Maxwell equations, H.A. Lorentz (1853-1928) noticed the need for a fifth equation, and he tried through the rest of his scientific life to find the missing fifth equation. (I have now found such an equation; see below.)

Into the category of errors belongs also the 'findings' of two more top Cambridge physics professors: In the 1880's a certain Strutt (knighted as Lord Rayleigh) dreamt up 'groups of frequencies' with their own delays and speeds of propagation, in the

form of differential quotients. But, **F3**, he had forgotten his basic mathematical training: differential quotients exist only for continuous variables, such as (God-given) space and time (x, y, z, t). The only 'man-made' idea of frequencies is not continuous because comes from integral transforms of time functions (Fourier, 18th century), which are possible only for rational frequency numbers.

In the 1890's, the most important achievement in physics was the discovery of the electron by J.J. Thomson (JJT). And so, he deserves praise for it. But JJT also tried to explain how this (very first discovered) massive elementary particle existing (besides mass-less ones) might be built and might function.

This is how JJT became the 'creator' of the 'classical elementary particle radius'. He knew that electrons have mass and are electrically charged. So he probably pondered that mass could be evenly distributed in space, but hardly 'charge'. But distributions in space are not the real problem that Nature (or God) had to solve in this context. The true problem is rather this: How could a finite quantity of mass and charge, **1)** form a finite thing (a few years later called 'quantum'), and **2)** keep it (indefinitely) in the proper shape and doing the proper function. JJT thought that a spherical shell of charge (as well as mass?) would be the solution. This must definitely be considered erroneous, and classified as **F4**. The proper solution was nowhere presented until 100 years later, and by no one else but the present author. JJT's spherical shells (of zero thickness) are impossible to originate via any natural process, and would not have any stability. In my case, the stability is granted by a toroid of space charge, rotating with a tangential speed of about $68.5c$; the natural process of its creation is highly complicated, but is indeed explained in my book [1]

JJT is to be blamed for two more F's., **F5** is the plain error of the first atom model of modern times, known as the 'raisin cake model': Atoms consisting of lumps of 'matter dough', about 10^{-10} m big, with (amongst elements) varying numbers of electrons, about 10^{-14} m small, and sticking in said 'matter dough'. The next one, **F6**, is a lapse; namely, not having already concluded from is 'classical radius' formula " R proportional to $1/\text{particle energy}$ ", that in the realm of quanta a reciprocity law of the ratio between mass and size applies.

2b: 1900-1919

The 20th century AD began for the science of physics with Max Planck's (MP) fundamental perception that Nature, even though being continuous in various respects (e.g. space and

time), is not at all continuous in general, but is predominantly 'quantized' (i.e. below certain limits **not further divisible**). MP did also 'deduce' (or 'guess', as quite a few fellow mathematicians thought) his Constant of Nature h , numerically pertaining to this occurrence. I personally have no problem or worries in this respect, but I do criticize strongly his choice of name for it: 'Wirkung' in German, 'action' (or 'effect') in English; and I criticize its dimension: [Js] (Joule seconds). A physical quantity of this dimension does not exist, so h got mixed up with energy density *vs.* frequency units: [J/Hz] or [J/rad]. For this, MP needs to be blamed for a failure, **F7**.

The failures **F8**, **F9** and **F10** (~1905) have to be charged to the account of a scientist who is by a majority of scientifically educated persons considered to be the most outstanding physicist of the 20th century: Albert Einstein (AE). He is my choice for worldwide centennial physics genius of the past century. But he committed some errors: **F8** is his *faking* the existence of a 'Lorentz transformation' of coordinate, competing with the well-known Galilean transformation of coordinates; **F9** is AE's failure to try at all to surpass mentally the one contemporary of his whom he had blamed for his own **F8**; namely, Lorentz.

Lorentz made attempts via partial differential equations, but failed to deliver the 'missing 5th' Maxwell equation. I tried the differential-equation approach too, but gave up on it. I then substituted an engineering approach, tested it, and applied it successfully. [1] The engineering approach begins from the fact that JCM, through his E and H fields, totally covered both electric and magnetic forces at any distance, but had left out the only third force of this type in Nature: *mass* force. I utilized all its ramifications, such as momentum, spin, centrifugal force, and their pertinent laws of conservation, and tangential speeds up to and far beyond c , numerically calculated even though not observable. This enabled me to deduce size, form, and function of three mass-bearing elementary particles: electron, proton, and one I discovered and named 'n wrapper electron'. Only the sized differ; form and function are identical.

Einstein's **F10** is his deduction of a structural formula for MP's 'light quanta', already predicting the ' v ' discussed below.

F11 occurred in 1912, and is the worst, most stupid error of physics committed in the 20th century. It is the teaching by Neils Bohr (NB) that all electrons in all atoms of any element would 'circle' the atomic nuclei at up to almost 100 different distances from the nuclei, and in just as many different planes of rotation. NB, then at age 26, had just taken his first job as a lab assistant for Prof. Rutherford (R, a New Zealander), at the University of Manchester. The famous Prof. R was trying to find a better explanation for the behavior of the electrons in atoms then known from JJT's 'raisin cake model' (see **F5** above). NB suggested a comparison between electrons in an atoms and planets in a solar system, which avoid like hell to fall into the hostile sun at the center! But in the case of an atom, this is an absolutely *ridiculously* naïve idea! Nonetheless, it has since brainwashed millions of persons world-wide educated in physics. The worst ramification of this error by NB and R is that an important mental aid for understanding MP's quanta failed to get introduced into the vocabulary of physics; namely, the term 'quantum multiples' that electrons and similar particles (n wrappers) can form with the

property of absolutely zero energy of motion', up to extremely huge numbers in the volume of a single one of them.

2c: 1920-1939

1920 is the year of an important discovery in physics, via the 'Stern-Gerlach experiment. Electrons do arrange in pairs at combined spins of either 0 or 1, at bonding energies of a few eV. Both experimental physicists failed to explain what they meant to prove with this experiment; namely, that electrons are nothing else but 'electrically charged permanent magnets'. This omission demotes the Stern-Gerlach experimental finding, and makes it failure **F12**.

F13 came shortly thereafter. The Austrian Mathematician (or 20 year old math fool) Wolfgang Pauli offered the explanation of the Stern-Gerlach experiment as a 'mathematical principle' (in physics!). This was definitely the second dumbest explanation, surpassed only by NB's orbiting electrons, fouling up physics of the 20th century. The worst shame in this context is that Pauli's error was in 1945, at the end of WWII, even Nobel Prize decorated!

F13 was the 1923 claim of the French math fool Louis-Victor de Broglie that he had discovered 'matter waves' with wavelength $\lambda = h / p$, which is nonsense. It goes back to **F3** above, involving mathematically forbidden differentiations *vs.* frequency. The only λ as a function of moving mass is a 'Planck wave', proportional to the inverse of energy E , thus requiring velocity squared in its formula.

F15, **F16** and **F17** came in 1925: Klein-Gordon, Schrödinger, and Dirac, and their so-called 'Quantum Mechanics' (QM). They all fell prey to the nonsense that came about via **F14**, and believed that three totally different equations for the same problem would be an adequate description of one and the same phenomenon of Nature. All three should be discarded and forgotten forever.

F18 is Heisenberg's 1926 'uncertainty relation'. It is erroneous because it employs the constant h , which is not at all a random variable, but a constant known to high precision.

F19 is from the 1920's: the absurd idea of the Belhian monk and hobby star gazer Georges Lamaitre the One Big Bang was the origin of the Universe. This is completely impossible because energy conservation is undoubtedly a Law of Nature. Solar (or planetary) system creation by $\sim 10^{22}$ 'little bangs' of partial black-hole explosions is, on the other hand, highly probable. [1]

F20 is also from the 1920's. Hubble correctly discovered the spectral red shift of very far-off galaxies, but misunderstood it as an expansion of the Universe. The problem is that from far away, tangential movement looks exactly like radial movement away.

F21 is Chadwick's 1931 experimental 'proof' of the existence of a third subatomic particle, the 'neutron', presumed theoretically for a decade since Rutherford's proof of the proton. The experiment is, of course, praiseworthy. Chadwick's error was only that he parroted theoreticians who claimed the neutron needed to be 'elementary', instead of analyzing its true structure. Nobody did this until I did it myself, about sixty years later, in my first candidate doctoral thesis submitted to the University of Tübingen. In that thesis I described the neutron as a particle

combination, comprising one regular proton and one 'heavy' electron, about 2.52 times the mass of a regular electron, and hence $1/2.52 = 0.397$ times its linear size. It exists exclusively as 'wrapper' of protons. If one proton, then we have the neutron, radioactive at about 11 minutes decay time. If two protons, we have a deuteron, also radioactive, but at years of decay time. Such wrapper electrons can form quantum multiples that provide the necessary 'negative charge-tinted atmosphere', in which up to hundreds of positively charged protons no longer repel each other, and instead can, and indeed do, magnetically bond very strongly (see F23 below).

F22 was Pauli's 1932 presumption of, and naming of, the neutrino ν , without any attempt to deduce mathematically its structural formula. As a matter of fact, nobody did that until I did it myself, in two papers that I submitted to the University of Tübingen in 1990 and 1992 as two candidate doctoral theses. In the first one, I assumed a *three-dimensional* and propagating Gaussian function. But I soon found out that this was not the optimum solution, and so corrected it in the second paper. The proper solution is a Gaussian root function. (Incidentally, AE could have already predicted the ν particle in 1905, since he already had the same training in Maxwell mathematics as I received some 40 years later.)

3d: 1940 and Later

F23 was the erroneous deciphering of exclusively nuclear forces in the 1940's. This problem arose out of the work of a group of physicists considered by many, probably a majority of, 'common' people as 'scoundrel physicists'; namely, atom bomb builders (like the famous Italian physicist E. Fermi). They promptly proved themselves as top blockheads, because they defined two forces occurring in atomic nuclei: a 'weak' and a 'strong' nuclear interaction.

Nevertheless, the bomb researchers might consider their success in having produced the most lethal weapon in the history of mankind the highest possible achievement of the exact natural science of physics. And they might conclude from there that they deserve the title of top physics geniuses of all times – or at least of their millennium. However, that title should go, not to the top destructive scientist, but to the top explanative scientist. By that criterion, I myself am a better candidate than any of the bomb designers. In my Tübingen papers I explained that the 'weak' interaction in nothing but the positioning of one or more protons inside a very special electron of about 2.52 times the usual mass m_e , and $1/2.52$ the usual linear size.

In the same paper I also explained that the 'strong' nuclear interaction does not at all require 'hooks', which would need to be 'welded' to elementary particles (exclusively hadrons: protons and neutrons). It is one of only three forces that act at a distance; it is magnetism between exclusively protons. It is a fact that protons cannot form Pauli pairs in free space, as electrons can do. I showed this to be due to different charge rotation speeds in protons, as compared to electrons; *i.e.* $\sim 23c$ in protons *vs.* $\sim 68.5c$ in electrons. The $23c$ in protons suffices because of a 'charge tinting' inside the above-mentioned $2.52m_e$ 'wrappers'.

F24: In the 1950's, Hofstadter (H), an experimental physicist of German origin living in California, had won the trust of the

private financiers of the world's first linear accelerator, the Stanford Linear Accelerator known as SLAC. He used SLAC to 'measure' the nuclear sizes of all then known elements (about 100). But as a non-theoretician, he lacked prior ideas about how they might (or must necessarily) be built in order to function. H's results supported the belief of most physicists, other than myself, that nuclear diameters would scale as the cube-root of their hadron numbers. In my Tübingen work, I concluded that all nuclei would have the diameter of a typical electron.

F25: In the 1960's, M. Gell Mann, the most ignorant mathematician ever so-honored, got a (partial) Nobel prize for his Quantum Chromodynamics (QCD). This nonsense is based on no knowledge of Nature whatsoever. It is based on nothing more than the fact that one of the three QM's of the 1920's used a two-dimensional matrix (U2). Gell Mann considered this 'ingenious'. So, as reported in a biography, on some warm summer evening he lay down in his 'garden' (on the roof of a New York skyscraper) and he pondered...until the 'ingenious idea of a U3 matrix came upon him. This was the origin of QCD. In my opinion, this kind of mathematics-physics is the worst form of abuse of the meaning of 'science'. Human science (in all subdivisions thereof) needs to strive to come closer to God's thinking. This ends of captioned list.

Conclusion

In the last line of this paper I mentioned 'God's thinking'. I believe that too many of those very learned people who wanted to come sufficiently close to God's thinking believe that God must be 'someone of *my own* profession'. So, mathematicians think that, statistically, the fewest humans ever manage to become A students in math. But this kind of thinking is the reason why the least gifted humans (the mathematicians) do the worst harm to useful attempts of genuinely finding God's thinking. Math fools (such as Stephen Hawking) do definitely think, "if I were God, creator of the Universe, then I would create the one and only mathematical 'world formula'." This, however, is definitely NOT the way our Universe came about. Here, **creator** and **creation** need to be considered identical. Nevertheless, there are, worldwide, hundreds of very learned people gathering around a Stephen Hawking every once in a while, with the intention of finding this mysterious (but quite unimportant, or useless – if not impossible) 'world formula'. But the 'engineering approach' is obviously capable of finding it – or, rather, correctly substituting it. So, it seems that just that latter conclusion is the optimum possible achievement of the human exact sciences.

Post Script

The author would like to make readers aware of a ten-minute TV spot presented like a news item, on German-language channel NTV on Easter Sunday of 2010. I concluded from this form of publication that some NTV journalist tried to give some rather unknown 'scientist' the opportunity to publish his or her idea. The idea is that the utterly rare occurrence of planets similar to our Earth, with an abundance of water, indeed oceans of it, needs a plausible explanation. There is no possible way within the laws of nature that so much dry matter as our Earth and so much

water as its oceans could ever originate at one location in the Universe, and at one time in its history.

The surprising explanation (NTV's explanation, in my opinion) is that at least one comet must have been among the many celestial bodies impacting Earth over its $\sim 4.5 \times 10^9$ years of existence, and the comet(s) delivered an amount of water sufficient to develop a biosphere. Comets are the likely source because astronautic research over the past few decades has revealed that comets consist predominantly of 'dirty ice'.

The fact is: only very few comets appear in our solar system. That is probably true also in other solar systems and other galaxies, as comets need tens or hundreds of years to re-appear. From this fact I conclude that comets must necessarily consist of ice frozen to near 0° K. The next time one of our very few solar comets comes near enough, its temperature can and should be measured.

From the comet scenario, I conclude that our Earth might indeed have the statistical potential to be the one and only Earth-like planet in the $\sim 10^{22.6}$ Sun-like solar systems of the Universe. And I have ventured to claim several times in NPA meetings that our universe contains the mass of about, and definitely not much more than, 10^{80} protons.

Reference

- [1] M. Mueller, **Basics of Physics Suitable for the Third Millennium** (ISBN 3-936469-07-5, Gottert Verlag, 2002).