http://www.ivorcatt.co.uk/x231.pdf The trouble is, the instrumentalists who today command all the commanding heights of "science" may not know any philosophy of science, history of science, sociology of science. John Dore FIEE only now (after 40 years) told me he did not care whether he was on the side of Galileo or Bellarmino! Why have I only now realised that the story of "The Glitch" is incompatible with instrumentalism? It must be that I failed to study a philosophy as absurd as "The Truth that there are no truths". But now these people control all of what was "science", and block scientific advance.

Better version; http://www.ivorcatt.co.uk/x8cktony.pdf

The Betrayal of Science

Oliver Heaviside
327 ELECTROMAGNETIC THEORY. Vol. 1, 1893, CH. IV,
If you have got anything new, in substance or in method, and want to propagate it ra pidly, you need not
expect anything but hindrance from the old practitioner even though he sat at the feet of Faraday. Beetles
could do that. Besides, the old practitioner is apt to measure the value of science by t he number of .dollars he thinks it is likely to bring into his pocket, and if he does not see the dollars, he is very disinclined to disturb his ancient prejudices. But only give him plenty of rope, and when the new views have become fashionably
current, he may find it worth his while to adopt them, though, perhaps, in a somewha t sneaking manner, not unmixed with bluster, and make believe he knew all about it when he was a little boy.
He sees a prospect of dollars in the distance, that is the reason.
338 ELECTROMAGNETIC THEORY. CH. IV.
The perfect obstruction having failed, try the perfect conduction. You should make y our converts out of the
rising generation and the coming men. – Oliver Heaviside
[Heaviside is wrong here. "The coming men" are only interested in passing exams, a nd dislike uncertainty. – IC 27.1`2.2018]

http://www.ivorcatt.co.uk/wxyz.pdf
http://www.ivorcatt.co.uk/44.htm
http://www.electromagnetism.demon.co.uk/news2000.htm

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http://www.ivorcatt.co.uk/x231.pdf

The Instrumentalist's Manifesto

[It is only a theory that phlogiston does not exist. When teaching, the more clutter, the better. Keeps them quiet.]

Tue, Dec 18, 10.21 PM
Professor Tony Davies was on the Board of Directors of the IEEE, 400,000 members, the senior institution for electromagnetic theory.
Tony Davies,
to me, Alex, Christopher, Malcolm, David
For what it is worth, just a brief comment based on a quick read of this:

While I was an electrical engineering undergraduate at Southampton University (from where I left with a BSc(Eng) in 1961 to go to GEC in Coventry, **it was my understanding that Theory H was the 'correct one'. and I have not had any reason so far to change that view.** That is not to say the Theory H is correct, there might be something better, but I do not know enough of field theory to decide about that.
As I have mentioned before my 'roots' are in circuit theory which I have never claimed to be a description of reality, but is an extremely helpful basis for designing useful things, which have performance close enough to the results from circuit theory that this is sensible and for many applications remains the best way to get to those useful outcomes. Do not forget that since there is no distance dimension in circuit theory, a transmission line approximated by one thousand ideal capacitors and inductors (of the text book type) can easily be fitted on to the point of a very sharp pin (and **there is stilll room for all those medieval angels as well**, if you choose to also believe in that).
Perhaps some would wonder why Theory N persists if it is incorrect. Leaving out the complexity of understanding what ExH means, and describing electricity by analogy with water flowing through pipes, etc. has been and still is, a sufficient explanation for many amateur and professional electrical technicians who have to install and repair electrical installations in buildings and understand the IET Wiring Regulations, etc. For the general non-scientific public it is probably better to tell them that electricity is a flow of electrons and that these can move quite freely in a conductor, making it warm in the process, and melting it if there is too much current because it gets too warm. Such ideas are helpful in other situations such as the design of water-based piped central heating systems where the designer has to work out the required pump pressure (like voltage) and the diameter of the pipes (like resistors) in order to carry the required water flow (like current) to the radiators (which are actually producing most of their heat by convection rather than radiation). It is only necessary to know that the 'resistance' has a square law relationship to pump pressure and water flow to understand that the iterative calculations done by central heating designers are what an electric circuit engineer would do to analyse electrical resistive networks made up of square law resistors - e.g. it is not just linear simultaneous equations, one has to use an iterative method such as Newton-Raphson (which, of course is unknown to most central heating installers). https://en.wikipedia.org/wiki/Newton%27s_method
I hope that all this gives you something nice to dream about over the coming holiday season.
Tony Davies

2018 Dec 18th

John Dore FIET says he agrees with the above

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John Dore FIET recently said he does not care whether he is on the side of Galileo or Bellarmino.

Any denial by him will be added here.

From Dore; My research interests trump wasted thoughts!
... be productive for a change!!! 16.3.2019

Inbox

John Raymond Dore FIEE - FIET

Mon, Mar 18, 12:02 PM (1 day ago)

to me, Anthony

Ivor,
My research interests include:
1. Computer simulation and emulation in both hardware (fpga and micro computers)
2. Macros and macro compilers and compiler-compilers
3. Finite element methods for structures and electrical problems
4. Parallel computing
These are quite enough to occupy me constructively
I would draw your attention to courses run by mooc contributor edx
eg structures run by Princeton university at zero cost
I have recently completed such a course on the design of shell roofs.
It includes appropriate computations.
I think what I am doing is far more valuable than contemplating truths, facts and the various philosophical diversions in which you seek to interest yourself.
There have always been dysfunctional families throughout history but in Roman times knife crime was committed by the well healed from good families.
The reason for knife crime in the UK is a function of the availability and use of drugs predominately by a particular segment of society.
It would be good if you could make it to the lecture just off the Strand at BCS HQ next Thursday at 2:30pm. You just book online CCS BCS
Happy cogitating

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http://www.ivorcatt.com/2607.htm

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How many angels can dance on the head of a pin?

From Wikipedia, the free encyclopedia

Jump to navigationJump
to search


Dancing angels

The question **"How many angels can dance on the head of a pin?"** " (alternatively *"How many angels can stand on the* point *of a pin?"*[1]) is a reductio ad absurdumof medieval scholasticism in general, and its angelology in particular, as represented by figures such as Duns Scotus and Thomas Aquinas.[2][3] It is first recorded in the 17th century, in the context of Protestant apologetics. The question has also been linked to the fall of Constantinople, with the imagery of scholars debating about minutiae while the Turks besieged the city.[4][5] In modern usage, it therefore has been used as a metaphor for wasting time debating topics of no practical value, or questions whose answers hold no intellectual consequence, while more urgent concerns accumulate.[1][4]

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Electromagnetism for Engineers: An Introductory Course (Textbooks in ...

https://www.amazon.co.uk/Electromagnetism-Engineers-Introductory.../0198562993

1.
Percy **Hammond** is **Honorary Research Professor at Southampton**, and is a very **distinguished** figure in the circles of **electromagnetic** scholarship. This book is ...

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https://archive.org/stream/electromagnetict01heavrich/electromagnetict01heavrich_djvu.txt - Oliver Heaviside

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But the old established practitioner with prejudices, who could not
see the reason, was put into a position of some difficulty
resembling chancery. If you have got anything new, in
substance or in method, and want to propagate it rapidly,,
you need not expect anything but hindrance from the old
practitioner even though he sat at the feet of Faraday.
Beetles could do that. Besides, the old practitioner is apt
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to measure the value of science by the number of .dollars-
he thinks it is likely to bring into his pocket, and if he
does not see the dollars, he is very disinclined to disturb his
ancient prejudices. **But only give him plenty of rope, and
when the new views have become fashionably current, he may~
find it worth his while to adopt them, though, perhaps, i
a somewhat sneaking manner,** not unmixed with bluster, and
make believe he knew all about it when he was a little boy t
He sees a prospect of dollars in the distance, that is the-

reason. The perfect obstruction having fciiled, try the perfect conduction.

You should make your converts out of the rising generation
and the coming men. Thus, passing to another matter, Prof.
Tait says he cannot understand my vectors, though he can
understand much harder things. But men who have no quater-
nionic prejudices can understand them, and do. Younger
men are born into the world with more advanced ideas, on
the average. There cannot be a doubt about it. If you had
taught the Calculus to the ancient Britons you would not
have found a man to take it in amongst the whole lot, Druids
and all. Consider too, what a trouble scientific men used
to have with the principle of the persistence of energy. They
could not see it. But everybody sees it now. The important
thing is to begin early, and train up the young stick as you
want it to grow. Now with Quaternions it is different.
You may put off till to-morrow what you cannot do to-day,
for fear you commence the study too soon. Of course, I"
refer to the Hamilton-Tait system, where you have to do
violence to reason by making believe that a vector is a
quaternion, and that its square is negative.

According to Ohm's law alone, a perfect conductor should be
one which carried an infinite current under a finite voltage,
and the current would flow all through it because it does so
ordinarily. But what is left out of consideration here is the

manner in which the assumed steady state is established. If we take this into account, we find that there is no steady state when the resistance is zero, for the variable period is infinitely prolonged, and Ohm's law is therefore out of it, so far as the usual application goes. In a circuit of no resistance containing a finite steady impressed voltage E, the current would mount up infinitely and never stop mounting up. On the other hand, if we insert a resistance R in the former circuit of no resistance, there will be a settling to a steady state, for the current in the circuit will tend to the value E/R, in full obedience to Ohm's law. The current is the same all round the circuit, although a part thereof has no resistance. We conclude that that portion has also no voltage.

But this is only a part of the story. Although we harmonise with Ohm's law, we overlook the most interesting part. The

smaller the resistance the greater the time taken for the current to get into the conductor from its boundary, where it is initiated. In the limit, with no resistance, it never gets in at all. Where, then, is the current? For, as we have said, it mounts up to a finite value if there be a finite resistance inserted along with the perfect conductor, and mounts up infinitely if there be no resistance.

We recognise the existence of electric current in a wire by the magnetic force round it, and in fact measure the current by its magnetic force. Therefore, according to this, there is the same total current in the wire, if the magnetic force outside it remains the same. If, then, the magnetic force stops completely at the surface of the wire, whose interior is entirely free from magnetic force, the measure of the current is just the same. The uniformly distributed current of the steady state appropriate to finite conductivity becomes a mere surface current when the conductivity is infinite. In one case we have a finite volume-density of current, and in the other a

finite surface-density. When the current inside the wire is zero so is the electric force, in accordance with Ohm's law again. The electric and magnetic phenomena are entirely in the dielectric outside the wire, the entrance of any similar manifestations into it being perfectly obstructed by the absence of resistance. For this purpose the thinnest skin would serve equally well. In the usual sense that an electric current is a phenomenon of matter, it has become quite an abstraction, for there is no matter concerned in it It is shut out completely.
In the circuit of finite resistance, a portion of which is a wire of no resistance, supporting a steady current, there is no difference whatever in the external, magnetic force outside the resisting and non-resisting parts, though in one case there is entrance of the magnetic force and waste of energy, whilst in the other there is no entrance and no waste. These conclusions do not rest upon Maxwell's theory of dielectrics, but upon the second circuital law of electromagnetism applied to conductors. But it is only by means of Maxwell's theory that we can come to a proper understanding and explanation of the functions of conductors.

The sense in which a perfect conductor is a perfect conductor in reality as well as in name is that it allows electro-

magnetic waves to slip along its surface in a perfectly free-manner, without waste of energy. Though perfectly obstructive internally, it is perfectly conductive superficially. It merely guides the waves, and in this less technical sense of conduction the idea of a perfect conductor acquires fresh life.

The Effect of a Perfect Conductor on External Disturbances. Reflection and Conduction of Waves.

190. The conditions at the interface of a perfect conductor

and a dielectric are that the electric force in the dielectric has- no tangential component and the magnetic induction no normal component. Or

VNE = 0, NH = 0,

if N be the unit normal from the conductor. Thus, when there is electric force at the boundary it is entirely normal, with electrification to match ; and if there is magnetic force it is entirely tangential, with electric current to match. Both electrification and current are superficial. The displacement measures the surface density a- of the one, and the magnetic* force that of the other, say c, thus

<r = ND, c = VNH,

in rational units, without any useless and arbitrary 4?r constant,, such as is required in the B.A. system of units, of amazing irrationality. If, then, we have electromagnetic disturbances given in a dielectric containing a perfect conductor, the latter first of all is free from disturbance, and next causes such re- flected waves as to annihilate the tangentiality of the electric force and the normality of the magnetic force.

As regards steady states, the influence of a perfect conductor on induction due to foreign sources is to exclude it in the same manner as if the inductivity were made zero ; that is, the induc- tion goes round it tangentially instead of entering it. This is usually ascribed to an electric current-sheet induced upon it& surface, whose internal magnetic force is the negative of that due to the external field. This is right mathematically, but is deceptive and delusive physically. There is no internal force,, neither that of the external field nor that of the superficial current. The current sheet itself merely means the abrupt

stoppage of the magnetic field, and cannot really be supposed to be the source of magnetic force in a body which cannot permit its entrance. The previously mentioned case of a perfectly conducting wire inserted in a circuit of finite resistance supporting a steady current, will serve to bring out this point strongly. The supposed induced superficial current is now actually the main current in the circuit itself.

It is different with the steady state due to external electric sources. The displacement is just as much shut out from the perfect conductor (which may also be a dielectric) as was the magnetic induction, but in a strikingly different manner, terminating upon it perpendicularly, as if it entered it in the manner that would happen were the conductor nonconducting, but of exceedingly great permittivity, so that it drew in the tubes of displacement.

Although a perfect magnetic conductor is, in the absence of knowledge even of a finite degree of magnetic conductivity, a very far-fetched idea, yet it is useful in electromagnetic theory to contrast with the perfect electric conductor. A perfect magnetic conductor behaves towards displacement just as a perfect electric conductor does towards induction ; that is, the displacement goes round it tangentially. It also behaves towards induction as a perfect electric conductor does towards displacement ; that is, the induction meets it perpendicularly, as if it possessed exceedingly great inductivity, without magnetic conductivity. This magnetic conductor is also perfectly obstructive internally, and is a perfect reflector, though not quite in the same way as electric conductors. The tangential magnetic force and the normal electric force are zero.

As regards waves, there are two extreme ways in which a perfect conductor behaves that is, extreme forms of the general behaviour. It may wholly conduct them, or it may wholly reflect them. In the latter case we may illustrate by imagining a thin plane electromagnetic sheet, consisting of crossed electric and magnetic forces in the ratio given by E = /*vH, moving at the speed of light, to strike a perfect conductor flush that is, all over at the same time, by reason of parallelism of the sheet and conducting surface. The incident sheet

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is at once turned into another plane sheet, which runs away
from the conductor as fast as it came. If the conductivity be



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of the electric kind the reflected sheet differs from the incident
in having its displacement reversed, but in no other respect*
This is perfect reflection with reversal of E. During the act
of reflection, whilst the incident and reflected sheets partly coin-
cide, E is zero and H is doubled. Both are tangential ; but
there can be no tangential E, so the reflector destroys E and
initiates the reflected sheet, in which H is the same as in the
incident sheet, whilst E is reversed.

On the other hand, when the conductivity is of the magnetic
kind, the reflected wave sheet differs from the incident only in
having its induction reversed. The displacement persists,
being doubled during the act of reflection, whilst the induction
is then annulled.
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https://en.wikipedia.org/wiki/Archibald_Howie

re cattq, **http://www.ivorcatt.co.uk/cattq.htm** , Howie is a westerner. Pepper, who reported to him as head of the Cavendish, is a southerner. (Both at Trinity.) They refuse to discuss their disagreement with each other or with us..

http://www.ivorcatt.co.uk/x67d.htm

Re: em

Inbox

29.3.2019

Prof. A Howie

10:08 AM (8 hours ago)

to me

Dear Ivor,

Thanks for our message. I admire your tenacity over EM theory which I'm sure keeps your brain firing away. I have never met Alex Yakovlev and had not even heard of him until maybe 6 months ago I came across his Phil Trans paper with its fulsome references to the work of you and your colleagues. Following our strenuous but unsuccessful efforts many years ago to resolve the difference between us, I am however not at all attracted by the idea of revisiting them!

In the past few months the "standard" EM theory that you dislike **[no; I want to be told what it is! See cattq**.] I have
been applying to compute the energy loss experienced by a fast electron beam. This travels in the z direction and is highly focused to about 0.2nm in the x-y plane, when it passes just outside a dielectric material. This theory gives a very good account of many experimental observations. Of course by some amazing fluke it may still succeed when built on a foundation **[Howie's or Pepper's?]** that you believe to be incorrect but so far I am not convinced. **[Why does he not discuss his disagreement with Pepper on fundamentals - cattq? – IC]**

You may recall that long ago I encouraged you to get your ideas published in Physics Education in the guise of a challenge to the teaching of EM. I shared some of your disappointment and frustration when, after accepting it, they pulled out from publication. At least Yakovlev has now managed to get some account of your theory published in the scientific literature and we can await reactions. I am not too confident that much will emerge however since the serious readership of most published papers is now close to zero. Most papers or now read by bots as I discovered when a paper I recently submitted to Ultramicroscopy was accepted. Within a few hours (while it was still listed as an on-line paper in the publication pipeline) I got first an email from some organisation telling me that a number of people had already consulted my paper and that I could find out who they were by signing up with them. Hard on the heels of this came a second message offering for sale a mug on which the first page of my paper would be printed!

Best wishes,

Archie.

> "Physics Education …. …. I shared some of your disappointment and frustration when, after accepting it, they pulled out from publication." – AH
> A few decades later the journal published an attack on me and the editor refused to let me reply.
> "Physics Education"**, a** journal of the Institute of Physics**.**
> **http://www.ivorcatt.co.uk/x311a.htm**

On 2019-03-28 21:11, Ivor Catt wrote:

> Dear Archie,
> I would greatly value your comment on
> HTTP://WWW.IVORCATT.CO.UK/YAK7.HTM [1]
> Ivor
>
> Links:
> ------
> [1] http://www.ivorcatt.co.uk/yak7.htm