

LETTERS

SEMICONDUCTOR MUSEUM

I wonder how many subscribers to your excellent magazine have noticed the sad disappearance of the British germanium transistor? I am sure that many of your readers can remember the days when the transistor was but a young upstart trying to steal some of the market from the respectable and revered valve.

In those days, Britain possessed her own transistors, and weird and wonderful they were. Named for their appearance, the red and white spots, and the "top hats", were uniquely British. Alas, such eccentric marvels are virtually unobtainable nowadays, superseded by drab devices with standardized American nomenclature and packaging.

Perhaps few of your readers mourn the disappearance of those colourful early types, and perhaps few have even noticed that they are gone. A quick scan of the advertisements in this issue will soon reveal that only a few AC and AD types survive to break the monopoly of the 2N series. Personally, I find that the variety of shapes, sizes, and colors of the first British devices is quite fascinating, and I am attempting to establish a small "museum" of these transistors. If any of your readers has some such early germanium types, or data books or sheets which describe them, I would be very grateful if they would write to me.

Andrew Wylie
18, Rue de Lausanne
1201 Geneva
Switzerland

HERETICS' GUIDE TO MODERN PHYSICS

I have thoroughly enjoyed Dr Scott Murray's heretical Guide to Modern Physics for it has reawakened my earlier misunderstandings of undergraduate physics.

My thoughts, however, were jolted by the statement that "if you believe in ghosts and miracles you have missed your vocation; you should have been a theologian not a physicist."

Until now I had no idea that Schrodinger and his colleagues were leading me down the slippery metaphysical path to an acceptance of these phenomena. But surely, theology and physics are not intended to be mutually exclusive but may be combined under a single philosophy. I can content myself with a somewhat hazy explanation of both areas.

Perhaps physical particles are made up from more basic thought or information particles put together in a certain way. This is just as our concept of area is created from the orthogonal addition of two lines, each of some length but of no width or area.

It is not surprising, therefore, that physical measuring instruments which are set up to measure two-dimensional "area" are unable to provide readings of invisible lines of single dimension. Furthermore the thought or information particle building block hypothesis makes phenomena such as trans-kinetics quite easy to explain.

Perhaps physical material can be dismantled into its thought-particle components and reassembled elsewhere at will, although will is presumably made of thought particles too.

We clearly now require a framework for thinking about thought. An analogous technique has been developed for interpretive language control of modern computers; program commands, addresses and data are all arranged to flow through the same wires in an ordered way.

We may extend the computer analogy another step. Perhaps we are permitted to interact with the daily world only through a high-level computer program, called, if you like, "Newton's Laws" whereas others (God or prayer perhaps) can use a more powerful assembler language that produces apparent miracles with ease. This is simply because the high level program controls the physical dimension whereas the low level program controls the thought dimension.

Just a thought.
Dr Brian T. Evans
Watford
Herts

RS232/CURRENT LOOP

The following comment on the useful article by L. Macari, February 1983 might be of help.

I designed and constructed a similar interface for communication between two computer systems where the emphasis was a requirement for optical isolation. The link showed every sign of successful operation though with infrequent, but serious, loss of data. This was eventually traced to the fact that the residual "zero" current of the loop still generated sufficient opto-coupling to create occasional errors, despite the fact that all components of both drivers and isolators, were proprietary brands.

The solution was to add a 1k resistor across the optical diode to ensure that the "zero current" voltage generated at that diode was less than its conduction threshold. As an additional precaution, I also included a reversed diode across the opto isolator diode to protect against inadvertent reversed connection.

B. Fisher,
Dista Products Ltd,
Speke
Liverpool

DEATH OF ELECTRIC CURRENT

I have progress to report.

D. W. Bell, who is not given to wasting words, said in his letter (October 1982) that the role of mathematics in physics "is essentially predictive" and concluded his letter "But if one accepts the logic of mathematics, one can accept the logic of mathematical models." It is clear from the introduction to his paper that Hertz would have agreed with Professor Bell; in fact Bell has explained the motive for every experiment performed by Hertz between 1886 and the time of his untimely death on the first day of 1894 at the age of 36. By accepting the logic of Maxwell's mathematical model of an ether, Heaviside and Poynting were the first scientists to realise that Maxwell's equations predict that the source of a current in a wire was located in the surround-

ing field. Hertz agreed with the mathematical reasoning of the Heaviside-Poynting theory "as the correct interpretation of Maxwell's equations."

Catt's critics, although not accepting the logic of Maxwell's mathematical model, have all based their criticism on the fact that Maxwell's equations predict the phantom existence of his displacement current. Maxwell's own definition of his displacement current is in Art. 111 of his Treatise, dealing with the phenomenon of induction of electricity through non-conductors.

"Electric Displacement. When induction is transmitted through a dielectric, there is in the first place a displacement of electricity in the direction of the induction. For instance, in a Leyden jar, of which the inner coating is charged positively, and the outer coating negatively, the direction of the displacement of positive electricity in the substance of the glass is from within outwards.

Any increase of this displacement is equivalent, during the time of increase, to a current of positive electricity from within outwards, and any diminution of the displacement is equivalent to a current in the opposite direction."

In other words, only during an acceleration or deceleration of the velocity of electric displacement does Maxwell's displacement current manifest itself. Maxwell said in Art. 62 that all electric currents flow in closed circuits, and in Art. 305 that as all currents of conduction must flow from a high to a low potential, conduction currents cannot flow in closed loops. I have suspected that all current loops are closed, and more importantly caused by, a displacement current, for instance in the induction of electricity from the primary to the secondary winding of a transformer. Hertz's paper seems to confirm this is so. The present confusion in electromagnetic theory lies in our failure to differentiate between electric displacement and displacement current; the latter only manifests itself when the momentum of the former either accelerates or decelerates.

Ivor Catt's Heaviside Signal or Poynting Vector travels through space at the constant velocity of light, and is therefore by Newton's first law of motion, inert. It is a form of perpetual motion, and will travel through space at its constant velocity forever, unless acted upon by a polarized force. Newton defined inertia as a 'latent' or potential force. If a body at rest or travelling at a constant velocity is either accelerated or decelerated, its equal and opposite reaction to a polarized force causes its latent force to be transformed into an active force, because a force is the product of a mass and an acceleration or deceleration. Maxwell's electric displacement also travels through his ether at the constant velocity of light in free space in the form of a wave of displacement or strain of his ether, and like the Heaviside Signal, will do so forever unless a polarized force, such as a conductor, decelerates the electric displacement and changes it into a displacement current. When the displacement of the potential energy of the ether is accelerated from a state of rest to the velocity of light, the resultant strain is in the form of a displacement current during the period of accelera-