

J E R E M Y

JEREMY : The Physics Society Journal

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EDITORIAL : The University of Sydney Physics Society

As some people may have noted, the Physics Society has been resurrected after having lapsed into oblivion several years ago. The Society intends to organise many activities - lunch time talks, student staff sport, excursions (such as a proposed comet spotting trip), occasional parties and anything else we can think of. This issue of the Society Magazine is the first of about half a dozen (hopefully) to be produced this year, covering areas of fairly general interest, as well as detailing forthcoming society activities.

In addition to all this, a number of competitions are to be run by the magazine. One of these, the Quotes Competition is described in more detail later - of more importance to this issue however is...

The Great Magazine Name Competition

The proposed name of the magazine was a subject of much discussion and a lot of thought (at least on the part of the editorial staff) all producing very little actual results (sort of like a Physics Prac.). The name of the previous Society's magazine was 'The Physoc Rag' - a name so mindbogglingly dull it can only be attributed to a theoretical physicist of the twenties. It was decided a name related to physics or a physicist would be desirable, so this first issue has been named 'Jeremy - the Physics Society Journal' after the almost unknown and sadly neglected Jeremy Rutherford, second cousin to Ernest Rutherford and long serving ticket collector on the London Underground.

For some strange reason however, some members have voiced disapproval with this fine upstanding name. To seek an alternative we are holding a Magazine Name Competition, with, of course, a suitable prize going to the person who supplies a better name than 'Jeremy'. (The Editorial Staff are not at all confident that there exists a name which can surpass all the subtle qualities which 'Jeremy' possesses.)

All entries should be sent to (or left in) the Physics Society letterbox opposite LT8 in the Physics Building. BE WARNED - if no suitable alternatives are forthcoming the name will remain 'Jeremy', so if you don't like it start thinking!

Finally

ANY student magazine relies solely on contributions from the students themselves. As mentioned later, quotes/fudges from lecturers are eagerly sought, as are contributions such as -

- * Short stories (of a physical bent).
- * Short articles on any reasonably interesting topic
- * Cartoons or caricatures
- * Anything Else !

All contributions can be left in the Physics Society letterbox opposite LT8. Contributions of any kind are welcome, ne demanded!

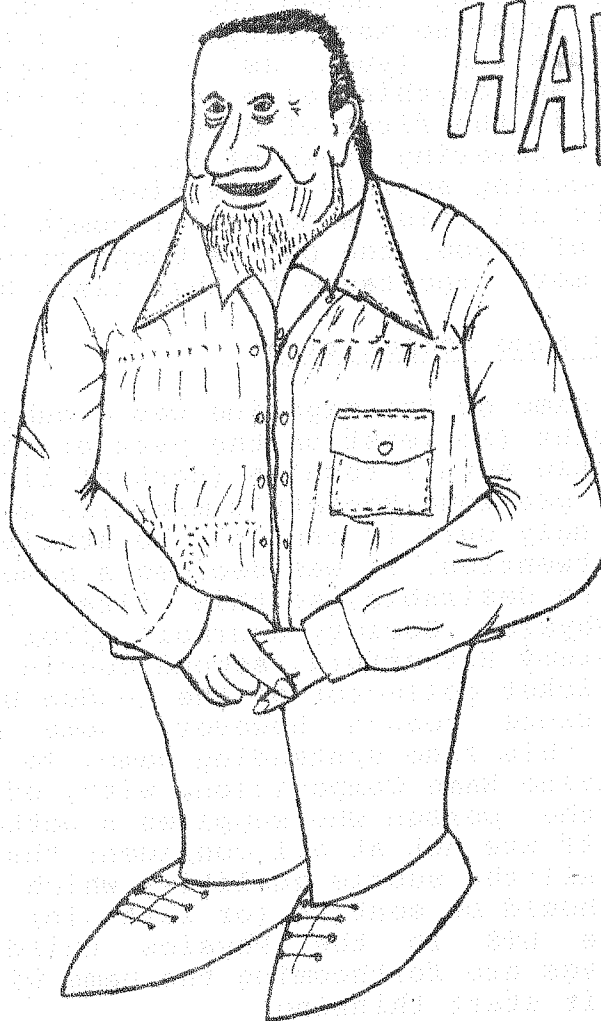
In line with our policy of letting the students get-to-know members of staff, a series of portraits will appear in 'Jeremy'. The first of these could only be our glorious leader, Professor Harry Messel.

IT'S

HAPPY

HARRY!

Meet the Staff
Number 1
"Harry Messel"



Our revered leader (Bow to Mecca three times)

Creation Science and the Speed of Light

Dr Ian Johnston - The Sir Frank Packer* Theoretical Department.

Of all the areas of ratbaggery, perhaps the most visible right now is Creation "Science" (and you will appreciate that I am using the word "science" here in its most debased form). Even though I am not a professional geologist or palaeontologist, I would have thought that the fossil evidence for the age of the Earth is absolutely overwhelming. Whatever is the message of the Book of Genesis - and please don't get me wrong, I do believe that it is one of the most important books ever written - whatever is its message, it is not that the Universe was created in 4004 B.C., which is the date that Bishop Ussher arrived at adding together the ages of all the patriarchs.

As it happens I can make a small contribution to this controversy. Let me tell it to you as it happened.

Just over a year ago a country high school teacher wrote to our department asking our advice about an article which he enclosed. The article was from a Creation "Science" journal, and thought it didn't look like an ordinary scientific article - it had lots of bold print and exclamation marks - what it said made interesting reading. The writer had listed all the measurements of the speed of light made since 1870, and observed that the latest, very accurate measurements do not agree with the earliest ones, even allowing for the quoted uncertainties of measurement. The 1880 value was 299 910 km/s (+/- 50), and the 1980 value is 299 792 - not a big effect but big enough. Furthermore/ the early values were ALL too high, and got progressively higher the earlier you went.

Now as far as we could tell without going back and checking the original papers the table of figures looked all right, and the normal reaction would be to wonder why the early values were wrong. But not this creationist. He simply stated that he had uncovered proof that the speed of light was slowing down! Furthermore he put the numbers into his COMPUTER and had found a mathematical formula to fit the data. And when he examined that formula - surprise! surprise! - it had a singularity in it. At one time in the past the speed of light must have been infinitely fast. Can you guess at what date this remarkable event occurred? You've got it - 4082 B.C., +/- 100 years.

The article goes on to say that since the speed of light changes, so must other atomic constants, and what goes on inside the nucleus must be slowing down too. So radio carbon dating cannot be trusted. Everything the astronomers, geologists and biologists have been saying about the age of the Earth is rubbish! It was created exactly when the Bible and Bishop Ussher said it was, in 4004 B.C. (+/- 100 years).

Our reply to this letter raised a few technical objections which I won't dwell on, and two important matters which I will.

The first is that, when scientists made the earliest measurements on any of the important physical constants, like the charge on the electron or the speed of light, they were doing very tricky experiments with lots of sources of error. They made allowances for all the ones they could think of, but they couldn't anticipate them all. So even though they got an answer which they knew to be very precise, they also knew it might be a little bit out. Only subsequent measurements could remove this uncertainty but they would have similar unknown errors, especially if they used the same KIND of techniques, as happened in the case of the speed of light. Only after a long time and many careful measurements would all errors be eliminated and complete agreement reached.

Now this is standard stuff which any student of laboratory physics knows. I does not PROVE the the creationist's effect is not real, it merely says that there is a perfectly simple explanation for the data, and so there is no unambiguous EVIDENCE that the speed of light is decreasing.

* Ed: We did not make it up - the Department really is called this!

The second objection was more important. What this creationist had done was to take some measurements from the last 100 years, which may or may not have been significant, and deduce what they would have been 6000 years ago. Let me give you an analogy to explain why this is not sensible.

Imagine you are passing Woolworth's one morning and you notice an article in the window priced at \$9.99. The next morning it is still there, but now it is priced at \$9.98. "Aha!", you say, "the price is falling". O.K. But you go on: "The day before it must have been even more expensive!" Well perhaps - though there's no compelling evidence. But now you get the creationist's computer and it tells you that exactly 6 months and 21 days ago, it must have cost well over a billion dollars! I think that's one for the raspberry blower, don't you? (Ed: See plot on page 5)

So in brief our answer was that there was no real evidence for the creationist's proposed effect, and even if there were he had made a completely invalid extrapolation. Therefore the conclusions he drew had no basis in experimental fact.

Nothing happened for a couple of months and then another letter arrived. The school-teacher had sent our reply back to the creationist for his comments. What he had to say didn't, in our view, meet our objections. Instead he pointed out that there had been a controversy in the scientific literature in the 1930's on just this question; so clearly the evidence was strong enough to be discussed by the scientific community themselves. He even hinted that if we didn't know about this, the knowledge must have been deliberately withheld. Therefore our criticisms on his paper were nonsense.

Well we didn't know about it, but it was easy enough to spend a day in Fisher Library finding out. There had indeed been a dozen or so letters in "Nature" between 1927 and 1934, but in the end agreement had been reached along exactly the lines we had suggested. But more came out of that library search. There had been other measurements of the speed of light as early as 1906 which were TOO LOW but which the creationist had not included in his original list. There was even a serious suggestion in "Scientific American" in the 1950's that the speed of light was INCREASING; but that didn't come to anything either.

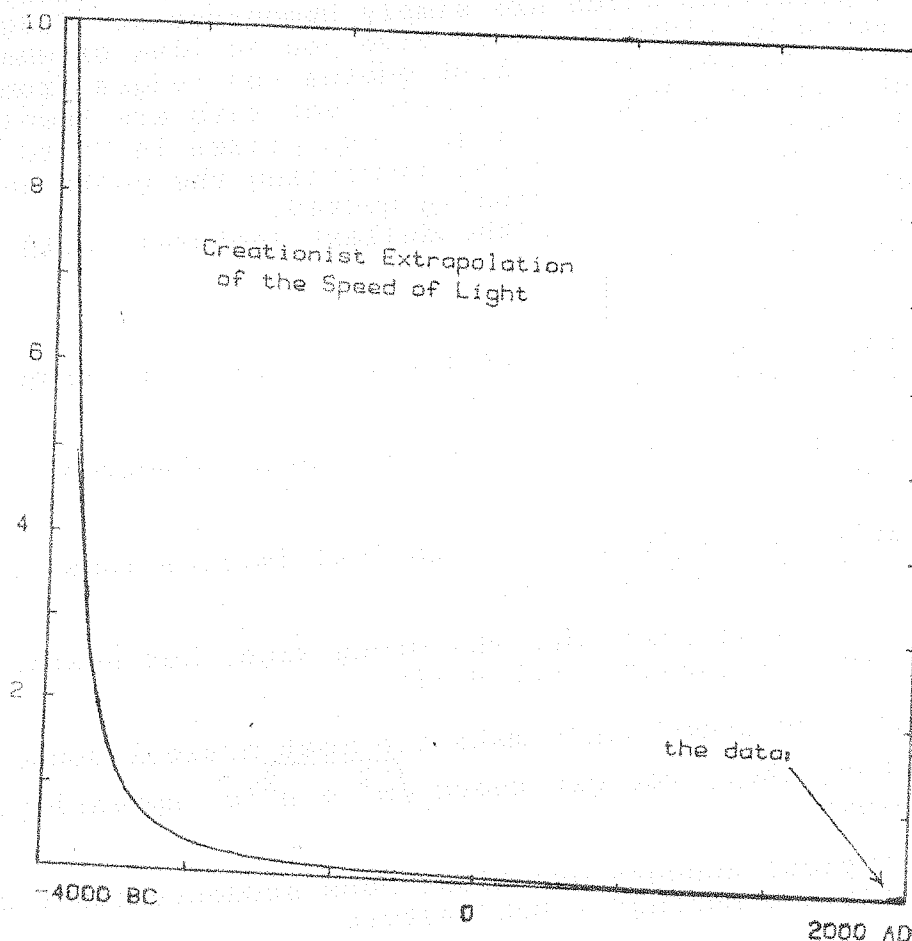
That was nearly a year ago and we haven't replied since. The reaction of the people in our department was annoyance. The initial arguments had been reasonably answered and shown to be wrong. The second letter was silly and didn't deserve an answer. But look at it from the teacher's point of view. He thinks he has done the right thing, passing the responses back and forth until one side admits defeat. He is treating it like a formal debate.

Now debating is a skill that can be learned, but, as any debater will tell you its object is not to arrive at the truth, but to win the debate. And ratbags are usually good debaters. George Bernard Shaw has a very funny story of a public meeting in which a member of the Flat Earth Society reduced his audience to apoplexy by producing reasonable sounding replies to all the objections they could raise. He clearly won that debate - but nonetheless, the Earth is not flat.

It's the same here. I'm sure this particular creationist has heard every point I could make against him, and he will have an answer for them all - it might be silly or irrelevant or dishonest, but it will be an answer. I'd have to invest a lot more time and effort to get the better of him. But that doesn't mean he's right.

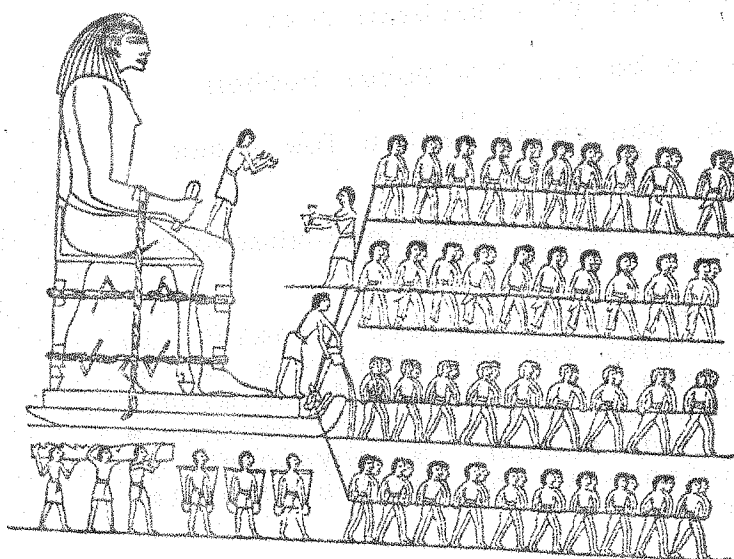
In the end, commonsense has a part to play. The speed of light is one of the most important of the physical constants. Our whole system of measurement standards is based on it. If it were changing you'd have heard about it. And the question of why it was changing would be the subject of an enormous research effort.

And you, this creationist has an answer for that one too. He is on public record as saying that the speed of light is decreasing because of man's sinfulness. So just be careful. Next time you're tempted to park in a No-Standing zone, give some thought to what you might be doing to the speed of light, or perhaps even the charge on the electron!



(Ed: This article was broadcast on the ABC's Science Show in July 1985, as part of Dr Johnston's series "The Science of Ratbaggery". It is to be published later this year by Nelson, along with several other excerpts from his series, in "The Best of The Science Show".)

...oooOooo...



Academic Staff Installing
the new 'Professor H.
Messel' Memorial Statue, as
a token of their
goodwill.

The Quotes Competition

As anyone who has spent more than one term at Uni can verify, lecturers can and do say some incredibly-dumb and/or funny things - usually either expressions which are simply humorous or fudges which are so obvious as to be ridiculous. To give you an idea of what we mean here is a selection of some of the best quotes and fudges from the last few years. Contributions from this year's lecturers are keenly sought, and as an incentive the Society will give out prizes in Third Term for the best quote - one for the person submitting the quote and one for the lecturer/tutor/demonstrator actually quoted.

So listen carefully - even the dullest lecturer could earn both you and his/herself a prize.

"Experimentalists can't count from zero, they start from one and use their fingers" - Bob Hewitt

"It must be rather uncomfortable to sit on an electron"
- Alex Klotz

"This probably has profound philosophical implications, if we knew what it meant." - Laurie Peak

"You get lousy magnitudes, and the wrong sign, but apart from that the agreement is good." - Bob Hewitt

"Maybe that's why drums don't make the most musical sound, because when you bang them, you get these $\sqrt{m^2 + n^2}$'s appearing."
- Terry Gagen

"This is a typical Honours question. Pass students can't handle it because it's too boring" - Bob Walters

"A vector field is like a squashed hedgehog." - Gordon Munro

"This method of series is like Brand X of washing powder, anything else looks good by comparison." - Dennis Winch (who is rumoured to supplement his salary by working for the Computer Science Department as a line printer)

"One of the hardest things in theoretical physics is knowing where to put the $\cos(\theta)$." - Ian Bassett

"So that one's right, modulo a small error" - Richard Josza

"Just as if by magic, it turns out to be ... " - Peter Buchen

"If you need this constant later on, you sneak back a few lines and add it in, in small writing." - Andrew Parle

"So here we have much-greater-than-one times much-less-than-one squared, so this still goes to zero" - Brian James

All entries for the Quotes Competition should be left (again) in the Physics Society letterbox outside LT8. You will notice a lot of these quotes come from mathematicians. Certainly we won't discriminate against people just because they're so dull as to become a mathematician, however if people listen hard enough, a physicist is just as prone to slip up as a mathematician - as the entries submitted so far for this years competition verify!

In recent years, the Pure Mathematics Dept, ably led by Terry Gagen, has repeatedly captured the Competition Pennant. This season however, the "Daily Telegraph" Theoretical Physics Dept., has grabbed an early lead, largely due to a mammoth effort by those two veterans, Don Melrose and Graham Derrick. Professor Melrose has made a sound start to his innings with shots like;

"I can find the value by looking at this expression long enough."

"Liquids are not perfect gasses."

"That's why we have a toy Tokamak - I suppose I shouldn't call it a toy - there are a lot of people playing on it down there."

Meanwhile Graham Derrick showing all his characteristic dash and flair, has been striking boundaries like so;

"This minus sign is very distressing!"

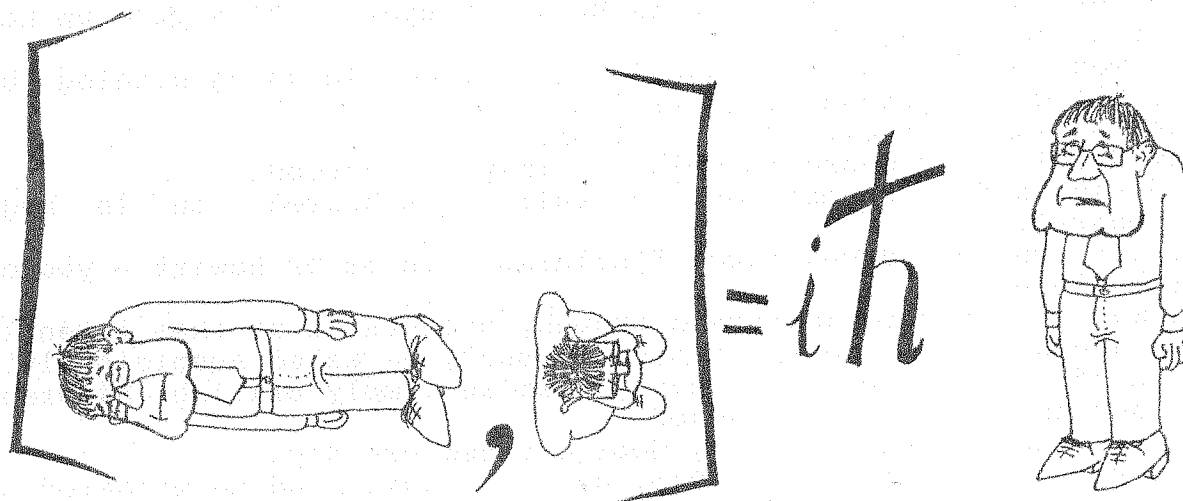
"One could multiply these three matrices together. It wouldn't help in any way."

"Its unsatisfactory and it offends one aesthetically."

"You will notice that some of the things that I say will not be strictly true."

"Lets put a half out in front of this, to make it look more like Quantum Mechanics."

Despite having got off to slow start, sterling performances are expected from other Departments as the season progresses.



Meet the Staff - Number 2
"Graham Derrick"

In the first episode of this tale Julian, Dick, Anne, George and Timmy the dog meet George's Australian uncle, Brian McInnes, then reach the depths of despair as they visit the "Australian Woman's Weekly" Theoretical Department and the Astrophysics Department.....

"Where do we go now, George?" asked Julian gravely.

"The letter from Uncle Brian says the Carslaw Building", his cousin replied, "wherever that is."

"I see it", piped up Anne. "That horrid blue building."

"Yes, it is horrid, isn't it", George agreed. Timmy barked and she laughed. "See, Timmy thinks so too!" They all laughed and soon headed off towards the Carslaw Building.

Earlier in the year, the cousins had received a letter from Brian McInnes, George's uncle from Australia, offering them a holiday if they wished. As Julian and Anne had been rather ill, their parents had been anxious for them to recuperate in a warmer environment, so six weeks later found them all in Sydney, Australia, searching for George's uncle at the university where he worked.

As they walked up the stairs, George told them about her uncle.

"He's a big jolly chap - not a bit like Father"

The others were relieved. Their Uncle Quentin, though a brilliant scientist, tended to be a little vague and absent minded at times. Presently, a slender grey haired man, wandered past, clearly oblivious to their presence, his eyes appeared to be focussed about 12 feet up in the air and 12 kilometres away in the distance, and he mumbled something like "... alpha beta eta u mu nu times ...". They heaved a collective sigh of relief as the man disappeared into an office marked "Dr A. Klotz". Thankfully he wasn't George's uncle.

Soon though they did find him, and as George had said he was a fine chap, full of energy. He insisted that they all call him Uncle Brian, and whisked them off on what he said was a short tour of the Physics Building.

He took them first to the "New Wing", to see the Theoretical and Astrophysics Departments.

"I'll get the boring bits out of the way first", he promised.

They climbed a dingy flight of stairs to the third floor and the Theoretical Department.

"You must be quiet here", Uncle Brian whispered. "Everyone up here is fully occupied thinking."

"You mean this floor is full of people doing nothing but thinking, all day, every day?", asked Dick.

"That's right", their guide replied.

"How dull!", was George's opinion. They all agreed.

Suddenly, a door opened, and a tall dark-haired man in baggy shorts appeared.

Uncle Brian introduced them. "Children this is Dr Hewitt - you can call him Uncle Bob".

The man didn't seem impressed though, and stared at them intently.

"You are not experimentalists, are you?", he asked suspiciously.

"No sir", Julian replied gravely, "we're simply British children."

" - and the dog?", he demanded.

"No sir. He's British too!", George added proudly.

"Lucky", was all Uncle Bob had to say, - and he wandered off muttering under his breath, "Bloody experimentalists, I don't know ..."

"What an odd fellow Uncle Bob is", Dick declared.

"Yes", agreed Uncle Brian. "There's a lot like that up here. It seems to get to them all after a while." He lead them up another flight of stairs to a similar corridor. "This is the Astrophysics floor", he continued.

The children stared around them. Dust lay piled on the floor, one or two feet high, marked by only the odd footprint. Dim lights shrouded the hall in shadows. Timmy began to whine mournfully.

"Why is it so dreary, Uncle Brian?", Anne inquired.

"No one really knows", he replied. "No one has seen a living thing move up here for more than twenty years."

Anne crept along to a door, which was slightly ajar, and peered inside. An old man was slumped in a chair staring intently at a contour map on the wall. One hand idly spun a model of the moon, which lay on his desk. A smell of decay - and leftover coffee - filled the air.

"Let's leave here now", she pleaded. "It's absolutely awful."

Julian comforted her as they went down the stairs. "Don't worry Anne, I'm sure it's not all like this. Anyway, these people probably ENJOY being like that, doing what they do." His sister stared at him in disbelief.

"I'm sure they do", Julian repeated, albeit a little doubtfully. "Let's go and have some orangade and cake before Uncle Brian shows us anything else."

"I don't think I want to see anything else in here. This building just depresses me, it's so drab and dreary and simply horrid*", she burst into tears.

"Don't worry, Anne", Uncle Brian reassured, "soon we'll go down to the Plasma section. They have a wonderfully expensive machine down there, with lots of flashing lights and bells and everything!"

"But what does it do?", Dick inquired.

"Well ... I don't really know", Uncle Brian replied slowly. "But it's very impressive."

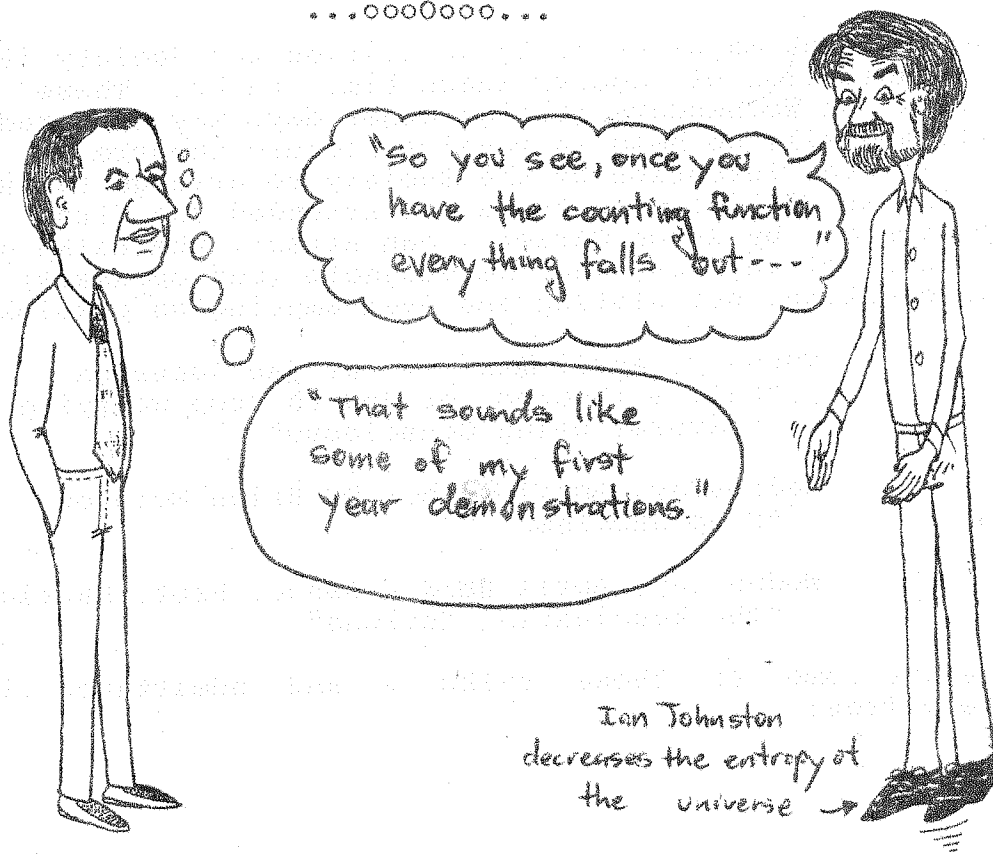
Perhaps it would be better, Anne thought to herself. She cheered up and began to drink her orangeade. It was delicious!

END OF PART I

In the next installment Julian, Dick, Anne, George and Timmy the Dog, visit the Plasma Physics Department and uncover a terrible secret!

* Ed: It's always affected me that way too actually.

...oooOooo...



Meet the Staff - Number 3
"Laurie Peak & Ian Johnston"

THE GALA(H) EVENT OF THE TERM!

The Inaugural Physics Society Party!

Do you have three assignments due in on Monday?
Has someone borrowed both Resnick & Halliday, AND Spivak
without telling you?
Do you believe all academic staff members are either fire
breathing dragons, or so boring its not worth talking to
them?

WELL, come to the Physics Society Party anyway - you might be
surprised!

The party will be held on Friday, April 11th at 5.00pm, on the
Solar Physics Roof (just keep going up until you run out of stairs).
Should it be raining, an alternate location will certainly be provided,
so don't let that stop you.

This is an excellent opportunity for you to meet both staff and
other students (especially ones from higher years, who have done all
your assignments before!).

Cost : 50c for Physics Society Members,
\$1.00 for non-Members (Membership is only \$2).

Physics Society Lunch Time Talks

One of the major on-going activities the Society is undertaking,
is the organization of regular lunch time talks. These will usually
take place on Wednesdays (though other days may be arranged from time
to time), and will be held in Physics Lecture Theatre 8.

It is the intention of the Society to arrange talks which are as
interesting as possible. As those who attended the first talk - very
ably presented by Anton Garret - can attest, the talks are aimed at a
general level of physics, and the subjects (and speakers) are chosen to
be as interesting, stimulating and even amusing as possible.

Tuesday, April 15th - Dr Ian Johnston
"Bell's Theorem, or How to Stop Worrying about the
Universe being Conscious."

Wednesday, April 29th - Dr Brian McInnes
"Soap Bubbles"

Wednesday, April 30th - Assoc. Prof. Laurie Peak
"The Fascinating Nucleus"

ALL are welcome to these talks - and admittance is absolutely,
completely free!