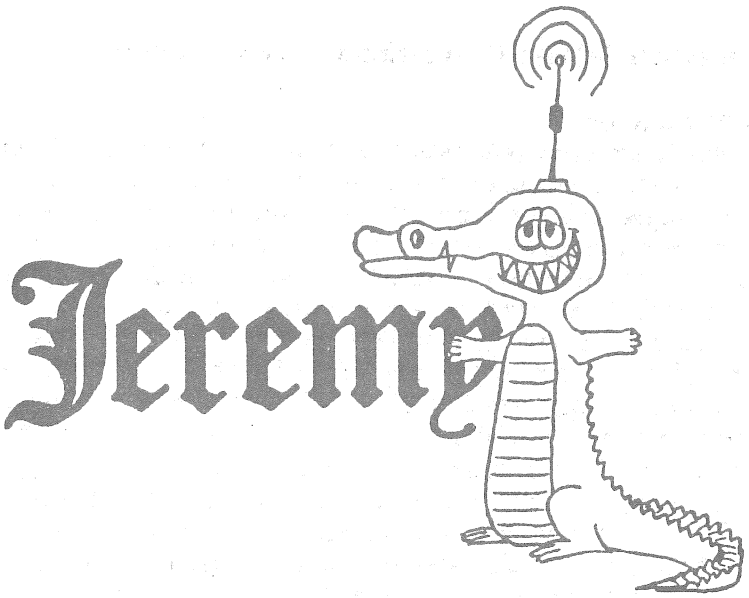

The Official Journal of The University of Sydney Physics Society

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Editorial

Put down your pens and crayons, stop doing assignments and read on because *Jeremy* has come to distract you from what you should be doing to something more enjoyable. Those with pacemakers are reminded that the contents of this journal may invalidate their warranty†.

Despite being threatened with assignment deadlines and other ploys used by lecturers to stall the inevitable, *Jeremy* has crawled up from the swamps for a second time this year. Reader participation has increased from zero to ħ. Our reader has been busy! If this situation continues we may only print three copies of the next issue. This is *your* journal, so help us! Send all contributions to the Physoc mailbox, behind the door of the main office foyer, and quickly, before we have to resort to doing things like our assignments and projects (shock! horror!).

We have spared no expense to bring you this latest, feature-packed issue of *Jeremy*. We even air-freighted one of our reporters to Canberra. His exclusive horror story appears inside. We present the next thrilling instalment of *The Hitch Hikers Guide to The Physics Building*. One of our postgraduates has come up with some interesting problems for you all to think about (although not too strenuously, of course). Some advice is offered to first year students from those with two years more experience of the drama of studying physics. We have also included some helpful information on how to read research papers and, of all things, printed a song. Despite not receiving *any* quotes whatsoever, we have the first real entries in the quotes competition for you. Note that all of these were collected, by hand, by us, except for one or two which other members of the Physoc executive gave to us. We need quotes! We're serious, there really is a prize! And you wouldn't want one of us to win it, now, would you, especially when it could just as easily be you! A picture is worth a thousand words, so we have included a photograph. We wait with interest to hear which particular thousand words the subject of this photograph uses when he sees it. But enough talk .... on with the show (such as it is).

The Editors: David Mar (Physics IV, Astrophysics)
Kim Lester (Physics IV, High Energy Physics)

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† This journal (its editors in particular) can take no responsibility for loss of life or sanity due to the use, either directly or indirectly, of this product in a manner for which it was not intended (eg. reading). J

Space Alien Weds Two-Headed Elvis Clone!!!

Now that we have your attention...

The Physics Society has been extremely busy since the last issue of *Jeremy* hit the lecture theatres all those weeks ago. There has been a party, lunchtime lectures and the first (as this issue goes to the printers) of a new, regular series of informal, lunchtime discussion groups.

The party was of course the huge Welcome to First and Second Years Party that was advertised in the last *Jeremy*. Despite the typical Sydney weather on the day, the party did indeed go ahead, though not quite as planned. The barbecue was set up outside, under the bridge joining the main building and new wing, and the sausages ferried in to the tea room for consumption by the starving hordes. Lots of bikkies, chips and dip were available for all to indulge in, as well as a plentiful supply of several forms of liquid refreshment; in fact, the only things in short supply were first and second year students. Whilst third and fourth years, postgrads and even staff were present in large numbers, it can be reported that the enormous first year turnout totalled four people (one of whom it was later discovered didn't even do physics) and it is still being debated if any second years showed up at all. Like the rest, the first years enjoyed themselves and we feel sure that the chance to meet and talk with the rest of the physics faculty was a valuable experience from which they learnt a great deal (shut up, Simon). Overall, for all of you who missed it, it was a great time. So don't miss the next one!

Three lunchtime lectures have been given by members of the staff since the last issue of *Jeremy* went to the printers. Professor Dick Collins of Applied Physics gave his now famous *Physics Is Fun* lecture demonstration compendium on the Ides of March. A truly fateful date, for Julius Caesar himself graced us with his presence, bursting into LT8 with a dagger protruding from his back, speaking those immortal words, "*Et tu, Dick?*" and then dying painfully on the floor in front of the stunned audience. Oblivious to this distraction, Professor Collins continued to bamboozle the crowd by smashing various objects, subjecting "volunteers" to spectacular physical phenomena and attempting to raise Caesar from the dead through the use of hydrogen explosions. The thunderous applause that accompanied the finalé proved yet again that physics really can be fun.

On the 12th of April, Dr Ian Johnston gave a lecture entitled *There Are Ratbags At The Bottom Of My Garden, or, How To Tell Real From Pseudo-Science*. When questioned about the title, Dr Johnston said that he had an obsession for giving things long and complicated names. We wonder what he calls his children. Dr Johnston gave the lecture in his usual enthusiastic style, repeatedly yelling at the audience and thumping his fist on the front desk whilst telling various stories from the annals of ratbaggery; such is the Cottingly Fairy photograph incident and the creation science extrapolations of the "varying" speed of light to "prove" that the Earth was created in 4000±100 B.C. The audience certainly enjoyed the talk, if the regularity and volume of the outbreaks of laughter were anything to go by, and most of them probably learnt a thing or two about the proper way of doing scientific research as well.

The 10th of May saw Professor Lawrence Cram of the Astrophysics Department give a talk on *SETI: The Search For Extra-Terrestrial Intelligence*. This was well attended and saw many people asking interesting and thought-provoking questions. Although Professor Cram could not give the answer to the question "Are we alone?" he definitely shed some light on this speculative yet most interesting and important topic. Indeed, one could draw the conclusion that some serious research into this field will be necessary to ensure any long term survival of our civilisation. Since, during the course of his talk, Professor Cram touched on aspects of astronomy, chemistry, biology, sociology and philosophy, most of the audience left with an increased respect for the magnitude and import of the issue.

Finally, we are happy to report that the first of the Physics Society informal lunchtime discussion groups, held on the 4th of May, was a smashing success. Believe it or not, this idea was actually formulated, suggested, acted upon, organised, advertised and brought to fruition by your hard working Society within the space of a single week. Dr Peter Krug gave a short talk to a packed Lecture Theatre 5 on the hottest (so to speak) topic in science today — Cold Nuclear Fusion. He then answered eager student's questions on the topic for the remainder of the lunch hour. The turnout was incredible, perhaps due to the free wine, cheese and chocolate on offer. The informal discussion group is now being organised on a regular, fortnightly basis, and we already have several exciting topics lined up for future discussions.

Perhaps a few words of explanation are in order. It was decided that the discussion groups would be run with a fairly strict "one staff member only" (i.e. the speaker) rule. This is in an effort to

ensure that the first and second year students, for whom the discussions are aimed at, will feel free to voice their questions and opinions without having to worry about "authority intimidation". We hope that all staff members will understand our motivation and respect our wish. After all, you guys have access to this information any time you want. Finally, our reasons for wanting to start such a thing. The Society felt that the students in first and second year deserved another, more fun, way to look at physics seriously. From third year up, one generally knows where to go for an answer to any questions one may have. But first and second years, who usually have a lot more things that they have heard about and want to know more about anyway, are not quite so sure who to approach. And they are not going to hear interesting aspects of cold nuclear fusion and general relativity in their mechanics lectures.

We have supplied a piece of paper, stuck on the first year noticeboard, for any students to write down topic suggestions for future discussions. This has already attracted some use and we are already thinking about the topics suggested so far.

As you can see from our scoop photos, an alien from Jupiter recently married an Elvis clone with two heads. The service was performed by the Reverend... (cont. p45) J

Uncle Dick's Conundrum Corner Answers

Unfortunately, none were submitted by anybody. Get with it you lazy lot!

However, through a conversation with Uncle Dick himself, it can be revealed that the problem of the boat sailing into the wind has been solved. In fact, a friend of Uncle Dick's has built a working model of just such a boat and demonstrated it at a party several years ago, much to Uncle Dick's consternation because he lost a bet involving a case of beer to the guy who built it. So why did he ask us about it? Why were none of us offered cases of beer? Maybe we'll never know. J

New Element Discovered!!

The heaviest element known to science was discovered in the University of Sydney's High Energy Physics Department just a few days ago. The element, tentatively named Administratium (Ad), has no protons or electrons, which means that it's atomic number is 0. However, it does have 1 neutron, 125 assistants to the neutron, 75 vice-neutrons and 111 assistants to the vice-neutrons, giving it an atomic mass number of 312. The 312 particles are held together by a force involving the continuous exchange of a new form of boson, called memo-ons.

Since it has no electrons, Administratium is inert. It can, however, be detected chemically because it seems to impede every reaction in which it is present. According to Dr J. Rutherford, the discover of the element, a very small amount of Administratium made one reaction that normally takes less than one second take over four days.

Administratium has a half-life of approximately three years, although it does not actually decay. Instead, it undergoes an internal restructuring in which assistants to the neutron, vice-neutrons and assistants to the vice-neutrons exchange places. Some studies seem to indicate that the atomic mass number actually increases after each restructuring.

Administratium was discovered by accident when Dr Rutherford angrily resigned from the Physics Department and dumped all of his papers into the intake hatch of the department's particle accelerator. "Apparently the interaction of all of those research papers, reports and grant forms with the particles in the accelerator created the new element," Dr Rutherford explained.

Subsequent research carried out by Dr Rutherford, after accepting his job back, seems to indicate that Administratium might occur naturally in the atmosphere. According to one of Dr Rutherford's colleagues, Administratium would most likely be found on university campuses, as well as in large corporations and government departments. J

The *Jeremy* Guide To Understanding Physics Research Papers

blatantly plagiarised from The Sydney Morning Herald.

Your ever-vigilant *Jeremy* editors recently came across an article in the SMH which should be of concern to all people involved in physics. We here reproduce the gist of the article, which consists of a glossary of terms that are often encountered in research papers and may easily be misconstrued by the uninformed. We quote the phrases as they often appear in published papers and follow them with the plain English translation in italics.

"It has long been known that..."
I haven't bothered to look up the original reference, but...

"...of great theoretical and practical importance."
...interesting to me.

"While it has not been possible to provide definite answers to these questions..."
The experiments didn't work, but I figured I could still get a publication out of it...

"The XXX system was chosen as especially suitable to show the predicted behaviour..."
The guy in the next lab already had one of them set up...

"High purity", "Very high purity", "Extremely high purity", "Spectroscopically pure", etc
Composition unknown, except for the exaggerated claims of the supplier

"Three of the samples were chosen for a detailed study..."
The results of all but three samples didn't make sense and were ignored...

"...handled with extreme care during the experiments."
...not dropped on the floor.

"Typical results are shown..."
The best results are shown...

"Although some detail has been lost in the reproduction, it is clear from the original micrograph..."
It is impossible to tell from the micrograph...

"The agreement with the predicted curve is excellent."
...fair.

"...good."
...poor.

"...satisfactory."
...doubtful.

"...fair."
...imaginary.

"...as good as could be expected."
...non-existent.

"These results will be reported at a later date."
I might get around to this sometime.

"The most reliable values are those of Jones"
Jones was a student of mine.

"It is suggested that...", "It is believed that...", "It may be that..."
I think...

"It is generally believed that..."
I have such a good objection to this point that I shall now raise it...

"It is clear that much additional work is required before a complete understanding is gained of..."
I don't understand...

"Unfortunately, a quantitative theory has not been formulated to account for..."
Neither does anybody else understand...

"Correct to within an order of magnitude."
Wrong.

"It is hoped that this work will stimulate further research into the field."
This paper isn't very good but neither are any of the others on this miserable subject.

"Thanks are due to John Smith for assistance with the experiments and to Bill Jones for valuable discussions."
Smith did the work and Jones explained what it meant.

J

Physics Forum

If you are interested in Physics (and because you are reading this, you are either interested in Physics or you had no choice in your course options) you have probably come across lots of phenomena that can be observed with very little equipment (often just your own eyes) but require fairly high powered physics to fully understand - the kind of thing that comes up every now and then in *Scientific American's* "The Amateur Scientist".

An example: Supposing you notice one day that when you rip some sticky-tape off its roll in the dark, it gives off a brief glow. Being a student of Physics, you would like to know why. Unfortunately, it's very difficult to look things like this up - where do you go? You won't find a section on "the luminescence of sticky-tape" in the encyclopedia or your Sears, Zemansky and Young.

You would have to go and pick somebody's brain. If, on the above issue, you were to come to me, I would be able to tell you this: Breaking the adhesive bonds causes charge imbalances (you know how hard it is to handle a long piece of tape; it keeps getting attracted to anything nearby because of the charge). The electrons rush to rebalance the charge and excite nitrogen molecules in the air, which shed their excess energy via the emission of light. For more information on this and other interesting forms of luminescence, see *Scientific American* **247**, 1, pp. 124-127 (July 1982). Now that's a pretty complicated phenomenom behind an apparently trivial experiment.

Now you can come here to get your answers. We'll print your questions in *Jeremy*, anonymously if you wish, and hopefully there's a reader somewhere who not only knows the answer (or at least where to look the answer up) but is sufficiently motivated to reply. The aim is to get some kind of discussion of fun physics going here without getting bogged down in mathematics or jargon. To get things started, I have a few questions of my own. I know the answers to none of them:

The UFO sighting

One good thing about physicists (let's not debate whether there are others) is that they need never be bored on trans-continental flights, because aeroplanes make great physics laboratories. Those drinks, for example, that the flight attendants force upon you make excellent combined levels and accelerometers provided that they are in clear cups or glasses. Slanting up to the left means you're banking to the left, slanting to the right means you're banking right and globules in the air indicate free fall and an impending extremely violent deceleration.

But jet liner physics comes into its own when you have a window to look out of. Late last year I was on my way to Los Angeles via Denver, which involved flying over the Rockies. They were quite spectacular to look at until cloud moved in to obscure them. I lost interest for a while, but then discovered much to my surprise a dazzlingly bright white oval which was tracking the aircraft at a somewhat lower altitude than mine. I nearly reached for my camera, but decided to think about the problem first. In a minute or two I had it: the spot was just an image of the sun, being reflected off the clouds below. It had to be, because the angles were right.

That's fine, except that clouds don't reflect that way. They have lots of spherical water droplets (or in the Rockies during an American winter, randomly oriented ice crystals) that scatter light in all directions. That's why they look white. These clouds were behaving more like a horizontal mirror, reflecting rays under the old $i = r$ law. Most of the clouds on my journey didn't do this; it was only the high altitude wispy ones. If the cloud is made up of ice crystals then there must be some non-random orientation of the crystals. But that's crazy. Can anyone tell me how a cloud can act as a specular reflector?

Physics Forum

The squash ball

Here's one I discovered while cramming late for a General Relativity examination last year. It was getting on towards midnight, and I needed to let off some steam.

If you play squash, try bashing a squash ball against a blackboard a few times. As you would expect, the ball leaves a dark mark where it bounces off the board (lots of Physics staff play squash, so if you arrive for a lecture one morning and find the board peppered with circular marks, you'll know why). In fact, almost half the ball will be covered in chalk, indicating the ball gets pretty badly squished when it hits. This method provides a pretty good way of studying the extremely short impact of a squash ball without expensive equipment.

Now take a closer look at the board mark and you'll find something interesting. There's blast marks radiating away from the impact area, which I expect, and a tiny dot of chalk which somehow collects in the center of the mark, which I certainly do not expect. What sucks the chalk into the center, when common sense says it should be pushed away by the blast of impact? I note some similarity in appearance with the lunar crater Tycho, which was formed by a meteor impact of somewhat greater scale than that of a squash ball. Are the two impact mechanisms related?

Chalk dust

Still on the subject of blackboards, you've all seen a lecturer clean a blackboard. If he or she has been particularly enthusiastic, there's a lot of chalk to get rid of, and a lot of chalk dust collects on the duster.

Occasionally a lump of chalk dust breaks off and glides effortlessly down the board, leaving a dark track behind it. You must have seen it many times. So what? Well, think about the forces involved. Somehow the chalk dust lump travels down the board with very little friction (not much more than can be ascribed to the air it travels through), and yet it stays so close to the board that it can pick up even more dust as it goes, leaving a track. Why can it slide so close to the board, and why doesn't it just flutter off when it slides down?

Now it's up to you. If you can answer any of these questions or have a few of your own, address them to me and put them in the society mailbox. I look forward to hearing from you.

- Bodie Seneta **J**

Attention all First-years!

Andrew Sykes

We in Physics III have had the experience of over 250 (Ugh!) physics lectures, not that anyone has attended them all. During these lectures, we have been accosted with numerous phrases which at first seemed innocuous and exciting.

With experience, however, we have learnt the true horrors of these deadly sayings. So we have taken it upon ourselves to warn other unsuspecting and innocent (I don't know about that! - Ed.) first years of the more dangerous phrases, which could, at any moment strike. *AVOID THEM LIKE THE PLAGUE!!!*

Government Health Warning: The contents of this article could be detrimental to your health. If taken in large doses consult a psychiatrist or arts student.

... use a Fourier Transform ...
... without loss of generality ...
(i.e. with complete loss of comprehension.)
... this is easy - you can do it in your head ...
(This one is especially dangerous coming from Ian Johnston.)
... using spherical polar coordinates ...
... called a Laplace transform ...
... using the transmission coefficient ...
... with a little bit of algebra ...
... you've done this before ...
... this will hardly ever occur ...
... we can easily see ...
... intuitively ...
... this should work every time ...
... as you would expect ...

The editors have a few to add:
... using tensor analysis ...
... taking a first order approximation ...
... by a series expansion ...
... it follows that ...
... for large N ...
... to within a constant multiplier ...
... to a good approximation ...
... it is clear that ...
... a trivial integration ...
... so ...
... by a well known trig indentity ...

For those of you above first year you will (have) come across the phrase:
... you did this in first year ... J

The National Science and Technology Centre

by David Mar

It was mid-January when your adventurous reporter found himself in our great national capital, eagerly searching for new and wonderful ways of viewing the world of science. Canberra is usually noted for boring things like politicians and politicians (not totally unlike lecturers in their ability to send people off to dreamland) and so may not seem to you like a particularly enlightening place to be, especially during the summer holidays. Fortunately, a mere two months before I arrived in that wonderful seat of power there occurred an event destined to change people's lives forever: the official opening of the National Science and Technology Centre (NSTC).

The NSTC is nicely located (as is everything in Canberra) on the shores of Lake Burley Griffin, right between the National Library and the High Court. It is a big, modern-looking, gleaming white building, with chunky angles and gentle curves visible in about the right visual ratio. Upon entering, one is confronted with a large and airy foyer, above which runs a long, sloping catwalk.

Having bought an entrance ticket, which cost me $3 on student concession (adult tickets were going for $6), I joined the crowds of people walking up the catwalk to the first exhibition room. Studying my ticket on the way, I discovered it to be calibrated in milliseconds. It explained that it could be dropped between a person's waiting fingers to measure their reflex reaction time. The scale looked quadratic, in accordance with $S=\frac{1}{2}at^2$, but a quick calculation when I got home showed that it had been designed for an acceleration due to gravity of 6.3 $m.s^{-2}$!

The catwalk sloped gently up to the third floor of the building, where it suddenly plunged into a large cylindrical section of the building and led me into a room full of mathematical exhibits. Now how many members of the general public do you think would be excited by this? Wrong! It took me a good ten minutes before I could fight my way through the crowds to have a good look at even one of the exhibits. Almost without exception, the exhibits were highly interactive in a way such that even the youngest children present could "have a go" at them. A few displays demonstrated probability by having steel balls roll down through various gating structures, another allowed people to investigate the strange properties of the Moebius strip by making one themselves. The ubiquitous elliptical billiard table was present, as well as a more dramatic display demonstrating the reflection properties of the parabola; children were lined up waiting to drop rubber balls into the large paraboloid and see them bounce unerringly onto a small metal disc suspended at the focus. The most popular exhibit was mainly patronised by muscular males, attempting to throw tennis balls as fast as possible at a protected radar (I assume it was radio waves they were using) speed measuring device. A cheer went up whenever one of the throws hit 100 kph.

The next display room, situated off the now spirally winding down catwalk, contained a temporary display of animated model dinosaurs. Although an excellent display, I won't go into details since the dinosaurs have since packed up and left (or were they wiped out by a comet?).

Further down the spiral came the really interesting stuff. Entering the display room titled *FORCE*, the first thing I noticed were the huge arcs of simulated lightning sweeping around the centre of the ceiling. "Wow, a Tesla coil!" I thought, and decided to have a good, close look at it after working my way through the packs of people around each of the other displays. There were people balancing sticks on their outstretched hands, children on see-saws and a bunch of people waiting to have a go at turning a dynamo to generate electricity and light a lamp. The interactive displays were by far the most popular, although I found a display of air bubbles rising slowly through an extremely viscous red fluid to be fascinating. Working my way around the room and slowly towards the Tesla coil in the centre, I noticed another electrical display. It appeared to be a three-phase Jacob's Ladder, much like the one we have stored away somewhere for Open Days and Orientation Weeks, except on a grander scale. There were various devices to demonstrate the principles of mechanics, especially the ever popular conservation of angular momentum. People toyed with gyroscopes and spun on

swivel chairs by twisting a rotating bicycle wheel. There was a large crowd of peop an area from which occasional laughter and screams of mock terror emanated. Inv revealed that a large platform supported on hydraulics of some sort was being used the public to simulated earthquakes. The long queues of people waiting for this experience deterred me from seeing what it was like for myself. By now I was ready to give the Tesla coil a thorough inspection. Unfortunately it was now not working. Since nobody (except me) seemed to be worried by this, I assumed that it was on some sort of automatic on-off cycle to save electricity. Waiting another few minutes proved fruitless and eventually I had to leave disappointed. I advise anyone visiting the NSTC to have a good look at the Tesla coil as soon as you see it operating and not to save it until later.

The next display room down the spiral was closed. It was probably still being furbished with its displays, which I believe are to be a large number of public-operated microscopes equipped with various slides showing the normally invisible world of the very small.

The last room on the spiral was titled *WAVES*. It contained exhibits showing various aspects of sound, light and the good old vibrating string. There was a twin parabolic dish sound projection "telephone" on one side of the room and a set of Chlandi vibration plates for people to play with. Various patterns of mirrors were set up to create interesting effects when looked at, including the famous infinite regression of images between parallel mirrors. The public appeared fascinated by various things which they had surely heard about but rarely, if ever, seen, such as optical fibres and lasers. There were several good holograms to look at, my favourite being a beautifully detailed rendition of a combed seashell. Colour mixing was demonstrated by an automatically controlled cycle of brightening and dimming primary coloured spotlights shining on a white wall. A group of children were having fun looking at the various coloured shadows they threw on the wall. A light table with polarising filter was deserted until I walked up to it and began to play with the various pieces of broken plastic and polaroid sheets. Other people, seeing the pretty patterns I was creating by merely moving pieces of plastic around, started to join in and I soon left the large group of excited children and parents now surrounding the display.

On leaving the *WAVES* room, I found myself in a final display area, a round tower nestled in the centre of the spiral walkway. There appeared to be a large, inflated apple in the centre of the area and not much else. From some documentation I discovered that this area was to house a continually rising and descending hot air balloon (the apple, obviously) and a huge Foucault pendulum.

My trek through the display areas ended, I took some time to browse through the small shop in the entrance foyer. There were science oriented books for sale as well as various scientific toys and gadgets. Posters of astronomical objects, holographic stickers and a well known non-Newtonian fluid (sold under the trade name of *Slime*) were all for sale. I was most impressed with an almost paper thin plastic Fresnel reducing lens, which possessed amazing optics and had many people forking over the five-odd dollars asking price. Making do with a souvenir badge and a couple of stickers, I left the NSTC most impressed with what I had seen.

Over all, I must say that the NSTC was a lot of fun and very entertaining. Aimed at the general public as it is, it doesn't really offer quite so much on an educational level to us physicists as it does in the realms of pure entertainment. Since places that offer a high level of entertainment seem to be in short supply in Canberra, I heartily recommend a visit to the NSTC to anybody who might happen to find themselves in Canberra at some time in the future. J

Really Serious Bit:

Again, the Editors wish to express thanks to Professor Dick Collins of Applied Physics and his secretary, Kathryn Collins, for the same stuff as last issue. But this time we also have to thank those fourth year and M.Sc. qualifying students in the Applied Physics department for letting us use **their** computer in particular. *Happy now???!* J

AIDS Scare! Are Lecturers HIV positive?

Jeremy is currently going through a period of negatively enhanced quote flow. What is the reason? Do the lecturers have AIDS (Acquired Idiocy Deficiency Syndrome) ? How many of them test HIV (Humour Insufficiency Virus) positive? Hopefully the situation is but temporary. We know there are quotes out there ready to be harvested, but you *do* have to listen to your lecturers (there had to be a catch). The only reason we have any quotes at all is due to the law of conservation of stupidity. Bernard Pailthorpe has triumphed along with some of the other fourth year lecturers to bring you this month's offering. *Jeremy* is proud to present:

The KitKat Quotes Competition

Yes, we are now officially sponsored! The huge end of year prizes for the quote perpetrator and submitter will include a whole box of Kit-Kats! So get those quotes rolling in! Quotes should be placed in the Physoc mailbox, behind the door in the main office foyer (near LT8). It is now prominently labelled with the *Jeremy* logo and so should be a bit easier to find. Here we go...

Graham Derrick:

"Well, I'll be very vague."
"Now this can be rather hard to prove unless it's true."
"I've just asserted this result; now I'll make it plausible."
"Now, one always likes to throw in Planck's constant..."
"If you multiply this out... oh, it's too hard."
"Well, what's this got to do with physics?"

Don Melrose:

"I'm worried about my *k*'s; should they be like that? I'm just confused."
"This is an interesting rule. I'd enjoy deriving it, but I'll resist the temptation."
"There's no exact way of doing this, so everything is a bit of a fiddle."
"2=1 is an important simplification."
"e_o doesn't exist, yes, but that doesn't help me to write it down."
"That will be covered in a later lecture, which we won't give."
"You'll recall this result from your second year course in electromagnetism, which nobody ever understands."

Ross McPhedran:

"The transverse part leads to transverse waves, the longitudinal part leads to longitudinal waves and the rotatory part leads to a mess."
"Have I made a mistake down here? No, I had it wrong in the first place."
On seeing a spanner laid down by a student building some experimental apparatus: "Never leave one of these things around were a theoretician can get his hands on it."

Max Brennan:

"The good thing about four o'clock lectures is that you're never in a hurry to go anywhere afterwards."

Donald McQuarrie (visiting from Indiana University):

"You guys probably like Carnot Cycles much more than chemists."
"When I first met Bernard [Pailthorpe], I just said 'My God!' to myself."
"Chemists are molecular level thinkers."

Ian Johnston:

"Scientists are just as gullible, just as stupid as everyone else, but they're worse because they're arrogant."
"Conversion to ratbaggery is obviously a phase change of the brain."
"The anti-gravity device? Well, I doubt that will ever get off the ground."

Lawrence Cram:

"If the temperature on earth was just a few degrees colder, or a few degrees warmer — and ha! you'll all be around when it is — the results could be disastrous for life."

Bernard Pailthorpe:

"We're going to write down 10^{20} of these energies, and the first 10^{16} are going to be the same number."
"Oh, I've missed a step... It doesn't matter, you don't need to know about it."
"What's A? It's a number of order 2... in some units."
"You'll notice I skimmed through this derivation. I can't imagine that any of you actually understood any of it. Neither can I, actually."
"This is basically chemistry — which, from a physicist's point of view, is irrelevant."
"We convert this sum to an integral because sums are always hard to do; integrals are much easier. But this integral is impossible anyway. So we take a series expansion."
"Mathematicians would take a week just proving you could do this. We just do it and see what we get."
"...And what this tells us is that it's going to be hard to work out."
"There are some wonderful integrals you get to do here — that give really cute results."
"So we can do an exact molecular theory, which is what we are going to do. But don't forget that it's only approximate."
"This is second year mechanics and you don't want to be retracing that sort of stuff — even if you never did it."
"I don't want to derive this damn equation."
"There it is, the centrepiece of statistical mechanics. Completely bloody useless."
"It's really elegant... nobody understands it."
"You can try to work out my non-sequential equation numbering system. That's a second order problem."
"This is the equation of the world, and it's totally bloody useless. All it's useful for is deriving theories that are useless."
"I'm in good form for quotes today."
"What does this look like? A Laplace convulsion!"
"All this stuff *was* part of physics once."
"You'll see in the notes that $(J_i)_{nn}=0$. I've forgotten why."
"I'm actually trying to simplify this, believe it or not."
"I want you to believe this, because we've just derived it."
"It always simplifies physics to take a Fourier Transform."

FØRƎIGN QUOTES:

Geoff Field (Pure Mathematics):

"...then I replace this with the largest number I can think of..."

T. C. Kuo (Pure Mathematics):

"Fourier to God: 'Thank you.'"

Now surely your lecturers have uttered even sillier things than these. We want to hear them! So let's get those pens recording quotes!

J

The Physics Phaculty

by Rob Coleman and Andrew Sykes (Physics III).

(To be sung to the theme tune from *The Addams Family*.)

They're balding and they're aging
Never seen out raging
They pull a decent wage in
The Physics Phaculty.

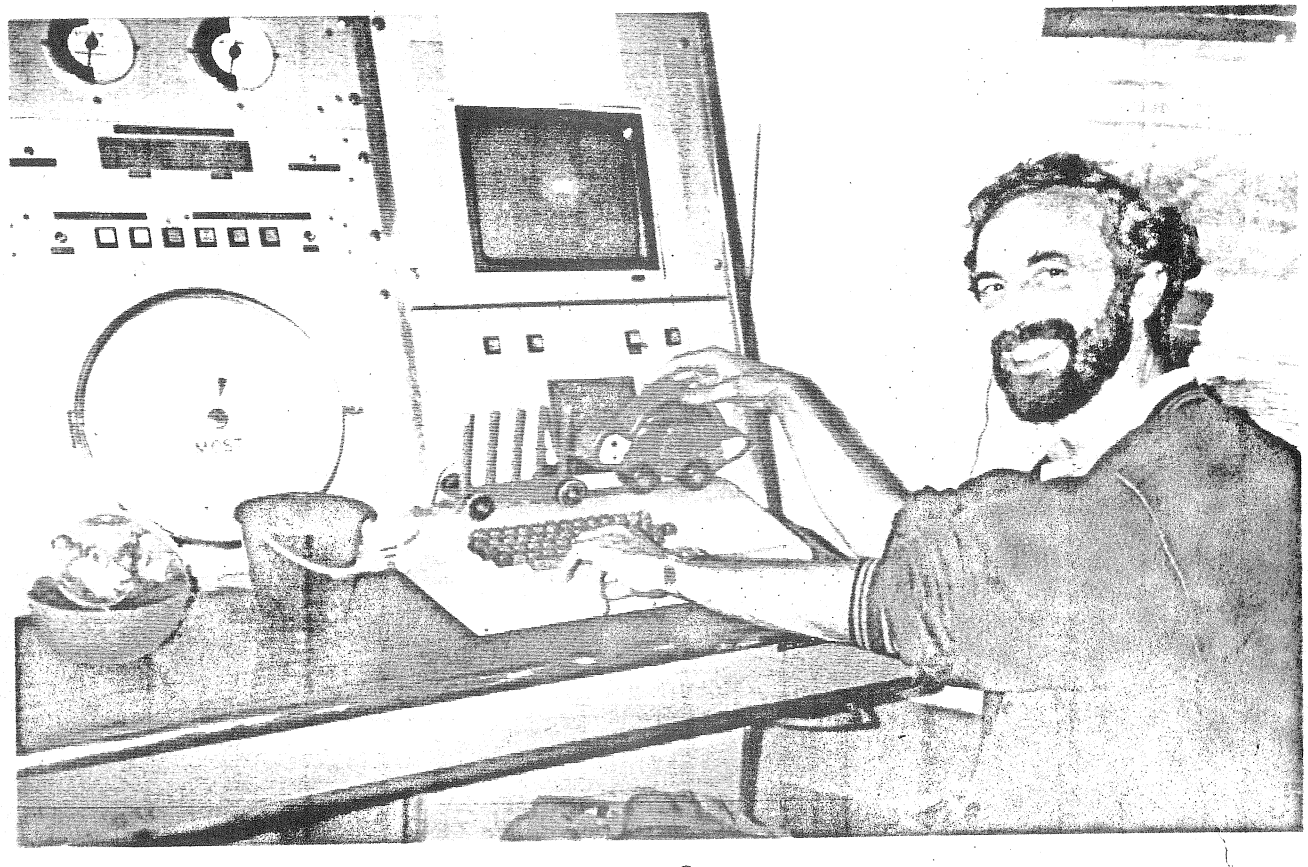
The building is a shambles
The lecturers all ramble
Exams, they are a gamble
The Physics Phaculty.

So get a Tortus built in
Appeasement to Max Brennan
We are now all enrolled in
The Physics Phaculty.

J

The Physicist At Work

In an effort to show you, our readers, what real physics research is like, we have unearthed a recent photograph of Dr Richard Hunstead of the Astrophysics Department, hard at work at the Molonglo Observatory Synthesis Telescope (MOST). Note the sophisticated technological equipment in use on the desk, and the particularly complex piece of apparatus in Dr Hunstead's hands. We thank Penny Hunstead for the photography.



The Physics Building at The End of The Universe

A Tragedy in Four Acts

by David Mar and Kim Lester.

The story so far:

In the beginning the Universe was created (by definition).

Big deal.

Anyway; four people by the names of Arthur Dent, Ford Prefect, Zaphod Beeblebrox and Tricia McMillan (or Trillian), have managed to mysteriously appear in a place which none of them recognise, a place which so far seems to be inhabited by young students and vague lecturers. Bravely exploring their surroundings, they have run into an all too familiar sight from their recent past, someone whom they had all thought was lost forever in the swirling eddies of the space-time continuum.

Act Two

"Hey, Kevin," said Zaphod, "What are you doing here? As a matter of fact, where is here?"

Kevin took his time to answer, as though he had much better things to think about than helping his old companions. Finally, just as Ford was about to say something, he spoke:

"What am I doing here? You want to know what I'm doing here? I'll tell you what I'm doing here. Research, that's what."

"Research? How awful," said Ford, "Research into what?"

"Physics," Kevin almost spat the word out.

"Physics?!" exclaimed Arthur, "That's horrible! But, where are we?"

"This is The University of Sydney Physics Building," began Kevin, "where hundreds of eager young students come every year, only to slowly degenerate, decay and wither away to nothing. It's commonly known as the Physics Building at The End of The Universe."

"My god, that's terrible!" said Trillian, "Physics should be interesting. I have a Ph.D. in astrophysics myself and I know it's not really like that. Is there an astrophysics department here, Kevin? I'll have to go have a word with them."

"Follow me," answered Kevin as he led the group down the hall and across a covered bridge linking the building with another, newer looking building. "It's up here," he added, ducking into a stairwell.

Before they could follow, Ford and Zaphod were almost knocked over by a student carrying bundles of papers who rushed past them out of a glass door, which led into what appeared to be a library. The library was walled off from the passage by large windows, which revealed a strange sight inside. Several large tables were heavily layered with sheets of paper and sitting around the tables, heads bent over incredibly large books, were a profusion of students, all busily writing or punching at calculators. Every so often, one of the students would let out what appeared to be a scream (Ford and Zaphod assumed the windows were soundproofed), scrunch a sheet of paper into a ball, throw it across the table and then set to work writing on a new sheet. The student who had rushed past them turned around quickly to apologise as she ran off across the bridge.

"Sorry! Third year assignment's due at the start of the next lecture!" she yelled, as though this explained everything.

The Hitch Hikers Guide to The Physics Building *has this to say on the subject of physics assignments.*

Assignments are the bane of a student's existence. They appear to serve no purpose whatsoever except to make the student's social life a drag and weekends a misery. Many lecturers are under the misconception that assignments actually help their students to learn whatever subject it is that they are attempting to teach to them. As any student can tell you, however, the entire content of the lecture course (or as much of it as can be fit into only one brain at a time) is invariably learnt on what is popularly known as the night before the exam. *Try as they might, no lecturer yet has managed to break this long-standing ritual of the student.*

Since assignments are usually worth marks, however, it is in the student's best interest to submit them. The problem then becomes how to get the answers without actually doing the questions. Whilst some students don't even go that far and resort to some other means of obtaining marks, such as bribery, the budgets of most students don't allow this option to be a serious possibility. The popular alternative is commonly known as the collective last-minute brainstorm, *which invariably leaves the students utterly exhausted and totally incoherent for at least as long as it takes them to realise that they have yet another assignment due the next day.*

The group followed Kevin up the stairs to the next floor of the building. Kevin began climbing the next flight, but Arthur found himself cautiously looking down the hallway that branched off from the landing. He thought he could hear a soft rustling sound emanating from behind one of the several closed doors. He moved to the door and listened at it. He touched the handle and slowly turned it.

The door swung open silently to reveal a dark haired man with a bushy beard, who was hunched over a desk and writing furiously on a thick pad of paper. The room was dark except for a tiny desk light shining on the man's work pad, but Arthur could just make out enormous piles of paper scattered all over the room.

"I'm sorry, I didn't mean to disturb..." began Arthur, stopping when he realised that he was being totally ignored. He walked into the room and clapped his hands behind the man's head. Nothing. He waved his hand in front of the man's eyes and again received no response. It was then that he looked at what the man was writing.

"Hhhhrrrrrrnnnnnnnnyyyyyaaaaaaaaaaarrrrrrrrgggggghhhhhhhh!!!!!" cried Arthur as he ran like a crazed rabbit out of the room and up the stairs to the others.

"Arthur, what's wrong?" gasped Trillian when she saw the peculiar colour of Arthur's face and the strange way that he appeared to be clawing for air.

"...Equations!..." gasped Arthur, "...Numbers!...Symbols!..."

"He's babbling," said Ford, "He's gone into shock."

"He must have gone into Ross McPhedran's room," stated Kevin.

Arthur was now lying face down on the floor, panting heavily. He spoke as he fought for breath.

"...Equations...pages and pages of equations...they were awful...I felt my mind, my very consciousness, being ripped apart...what's he trying to do anyway?..."

"He's been working on this for a while now," answered Kevin, "He's trying to unify quantum mechanics, super-string theory and the special and general theories of Alan Bond tax returns."

"My god," shuddered Trillian, "That's fiendish!"

"Yes," replied Kevin, "Anyway, here's the Astrophysics Department."

"I'm not so sure I want to go in there any more," said Trillian, looking around the corner and down the empty hallway. She noticed that there appeared to be masses of paper stuck to all the walls, hundreds and hundreds of layers, all overlapping one another, with the occasional leaf dropping off and falling to the floor. Only after looking intently for a few seconds did she realise that there were noticeboards hidden under all of the papers. "Let's get out of here," she added emphatically.

"Who's that out there?!" a voice suddenly boomed out from one of the rooms down the hall, "More fourth years? Come here, we've got plenty of work to give you!"

"Oh no," whispered Kevin, "Lawrence Cram's heard you. Down the stairs, quick!"

The group needed no urging; they were down the stairs and back over the bridge to the main building with the speed born of desperation to escape.

"Well hey, Kevin," began Zaphod, "this has all been really hoopy so far, but we really just want to get out of here."

"Ha ha ha ha ha!!!" Kevin laughed almost insanely, "You want to get out of here? I've been trying to do that for the past hundred million years! Nobody can get out of here!"

"But," said Ford, "You do physics here..."

"Ha! Physics; don't talk to me about physics! Now if you'll excuse me, it's tea time, and I've got to go claim my chocolate chip biscuits before anyone else can get to them."

As he said this, Kevin vanished from sight so quickly that none of the group could be sure of exactly in what direction he went.

"Did he say 'tea'?" asked Arthur.

"Who needs him?" said Zaphod, ignoring Arthur, "Come on guys, let's quit this place. Umm..." he hesitated for a second, "...down here."

Zaphod led the way down a corridor that looked almost infinitely long, much like the one on the ground floor. A few paces down the hallway, they had to step around a carefully arranged group of metal wastepaper bins that were apparently just failing to catch drips of water that fell from the ceiling. They continued down the corridor, occasionally passing a wooden door with dust coated panes of glass set into it. As they reached one door, they noticed that a feeble light was penetrating the eons of sedimentation.

They stopped outside the door. A dull murmuring drone emanated from behind the door, its low, throbbing tone mesmerising the group. Ford tried the handle; it resisted a little, then gave slowly with a grinding screech as if it had not been used in an extraordinarily long time (which was in fact the reason that it so complained). They peered inside and were shocked to discover bodies slumped over rows of desks.

"They look dead," shuddered Trillian.

Towards the front of the room, through a thickly translucent haze of chalk dust, a squat, grey figure slowly shuffled back and forth, all the while mumbling something about eigenstates.

"What's he saying?" asked Arthur.

"He's...er...mumbling something about eigenstates," replied Zaphod.

The mysterious figure continued his incantation, occasionally stopping to write some vague symbols on the blackboard. The group found themselves unable to take their eyes off him. They felt their willpower weakening as the thickly clinging atmosphere began to draw them inexorably into the room. The figure made a mystical gesture with a hand and then proceeded to rub a duster over some of the symbols on the board, adding great billowing clouds of chalk dust to the already heavy air. He then took up the hypnotic chant again, and the group were almost in trances when suddenly one of the dead bodies slumped into a different position.

"They're not dead yet, but they're close," commented Arthur as the rest of the group shook their heads to regain control of themselves.

"Yeah, bored to death. Quick, let's get out of here before anything happens to us," said Zaphod.

As they closed the door, they could feel the heavy atmosphere trying to draw them into the room.

It is interesting to note how a small mechanical fault can affect the lives of so many people. In one particular case, a mechanical defect in a wall clock caused it to stop during a lecture, and the lecturer continued to talk, oblivious to the cries of the students, until the "hour" was up. To this day, he is still believed to be lecturing in some dank, deserted part of the Physics Building.

To Be Continued. **J**

ANNOUNCING:

The Incredible End Of Semester Physoc Party!

SEE: The Amazing Bubbling Punch Bowl!

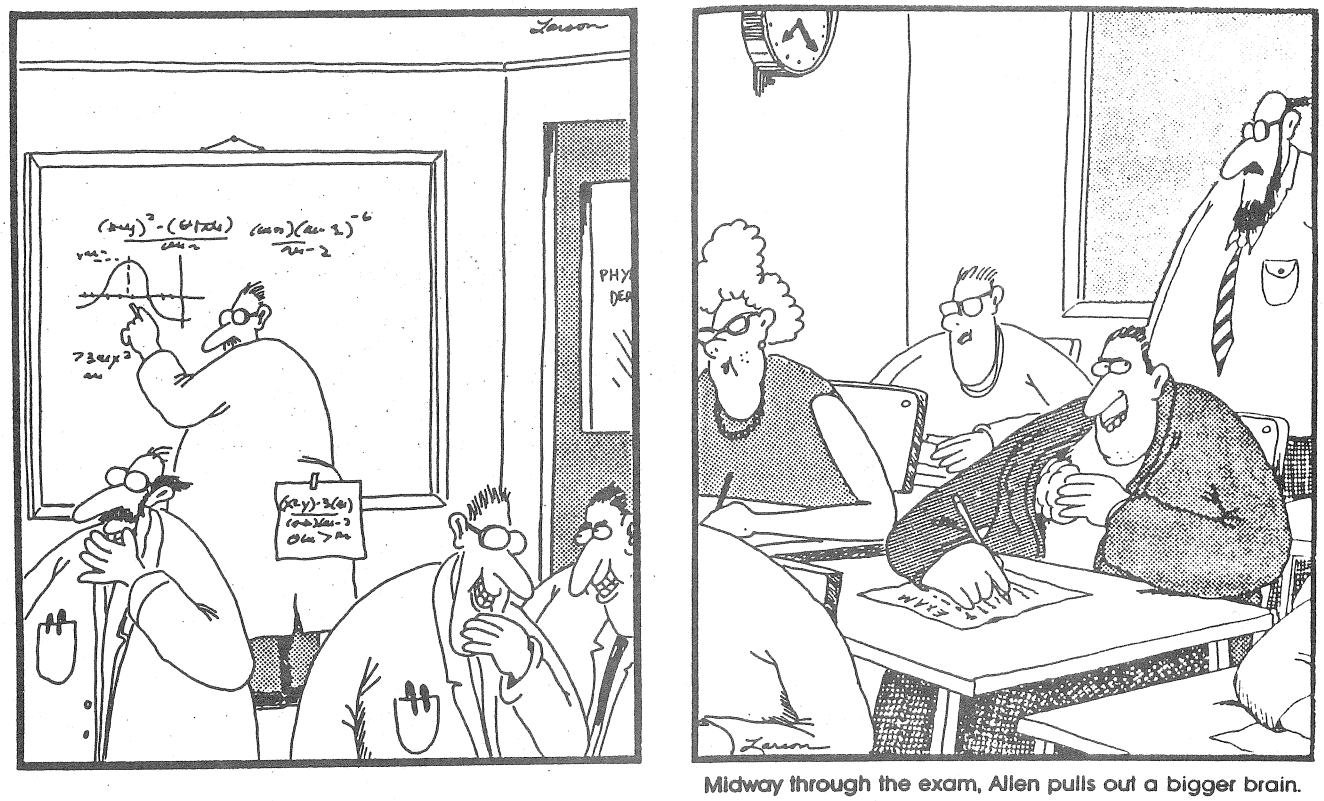
EAT: The Patented Carbon-12 Sausages!

DRINK: The Amazing Bubbling Punch!

And if you survive all that you can get stuck into the salads, wine, nuts, chips, beer, cheese, bikkies, dips and soft drinks. The time and place?

Solar Physics Roof
Friday, 2nd June, 5.30 pm
Only $3 for members (bring your card), $5 for non-members,
$7 to join and attend

J



Midway through the exam, Allen pulls out a bigger brain.

We (the Eds) would just like to wish everyone the best of luck for the exams and a safe and fun holiday. *Jeremy* will be back next semester!

J