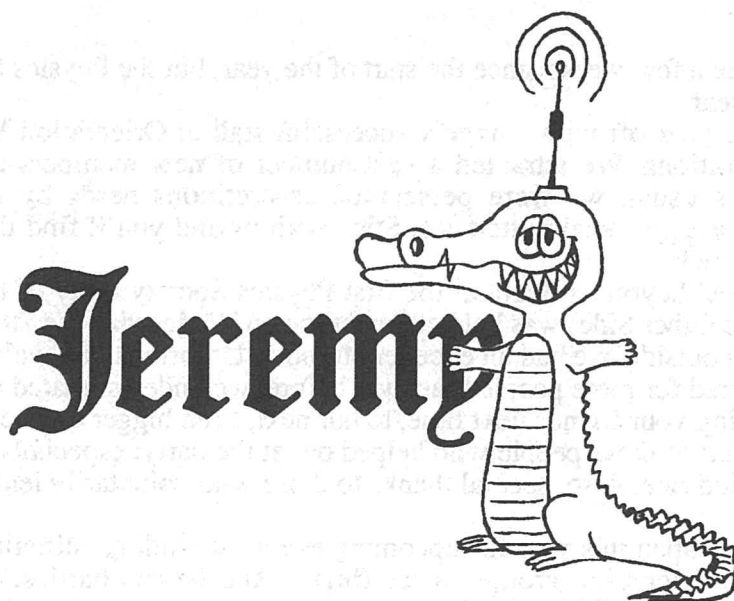




The Official Journal of The University of Sydney Physics Society

Volume 6 Number 1

March 1990

### Editorial

G'day and welcome to the first issue of *Jeremy* for the new year and the first issue with myself as editor. Even as this goes to print I am still searching for a fellow editor; so if there is anyone out there who might be even considering the possibility of being an editor, then I would love to hear from you. All you have to do is to come to the Physics Society's Annual General Meeting and state your intent or put a note in the Physoc mailbox, the location of which is described on the next page.

Somehow amidst all the chaos surrounding the first weeks of term, waiting in transfinite queues for books and union activities, we have achieved our ultimate goal.... the first edition of *Jeremy* for the new year. As usual *Jeremy* should arrive before your lecture but of course you aren't allowed to read it till the lecture is over!

To those who have not seen *Jeremy* before, its purpose is twofold. Firstly, as the Official Journal of the University of Sydney Physics Society it keeps you informed of the latest events run by Physoc. Secondly, we hope to amuse and inform you and give you something to read during lectures. To be successful in both these endeavors *Jeremy* needs your articles, quotes etc. To submit anything all you have to do is stick the material in the Physoc mailbox.

In this issue we have the start of an exciting new serial, "Alice's Adventures in Physics Wonderland", written by the "dynamic duo", a collection of essential definitions, which was submitted last year by some eager young first year students, an article about Phase Shifting, a pictorial guide to using music in Physics, plus of course lots of puzzles and quotes.

Finally I would like to thank David Mar and Kim Lester for all the work and effort they put into editing *Jeremy* last year and turning over to me a very successful journal whose high standard I hope to maintain. Also they helped me to edit this issue and have shown me the complicated procedure needed to bring this issue to you.

The Editors: Richard Planetaganet (Physics II)  
Soemone Else (Physics ??)

J

## Vampire Crocodile Devours Third Years In Sordid Lab Orgy

It has only been a few weeks since the start of the year, but the Physics Society has not rested on the laurels of last year.

We kicked the year off with a hugely successful stall at Orientation Week, with our usual whizz-bang demonstrations. We attracted a vast number of new members and received a lot of positive response. As usual, we were persecuted as cretinous nerds by the ill-informed and undoubtedly envious yuppy social butterflies. Stick with us and you'll find that we are capable of having a damn good time!

This was proved beyond a doubt at the first Physics Society Party of the year: The Chaotic Party (Welcome to the Other Side) was held at lunchtime on Wednesday the 7th of March. Even with the rain pouring down outside, we had an excellent turnout. Unfortunately, we've become so popular that, although we catered for more people than ever before, we underestimated the numbers. Keep up the good work and bring your friends next time, to our next, even bigger and better catered party.

Thank you to all of those people who helped out at the party; especially Elizabeth Hing, who made a superlative fried rice. Also, special thanks to those who voluntarily lent a hand by helping to run things.

Keep your eyes open this year for upcoming events, including: stimulating lunchtime talks, free wine and cheese discussion groups, more (bigger and better) parties, new Physics Society T-shirts, the annual (?) softball/frisbee/gridiron game, competitions and excursions.

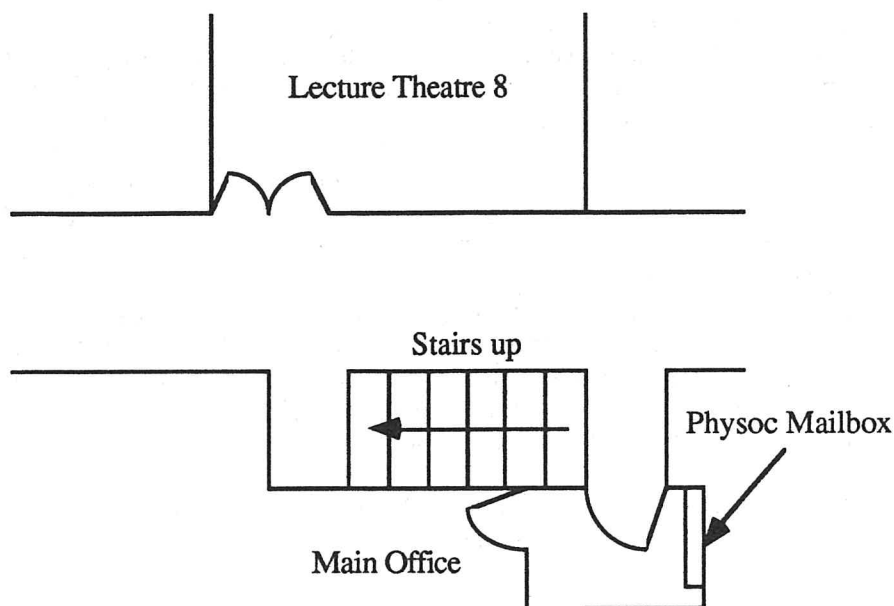
Our Annual General Meeting will be coming up soon, on Thursday the 29th of March, at 1 pm in Lecture Theatre 8. You should attend this to get your say in the running of the Society and for a chance to be elected to one of the positions of awesome responsibility that are so important to the efficiency of the Society.

J

## Submissions to *Jeremy*

*Jeremy cannot survive on love alone; in order to produce high quality material like this several times a year, we need students (that's you!) to submit material. Apart from entries for the **Kit Kat Quotes Competition**, we will welcome humorous articles, semi-serious articles, cartoons, questions and puzzles on physical phenomena, songs, poems, jokes, reviews, *anything* with any relevance to Physics at all. Anyone submitting publishable material (apart from quotes) will receive a handful of free **Kit Kats** from our sponsorship swag, courtesy of Rowntree Hoadley.*

If you have any submissions or suggestions for the Physics Society then all you have to do to get them read is to put them into the Physoc Mailbox (see the map below for its location).



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## Physics Forum

by Bodie Seneta.

(really by David Mar and Neil Broderick.)

This column, which became a regular feature of *Jeremy* last year, is being ghost-written for this first issue of the new year: Bodie was unable to submit a column for this issue because of travel commitments. But your intrepid Eds have come up with a few teasers of their own.

For those of you who are new to *Jeremy*, this column works like this: If you see something which you don't understand and which you think must have a physical explanation hidden behind it somewhere, send the puzzle in to us and we will do our best to help or throw the problem open to the general readership. Last year we discovered how you can see a reflection of the sun from clouds, why water droplets sometimes skitter around on the surface of a pond, why frisbees flip over when thrown sideways and we even did some practical quantum mechanics with a T-shirt.

The idea behind this column is that if *you* can throw some light on why the phenomena described happen, then you should send the answer in to us, so that we can enlighten everyone else, and especially the original questioner, as to the principles involved. Anyone sending in a correct solution will receive a bunch of *Kit Kats*. Just pop your solutions, and any questions of your own that you might have, into the Physoc mailbox.

Enough preamble; here are this year's first problems:

### The Bright Spot

Whilst flying in a small (ten-seater) aeroplane up to Coonabarabran recently, I (DM) noticed that on the ground beneath us, where I expected to see the shadow of the plane, was a large spot of bright light. Thinking about this for a while, I realised that, from the ground, the plane probably subtended a smaller angle than the sun and so there should be no prominent shadow; but why was there a significantly *brighter* area? Then I remembered the Poisson Spot experiment that I had seen during Open Day in 1988. If you illuminate a ball bearing with a laser beam, you can bring to focus on a screen some distance behind the ball bearing a diffraction pattern, with a bright spot in its centre. But that's with a laser — monochromatic, coherent light — and a finely tuned focal distance, and you still see the shadow of the ball bearing around the bright spot anyway. So why is there a large and very bright spot where the shadow of an aeroplane should be?

### Night Cricket

Attending a one-day cricket match at the SCG over the summer, I (NB) began looking for other interesting things when Australia's innings began going downhill and perceived that the night sky behind all of those glaring floodlights was a dark purple colour. Now, almost none of that light is directed upwards, since that would be pretty pointless, and so it seems that any effect on the sky overall would be pretty small. What's more, there is always plenty of light flooding up into the sky from the rest of Sydney, and nowhere else do you see the sky to be such a rich purple colour rather than its usual shade of black. Even when just outside the ground (after an embarrassing defeat at the hands of the Pakistanis) the sky looked quite normal even though the lights were still blazing in all their glory. The question, then, is: why does the night sky appear purple when seen from inside the floodlit SCG?

### Of Crowded Trains and Long Hair

One morning a couple of weeks ago, my usual train was cancelled and I (DM) was forced to catch the next one, standing up in the vestibule area all the way to Redfern (how we suffer in the cause of science!). The door windows were open in order to allow a bit of fresh air to circulate and several people were squashed against the doors. A woman in front of me was struggling to keep her long hair from being drawn out of the window — in accordance to Bernoulli's Principle, of course; that bit is simple enough. But then I noticed something which I didn't understand. Instead of the hair being blown *back* as one would expect from the rush of air past the train, it was being sucked *forward*. Can anybody explain why this should happen?

# The Quotes Competition

Yes, folks! It's back! Once again under the generous sponsorship of Rowntree Hoadley, the *Kit Kat Quotes Competition* is here to terrorise lecturers and tutors by revealing those humourous little slips of the tongue and totally outrageous statements that they make to all and sundry. The grand prize this year is again an entire box of *Kit Kats*.

Part of last year's prize was graciously shared around at last year's end-of-year party by the winners. The winning quote was chosen by semi-democratic jelly bean vote, and turned out to be this gem by Kevin "Animal" Moore:

"Assume the Earth has a uniform gravitational field, i.e. that it is flat, of infinite extent, non-rotating and of uniform density."

Unfortunately, Kevin will not be around to grace us with his keen observations this year, having left his tutoring position to go out into the big, wide world and find a real job somewhere. The winning quote was submitted by a consortium of second year students who referred to themselves collectively as *Quote Collectors Inc.*: Garron Lipschitz, Craig Sheehan, Nuria Lorente and Derek McKay. The official *Jeremy* trophies have been engraved with the relevant details and are on display in the case outside Lecture Theatre 8.

To have a chance at winning this year's grand prize, all you have to do is enter the competition! The rules are quite simple. All you have to do is attend your lectures (an unfortunate requirement, but quite necessary) and listen to what your lecturer says, not necessarily what he or she means. If, as quite often happens if only you listen carefully enough, something funny, wacky or downright stupid issues from the lecturer's mouth, have a good laugh like the rest of the class and then record the quote on a piece of paper (assuming you have a lecture pad and pen with you at the time). Then afterwards, add the name of the perpetrator, your own name and your year to the quote, and put it into the Physics Society mailbox. Suitable quotes will be published in *Jeremy*, and the winning quote will be chosen by ballot at the end-of-year party.

Note that forming consortiums like last year's winners in order to collect more quotes is legal, but if you win you will have to share that box of *Kit Kats* amongst more people! Also, foreign quotes (from other departments) will be accepted and printed if they can live up to the high standard we've come to expect from physics lecturers, but they are ineligible for the prize.

Just to give you an idea of the sort of quality we are expecting, here are a few entries from last year which arrived too late for publication in the last issue of *Jeremy*:

## **Lawrence Cram:**

"Charles' Law is holding the sun up."

"You don't realise you've got a problem until you've solved it."

"It's even more fascinating than Schrödinger's equation."

"It's an area of current research. In other words, we don't understand any of it."

## **Gordon Robertson:**

"This is 2.5 and not a simplification of 2.512, as some people thought."

"That's the letter *kappa*. I suggest you practice drawing it for yourself."

## **Ferg Brand:**

"Anyone who turns up late to this lecture will either miss a great experiment or a great humiliation."

## **Kevin Moore:**

"The mathematicians solved this many, many years ago . . . well, they didn't actually solve it. They gave it a name."

"Haven't you ever heard a vacuum pump go 'pooka, pooka, pooka, pooka . . .'?"

## **Peter King:**

"Is it  $\log_{10}$  or  $\log_e$ ? Actually it doesn't matter, your results are that far out."

**John Davis:**

"If someone switched off the sun at its centre, it would be about a million years before we knew about it. Of course, no one can do that, but it's still an interesting thought."

"You may be wondering; why have stellar spectra been included? That's a good question. I often wonder about it myself."

## FOREIGN QUOTES

**W. Taylor (Organic Chemistry):**

"We now add water . . ." *Writes  $O_2H$ .*

"The exam is not meant to be an enormous hurdle."

*Student:* "No, it's meant to stop you."

**Terry Gagen (Pure Mathematics):**

"I'll change 2 to 3 and hope for a miracle."

"I'll do two elementary operations at once because I'm twice as smart as you are."

"We expect students to sit in maths in a respectful, interested fashion."

"I get  $12/4$  plus  $45/4$  . . . oh, God . . . I won't enter into any correspondence about that. It's approximately correct."

"On one occasion, I sent someone out of my lecture because he was carrying a rifle."

**John McMullen (Pure Mathematics):**

"We know what these formal power series mean — they don't mean very much."

"This part is for those of you who spend spare time reading books on recreational mathematics."

**Nigel O'Brian (Pure Mathematics):**

"This is a Cauchy sequence."

*Class hiss.*

"Oh, you've heard of Cauchy sequences, have you?"

**Neville Weber (Mathematical Statistics):**

"I'm sorry for using numbers, I know this is an honours class."

"I could have left out  $\xi$  as a coefficient, but it would have left you feeling a bit empty."

*And now, we already have a few entries for this year.*

**Max Brennan:**

"In Paris there is a standard kilogram and in Australia there is a sub-standard."

**Lawrence Cram:**

*On the University:* "It's got a structure to it . . . somewhere . . . I think."

*"Sears, Zermansky and Young's a good read."*

**Laurie Peak:**

"If I say 'shove', that's another operator."

"An example of negative work is pushing against a charging elephant."

"You start at infinity, which is over here . . ." *Walks over to the side of the room.*

"You can all see me pushing this positive charge."

"This is a good time to stop and play."

*Talking about electromagnetism:* "It's not like sniffing flowers or folk dancing; it's got maths in it."

"If you have a bird sitting on a charged wire and it puts one leg on another wire, you very quickly have a fried bird, and that is disturbing."

*With both hands on a Van Der Graaff generator:* "I could like quite happily like this; the only thing is, my hair feels a bit prickly."

"And with my magic wand, 'Pop!', out comes a charge  $+q$ ."

**Paul Walker:**

"The number of physicists that are renegade engineers, you wouldn't believe."

**Bill Tango:**

"We've grown up now, so we don't have to use ' $f$ ' any more, we use ' $v$ '."

*On Fermat's Principle:* "The photon has to sit down, work out the integral, see which path is the shortest and then take off on that path."

*After a hand-waving proof:* "We're physicists, not mathematicians!"

"What we are saying is: paraxial rays are: A — rubbish and B — trivial anyway."

## FOREIGN QUOTES

**Michael Braun** (Electrical Engineering):

"... that's not really what we want to hear, so we just go 'waffle'!"

"It tends to create problems dividing by noisy functions which go to zero everywhere — but it's elegant; that's a good excuse."

*Student:* "Do we have library privileges?"

*Braun:* Blank expression.

*Student:* "Can we borrow books?"

"What time did I say we were going to wave our hands?"

**Peter Buchen** (Applied Mathematics):

"This is the important squiggle." *Writes on board:* "important squiggle".

"Sometimes we like to give fancy names to trivial results."

**Dr L. (?)** (Pure Mathematics):

"You are here perhaps to learn 'Complex Variables'. Why that is, I don't know."

"You don't have to come to lectures. They are usually a waste of time."

"I'm boring you, but I must. It's my job to make you feel bored."

**K. Choo** (Pure Mathematics):

"If you read through the lecture notes, you'll realise how much time I've spent on the stupid things."

"... K . . N . . O . . T, I don't know how to pronounce that stupid word!"

"I just wrote that down to convince you. In fact, it is all garbage."

**Jeff Kingston** (Computer Science):

"NSW road rules are designed so that whenever there is an accident, someone can be blamed."

"I hate lecturers who do this . . . but I'll do it anyway."

**Terry Gagen** (Pure Mathematics):

"Are you here for the second time around? That's a shame; you'll hear the same jokes."

**Dennis Winch** (Applied Mathematics):

"It's so obvious we won't even bother to think about it."

"You won't find this in the text books because, as it stands, it's useless."

"The next step always seems to be a big mystery."

"It's not as if you're lost on a desert island trying to derive this without any text books."

**John McMullen** (Pure Mathematics):

"Here's a simple theorem that sums up everything that you can do."

"An open set is one in which at every point you can swing a cat."

"I'll write this down longhand for those of you who have yet developed a steel digestive tract."

J

## The Great Physoc T-Shirt Design Competition

Physoc is going to print a brand new batch of T-shirts this year. We are only missing one thing — a suitable design! So we have decided to hold a competition to get some ideas. Here are the rules:

1. You may submit either a complete design or (if you can't draw or don't have access to nifty electronic printing devices) an outline of your ideas for the shirt.
2. Complete designs must be submitted on two A4 sheets of white paper, one for the front design and one for the back. We will enlarge or reduce as appropriate.
3. The design or idea for each side should be in one colour.
4. The design should be immediately identifiable as belonging to the Physics Society. It should be in good taste (with the exception of bad puns) and preferable slightly humorous.
5. Entries should be submitted in the Physoc mailbox by no later than 5 pm, Thursday, 12th April, 1990. Entries should include your name and year.
6. The prizes for the winning design/s will be a couple of T-shirts with your fantastic design on them (personally autographed by yourself if you wish), the honour of having your design worn by hundreds of adoring fans and FREE entry into the rest of this year's Physoc parties.

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# The Physics Society Annual General Meeting

When? Thursday, 29th of March, 1 pm

Where? Lecture Theatre 8, Physics Building

Why? To have a say in the running of Physoc,  
to have a chance to be elected to an executive position,  
to play a dynamic role in one of the  
most active societies on campus,  
for the FREE wine, cheese, OJ and bikkies!

Attend . . . or integrate!

$$\int_0^{\infty} \cosh\left(\sqrt{\frac{1}{4\pi\epsilon_0}} e^{i\theta}\right) \frac{\partial}{\partial y} (\nabla^2 \phi) . d\theta$$

## Phase Shifting at Molonglo

by Neil Broderick and Sue Byleveld.

At the end of last year, a team of students and staff went down to the Astrophysics Department's Radio Telescope at Molonglo, near Canberra. Our purpose was the installation of the "Amy-Large Phase Shifters", a procedure that was successfully carried out.

In the team were three first year students: Alex MacTavish and ourselves. We all obtained this job by various devious and nepotistic means, too intricate and complicated to delve into here. We two also wrangled three weeks in January working in the Astrophysics Department.

One of the problems with the telescope is that radio waves from a source arrive at different times at different sections of the telescope. This means that there is a phase difference in the data received that causes spurious signals when combined. By installing the phase shifters, we corrected for the phase difference in the data, thus eliminating the spurious signals.

All of the older members of the team were very helpful in answering all of our ignorant questions, on topics as far ranging as fractal landscapes and why storm clouds are black. The occasional question relevant to our work was also asked.

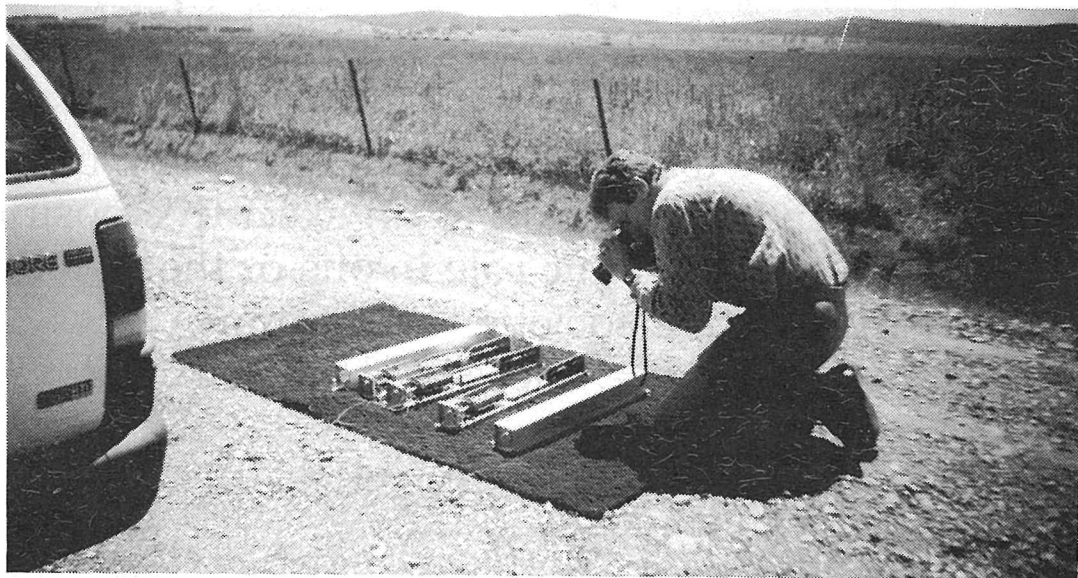
The atmosphere down there was very friendly, with everyone helping with the cooking — which produced some very interesting results. The food was excellent due to the fact that we could order what we liked, including  $n$  types of chocolate biscuits, where  $n$  is a very large number. The view around the telescope was lovely, with the sun setting behind the telescope while a flock of sheep grazed serenely beneath it.

Part of the daily routine was the calisthenics performed on the telescope. We had the dexterous tutelage of Dr Bruce McAdam, whose expertise in this field is legendary. Doing sit ups whilst suspended upside down twenty metres above the ground is no mean feat.

One of the highlights of the stay was participating in some rather chaotic kinematics on the MCG (Molonglo Cricket Ground). Fielders included T. Liger (our fearless tiger snake) and Terry Lamb (a short, woolly guy). The usual rules applied: hit the ball onto the telescope and you were out.

In the evenings, we received expert instruction on astronomy from the pros. Dr Michael Large, while showing us the planets with the aid of a pair of binoculars, announced a great discovery with the immortal words, "Since when does Venus have observable moons?" He then made an even more important discovery; he was in fact looking at Jupiter. Ph. D. student, Shaun Amy, was unable to identify the Large Magellanic Cloud, despite the fact that his research project concerns it.

Although much was resolved on this trip, more research is necessary to discover the solutions to such vexing problems as: why does Neil eat ice cream and chocolate topping for breakfast, does Bruce ever get out of bed before noon and why isn't Alex now doing Physics II?



Dr Michael Large performing a ritual sacrifice to the Great Gods of Radio Astronomy.

J

## Fundamental Definitions of Physics

by Tim Hatfield, Richard Banks and Lachlan Murray.

Last year, *Jeremy* presented an article outlining some of the Fundamental Laws of Physics. A couple of (then) first year students found this so enlightening that they decided to further our education with some of the Fundamental Definitions of Physics that every one of us should know.

**Applied Physics:** A field of Physics in which profit is more important than progress.

**Astronomy:** A field of Physics with errors as large as those in the Opposition's tax policy.

**Astrophysics:** A field of Physics consisting of astronomers who think that they are a cut above the rest.

**Chaos:** The theory upon which the School of Physics' organisation is based.

**Chemistry:** A very small branch of Physics concerned with buckets, smelly liquids and all the boring orders of magnitude.

**Cold Fusion:** The best way to keep warm in Siberia.

**Computer:** A device which swallows results whilst pretending to be helpful.

**Device:** Something to hold the wood when sawing.

**Engineer:** A university student who believes that learning to count is important.

**Error:** What most Physics students realise they have made when they learn what Physics is really like.

**Experiment:** Something which proves that theory can never actually predict what will happen.

**Fluid Mechanics:** A course which will leave you out of your depth.

**Grand Unified Theory:** States that no single student will learn anything during a lecture in which *Jeremy* is issued.

**High Energy Physics:** A field of Physics in which the experiments cost more than Australia's budget deficit.

**Interference Pattern:** A welcome relief when one of these comes on to your television screen during *Hinch*.

**Jeremy:** The main factor responsible for the momentary tripling of lecture attendance five times a year.

**Kinetic Energy:** Students leaving a lecture.

**Momentum:** Mal Meninga running at the Balmain back line.

**Photoelectric Effect:** The situation where the flash on a camera makes you blink (and generally look quite stupid) at the exact moment the photo is being taken.

**Physical Optics Department:** A lean and hungry new flock, led by a Sheppard.

**Physics Lab:** Innocent sounding name for a torture chamber.

**Planck's Constant :** The number of planks that the average student is as thick as.

**Plasma Physics:** A field of Physics which promises to bring us fusion power, along with a workable Opposition health policy.

**Potential Energy:** Number of students in a lecture multiplied by the time they have been there.

**r:** Main cry uttered by a lecturer as a demonstration goes wrong.

**Recoil:** What the front few rows of a lecture do when a demonstration of the physical properties of explosives is about to be commenced.

**Recursion:** See recursion.

**Sledgehammer:** A tool used to fine tune sensitive equipment.

**Spherical Harmonics:** Sounds made by an obese violin.

**Spherical Polar Coordinates:** Something used by lecturers to make simple problems difficult and hard problems even more difficult.

**Tensor:** A stress related disease.

**Terminal Velocity:** The maximum speed reached by a lecturer's mouth before he suffers a coronary.

**Theoretical Physics:** A field of Physics into which mathematicians have wandered by mistake.

**Torque:** Something every student does during lectures.

**Twin Paradox:** Physics and Chemistry are related, even though the lecturers unanimously agree that they aren't.

**Work:** ???.

# Alice's Adventures in Physics One-derland

by David Mar and Kim Lester.

## Chapter One

### *Down The Rabbit Hole*

Alice was beginning to get very tired of sitting by her sister on the bank, and of having nothing to do: once or twice she had peeped into the book her sister was reading, but it had no pictures or conversations in it, "and what is the use of a book," thought Alice, "without pictures or conversations?"

So she was considering, in her own mind (as well as she could, for the hot day made her feel very sleepy and stupid), whether the pleasure of making a daisy-chain would be worth the trouble of getting up and picking the daisies, when suddenly a White Rabbit with pink eyes ran close by her.

There was nothing so *very* remarkable in that; nor did Alice think it so *very* much out of the way to hear the Rabbit say to itself, "Oh dear! Oh dear! I shall be too late!" (when she thought it over afterwards, it occurred to her that she ought to have wondered at this, but at the time it all seemed quite natural); but, when the Rabbit actually *took a watch out of its waistcoat-pocket*, and looked at it, and then hurried on, Alice started to her feet, for it flashed across her mind that she had never before seen a rabbit with either a waistcoat-pocket, or a watch to take out of it, and, burning with curiosity, she ran across the field after it, and was just in time to see it pop down a large rabbit-hole under the hedge.

In another moment down went Alice after it, never once considering how in the world she was to get out again . . .

Alice found herself in a long, straight hall, lit by a row of fluorescent lights. There were doors along the sides of the hall, but they all appeared to be locked; and she had been all the way up the hall and half-way back down trying to open them, when she saw a display cabinet on one of the walls ("which certainly was not here before," said Alice), with a little paper cup in it, which was overflowing busily with a misty, white vapour, and which had the words "DRINK ME" beautifully printed on it in large letters.

She carefully considered the liquid in the cup for a minute (for she did not wish to drink anything which might be poison), and was just about to put the cup to her lips, when she heard a little pattering of feet from down the hall and saw the White Rabbit returning, carrying great bundles of papers in its arms. The Rabbit noticed Alice and called out to her, in an angry tone, "Why, Mary Ann, what *are* you doing here? Run up to the first year office this moment and buy a set of lab notes! And put down that Physics Society Party punch before you injure yourself! Quick, now!" Alice was so much frightened that she ran off at once down the hall, and did not stop until she came upon an open door with a desk set up in its frame, and a mouse and a dodo sitting behind it, amongst great piles of books; each pile consisted of many books of the same coloured covers, but the particular colour of each of the piles was different.

"Hello," said the mouse, "would you like to buy a lab manual?"

"Well," replied Alice thoughtfully, for she did not want to commit herself to anything without first knowing exactly what it was all about, "do I need one?"

"That depends," answered the mouse, looking very gravely at Alice with one eye squinted almost right down to being closed fully, "Are you an engineer?"

"Well, I never!" started Alice, most shocked by the impropriety of the mouse, "I most certainly am not!"

"Then you'll want a pink one," continued the mouse, as if nothing at all out of the ordinary had happened, "That will be ten dollars." The dodo proceeded to rummage through the piles of books and finally came up with a pink-covered one, which it then passed to the mouse.

Alice stared blankly at the mouse, for she did not have any money on her at all, and certainly had never handled as much as ten dollars all at once. "I'm afraid that I don't have any money," she finally said.

"That's all right," interrupted the dodo, "You can pay by cheque. Make it out to *The University of Sydney*."

"So that's where I am," thought Alice to herself, and then, seeing the impatient look on the mouse's face, she added out loud, "I'm sorry, but I don't really think I shall be needing one of those after all."

"No cheque-book either?" said the mouse, "Well, don't worry, you can come back next week."

Alice was beginning to get tired of this conversation, and looked around as politely as she could manage, for she did not want to offend the mouse (who did, after all, appear to be trying to help her), in an attempt to find someone else to whom she could speak. She was shocked to see, just behind her, a large tree and, sitting in its boughs, a physicist (she knew it was a physicist because she had seen them before, when her father had taken her to the university; and this one had messy hair, an unkempt grey beard and wild eyes just like all of the other ones she had seen), grinning brightly at her.

It looked good-natured enough, Alice thought: still it had a great many teeth, so she felt that it ought to be treated with respect. "Mister physicist," she began, rather timidly, for she did not know whether it would prefer to be called by another name, "please would you tell me why you grin like that?"

"I'm a Cheshire Johnston," the physicist answered, "and that's why."

Alice was not altogether sure that this was reason enough, but she decided that it might be better not to question the creature on the matter. She asked instead, "Would you tell me, please, where I ought to walk from here?"

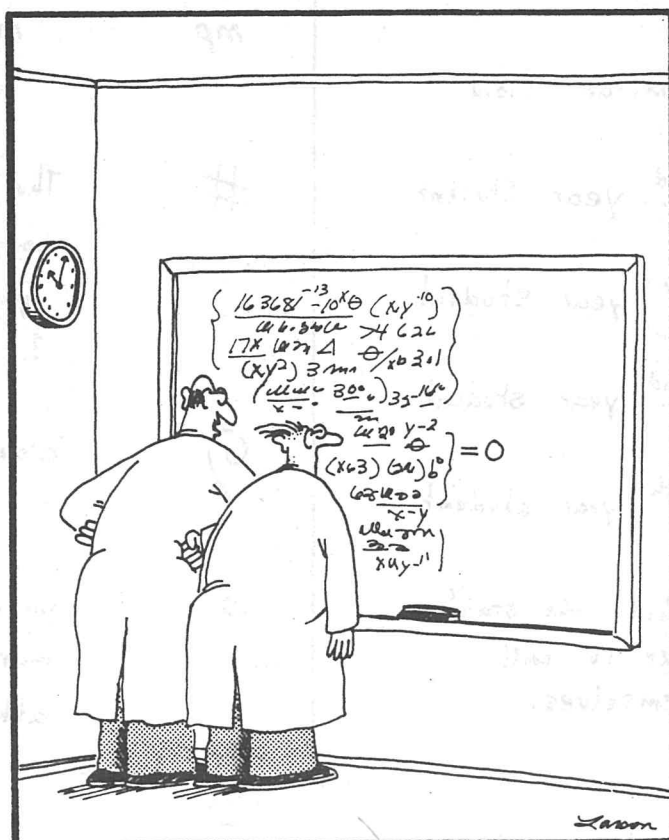
"That depends a good deal on where you want to get to," said the physicist. "In that direction," it continued, waving its left arm around, "is a first year lecture being given by a Mad Brennan: and up there," waving its other arm at some stairs, "is a second year lecture with a March Peak. Attend whichever you please; they're both incomprehensible. But you had better hurry, it's almost tea time."

Having said this, the Cheshire Johnston slowly began to vanish, beginning with the tips of its toes, and ending with the grin, which remained some time after the rest of it had gone.

"Well! I've often seen a physicist without a grin," thought Alice; "but a grin without a physicist! It's the most curious thing I ever saw in all my life!"

*To Be Continued.*

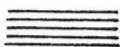
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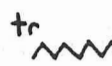


"No doubt about it, Ellington—we've mathematically expressed the purpose of the universe. Gad, how I love the thrill of scientific discovery!"



WARNING: This is examinable material.

|                                                                                     |                                         |
|-------------------------------------------------------------------------------------|-----------------------------------------|
|    | crotchet                                |
|    | crotchet vector                         |
|  | $\frac{d(\text{crotchet})}{dt}$         |
|  | turbulent flow                          |
|  | laminar flow                            |
| Major                                                                               | 3 <sup>rd</sup> year Student            |
| Minor                                                                               | 1 <sup>st</sup> year student            |
| Diminished                                                                          | 2 <sup>nd</sup> year student            |
| Augmented                                                                           | 4 <sup>th</sup> year student            |
| Perfect                                                                             | What the staff like to call themselves. |

|                                                                                     |                                                               |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------|
|    | thermal resistor                                              |
| accelerando                                                                         | $\frac{\text{velocetti}}{\text{timelli}}$                     |
|  | capacitor                                                     |
| mp                                                                                  | malicious physics                                             |
| #                                                                                   | The start of a noughts & crosses game in a physics 1 lecture. |
|  | cloud chamber tracks                                          |
| o                                                                                   | your end of year mark, if you didn't attend lectures          |