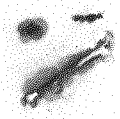
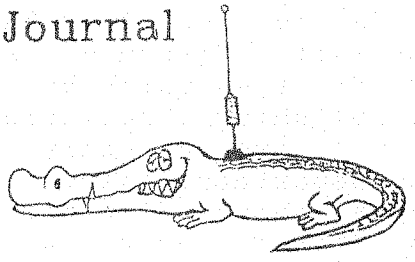


JEREMY

JEREMY : The Physics Society Journal



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CONTENTS

EDITORIAL

This is the final issue of **JEREMY** for the year. There isn't too much else to say in this editorial as the Physics Society has gone into hibernation for the summer, not to reappear until Orientation next year. The feature of this term has undoubtedly been the final PhySoc party, held on the solar roof in September. More than 60 people turned up, and everybody had a good time. (At least if they didn't have a good time, they shut up about it.) With a cost of only one dollar to get in (even cheaper for members), it was a bargain, with beer, wine, orange juice, chips, cheese and biscuits,cakes,peanuts and for the really hungry - sausage sandwiches. One problem with the sausages was that the BBQ only held about 5 of them at the one time, which was a shame for the other 55 people who wanted to eat. This actually had a good effect on attendance at the party, however, as no one wanted to leave without a sausage, thereby wasting their dollar. The presentation of the Jeremy Quote Rate was held, with Graham Derrick taking off this prestigious award. Also, the voting for the Quote-of-the-Year was held, with everyone at the party able to vote. Michelle Storey took off the trophy, with one more vote than Dick Collins. A more detailed discussion of the voting is given later on in in Jeremy. Hopefully everyone will remember how much fun the party was and come along next year.

That's about all for this year. Thanks to everyone who has contributed to this journal,especially Kevin Moore, who has provided all the cartoons of staff members that have been published during the year. Also, the lunchtime talks - they were a great success, with up to 120 people turning up each week. See you next year.

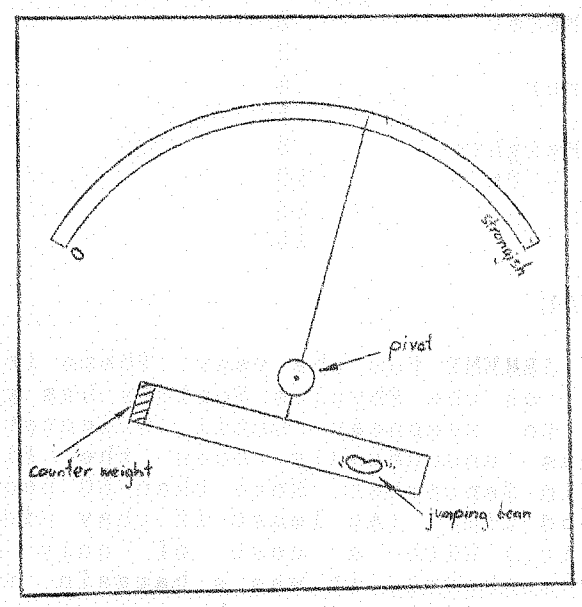
THE REID-BARSAMIAN FORCE : QUANTIFIED!

Jeremy Exclusive! - Eugene Seneta

While scientists around the university have scoffed and condemned the Reid-Barsamian theory of a new fundamental force, the Australian Government's Department of Paranormal Enquiry (DOPE) has stolen the march by not only proving the existence of the force, but establishing a reliable method for measuring its intensity.

"We actually discovered the force first", a spokesperson for the department said. "If you look in our records, we patented our meter about five months ago, long before the University News took it up. This is why we've been able to announce positive results so soon after the story was published."

The construction of the meter itself is pure simplicity. A needle is placed on a vertical pivot with a scale behind it. The bottom of the needle is attached to a weighted box, which is specially constructed so that its centre of gravity changes with the Reid-Barsamian intensity. As it shifts, the needle points to the appropriate position.



Principle of the force meter

The box contains the mechanism that actually detects the force - a Mexican jumping bean. So obvious when you think about it! The bean, being alive, is naturally sensitive to the force and moves about inside the box accordingly, providing scientists with their readings. There are some disadvantages, though: "The beans are great, but tend to have a short shelf life - only several days. We are feverishly investigating alternatives, such as beetles. These are rechargeable, but unfortunately, unlike the beans, they tend to leak quite corrosively regularly. We are approaching several biotechnology companies with contracts to solve this problem."

It is not known whether the force is actually a force, or a flux, or some other measure, so the units for it are hotly disputed. Suggested names are the Garret or the Moore, after scientists who have given the research every bit of support it deserves. We shall keep you posted on the issue.

The Quotes Competition

The Quotes Competition is over for another year, with the **JEREMY Memorial Quote of the Year** being awarded at the final physics party of the year, in mid-September. The voting for the Quote of the Year was very democratic, with each person at the party being entitled to five votes. Everyone who attended was given five jelly beans as they arrived, these representing five votes. In a nearby room were lined up 17 of the best quotes given in to **JEREMY** this year. Voters could then distribute the jelly beans in any way they wished - one vote for five different quotes or five votes for a particularly good quote. Once everyone had voted, the total number of jelly beans for each of the finalists were added up. Unfortunately, as it turned out, there were a high proportion of black jelly beans among the beans used as voting tokens. This led to a large number of informal votes, as people ate, rather than cast, their votes. Oh well - every democratic process has its problems.

The high scoring finalists are listed below, with the jelly bean count alongside. Congratulations must go to **MICHELLE STOREY** for her narrow win over Dick Collins. As Michelle only had one quote entered in the entire competition, her win shows that quality can indeed triumph in the end.

Second Year students are lucky if they realize that they're ten orders of magnitude out....Michelle Storey. (27 jelly beans)

Graduate students are the cheapest form of servo-mechanism ever devised...Dick Collins. (26)

These numbers are so mindbogglingly huge that you can integrate and differentiate them as you like without explaining how... Bill Tango... (23)

That's why we have a toy tokamak - I suppose I shouldn't call it a toy - there are a lot of people playing with it down there... Don Melrose. (21)

If you have got a hangover, blurred vision, etc. you will certainly get a value greater than h... Laurie Peak. (20)

Oh! This is too hard...it's only elementary algelba - you fill it in...Graham Derrick. (19)

The experts may not really be experts - they may be chemists.. Max Brennan. (18)

For our purposes, infinity is as good as zero.Max Brennan.(18)

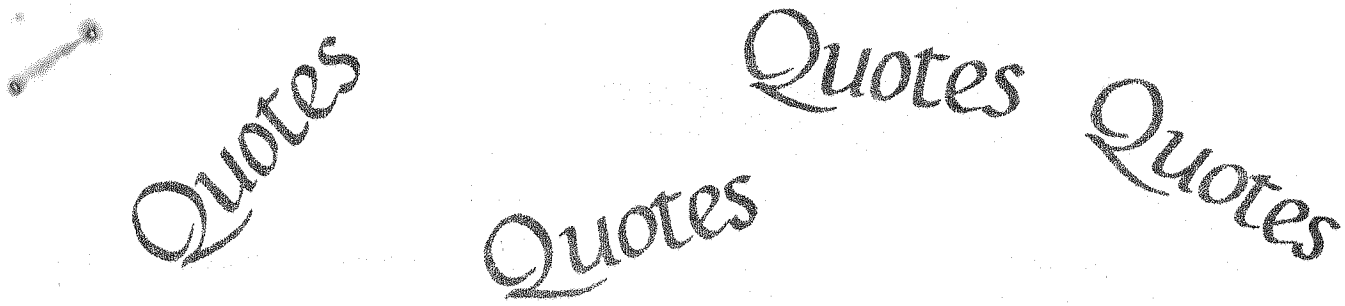
KicKat

QUOTE RATE

The final weeks of this competition were full of excitement as quotes came flooding in from all over the school. Max Brennan managed to increase his quote rate without actually giving any more lectures, which isn't a bad effort. It was **GRAHAM DERRICK** who, scoring heavily in the final weeks, managed to finish in front. It has been an exciting year, with fine innings being played by many a lecturer. It was a little surprising to see that the more flamboyant types, such as Laurie Peak, Dick Collins and Ian Johnston, didn't figure more highly amongst the leaders. As for the champion, his win shows that a low key delivery style and a wry, somewhat cynical sense of humour can still win in these days of more extroverted stylists.

The leaders at the end of the season are given below, accompanied by their quote rates.

Graham Derrick	96
Max Brennan	92
Rod Cross	62
Bob Hewitt	60
Dick Collins	57



As mentioned previously, **GRAHAM DERRICK** came home with a wet sail - here are the quotes that helped him to win the Quote Rate, as well as some from later in the term.

There are philosophical reasons why you should invent a theory - which may or may not work...

Einstein observed that when you jump off a cliff, you don't feel any gravity...

One nice thing about these two things being equal is that we can cancel them...

- what's another Greek letter...

A particle is a one dimensional surface...

We now have forty equations and forty unknowns...

When you're playing these index games...

..it's not just mathematical games...

One tries to avoid putting subscripts on superscripts...

Physicists love commutators...

You may think this tedious, but Einstein had problems too...

..this is of the form of a divergence times something - which always excites us...

Conservation of energy is not a profound thing - it's just a mathematical identity...

If you want to measure this, you'd carve out a cubic metre of space-time and weigh it - well, you'd have problems...

This second term is an embarrassing one...

You go to the top of a tower and drop a photon...

What you do is wobble the sun here...

We have to work out all 80 Cristoffel symbols - I'll let you fill in the details...

You should never take these co-ordinates too seriously...

Quotes

MAX BRENNAN's quote rate benefitted from these late quotes, sent in from his second term course.

This was thought up by an astrophysicist, which tells you something about the way that science works...

The idea came to him whilst he was skiing in South America - which tells you something more about science...

We as a community make a deliberate choice to kill people - because the benefits, both economic and social, are so great...

I want to go and pick up the electric field now because we left it dangling...

Down the corridor we only set 1 000 000 degrees - it's very cold plasma.

Bob Hewitt has more quotes from last term, too.

I probably only break $\sqrt{3}$ of the equipment supplied each year...

And that time I got it right...

I'm not sure how much exactly you'll learn from me doing it, but I have a lot of fun...

I always did get behind in this lecture course because I enjoy playing with my toys so much...

Despite lots of cleaning on my part, the floor disintegrated...

Also from second term, here's a collection of **ROD CROSS**'s quotes

You need a million dollars to do a good physics experiment...

This is a 2 microcurie alpha source - I can handle it safely, but if I swallowed it I'd get sick...

You would call this a fudge - I call it a physicist's approximation...

What happens if n is greater than infinity...

Physicists don't mind infinity times zero - mathematicians do...

Quotes

What's the answer? - the answer is that you cannot ask questions like that...

God has been busy as a physicist...

I'd like to diverge into an area known as, um, ah ---- chemistry

The photon is dead...

If you put 5kg of plutonium in your pocket, it will explode...

Other people have been performing well lately.

This is exciting - you may not know it but this is exciting...Laurie Peak

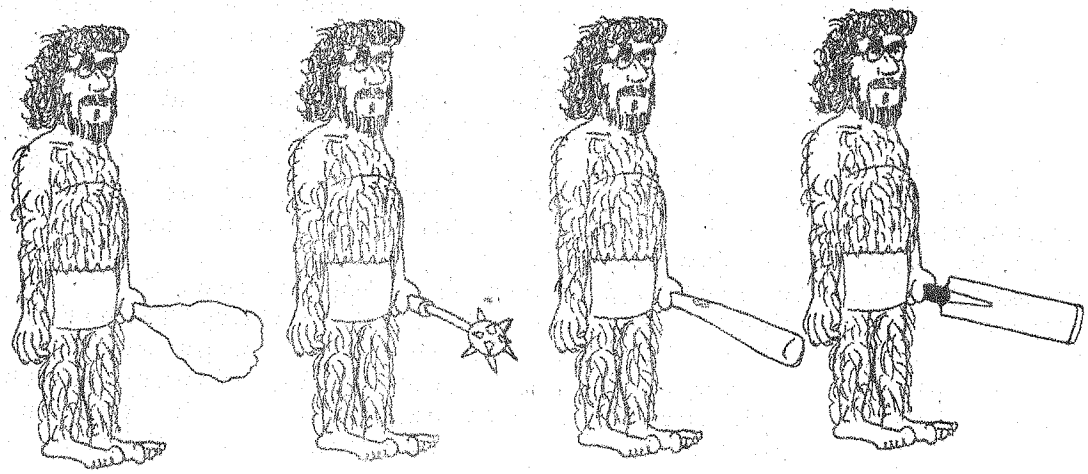
It's one of these fudges which is optimized to give the right answer...Ross McPhedran

This is one of those questions by the phrase "It can be shown"...Ross McPhedran

And 'zap', you get all these interesting particles coming out... Laurie Peak

You have to renormalize. Now the electrons are black and the positrons are white...Laurie Peak

EVOLUTION.



THE PHYSICS SOCIETY GOES TO LUCAS HEIGHTS

On Wednesday, the 27th of August, a number of students were able to muster up enough courage to visit the Lucas Heights laboratories, home of Australia's only nuclear reactor. The considerable fortitude was required not because of any rumours of radioactive contamination and so on, but rather because each and every one of us had to entrust the Physics Society with three dollars of hard earned cash (fear not, it wasn't wasted).

We met at 9.30 on the day at Sutherland Station. I was feeling quite proud that we'd managed to get hold of a bus to take us to Lucas Heights at a bargain basement price. Then I found out why it was so cheap ... when running it was an excellent verification of the theories of both entropy and resonance. Nonethelass, we made it to Lucas Heights (almost) on time, and our driver sought out a canteen where he could recover from the ordeal.

We were ushered into a little cinema, where we were shown an introductory film - Walt Disney vintage, complete with cartoons and two dreadfully American accents - introducing us to the concepts and controversies of nuclear energy. If we are to believe the Americans, then nuclear energy is a celluloid genie we have released from a cartoon bottle.

Then it was off to HIFAR, the reactor itself - but before we went, we were relieved of all our cameras, presumably to prevent us from photographing the enormous Australian effort going into Star Wars research. We piled into a (much better) AAEC bus which took us all of five hundred metres or so - I was reminded of the opening scenes of "Crocodile Dundee". We had to write down our names so that the staff would know who was missing if there was an accident and we had to evacuate . Very reassuring.

The first thing we saw in the reactor building was a sign telling us that if the alarm sounded we were to assemble outside the building. The alarm sounded. Our guide ignored it.

The reactor is entered by a formidable airlock. Our hostess took great pains to convince us that the enormous amount of steam we could see issuing throught he cooling towers was NOT radioactive. Once inside, my first impression was that the place resembled nothing so much as the Second Year labs, but on a (slightly) higher budget. With the exception of the control room, which had lots of push buttons and consoles and flashing lights, the widgets around the core all looked like they were prototypes someone had tried very hard to give professional touches to - you know, like the timer/counter or the plug in circuit board on your lab bench. Electronic string and sealing wax.

We were presented to a man in a white lab coat, who gave us an introduction to the design and operating principles of HIFAR. He appeared pleasantly surprised when he discovered that we already knew what the difference between U-235 and U-238 was. And as for heavy water...well! We must have made his day!

The alarm sounded again. The man ignored it too.

Darren Kelly (sporting a new Physics Society T-shirt) asked why the cooling system was underneath the reactor; it seemed to be a silly place to put it if there was a meltdown. The answer was that if that happened, there was obviously something wrong with the cooling system anyway, and it wouldn't matter very much after that if it was ruined by molten fuel.

From HIFAR we travelled (on foot this time) across the street to the handling laboratories, where reactor waste and radioactive medicines are handled. We saw a pool of heavy water with sundry cylinders at the bottom. It was just possible to see a faint glow issuing from them - Cerenkov radiation. I wondered why it was blue, and not some other wavelength. The guide didn't know. He said that it was "something to do with the wavelength of the thing." Great!

We were then shown the packaging that medicines and suchlike were put in for delivery to hospitals. The stuff is put in a glass bottle, wrapped in wettex in case it breaks, then lead shielding, then rocks, then a metal cylinder, then a lead lined box.

From there it was a short walk to the medical laboratories. We were given an overview of the the uses of radioactive drugs, and how hard it was to supply technecium-99m, with a half life of several hours, to hospitals. The solution: technecium on tap! We had a demo of a little plastic widget where you press a button and a technecium suspension magically comes out. It contains a suspension of some exotic element that continually breaks down to technecium; anything which isn't technecium gets filtered out when you want a sample of the stuff. To finish things off, we had a go on the waldos that handle radioactive substances.

Then it was off to the AAEC bus for the five hundred metre journey back to the entrance. Our hostess commented that we were so much better than the press agents, who "chew gum and talk to each other even when we're trying to explain things". It must have been something of a novelty for them to be able to be guides for a group that even vaguely understood what they were talking about. Then again, it could just be that our years at university have made us very good at PRETENDING to understand things.

The cameras were reclaimed. We boarded our highly resonant bus and travelled back to the station (this time, the road was mainly downhill or level; we halved our travel time). From there we caught trains to wherever.

I have mixed feelings about the excursion. Overall, it was a great success; it is always good to see an example where Physics has actually proved to be useful for something. However, it was clearly the standard factory model tour that the AAEC dishes out to all and sundry, and we didn't actually learn very much from the staff that we didn't already know. We might try for a more detailed tour next year. Any takers?

Eugene Seneta

FIVE GET INTO TROUBLE - Part 5

In the final episode of this exciting tale, Dick Collins helps Julian and Dick, and the children are reunited. The boys tell their story to a meeting of the physics professors, but things are not as they seem.

Briefly, Julian explained to Professor Collins what they had found. The professor listened carefully, raising his eyebrows as he heard about the crates of whiskey in the basement near the tokamak. To the boys' relief, Professor Collins immediately took charge, and declared his intention to get to the heart of the matter. There was a professors meeting later that day, he explained, and the boys could tell their story then. Once the other professors had heard the story, he assured them, appropriate action could be taken. In the meantime, he suggested, he could show them around the Applied Physics Department.

"I'm very proud of this lab," he told them. "We do lots of important practical, useful things around here - things that benefit society. It gives you a good feeling deep inside."

The boys didn't know quite what to make of the professor. He seemed very intelligent, and very nice, but he kept doing the strangest things. Several times he picked up objects and hurled them across the laboratory. As Julian and Dick watched the object smash on the floor, he talk about something called "angular momentum". At one stage he picked up a long wooden pole and crashed it into a banister railing, breaking it up into several pieces.

"Now, tell me why the pole broke," he requested. When the two boys stared at him dumbfoundedly, he answered his own question.

"Because I smashed it against the rail," he said with a twinkle in his eye. Seeing the boys continuingly blank stares, he sighed.

"Oh, well. I don't suppose you can always have a receptive audience."

Despite this strange behaviour, Julian felt as if a great weight had been lifted from his shoulders. He felt sure he could trust this man. Feeling secure, both boys were startled to hear a dog barking on one of the lower floors. To their surprise, they saw Timmy racing up the stairs to meet them.

"What on earth is that?" asked Dick Collins.

"It's a dog, sir," answered Julian. "Our cousin's dog."

"A British dog," Dick added proudly,"-but what is he doing up here."

"WOOF. WOOF. YELP. YELP. WOOF", barked Timmy.

Julian sensed immediately that something was wrong.

"I believe that something is wrong, Dick," he said to his brother. "Timmy wouldn't have left George if everything was all right."

"Where did you leave the girls?" asked Professor Collins, overhearing this.

"In the tokamak lab, sir," Julian answered.

"Right," decided the professor,"we'll look in there on the way to the professors meeting."

They started down the stairs. When they reached the bottom, they heard two voices calling them.

Meet the Staff, No.88
Brian M^{c}Innes

"JULIAN! DICK!"

They turned to see Anne and George, with Uncle Brian close behind, racing down the corridor towards them.

"Thank heavens you're safe," gushed Anne.

"Timmy! Oh, I've been so worried about you!" cried George, overjoyed at being reunited with her pet.

Quickly, the boy's explained what they had discovered. In turn, the girls detailed their adventures. Professor Collins, though, wa shurrying them on, and the little party set off down the hall. Dick Collins explained what was to happen to a confused Uncle Brian. Julian marvelled that even on a holiday in Australia, in a university school of physics, they had found themselves in yet another adventure. Gosh this was all very exciting, he thought to himself.

They were ushered into a luxuriously furnished board room, with portraits of past professors lining the walls. There were a number of men already there, seated at a long table. All the children recognized Max Brennan while the girls also recognized Don Melrose, although he had changed out of his jogging gear. One of the men they didn't know was a thick set man with close cropped greying hair. He addressed Proffesor Collins in a loud, North American accented voice.

"For God's sake, Dick, what are those kids doing here. This is a meeting, not a child care centre."

Dick Collins introduced them to Harry Messel, the head of the school, and explained to Harry why they were there.

"Perhaps we should listen to them, Harry," said a white haired man who sat near Professor Messel. The children later found out that this was Don Millar, the administrative head. He had a deep, melodious

voice.

"Oh, all right," agreed Harry Messel. "But for Pete's sake, be quick about it."

Julian retold his story, with Dick interrupting every now again to add anything his brother had left out. All of the professors listen carefully and intently. When he had finished, Don Millar thanked them, and Uncle Brian ushered them out.

"Well, thankfully that's all over." Julian sighed with relief in the corridor outside the board room

"What do you think will happen?" George asked her uncle.

"Oh, they will take care of it, don't worry" assured Brian. "How about we get out of this place, and go to the beach or something. Would you like that?"

"YES, PLEASE!!" was the reply from all the children together. It was with relief that left behind them the School of Physics.

Back at the meeting, the professors were discussing what was to be done.

"For Christ's sake, Max - how can anyone be making that much whiskey down there without you knowing about it," began Harry Messel.

Max Brennan looked at Dick Collins, who looked at Don Melrose, who looked at Don Millar. In response to all this Don replied,

"But we do know, Harry - we all know."

"What are you talking about!" Harry demanded.

"What do you think that drink is in front of you, Harry," Don Millar answered. "It came out of this bottle." He held up a bottle with with **PLASMA PHYSICS WHISKEY** on it. He took out another bottle with **SOLAR PHYSICS GIN** on it and another with **THEORETICAL BRANDY** on the label.

Harry was taken aback, lost for words (the others looked on this in astonishment). "Well done, boys", was all he could say.

"But what do we do about those kids?" asked Don Melrose.

"We'll have to get the still moved away from the tokamak," Max decided. "Blast those meddlesome kids."

THE END

Meet the Staff No. 90:
Bruce McAdam

Bits & Pieces

In the beginning there was Aristotle
And objects at rest tended to remain at rest,
And objects in motion tended to come to rest,
And soon everything was at rest,
And God saw that it was boring.

Then God created Newton,
And objects at rest tended to remain at rest,
But objecys in motion tended to remain in motion,
And energy was conserved;
And momentum was conserved;
And matter was conserved,
And God saw that it was conservative.

Then God created Einstein. And everything was relative.
And fast things became short,
And straight things became curved,
And the Universe was filled with inertial frames,
And God saw that it was relatively general,
But some of it was especially relative.

Then God created Bohr,
And there was the principle,
And the principle was quantum,
And all things were quantified,
But some things were still relative,
And God saw that it was confusing.

Then God was going to create Ferguson,
And Ferguson would have unified,
And he would have fielded a theory,
And all would have been one,
But it was the seventh day,
And God rested,
And objects at rest tend to remain at rest.

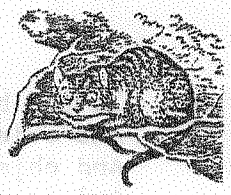
- Tim Joseph

I've heard of a man called Jeremy,
Although he was never a friend of me.
He rose to great fame
When attached to his name
Was a Journal of quite great absurdity.

Anonymous PhD student

1986 LUNCHTIME TALKS

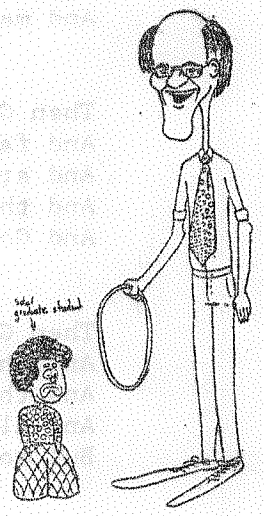
The 1986 Physics Society lunchtime talks have been successful and popular. We saw a variety of speakers, from members of the School of Physics we all know and love, to guest speakers from parts foreign. We hope next year's talks will be as successful.



ANTON GARRETT on **Colour and light in the atmosphere** (approximate attendance 40), in which some spectacular atmospheric effects were shown and explained

IAN JOHNSTON on **Bell's Theorem, or How to stop worrying about the universe being conscious** (with our record attendance of 120), in which one of the principle paradoxes of Quantum Mechanics was discussed

BRIAN McINNES on **Soap Bubbles** (attendance 50), in which we all got to play with detergent, just like pre-school



LAURIE PEAK on **The Fascinating Nucleus** (attendance 70), in which we were taken on a whirlwind tour of the atom

BOB HUNTER from Scientists Against Nuclear Arms, on **The Star Wars programme: Should physicists participate?** (attendance 40), in which some of the moral issues surrounding SDI were discussed

DICK COLLINS with **Physics is Phun** (attendance 100), in which glasses were broken (almost), bangs were made, and a fine time was had by all

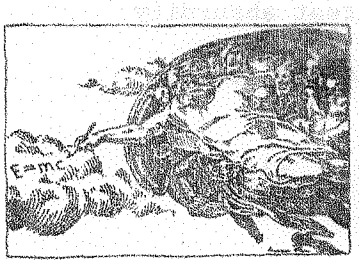
ANTON GARRETT on **Science and the Paranormal** (attendance 60), in which the virtues of being a skeptic were extolled

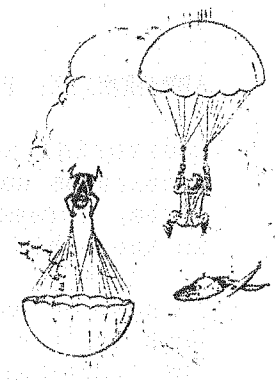
MICHAEL LARGE on **The Molonglo Observatory Synthesis Telescope - a guided tour** (attendance 50), in which we synthesised Ray Anderson and learned about the joys of radio astronomy

MAX BRENNAN on **The Nuclear Energy Scene: Fission, Fusion and the Australiann Atomic Energy Commission** (attendance 50), in which we heard about the future of atomic energy in Australia

ROBYN WILLIAMS from the Science Show, on **And now for something completely different** (attendance 100), which was, and which resulted in free publicity for Physoc T-shirts on the ABC

CHARLES BIRCH, Emeritus Professor of Biology, on **Science and Religion in the Post-Modern World** (attendance 60), in which Anton got so annoyed that we had to give him a chance to answer two weeks later



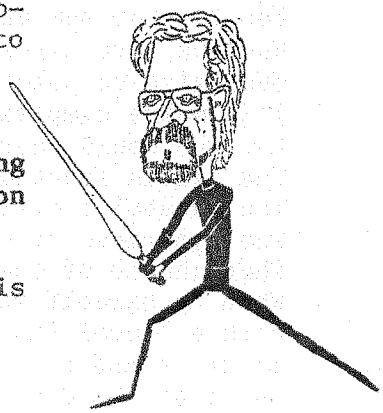


IAN JOHNSTON on **UFOs, or, Close encounters with closed minds** (attendance 70), in which more ratbags met their ends

DICK COLLINS on **Solar Energy: It lights up your life** (attendance 60), in which Prof Collins wore several hats and showed his severe split personality problems.

BILL TANGO on **How to take the temperature of a star: The Stellar Interferometer Project** (attendance 40), in which the design, construction and funding of interferometers were explained

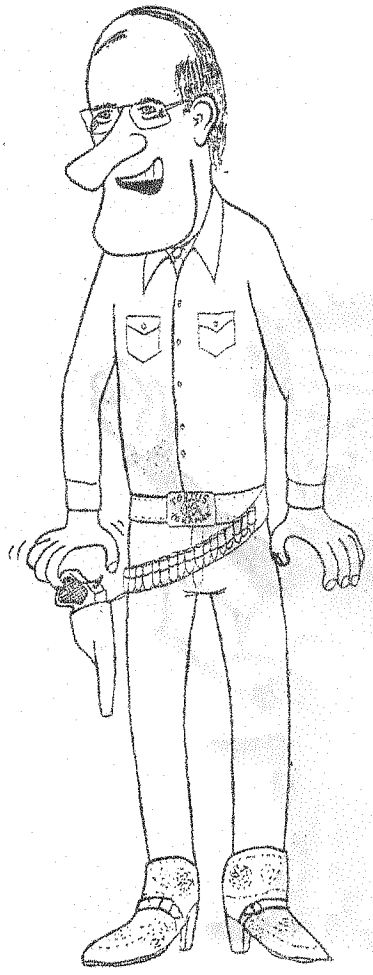
BERNARD PAILTHORPE on **Real physicists believe in the force: Adhesion in the kitchen and the bedroom**, in which the forces no-one tells you about in first year were at last acknowledged to exist



and our final talk for the year, on Wednesday 29th October:

DAVID COCKAYNE from the Electron Microscope Unit, on **Seeing is Believing: Material science and the modern electron microscope.**

We would like to thank all those who lectured for us this year, and if anyone wants to volunteer for next year...?



Meet the Staff No. 89:
Rod Cross

ABRAMOWITZ: PRINCE OF DENMARK

(Editorial note: The editors take no responsibility for the incestuous nature of the Theoretical jokes expressed herein. For plebs, Abramowitz and Stegun's Handbook of mathematical functions is the bible of the theoretical physics department).

To sum, or not to sum - that is the question;
Whether 'tis nobler in the mind to suffer
The recursive nature of outrageous functions,
Or to use identities against a sea of terms,
And by transforming add them? dy/dx -
No more; and by a sum to say we end
The Wronskian and the thousand infinite series
Functions are heir to. 'Tis a consummation
Devoutly to be wish'd. dy/dx;
dx, perchance to sum. Ay, there's the rub;
For in that sum of terms what terms may come,
When we have circled round this mortal curve,
Must give us poles. There's the residue
That makes complexity of so long life;
For who would bear the Whittakers and Struves of time,
The Kelvin function, the Poisson-Charlier,
The parabolic cylinder, the Student's-t,
The hypergeometric, and the chi-squared
That chance of the unworthy takes,
When he himself might his quietus make
With a Bessel function? Who would these functions bear,
To grunt and sweat under theoretical life,
But that the dread of something after death -
The undiscover'd function from whose bourn
No analyst returns - puzzles the will,
And makes us rather bear those poles we have
Than fly to others that we know not of?
Thus divergence does make cowards of us all;
And thus our analytic resolution
Is sicklied o'er with the pale cast of thought,
And integrals of great pitch and moment,
With this regard, their limits turn awry
And lose convergence. - Soft you now!
The fair Stegun. - Nymph, in thy pages
Be all my sums convergent.

- Peter Robinson

Meet the post-grads No. 143:
Peter Robinson