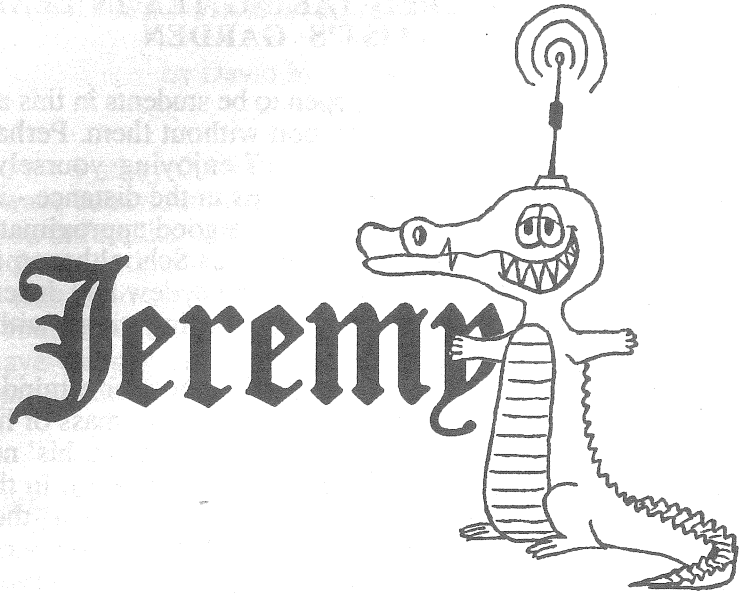


The Official Journal of The University of Sydney Physics Society

Volume 7 Number 1 April 1991

Editorial

Welcome all, to this the first issue of *Jeremy* for the new year.

For those of you who are new to physics, *Jeremy* is the official publication of the PhysicsSociety and is proudly sponsored by *Kit Kats* and The Centre for Theoretical Astrophysics. *Jeremy*comes out four times a year or more depending upon the workload of the overworked, and underpaideditors, and is packed with useful information about the School of Physics, without which nobodywould survive.

Jeremy does try to have a serious side, its called the Physics Forum, now written by the well known John Gaunt. The purpose of that section is to show how physics can be applied to thereal world as opposed the the physics labs, where as everybody knows is the one place that physics cannot be applied. *Jeremy* is also supposed to keep you informed about the up and coming events of the Physics Society, the only problem being that by the time anything is printed it is out of date or probably wrong.

This the first issue is full to the brim with exciting stuff. There is another story by A. Nonymous(Physics XVIII), along with an article about the Physics of the Mexican Wave, lots of quotes plus a lot more.

Those of you who have seen the names of the editors or in fact the name of the Journal, might be wondering who are these people and why aren't they resting quitely in there graves, like normal people. Well don't there is in fact a logical, sensible reason behind the names of the editors, its just that we cann't remember what it is but we are sure that it is important. The origins of the name Jeremy are lost in the mists of time, although legend has it Jeremy is in fact the name of a Phd student who got lost in the physics building and has never been found since.

Jeremy is this year holding a "Dud Theory" Competition, the idea is to explain a specific physical thing, such as friction, using as little physics as possible. The theory has to be wrong and amusing. Brian McInnes states that fricion is caused by demons that hold onto objects.

Please Note: Some Quantum Physics Theories suggest that when the reader is not directly reading this journal, it may cease to exist or will exist only in a vague and undetermined state.

The Editors: Richard Planetaganet (Physics II)
Mrs Muriel Pim (Physics II)

FAIRIES DISCOVERED TAKING TEA IN LEADING SCIENTIST'S GARDEN

No doubt many of our readers who happen to be students in this august institution find it hard to believe that the Physics School function without them. Perhaps you have tried to imagine what the building is like when you're off enjoying yourselves: the long, silent, echoing corridors; the muffled and mysterious sounds in the distance - in other words, much the same as during semester. But nothing (at least to a good approximation) could be further from the truth. When the students are away, the Physics School becomes a veritable hive of activity. Large parties involving harps, viols, mead, honeydew and dancing girls are attended by cavorting, merry-making physicists, and the building rings with shouts of joy and exultation.

Of course, it hasn't been all fun. Your humble lecturer's mind, so often seemingly asleep, goes into overdrive when undisturbed by the seething mass of humanity that crowds his lecture theater. (And, gentle reader, I use the dreaded pronoun 'his' not through any subtle sexism, but because I have yet to meet a female physics lecturer). In the long vacation, the Physics School has been responsible for: getting cold fusion to work, the discovery of life on Mars, and the resolution of the Gulf War. The Physics Society and your intrepid editors have been covering the work-in-progress, and you can expect a report on all that soon. Besides which, we have a number of exciting talks lined up: speakers include Carl Sagen, Steven Hawking, and the ghost of Albert Einstein (via spirit medium). So you see, you have made a wise choice choosing (or re-choosing) to study physics, if only because you have such an indefatigable society working on your behalf.

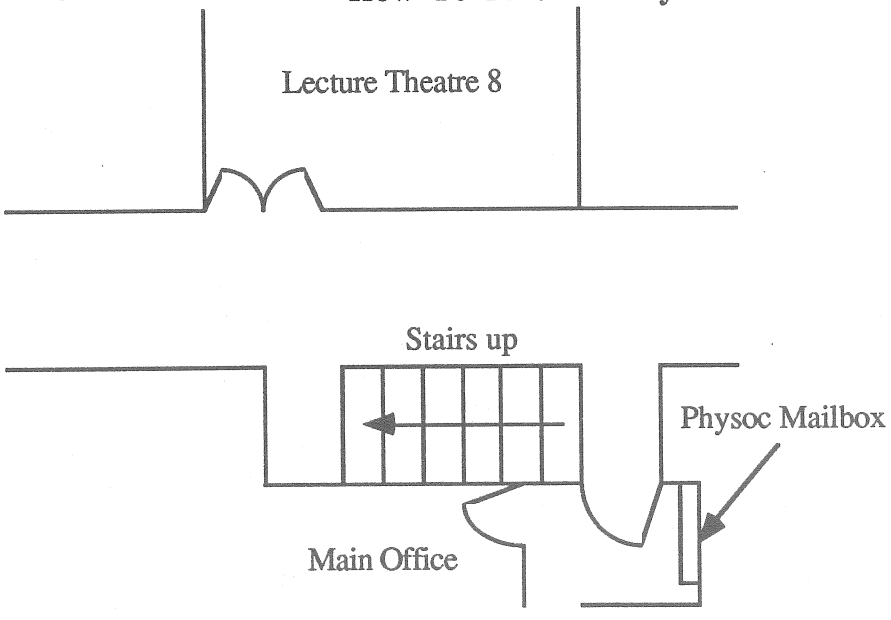
On the more serious side of things, Physoc has been very active in the new year. The O-Week stall was a great success, with a lot of new members, and bemused onlookers. We have had one party already, as well as an exciting talk by Bernard Pailthorpe about the uses of diamonds, if you weren't there then you missed out on the free sample given out by Bernard, but I'm sure if you went and asked him he would give you some.

The most important news item is how to submit articles to Jeremy. Jeremy cann't survive unless we get lots of lovely articles from you. To submit articles all you have to do is going into the man office, where you will see to you left a wall full of letter boxes, one of which is marked "Jeremy". All you have to do is put the article in there, and we will receive it.

Love,

Muriel.

How To Find The Pysoc Mailbox



The Physics of the Mexican Wave

by David Mar and Neil Broderick.

Having visited the Sydney Cricket Ground during the summer, we have noticed an interesting example of classical wave behaviour — the so-called *Mexican Wave*.

For those of you unfamiliar with the Mexican Wave, it is basically a form of transverse wave which propagates around the grandstands at various sporting events such as cricket matches. A section of the crowd will stand up, stretch their arms upwards, and make a loud cheering noise. An adjacent section will follow this behaviour immediately after, as the first group sits down again. This continues and the "wave" propagates around the ground.

As a first approximation, the Mexican Wave can be assumed to follow the simple wave equation

$$y = y_o \cos(k x - \omega t)$$

where y_o is the wave amplitude (roughly the height of a person with arms stretched above the head), k is the wave number ($2\pi/\lambda$), and ω is the angular frequency. Close inspection will reveal that all of the physically important Mexican Waves are not actually sinusoidal, and Fourier analysis is required for as complete description. Nevertheless, some fascinating insights into Mexican Wave behaviour can be had by following up this simple approximation.

The usual relation defing the wavespeed holds, namely

$$v = \nu\lambda$$

where ν is the frequency ($=2\pi\omega$) and λ is the wavelength. The wavespeed is also given by the expression

$$v = \sqrt{\frac{T}{\mu}}$$

where μ is the mass per unit length of the crowd and T is the tension in the crowd. It can be seen from this that as the crowd eat more hot dogs and imbibe more beer, the speed of the Mexican Wave will decrease. Conversely, as the cricket (or whatever) match builds up to an exciting finish, the crowd tension and hence wavespeed goes up. These two effects tend to counteract one another, and so the wavespeed remains fairly constant throughout a match.

One practical aspect of this last equation is that it provides a totally objective measure of the crowd excitement level generated by various sports. If the mass term is considered to be constant (a good approximation), then a measurement of the wavespeed will give a direct measure for the excitement value of the sport. For example, Mexican Waves are seen to propagate only at extremely low speeds in crowds of spectators observing golf tournaments.

Mexican Waves are, in theory, capable of displaying various interference and standing wave effects, but the practical aspects of setting up multiple Mexican Waves of differing amplitudes and directions in a single crowd are very restrictive indeed, and such behaviour has only been observed once (in a World Cup soccer final in Mexico City — hence the naming of the waves). What is more, there are sometimes areas of the crowd, such as the Members' Stand at the SCG, which display distinctly non-physical behaviour. This stand indeed acts as an energy sink, absorbing the propagating Mexican Wave without even the slightest hint of a wave reflection, as would be expected from any well-behaved interface. It has been suggested that some of the lost energy is released in the chorus of booing which inevitably goes up around the rest of the ground whenever this effect occurs.

The question of Mexican Wave resonance is an important one, which has not yet been fully addressed. It is believed that this phenomenon may be the cause of various incidents around the world where grandstands have collapsed, causing tragic losses of life in some cases. Various authorities have implored sports ground designers to include some wave damping mechanism in their designs to forestall any further tragedies. The Members' Stand at the SCG may indeed be serving this purpose.

It is interesting to note that the equations governing Mexican Wave behaviour can be derived from Maxwell's equations of electromagnetism if one considers the magnetic field to be represented by the distribution of food and drink in the ground, and if the electric field is identified with the

general level of excitement amongst the crowd. This representation is well reflected by various statements made by the match commentators — "And the atmosphere here is electric tonight."

A much more rigorous description, however, is given by solving the quantum mechanical Schrödinger Equation

$$-\frac{h^2}{2m}\nabla^2\Psi + V\Psi = ih\frac{\partial\Psi}{\partial t}$$

where the *Mexican Wave-function*, Ψ, describes the full, time-dependent behaviour of the wave, in the presence of a *crowd-potential*, V. Unfortunately, for large crowds (about 10 000 or more people) the crowd-potential becomes too complex to be readily calculated and various perturbation theories need to be applied. The best known of these is the *Benaud Approximation* — "Well, there is an absolutely *huge* crowd here today."

Although conforming in most respects to purely classical behaviour, Mexican Waves do exhibit certain quantum properties. The Heisenberg uncertainty principle, for example, dictates that the product of the crowd energy and the time between successive waves must be greater than h. This manifests itself in the fact that a more energetic crowd will be seen to initiate Mexican Waves with greater frequency than less energetic crowds. Quantum tunneling is also seen when, at the SCG, a Mexican Wave can reappear on the opposite side of the Members' Stand after impinging on one side and apparently having no physical existence inside the stand. This is an example of the now well-understood *virtual Mexican Wave*.

It is also now well-known that the speed of a Mexican Wave is invariant in any frame of reference. This leads to the relativistic effects first noticed by Einstein (Berlin Olympic Games, 1936), which dominate when the wavespeed approaches c, the speed of light. The crowd tension is limited to a value less than $c^2\mu$, and various bizarre effects come into play. This includes the phenomenon of time dilation, where the time towards the end of a sporting event seems to pass much more slowly when your team is winning by a small margin and looks in danger of losing the advantage. The famous relation

$$E = mc^2$$

relates the crowd energy to its mass in a very fundamental way, showing that the larger a crowd is, the more likely it is to get rowdy (and to initiate a large number of Mexican Waves).

Although we have progressed a long way in the understanding of Mexican Waves, there are still various phenomena which cannot yet be explained. These include the vexing question of what effect the seagulls on a ground have on the behaviour of the wave, although there is a very promising new theory addressing this question: QAMD, or *quantum aviomexicodynamics*. Other more exotic theories, involving black holes, quarks and superstrings, have been postulated to explain further puzzling aspects of Mexican Wave behaviour, but these theories must be seen as tentative at best. These have generally been put forward in an attempt to explain exactly how a Mexican Wave is generated. This question still remains unsolved, even though we have a good formulation for the properties of existing waves.

Research into the fascinating field of Mexican Wave dynamics will continue, as it can clearly be seen that such knowledge will be of great benefit to human society, and possibly even to the world and environment in general. So remember: if you ever see a scientist at a sporting event, he or she will not be there for entertainment, but for serious reserch!

J

The Case of the Capacitated Student

A. Nonymous

Physics XVIII

In glancing over my notes of the last seventy odd cases in which I have during the last eight years studied the methods of my friend Sherlock Holmes, I find many tragic, some comic, a large number merely strange, but none commonplace. Of all these varied cases however, I cannot recall any which presented more singular features than that which was associated with the third year laboratory in the year of '89. The events in question occurred in the early days of my association with Holmes, when we were forced to share room 221B due to cut backs in staffing offices.

It was one of those mornings. I was trapped behind a mountain of assignments waiting to be marked, during which time, Holmes leisurely smoked his pipe whilst sitting upon our only 'easy' chair. It was indeed boring and the conversation, which had roamed in a desultory, spasmodic fashion from golf clubs to causes of the change in the obliquity of the ecliptic, came round at last to the question of electromagnetism and whether or not Dick Collins prepares his quotes.

I was indeed extraordinary that a knock should come to the door and the originator of that knock should be the man (or should I say *enigma*) himself, Dr. Collins. He appeared most agitated and scurried across the room to collapse into the chair that Holmes had vacated to open the door. Holmes began to speak...

"Please calm yourself, my dear professor. I perceive you have had a frightful experience in the third year labs, but being an applied physicist, you should not have run so fast to get here lest you get mistaken for a plasma sample. Now again I say to you, calm down and tell us your tale of woe."

"B.. B.. But how how did you know that I came from the third year lab," stammered the obviously baffled professor, "not to mention the other things that you so rightly stated about what has happened?"

"It was obvious," said Holmes, "You were agitated, hence the frightful experience, you are a shade pinker than the norm, implying your rapid translation to our room here and I could tell you had been in the third year laboratory as I do perceive you are glowing slightly – the gamma experiment perhaps?"

"How absurdly simple!" cried Dr. Collins.

"Exactly!" said Holmes.

At this point a sharp rap came to the door and Inspector Lehane let himself into the room and addressed the gathering.

"Good Morning, Holmes, Watson. I suggest that you come down to the third year lab; something there that might interest you I believe."

We left the room and proceeded to the third year laboratory with Dr. Collins staggering after us.

Upon our arrival at the third year lab, we were greeted by Dr. Winn, who was most distressed despite having successfully failed many students. He led us to the back of the lab to a bank of capacitors. As I came into view of the capacitors, my mouth dropped with horror at the hideous sight that was presented to my eyes.

A student was lying prostrate on the floor in front of the capacitor bank. At first one might have thought that he was trying to catch up on some sleep whilst doing data collection on the 'Mossbauer' experiment if it were not for a charred skeletal hand that reached up to one of the terminals of the capacitator bank. The student was obviously dead.

"He's dead.", said Dr. Lehane.

"I can see that", said Holmes bending forward, pulling out a strong magnifying glass (convex, focal length 130mm, aperture 80mm) and examined the hand and the surrounding area. Immediately above the terminal was a small sign which read "+5 volts". Holmes studied the surrounding circuitry and then suddenly exclaimed,

"Ah! I have found the problem! See here", he said extending a long bony finger at a small printed circuit board. "There is a diode in back to front. Someone has tampered with the safety circuitry."

We all had a look and indeed the diode had been inserted incorrectly.

"But surely this would not be the problem," someone remarked.

"It has long been an axiom of mine that the little things are infinitely the most important." said Holmes.

Dr. Winn grabbed a piece of paper from a convenient location and scribbled many alphanumeric characters upon it before stating that this would generate 811 volts DC I reached for a high-volt DC meter and some heavily insulated probes which I placed carefully on the terminals of the capacitor bank and indeed the meter read 810 $\pm$ 5 volts.

The gathering slowly drifted away and I was left alone standing with Holmes who was pondering the matter, speaking his thoughts aloud as was often his habit.

"It is all in this diode. A small component but of great significance. It is apparent that it has been tampered with as the solder is of a different lustre showing it to be much more recent in its application than any of the other joins on the board.

"I feel that the criminal is a physicist. Only a physicist could enter these buildings without raising suspicion. And nobody has noticed a non-physicist since the equipment was last working yesterday. Inspector Lehane has made quite sure in his investigations.

"The mere fact that it was soldered indicates that the culprit is not a theoretician as a person of such inclination would not be capable of plugging in a soldering iron, let alone knowing which end to hold.

"It was not the doing of an astronomer or astro/optical physicist. They would not choose so subtle a means of disposing of a student when a 100 watt CO_2 laser is readily available, not to mention replacing a solar filter with an image intensifier.

"Likewise, the plasma and high energy physicists would resort to other measures, such as gamma radiation or beta particles. Which, by process of elimination, leaves only the Applied Physics Department."

"What!", I exclaimed. "Surely that is most improbable."

Holmes turned to me and said, "It is an old maxim of mine that when you have excluded the impossible, whatever remains, however improbable, must be the truth."

"Who could it be?" I inquired.

"I'm not sure." said Holmes, "It is quite a three pipe problem."

We set off for the illustrious department of Applied Physics. Holmes did not speak but strode briskly with his head held high; a sure sign that he was onto something. I had grave doubts as to theory which my friend had proposed about the culprit lurking within the haloed walls of the Applied Physics Department and I voiced these to him.

"It is my belief, Watson", he said, "founded upon my experience, that the lowest and vilest alleys of the Astrophysics Department do not present a more dreadful record of sin than does the smiling and beautiful Applied Physics Department. Now, hush Watson, we draw near our destination. I will ask you to let myself do all the questioning."

We ambled into the department and Holmes began his inquiries. Not one of the staff, much to their annoyance, escaped the most mathematically rigorous inquisitions with which Holmes lashed out. Even the elusive Dr. Pailthorpe was pinned down and interrogated.

After about an hour of exhaustive questioning we had gotten nowhere and my friend was showing signs of depression. Every staff member could account for themselves between the time of the crime and the time the experiment was last working correctly. Holmes was tempted to get out his violin and play some enchanting, melancholy frequencies but he decided against it for fear of luring Dr. Johnston out of his office.

"Heck." I muttered.

"The optics textbook?" inquired Holmes, puzzled.

"Not Hecht, Heck." I replied. "What are we going to do. The whole situation is so bizarre. The first we hear of it is when Professor Collins bursts into our tiny abode. Then Inspector Lehane arrives and..."

"Stop!" Holmes exclaimed, "That is it, Watson! What was Professor Collins doing in the third year lab. Of course. How blind could I possibly be. He was there to tell the students about the third year special projects. Now, if I remember correctly, the Applied Physics Department is notorious for excruciatingly torturous special projects. It wasn't murder after all. It was suicide!"

"Suicide!" I exclaimed.

"Yes, Watson. The student in his grief at the prospects of the heavy workload decided to end it all on a high voltage supply. Yet this was at the time of peak activity (not the 'Laurie' variety) and all the EHT suplies were being used by other students. So our unfortunate creature, not wishing to disturb his comrades found an unused piece of equipment and wired it himself. And I would stake a fiver that in the students other hand is the soldering iron that allowed him to alter the circuit in order to take his life. We had been so concerned with the charred hand on the terminals that we forgot to observe the other hand. Oh, how forgetful can I be; this is not like me at all. Come, Watson, we will go at once to the lab."

Sure enough, Holmes was right. We saw Inspector Lehane and the matter was cleared.

As we were walking back to our room I inquired of my friend what he intended to

do for the rest of the day.

"I think that I will return to my easy chair," said he, "and read a book on particles."

"What sort of particles, Holmes?" I asked.

A smile came over Holmes' face and he replied,

"Elementary, my dear Watson."

J

Births

The physics society is pleased to announce the birth of the "Research Centre for Theoretical Astrophysics". The Centre weighed in at one and a bit professors, 1.285 research fellows, one postdoc and one applied mathematician to boot.

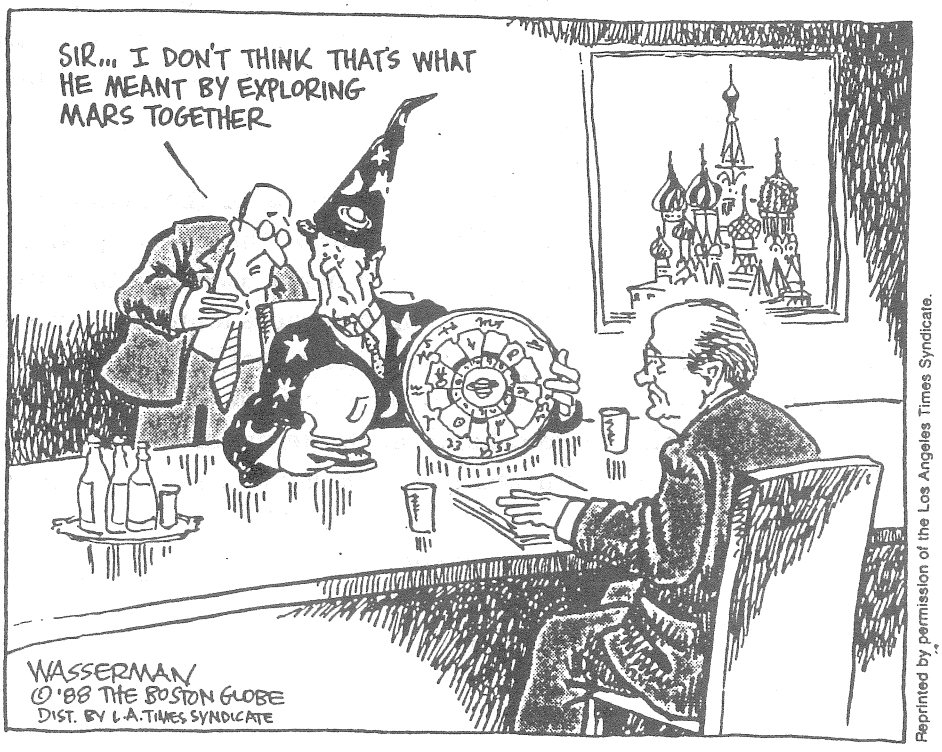
The proud father, Don Melrose, has high hopes for his brainchild. His aim is to have it promote interaction between theoretical and observational Astrophysicists. Never before has so much been done by so few ....

The youngster has already been seen at play in the Physics Building. It has a penchant for Sun SparcStations, simple (very) models of Life, The Universe, and Everything, and it just loves going for rides in the car out to the ATNF in Epping. It's pet hatred is of University red tape with which the administrators constantly try to restrain it.

Don has had the old tutorial room #317 converted to a cerebral base for the Centre, and there are strong rumours that the Centre may soon take over the gents' loos opposite the Tea Room. A quick glance revealed at least 4 postdoc size offices were there already, complete with stationery, but for some reason the doors don't go all the way to the floor ....

The Centre is growing fast and has a taste for eager young students with a theoretical background (engineers have too much grit). So if you can integrate six impossible functions before breakfast then the Research Centre for Theoretical Astrophysics is the place for you.

J



The Kit Kat Quotes Competition

This section of Jeremy is by far the most popular, as well as being the one which causes lecturers the most pain, and distress, although certain perverse lecturers count it a honour to get their names mentioned as often as possible.

It is a well known fact that, most lecturers say things that they don't mean or didn't mean how it sounded. So when your lecturer makes a mistakes, instead of unkindly laughing at him, write it down, and submit it to Jeremy, where the whole of physics will find out what he said, and possibly the rest of Australia.

The best quote of the year will receive a prize of the order of 1 box of Kit Kats for the person who submitted it, as well as getting their name on a trophy. The poor lecturer only gets a book prize. So it is in your best interests to submit quotes as soon as you get them. Below is the winning quote for last year.

Dr Les Wood (guest lecturer for 3rd year):

"The mathematician follows the elephant with a bucket and shovel. The physicist rides the elephant telling it where to go"

submitted by Quote Collectors Incorporated (along with the majority of other quotes). They say they'll go for 3 in a row this year. Dr Les Wood, awfully embarrassed by the attention has returned to his home campus of Cambridge. We do not know if he will return this year to repeat this feat.

So here are the first quotes for this year

Martyin de Sterke:

"this is not thermodynamics so you don't have to write it down, it's just E.M that you did last year, and if you swallowed that then, you should swallow this thermodynamics now."

"what symbol should I use, a box? a circle?, ... decisions!"

"Lets see how this hocus-pocus works"

Don Melrose:

"I've got C in my notes, I wrote down F, and it should be G"

Ian Johnston:

"Of course it's plausible, if I'm saying it"

FØRƎIGN QUOTES

Peter Wilson(Applied Maths):

"And we assume the distributive law because theres' absolutely no reason why we shouldn't"

"Euler is the guy sitting on the beach drinking tinnies, Lagrange is riding a surfboard following the water particle. You see that acceleration doesn't mean much to Mr Euler"

"This is one of the reasons why Fluid Dynamics is such a neat subject, because it allows you to commit murder and get away with it."

"Aeroplanes fly, essentially , by ignoring that term"

"These are called interial terms, while they look harmless, they're bristling with difficulty"

Bob Walters(Pure Maths):

"You cann't tell true from false because there's an isomorphism. The problem is worse if you're left handed"

Phillip KirkPatrick(Pure Maths):

"Infinity is sort of big you see"

"and so it was greed that led to the invention of comlpex numbers"

Michael Wise(Computer Science):

"The two things I'm not going to mention are ..."

"What we have here is a single sausage slicer. What we really need is a multiple simultaneous sausage slicer"

J

Physics Forum

John Gaunt

The purpose of this section of Jeremy is to show how physics can be applied to the real world. All too often we the impression that physics is only concerned with the complicated, expensive or the very big. However in *Physics Forum* we are concerned with the everyday aspects of physics, the kind of things that you see around you on the way to university.

The way we operate is that if you have any problems that you don't know the answer to, then you can send them in to here for discussion. While we don't guarantee an answer, we do promise to give some insights. To succeed in the second part we need your help. If you know the whys and wherefores of various problems we have been discussing then send in your answer and you will be richly rewarded (a handful of *Kit Kats* actually)

This article marks the demise of Bodie who has written this section for the past two years. Bodie is going out into the real world to seek out and spend strange new pay-checks(the kind with three figures on them) and we here at *Jeremy* wish him all the best.

Wind, Waves and Water Last year the question was raised as to why some patches of water appear smooth while others nearby appear choppy. This is quite familar to anybody who has ever been out on the water. It was noted by some that the regions of smooth water correspond to areas where there is little wind, and consequently those in sail boats should learn to avoid them. Derek has come up with an alternate suggestion that the different areas correspond to regions of different temperatures, something on which I have no knowledge. However neither of these explations explain the well defined boundary, which exists between the areas. The problem is that the waves appear to die immediately upon crossing into a region of smooth water. Is it just that the amplitude of the waves falls of slowly and the region of no wind actually extends past the area of no waves? From my experience of sailing I suggest that this is unlikely as the borders between areas of no wind and areas of wind correspond very well with the areas in the water. Another possibly is that there is some strong damping force that acts upon the waves, but again I have no idea what it could be.

A related problem has to do with wakes (boat's) and why they appear to be very stable. David Mar raises the question after noting that often you can see a boat's wake long after the boat has disappeared. This is especially true at night as the boat's wake is a lot smoother than the surrounding water and so reflects more light in a coherent direction. Here we have again the problem of a patch of water remaining calm for a long period of time, while around it the water contains lots of little waves.

Any Ideas?

Double, Double, Boil and Bubble Over the holidays your intrepid author was at a News Years party, enjoying himself when he noticed that the bubbles from his champagne glass were all coming from the same spot. In fact there was a trail of bubbles leading from the top of the glass to the very bottom in the centre where the bubbles where forming. Further investigations revealed the surpising fact that something similar occured with cider with the bubbles being formed in one spot near the bottom of the glass (a more sober person has noted that you can see the same thing in most fizzy drinks). Irrespective of the shape of the glass the bubbles where all formed at or near the bottom. Now the pressure is greatest at the bottom so that should be where the solubility of the gas is greatest and so where you would expext bubbles not to form. Is it something about the shape of the glass that causes bubbles to form, or is it a property of liquids in gereral that bubbles seem to form at one point constantly?

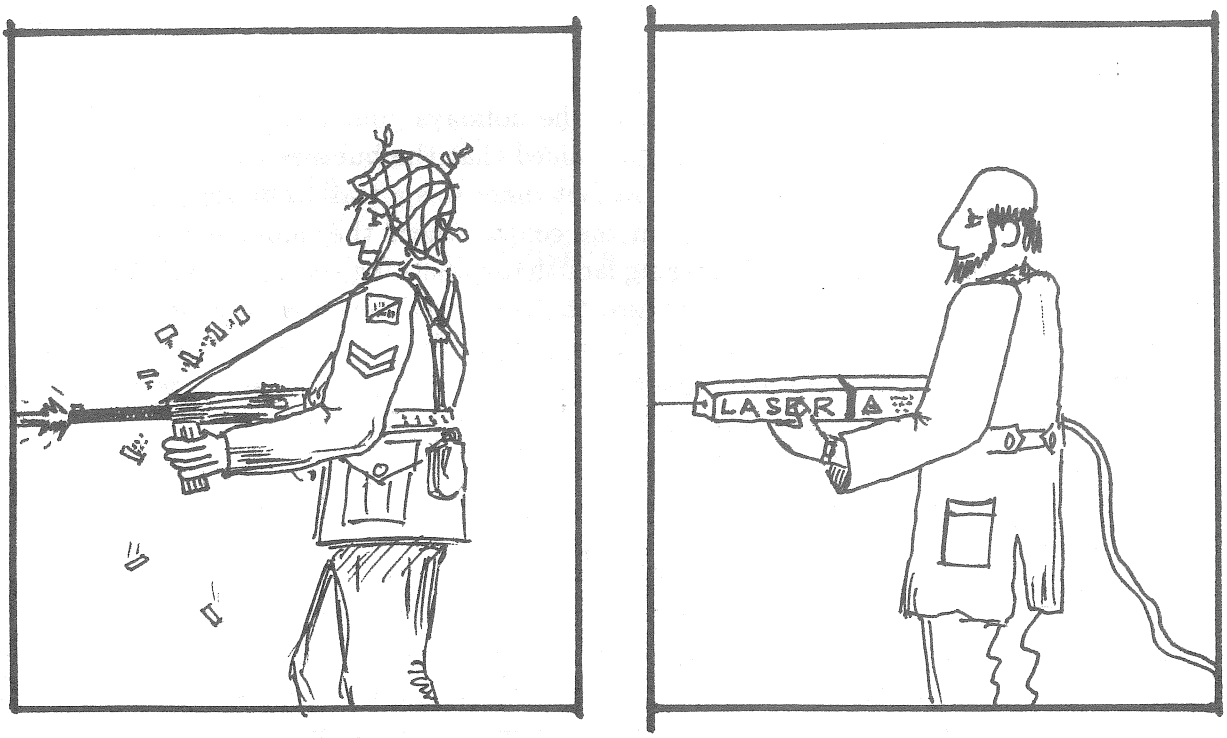
The next problem to do with fizzy drinks is this. Why when you pour a drink over some ice cubes does it fiz up more? It is not because of the increased surface area over which to form bubbles, as if you pour the same drink into a glass conainting leggo blocks you don't get as much fiz. The other reason people have suggested is that CO_2 is less soluble in cold water but this is wrong as solubility of gases increase as the temperature decreases.

The next question about drinks is that why when you pour the soft drink over the ice does the ice crack?

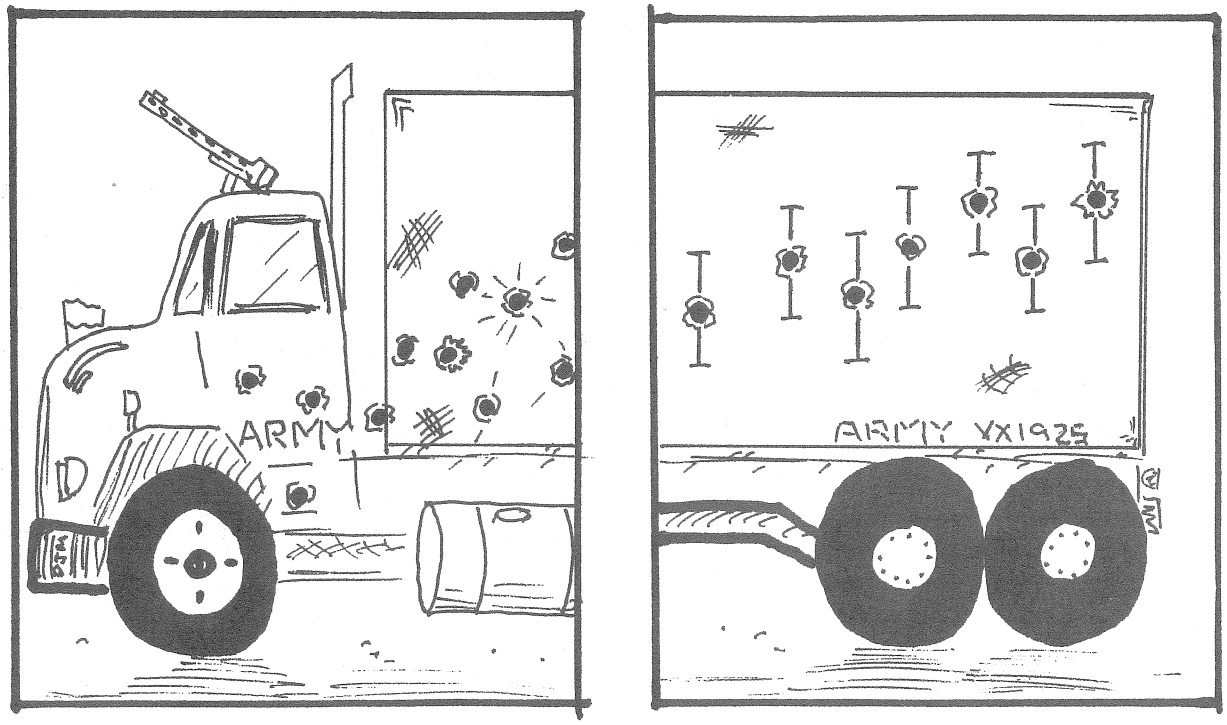
The last question in this section comes from Justine who has observed the following. When you are boiling a liquid you produce steam, okay, but Justine has noticed that if a liquid is boiling and you turn the temperature down, the amount of steam being produced suddenly increases. Furthermore the more viscous the liquid the greater the puff of steam. This one has left me totally lost and I would love someone to send in the answer. You will get double the reward if you answer this problem. So if you have any ideas on any of these problems send in your solutions to us.

Feedback This is where we discuss the answers to last issues' problems. The feedback from the last issue has been poor, althought that is not surpising as the holidays have intervened. However we did get one reply to the problem about the water dripping from the tap. A kindly chemical engineer wrote in saying the answer was capillary waves, that moved quickly up to the tap when you disturbed the stream at the bottom. Thank you for that, and if you would care to come and see me or any of the editors you will receive your reward of *Kit Kats* That is the only feedback we have recieved so far, but we are sure that the feedback will increase as you will recieve huge amounts (at leats a Jansky of them) of *Kit Kats* if you do.

J



WHAT IS THE DIFFERENCE BETWEEN A SOLDIER & A SCIENTIST?...



ERROR BARS