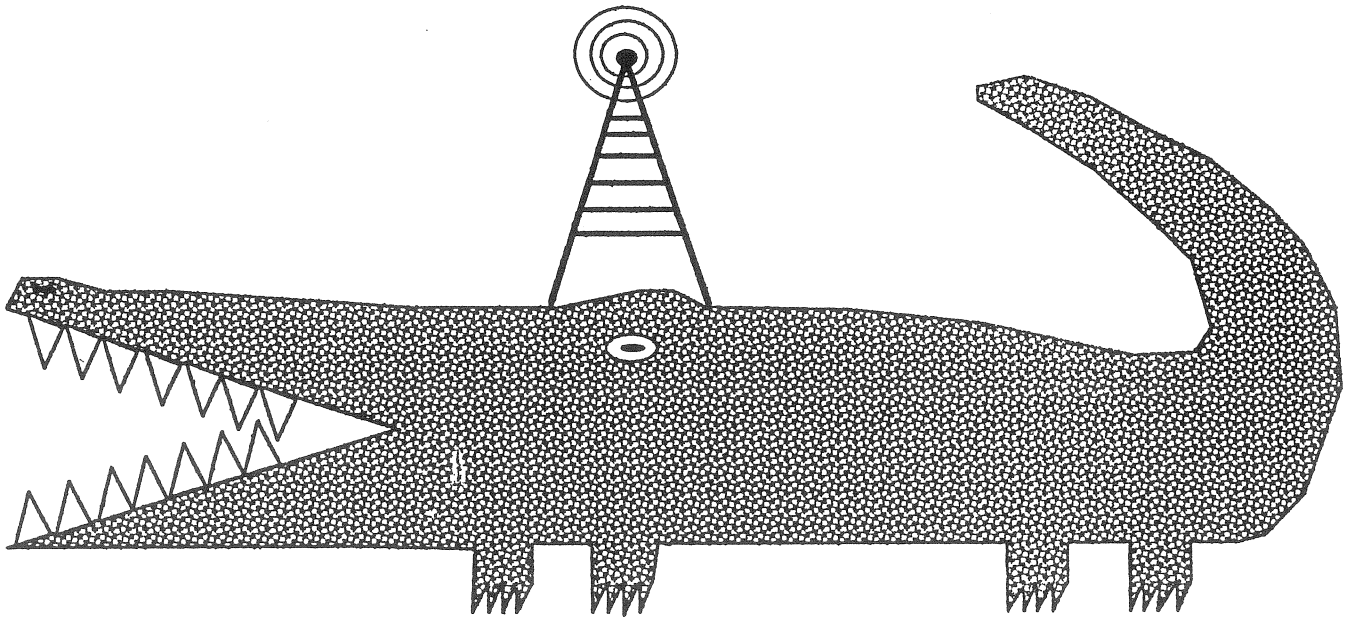
Jeremy



The Official Journal of the
Sydney University Physics Society.

Volume 15, Number 2, May-June 1999

Editorial

Welcome to the second issue for this year. Your hard-working editorial team has finally got into gear and published another edition. It includes :

* insightful commentary on the interface between science and popular culture (i.e. we jump on the Star Wars bandwagon)
* insightful commentary on the interface between astronomy, chaos theory and seismology (i.e. one editor's late night ramblings)
* insightful commentary on the much neglected subject of feline physics
* insightful comments made in lectures (the Quotes Competition)

Many thanks to our contributors, particularly the unwitting contributors (Dr. Peter Robinson and the Internet). And we're already on the lookout for articles for the next edition (not to mention a better illustration for the front page). Please send your insightful commentaries to the cardboard PHYSOC mailbox in the First Year Office or the electronic PHYSOC mailbox (physoc@physics.usyd.edu.au).

Enjoy !

- *Edward Boyce, Amy Dickings, Jocelyn Laurence and Jeremy Nicholas.*

The Phys Quiz

We're interested in the opinions of our readers, so please participate in this survey. Send your answers to the places mentioned in the editorial above.

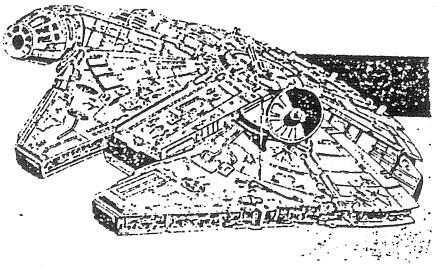
1. Dihydrogen monoxide is a tasteless, odourless chemical, found in all tumour cells and in the arteries of all heart attack victims. It aggravates soil erosion, contributes to soil salinity and corrodes metals. In the solid state it poses a serious hazard to shipping and in the gaseous state it acts as a greenhouse gas. Should we ban dihydrogen monoxide?
   ☐ Yes ☐ No

2. What is your favourite fundamental force ?
   ☐ Electromagnetic ☐ Strong Nuclear ☐ Weak Nuclear ☐ Gravitational

3. What is your favourite physical constant ?
   ☐ Gravitational Constant (G) ☐ Planck's constant (h) ☐ Electron Charge (e)
   ☐ Electron Mass (m_e) ☐ Proton Mass (m_p) ☐ Neutron Mass (m_n)
   ☐ Avogadro's Number (N_A) ☐ Boltzman Constant (k)
   ☐ Permittivity of Free Space (ε_0) ☐ Permeability of Free Space (μ_0)
   ☐ Speed of Light (c) ☐ Other .....

4. Do you participate in voluntary surveys?
   ☐ Yes ☐ No

21 Reasons Star Wars is Better than Titanic



1. Titanic may be big, but it doesn't have hyperdrive.

2. Leia is a princess, a senator, a diplomat, a freedom fighter, a brilliant strategist, and potential Jedi material; Rose is just cute marriage bait.

3. Star Wars has WAY better action figure potential.

4. Yoda could use the Force to just lift Titanic out of the water.

5. Ewoks throw better parties than first class or steerage.

6. When flying towards Titanic, Wedge couldn't say "WOW! Look at the size of that thing!" with any sincerity.

7. It would be scarier to get chased around the boat by an evil madman with a lightsaber as opposed to an idiot with a handgun.

8.a. Titanic is egalitarian in that it portrays poor people as sympathetic characters. Star Wars is egalitarian by promoting bug-eyed amphibians to the rank of admiral.

8.b. Said bug-eyed amphibious Admiral manages not to lose his ship.

9. We know Cal is the bad guy because he greases his hair, sneers at the poor and treats his fiancée like property. We know Darth Vader is the bad guy because he wears an ominous, voluminous black cape and mysterious mask, strangles people with a glance and blows up planets for sport.

10. Yeah, okay, Leo can dance... but can he fly an X-wing?

11. People have never lost their lives trying to recreate a scene from Star Wars on the bow of a cruise liner.

12. Rose braves icy water to rescue her man. Leia braves Jabba the Hutt. Now, come on, who's really the brave one here?

13. Two words : Harrison Ford.

14. The theme from Star Wars is one of Hollywood's most memorable movie themes. "My Heart Will Go On" is one of it's most forgettable.

15. There are always more than enough escape pods in Star Wars.

16. Do you have any idea what the Empire does to self-proclaimed "Kings of the World"?

17. If Luke were handcuffed to a pipe below decks in a sinking ship, either :

a. he would cut himself free with his lightsaber;

b. he would use the Force to get the key; or

c. Han Solo would burst in at the last second and blast the cuffs off.

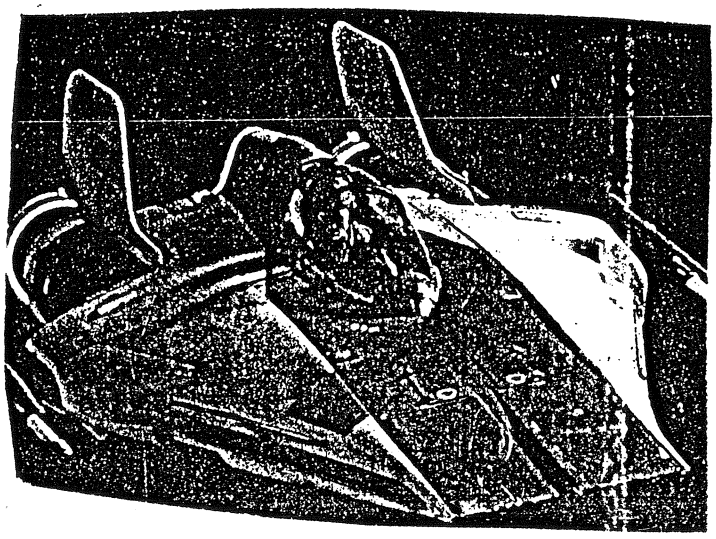
18. "I'd rather be his whore than your wife" doesn't have the same sting as "I'd rather kiss a Wookie."

19. We all knew the boat was going to sink, but who was ready for "Luke... I am your father."

20. Han Solo would have missed that iceberg.

21. Han, though frozen solid in carbonite, returns in excellent health to mount a successful mission against the Empire on Endor, paving the way for the destruction of the Death Star; AND claims the hand of the woman with whom he will live happily ever after. Jack, on the other hand, simply freezes.

Lines from Star Wars that are Improved if you Substitute the word *"Pants"*



"She must have hidden the plans in her pants. Send a detachment down to retrieve them. See to it personally, Commander."

"I find your lack of pants disturbing."

"These pants contain the Ultimate power in the Universe. I suggest we use it."

"Han will have those pants down. We've got to give him more time."

"General Veers, prepare your pants for a surface attack."

"I used to bullseye womp-rats in my pants back home."

"TK-421 - Why aren't you in your pants."

"Lock the door. And hope they don't have pants."

"Governor Tarkin. I should have expected to find you holding Vader's leash. I recognised your foul pants when I was brought on board."

"You look strong enough to pull the pants off a Gundark."

"Luke... help me take... these pants off."

"Great, Chewie, great. Always thinking with your pants."

"A tremor in the pants. The last time I felt this was in the presence of my old master."

"You are unwise to lower your pants."

"We've got to be able to get some reading on those pants, up or down."

"Don't worry, Chewie and I have got into a lot more pants more heavily guarded than that."

"Maybe you'd like it back in your pants, your highness."

"Your pants betray you. Your feelings for them are strong, especially for... Sister!"

"Jabba doesn't have time for smugglers who drop their pants at the first sign of an Imperial Cruiser."

"That blast came from those pants. That thing's operational!"

"Yeah, well, short pants is better than no pants at all, Chewie."

"Tell that to Jabba. He may just take your pants."

"Strong am I with the pants, but not that strong."

"Attention, this is Lando Calrissian. The Empire has taken control of my pants. I advise everyone to leave before more troops arrive."

"I cannot teach him. The boy has no pants."

"You came in those pants? You're braver than I thought."

Luke and Obi-Wan Kenobi are in a Chinese restaurant having a meal. Skillfully using his chopsticks, Obi-Wan deftly manoeuvres a large portion of noodles into his bowl, then tops it off with some chicken, stir-fry vegetables and cashew nuts. All this is done with consummate ease - as you might expect from a Jedi master.

Poor old Luke is having a terrible time, using his chopsticks with both hands, dropping his food all over the table and eventually himself. Obi-Wan looks at Luke disapprovingly and says, "Use the forks, Luke."

Vogon Poetry Page

For those readers not familiar with the work of Douglas Adams, the Vogons are an alien race described in "The Hitch Hiker's Guide to the Galaxy." Their poetry is renowned as being the third worst poetry in the Universe - so bad that listeners had to be strapped to their chairs to prevent them leaving. Here is a sample, from Douglas' Adams superlative book :

> Oh freddled gruntbuggly thy micturations are to me
> As plurdled gabbleblotchis on a lurgid bee.
> Groop I implore thee my foonting turlingdomes.
> And hooptiously drangle me with crinkly bindlewurdles,
> Or I will rend thee in the gobberwarts with my blurglecruncheon, see if I don't.

Unbeknownst to most, we have a Vogon lurking in the School of Physics, who has kindly agreed to submit a poem. So here is the poem, from an anonymous Vogon contributor :

Colloquium

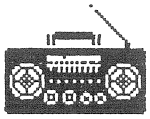
Ah colloquia
Sitting perched on
    wooden benches
mind dead
empty cavity pounding
you don't know what inside your head.

People lost,
    wondering what they're doing
    in an astrophysics group meeting
Looking round the room
    for answers.
Why here? In a room that
swims in orange + lemon sherbet?
Because they want to,
    because they have no life,
because somewhere deep in
side there is a part of all of us
    that wants to be a theorist.
Just because

Physics Party

I sadly missed the last PHYSOC party due to an unforeseen talk I had to present in a far off, and distant land. But all was not lost. While in the basement of the Physics Building at Kansas State University I fell into a time-portal and found myself transported in a spatial sense to a Party. A Party of young undergraduate physicists and mathematicians. Whilst there I jotted down some observations that might be of interest to you budding genius-fizikist types.

* Everyone gravitated toward Newton, but he just kept moving around at constant velocity and showed no reaction.
* Einstein had a relatively good time.
* Coulomb got a real charge out of the whole thing.
* Cavendish wasn't invited but had the balls to show up anyway.
* Thomson enjoyed the plum pudding.
* Pauli came late, but was mostly excluded from things, so he split.
* Pascal was under too much pressure to enjoy himself.
* Heisenberg may or may not have been there.
* Ohm spent most of his time resisting Ampere's opinions on current events.
* Hamilton went to the buffet tables exactly once.
* Gödel was always talking about himself.
* Volt thought the social had a lot of potential.
* Hilbert was pretty spaced out for most of the party.
* Cauchy managed to integrate well with everyone.
* The Curies were present, and just glowed the whole time.
* Van der Waals forced himself to mingle.
* Schrödinger partied so hard he seemed half-dead by the end of the evening.
* Wien radiated a colourful personality.
* Kepler kept circling around the room.
* Millikan dropped his Italian oil dressing.
* De Broglie stood in the corner most of the time and just waved.
* Hollerith liked the whole idea.

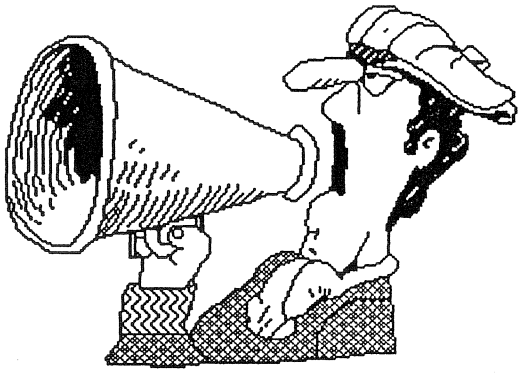


* Stefan and Boltzman got into some hot debates.
* Everyone was attracted to Tesla's magnetic personality.
* Young kept seeing double.
* Rutherford's party trick was to spit olive pips at guests.
* Crompton got a little scatter-brained at times.
* Bohr ate too much and got atomic ache.
* Watt turned out to be a powerful speaker.
* Hertz went back to the buffet table several times a minute.
* Faraday had quite a potential for food.
* Oppenheimer got bombed.

- King Fletch, PHYSOC President.

Don't Quote Me ! -

The Quotes Competition



Dr. Peter Robinson, Theoretical Physics

"You could always have an equation-solving party, where everyone brings a case of differential equations. But remember - only between consenting adults."

"There is an alternative way to look at this, well actually there is an infinity of ways to look at this..."

"We're in fourth year now... we KNOW the universe is hard to understand."

"You may be surprised to find that differentiating tensors is more difficult than you think. That's kind of ironic..."

"So basically General Relativity has to do with converting a comma to a semicolon. So if you can punctuate you can understand General Relativity... but that may an oversimplification."

"I don't care what the world population considers the universe to be!"

"Santa Claus may be able to do it, but Santa may have a projection into the fifth dimension... But he would not be able to bring us presents as they would have to exist in the physical realm."

"How is it that a psychiatric patient in his pyjamas wanders all the way from RPA and naturally gravitates to the theoretical physics department? I'll let you ponder that..."

Dr. Martijn de Sterke, Theoretical Physics

"We can do anything we like and still get the same answer. Great theorems !"

"Let me spare you the details - you can work it out for yourself."

[on Bragg reflection] "I want you to wake up at night and think of that."

"...the thought experiment, sorry, computer experiment - it's a real one."

"Did that go up like a lead balloon?"

Professor Colin Sheppard, Physical Optics

"You probably can't read very well at the back."

Professor Dick Collins, Applied Physics

"Well you could write it down in terms of Bessel functions but that would be a terrible waste of your life."

Blair Conn, Physics IV

"It's gotten to the stage where I am having dreams about my clock doing relativity problems for me."

Dr. Laurentiu Paunsescu, Pure Mathematics

"This brings us back to Euclidian space, and here we assume we know everything."

"So next time you eat doughnut, think about its Gaussian curvature."

Dr. David Galloway, Applied Mathematics

"So you can imagine that you're trying to drown your fish, which I suppose is impossible."

"This complex variable theory is rather fun, but what you have to remember is that the solutions are mostly fantasy."

With the defeat of J.H.P in the union elections, lecture taping seems to be on the backburner. So the only way great quotes like those above will be preserved is if you send them in for publication in Jeremy. You could even win the HUGE $20 prize at the end of the year for the student sending in the best quote. We'll accept quotes from other departments as well, but only quotes by physics lecturers are eligible for the prize.

Why Physics is Better than Sex

Earlier this year, posters went up advertising a PHYSOC competition (if you missed them, something must be sending you blind). All you had to do was tell us, in 25 words or less, why physics is better than sex. Here are the entries :

* It's acceptable for a physicist to just theorise about the weird stuff and leave the actual experimentation to other physicists.

* As Stephen Hawking has shown, you can be a great physicist without having a great body.

* Fewer censorship restrictions on graphic descriptions of physics.

* The government will let you teach physics to minors.

* Length contraction is quite acceptable in special relativity.

* You can't win a Nobel Prize for Sex.

* Physics has the ultimate Big Bang.

* Physicists are a bunch of wankers. No wonder they think physics is better than sex.

* Unlike sex, most first years have had some experience with physics.

* In physics, uncertainty in time means that any event has a reasonable chance of lasting for more than 15 seconds.

And the winning quote, from Joe Lizier:

* In physics there is always uncertainty in position AND/OR momentum - and thus there are infinite possibilities.

Feline Physics

Law of Cat Inertia :
A cat at rest will tend to remain at rest, unless acted on by some outside force - such as the opening of cat food, or a nearby scurrying mouse.

Law of Cat Motion :
A cat will move in a straight line, unless there is a really good reason to change direction.

Law of Cat Magnetism :
All blue blazers and black sweaters attract cat hair in direct proportion to the darkness of the fabric.

Law of Cat Thermodynamics :
Heat flows from a warmer to a cooler body, except in the case of a cat, in which case all heat flows to the cat.

Law of Cat Stretching :
A cat will stretch to a distance proportional to the length of the nap just taken.

Law of Cat Sleeping :
All cats must sleep with people whenever possible, in a position as uncomfortable as possible for the people involved and in a position as comfortable as possible for the cat.

Law of Cat Elongation :
A cat can make her body long enough to reach just about any counter top that has anything remotely interesting on it.

Law of Cat Obstruction :
A cat must lay on the floor in such a position as to obstruct the maximum amount of human foot traffic.

Law of Cat Acceleration :
A cat will accelerate at a constant rate, until he gets good and ready to stop.

Law of Dinner Table Attendance :
Cats must attend all meals when anything good is served.

Law of Rug Configuration :
No rug may remain in its naturally flat state for very long.

First Law of Energy Conservation :
Cats know that energy can neither be created nor destroyed and will, therefore, use as little energy as possible.

Second Law of Energy Conservation :
Cats also know that energy can only be stored by a lot of napping.

Law of Obedience Resistance :
A cat's resistance varies in direct proportion to a human's desire for her to do something.

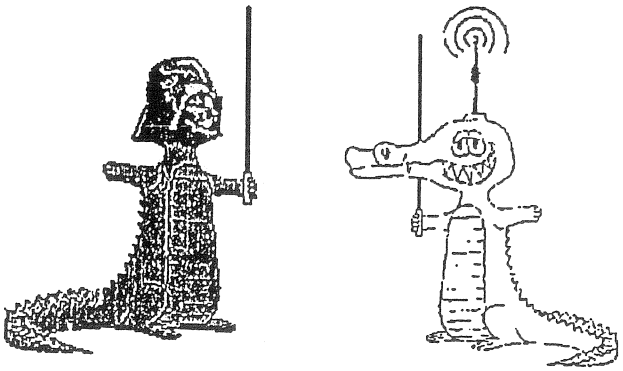
Law of Refrigerator Observation :
If a cat watches a refrigerator for long enough, someone will come along and take out something good to eat.

Law of Electric Blanket Attraction :
Turn on an electric blanket, and a cat will jump into bed at the speed of light.

Law of Random Comfort Seeking :
A cat will always seek, and usually take over, the most comfortable spot in any given room.

A short time in the future, on a roof not too far away...

BBQ 2 : THE PHYSOC MENACE



Second PHYSOC Barbecue
1p.m. Thursday, 3rd June
Physics Solar Roof (follow the signs)
Members:$2 Others:$4 (including membership)
Sponsored by the Union.

Law of Bag/Box Occupancy :
All bags and boxes in a given room must contain a cat within the earliest possible nanosecond.

Law of Cat Embarrassment :
A cat's irritation rises in direct proportion to her embarrassment times the amount of human laughter.

Law of Milk Consumption :
A cat will drink his own weight in milk, squared, just to show you he can.

Law of Furniture Replacement :
A cat's desire to scratch furniture is directly proportional to the cost of the furniture.

Law of Cat Landing
A cat will always land in the softest place possible; often the midsection of an unsuspecting human.

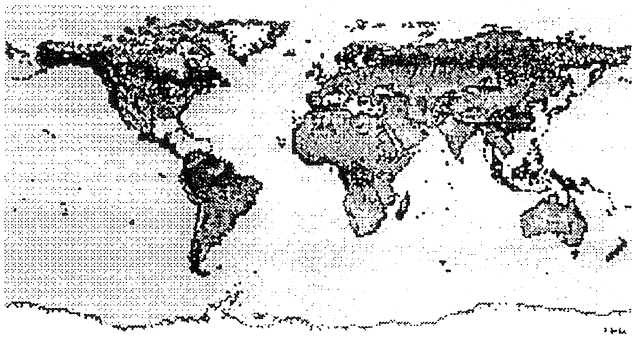
Law of Fluid Displacement
A cat immersed in milk will displace her own volume, minus the amount of milk consumed.

Law of Cat Disinterest
A cat's interest level will vary in inverse proportion to the effort a human expends trying to interest him.

Law of Pill Rejection :
Any pill given to a cat has the potential energy to reach escape velocity.

Law of Cat Composition :
A cat is composed of Matter + Anti-Matter + It Doesn't Matter.

Planets, Earthquakes and Butterflies



On the 5th May, 2000, the Sun and the five nearest planets (Mercury, Venus, Mars, Jupiter and Saturn) will all lie in roughly a straight line from the Earth. There have been predictions of the Earth being tilted from its axis, massive earthquakes, cyclones and other calamities. So will the cosmic alignment cause a series of disasters - or will the world go on its merry way?

It may disappoint those of an apocalyptic bent, but the planetary alignment won't wreak destruction on a planetary scale. The combined gravitational pull of the planets is about 30 millionths that of the Sun, while their total tidal force will be about the same as that of a jumbo jet flying overhead at 9,000 metres. Neither effect is strong enough to unleash a series of disasters. And if you're still not convinced, the same five planets were lined up even better on 31st January, 1962 - and nothing much happened.

So can we just ignore the planets? Not entirely, because the weather and the earth's geological processes are chaotic. A chaotic system is susceptible to even the smallest change in the initial conditions. A minuscule variation in the state of the atmosphere or crust will have dramatic effects on their behaviour - if you look far enough into the future. The classic example is the butterfly effect - the flap of a butterfly's wings may affect a cyclone on the other side of the world, months later. The planetary alignment would fall into the same category - a tiny variation which will nonetheless have some effect in the future.

However, even in chaotic systems these small disturbances have no immediate effect. A butterfly's flight doesn't start a rainstorm that afternoon, and five distant planets won't rupture a fault line on the spot. By the time the tiny variations do make a difference, they are just one minor contribution among billions. So they're not the cause of a natural disaster (which are just part of the way the planet is put together), although they may exert some influence on its timing and location. We can't even predict what the effect of these variations will be. Any such prediction would require calculations for every one of those billions of tiny contributions, and that's too complex for any present-day computer.

So the slight gravitational pull of the planets won't cause a catastrophe, any more than the butterfly flitting around your garden. But both of them may affect the timing of some future natural disaster, in a completely unpredictable fashion.

Acknowledgement : All the statistics in the second paragraph have been ripped off from Dr. Karl's book, Munching Maggots, Noah's Flood & TV Heart Attacks. Here at Physoc, we love to publicise Dr. Karl's work.

- Edward Boyce.