

JOURNEY DIGIT



THE SPACE ISSUE

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Nicholas Hill • Dick 'Ditmar' Jensen • Jean Martin • Liam Proven
Alastair Reynolds • Ang Rosin • James Shields • Bill Wright

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Guest editor & design: Pete Young, *co-editors:* James Bacon, Claire Brialey, & Chris Garcia

James, Chris, Claire and Pete wish to deliver a Prime Directive of eternal thanks and universal gratitude to all contributors for use of their articles, photography and artwork. All written contributions are © their respective authors. If James Bacon tells you he's seeing attack ships on fire off the shoulder of Orion, ask him to buy you a pint so you can have a look too.

Space is big. You just won't believe how
vastly, hugely, mind- bogglingly big it is.
I mean, you may think it's a long way
down the road to the chemist's, but
that's just peanuts to space.
- Douglas Adams, *The Hitchhiker's
Guide to the Galaxy*, 1979



EDITORIALS

James Bacon

It's really very nice to work with this gang, Claire, Chris and Pete, and the end result shows. Pete's awesome layout, Claire's super touch that refines and induces editorial reflection, Chris's gung-ho 'we can mend it' approach that mirrors my own brazen positivity. It's nicer, though, to get a response.

Two years ago, John Birchby approached me at Eastercon to compliment my writing for *Bananna Wings*, and in quiet but firm words, encouraged more. That was an incredible moment. I will treasure it. Always.

With *Journey Planet* John corresponded with us, stamps and delightful postcards arrived. At this year's Picocon, I bought him a half pint and we chatted a little.

Now John is gone.

I like doing this stuff, but don't

take it for granted, please. A small comment or thank you, is quite nice, John understood that. Do you?

I enjoy fanzines and conventions and feed off people having a good time and in this case a good read. I especially would like to hear from you, if I haven't yet.

A LoC would be good, but if you want to write about something, your favourite SF novel, a series of comics, a science experiment, drop us a line. You may be an expert in something we'd love to publish. Ask about future plans - your article might fit in.

Other feedback is welcome - photocopies of interesting articles or even a book recommendation etc., is all good. Even if words lose you, some stamps or a nice postcard is very pleasant to receive.

If you don't want the paper fanzine or prefer the electronic one, let us know - it will save us money



and we'll appreciate your thoughtfulness. Likewise, if you read this online and would prefer a paper copy - get in touch.

I suppose some stamps and a relevant postcard from John meant a lot. That's gone now and the positive effect, or lack thereof, worries me, so please make an effort. We do.

Very grateful as always to some superb contributors and especially to Dave Lally who will always get *Journey Planet* now for an unusual contribution to my wall!

Hope to hear from you soon.

Chris Garcia

Space isn't my thing. I'm not a huge space guy, I never played spaceman when I was young. We played Superheroes, we played detectives, we played scientists, but we never played spacemen. My Dad, he loved space, especially the explorations of the 1960s and '70s. He turned fourteen the day they left for the moon. We had photo books from the Pioneer and Viking programmes full of pictures and early computer graphics done on the SuperPaint system (which is currently in the collection of The Computer History Museum). I spent a lot of time looking through them. Even when we'd go to Disneyland, two or three times a year, Dad would spend five or ten minutes staring at the space images along the line to ride Space Mountain. We'd have to pull his sleeve to get him to move along. Such was the pull of space to my Pops.

Me? Not too much.

I loved the oceans. I had a series of books of photos of undersea photographs. Hundreds of photos of octopi, of Humboldt Squid, huge schools of sardines shaped like Kandinsky amorphs, beluga whales, angler fish, cuttlefish, giant lobsters. I spent hours with them, sometimes trying to draw the figures in crayon in a little notebook. In the early 1980s, we were discovering new and exciting sealife all the time. There would be huge spreads in *National Geographic* of the latest discoveries. Space? We hadn't been to the moon in my lifetime. We had given up on most of space. We were talking about space, we were coming up with hundreds of theories of everything space, but we had stopped going to all but a few places.

The sea was a frequent collab-

orator. It seemed to be far more willing to pose for *NatGeo* centerfolds than space.

The thing is space is huge, slow, empty, dull. You look up and you see a sky full of points of light, but if you look above it all, there's nothing. Stars are merely punctuation in a universal essay that just goes on and on. Space is that area in a vault that isn't actually occupied by something. The stories are written about what's in them, but the space itself is secondary. The sea is full of stories, every inch a tale told in hydrobiology. Maybe the big different is that the ocean is water while space is a vacuum.

It's hard to get a handle on the sheer size of space.

I think that's one of the reasons why there are so many terrible bits of nonsense in science fiction movies. Lasers wouldn't show up as bright streaks across the sky in space! It's impossible to go faster-than-light. There's so many problems because you have to deal with the fact that much of space is simple nothing. It's hard to make nothing interesting, hence ridiculous (yet AWESOME!) space battles, insane special effects, weird rocket shapes which would never work. In novels, it's a little easier to deal with, but can you think of a novel that actually dealt with Space instead of with people/politics/hyper-intelligent squids in space? I can't.

There have been times when people got it right, or at least interesting. The first one that comes to mind is *2001: A Space Odyssey*. It is a film that has been often accused of being confusing, pretentious, slow and dull. I can see some of that, but the slow and dull I will take exception with. It is space as space. It is wide-open, probably the most wide-open you'll ever see when it comes to movies. It's quiet. There are periods where the only sound is that made by the audience. There are long, slow, desperate moments of floating, sitting, staring. It's as if every word is coming from Earth to the ship. There are long pauses, amazing and beautiful pauses that just settle you into the fact that there is an amazing emptiness. Hell, when HAL kills the crew that's in cryostasis, it's as if nothing has happened. A lesser film would have had them crawling out of





the pods and dying significant, soundful deaths on the ship's floor, but this was a story of space as it may well be. Quiet. Distant. Empty.

Not a lot of films get that. *Moon*, by Duncan Jones (aka. David Bowie's son) is another. Any film which deals with the isolation in any way other than embracing it is simply kidding us all. In *Moon*, there is quiet and when there is action, like clones knocking each other out, it stands out because it revels in the isolation, the silence, the strain to see anything other than emptiness.

Space is weird. It's the Grand Canyon without the cliff walls.

When you look into the abyss, either the deep sea variety or the last really cool James Cameron film, you see that it is what space has always been represented as. There are dangers around every corner. We understand how to interact with it, how to prevent our own dark death from it, but we have trouble lasting in it, staying under it. There has never been an under-sea research station that didn't receive supplies from the ground. Most subs surface every few days. In space, there's a constant pressure, while the deeper under the sea you go, you have to deal with greater and greater attempts to crush your vessel. The deepest part of the sea is still full of life, of action, of flows of gases and magma and so on. It's an impossibly rich place, almost unknown to us save for brief glimpses. In space, there is nothing. You might come across a rock, maybe some dust, every million miles or so. It's like trying to find a needle in a haystack that has been spread across the whole of the Earth. There are big things, stars, planets, etc, but mostly, it's just the space between.

And the sea is even more mysterious than space. Space is a mystery due to size. The oceans are a mystery because we just can't rope it in. There are dozens of varieties of new sealife found every week. There are animals that we only know from the fact that we've found pieces of them in the stomach of whales. We've only had a couple of good photos of giant, not-yet-hyper-intelligent squids, and none of at least a half-dozen kinds of cetaceans that we know from found skeletons. The waters of the Indian Ocean hid coelacanths for eons and we hardly knew anything about them.

You don't see these things happening in space.

So yeah, I like space, I think that the people crazy enough to take to space are either insane or brave beyond reason. I wish I could do it, go out there, but I like living too much and I think I'd be bored being held in by an infinity of nothing.

Pete Young

One of my favourite quotes that I discovered recently is from Gene Roddenberry (and I've embodied it in a Wordle on page 17 of this zine):

"For me science fiction is a way of thinking, a way of logic that bypasses a lot of nonsense. It allows people to look directly at important subjects."

Granted, it also provides plenty more nonsense to entertain and waste your time if that's what you happen to be looking for (I'm kind of addicted to *3rd Rock from the Sun* myself), and this only goes to demonstrate that science fiction, from its early roots up to today, now has space enough to encompass pretty much everything under the sun to meet almost anyone's tastes, if you know where to find it. And thankfully it's most certainly not a self contained genre as many non-SF readers still believe, as it still borrows from elsewhere as much as it gives back. It's a healthy trade. Roddenberry was famously optimistic about the future and humanity's destiny in space; in fact it almost seemed to be his personal Mission Statement to entertain while providing food for thought on somehow getting us closer to a more positive future, bypassing "a lot of nonsense" that passes for life in our time (Point A) and getting us ASAP to where, ideally, he believed we ought to be heading (Point B). There are two futures I would settle for living in: Iain M. Bank's Culture (and I'm far from being alone in that sentiment) and Roddenberry's Federation. And I wouldn't even call myself a *Star Trek* fan.

However I wish more people would use science fiction as a tool to evaluate the world in a similar way to Roddenberry. If time permitted (and let's face it, space in a PDF like this is not a problem) I'd like to have commissioned an article that explored just that notion of how we might get from Points A to B as described above: I expect it would involve a greater

human presence in space, although not necessarily, and I suspect it would almost by definition involve a world-changing reduction on arms spending. All I personally ask for out of our long term future is an end to the need for international wars, a decrease in human population and a corresponding revival of the natural world and the environment. And all I want from science is a greater understanding of the universe, better healthcare and faster broadband speeds. But at the farthest reaches of our *practical* knowledge about the universe, I'm optimistic we'll know about the existence of extraterrestrial life within our lifetimes long before we're able to make contact with it. That, for me, is the whole point of our looking out into space: to ultimately find someone on the other end of the line for us to talk to.

One of the earliest paintings that knocked my head right out of the park at age twelve, at the same time I had constellation maps all over my bedroom walls, was the Dave Hardy illustration on the cover of this fanzine: it's from *Challenge of the Stars* which he co-authored with Sir Patrick Moore in 1972. Carl Sagan bought the original, and at a Novacon auction I acquired what Dave tells me

is the only proof copy. It's still one of the most optimistic science fiction illustrations about space that I know of, hence my request to use it here. Sympatico to Wernher von Braun's revelatory point of view about life elsewhere in space (well, it's revelatory if you've never read it before, and I've Wordled it on page 47), Sagan himself had a very quotable opinion included in the film of his novel *Contact* (which also won the Locus Award for Best First Novel in 1986): "If it's just us, it seems like an awful waste of space." Yes, I know it's cute, but it also happens to be true.

I'm not going to make statements here about the need for greater investment in space as I tend to make a hash of such things, and will leave it to this fanzine's contributors who can marshal those arguments far better than I. My guest-editing of this fanzine was, as before, a fun thing to be asked to do, particularly when it provides the chance to showcase some brilliant photography and illustration, as well as a high standard of fanwriting. Thanks again to all contributors, as well as James, Chris and Claire for letting me have this gig a second time.

Space: this fanzine has plenty of it. Enjoy.

The origins of the US space programme: Wernher von Braun's V2 rocket. David A. Hardy, 1972.





THE LOC BOX

OUR READERS WRITE AGAIN...

Letters, lightly edited by Claire Brialey

In early all fanzine editors hope for response; I've known a few who don't like letter columns, but very few of us publish fanzines for the sake of one-way communication. And so we publish things that we like or otherwise find thought-provoking, in the context that we think other people will find them interesting too and may in turn be moved to tell us relevant things that they find interesting and, ideally, to pick up the topic and continue the conversation.

In the previous issue we published some material that we thought was not merely interesting but also important - addressing questions of personal rights, responsibilities, behaviour and safety in SF fandom - and although we hoped that people would want to think

hard about all of that and indeed be moved to respond, we weren't quite sure what that response might be. We knew that our contributors were writing about personal experiences and that it hadn't been easy for all of them to do; but obviously we couldn't know what other personal experiences and perceptions might be raised for readers, and how they would then react - including whether they would react against anything, or anyone, they were reading.

I was also concerned about this because, as it happened, all of our contributions on this subject last time came from women. (James had asked a number of people, both men and women, who had previously expressed opinions on some aspect of these issues



'R is for Rocket'.
Mathieu Struck, 2009.



if they would write something for us; but not everyone felt able to do so within the deadline, or that they could sufficiently get across the points they felt were most important, or comfortable about doing so at all.) That might have affected the perspectives of the material or the response. I had several conversations during Eastercon which were very engaged with the subject matter and particularly recognised the importance of the issues; some of those conversations were about editorial responsibility and also about the responsibility of contributors and respondents. I'm still pondering some of those comments but I'd like to underline that the editorial team shares responsibility for what we publish, and more generally that I think everyone should be equally responsible for their own actions and held to be so, regardless of their gender.

So I'd like to thank everyone who wrote to us on this subject not only for their considered comments but also for their honesty, their recognition of the potential sensitivity of the subject, and for generally recognising that there's a difference between disagreeing with someone's opinions and denying their experiences. And, since these are personal responses too, I've mostly included the comments on this as received and I haven't commented myself in between the letters. This doesn't necessarily mean I agree with all the points made; it just means that I think everyone else ought to have the chance to read them as intended.

There was another risk with the previous issue, which is that publishing articles on such serious subject matter might overshadow the rest of the fanzine, or might make it difficult for people to respond to other articles. I should obviously have more faith in our readers; but nonetheless thanks to our correspondents, who all proved quite able to work out what interested them to read and what felt like the right balance for them to comment on. I'd also like to thank all our contributors to the previous issue, again, and to this one - and of course our guest editor Pete Young.

Now, your turn at last.

David Redd

A beautifully stylish Table of Contents for us printfolks, yes indeed, and is it ungrateful of me to ~~complain~~ point out

that contact details are still hidden away at the bottom of p.10? Anyway, nice-looking zine and highly readable in appearance and in contents. If I'm to produce a letter it's within this hour or not all, so apologies to the perpetrators of much good stuff which I doubt I'll mention.

The Front Section: actually I have to digress straight away, thanks to Lloyd Penney's mention of "a friend in New York state that sells cds of old radio shows." He's lucky. Here in the UK old radio programmes are a highly endangered species. The BBC, home of nearly all our radio drama, archived very little. Various enthusiasts have banded together to salvage what they can from home recording, and the BBC did find them useful when it appealed for missing episodes of the long-running soap *The Archers*; Volume 3 of their 'Vintage Archers' release is devoted to lost episodes recovered from radio fans. The 'diversity' website has a section devoted to collecting old radio programmes.

If you need convincing of the richness and wonders of radio drama, consider SF adaptations such as *A Canticle for Leibowitz* or *The Glamour*, and non-SF originals such as *The Day Daniel O'Donnell Got Married* or Alan Plater making socio-political confrontation hilarious in *Just a Matter of Time*.

However, the collectors' group seems to be aging and dwindling, with several members either passing on or being beset by personal problems. In science fiction, their expert Penny Fabb was taken by leukaemia a couple of years ago, which is sad (and slowing my own microscopic researches into the field) and may well endanger the survival of some programmes against her wishes I'm sure. Although *Journey Planet* isn't the place to plead for some sort of national preservation effort for radio drama as a whole (I think it's a forgotten treasure-house, but unlike theatre etc. the broadcast media aren't regarded as fine art unless scripted by Dylan Thomas) I wonder would someone like the Science Fiction Foundation be interested in the science fiction? I'd welcome suggestions.

The City of London: great. For me absolute perfection would have included mention of the literary



characters: Ackermann, Arthur Ransome, Tambimuttu, Moorcock and Meltzer, our own George Locke... But there's more than enough to keep me happy, with perhaps Mike Perschon just nudging ahead of other contributors here. Just.

The Back Section: don't get me started. About twenty years ago I looked into possible eco-fascism for a story whose various drafts became a series, and I think the gradual loss of safety in conventions is part of the larger problem which is, basically, ecological. More recently I've studied nature conservation and know that as a general rule species only survive by losing the genetic material of individuals born damaged or unfit. (In nature, losers get eaten.) What this tells me about current society is no nicer than I found it two decades ago.

Look at conventions fifty-plus years ago. Can we date the changes in behaviour? At Supermancon, I recall reading, the uninhibited behaviour of a London contingent was a shock to others. Thirty or so years ago, in convention chat one fan (not someone I knew) could mention an activity and say, it was all right because it was only at home - our shared understanding being that behaviour in public still followed certain standards. Cruising occurred but people could say no. Forward to today, and there's an issue of safety at cons. (Something escalating here.) People want freedom to do what they like where they like, the Aleister Crowley philosophy, and the space around a person is that person's whether it's in public or not. I accept that some anti-social behaviour such as drunken violence has a centuries-long history, even in the centre of Haverfordwest, but growing up post-war I'd hoped we were getting away from all that. Now it's back and getting worse. SF conventions, like society generally, are still subject to the same nature conservation rules that I've been looking at. This is where I think the disease is nasty but, as with the virus invasion in Eric Frank Russell's *Three to Conquer*, for ordinary individuals the cure is as bad as the disease. New rules for our conventions would be the least of it.

I don't want to sound National Front or Nazi - my personal politics favour independence - but our society seems to have generated a consensus

view that everyone should have freedom without responsibility, as with the NHS having suffered mission creep from curing sick people to becoming a safety net for drunks and druggies. (Over-simplification alert.) In the countryside, people have been given a 'right to roam' over virtually all the natural environment, with one result being that the untrained and ignorant can endanger themselves, others, the livelihoods of others, and the very natural environment they are supposedly enjoying. (The lesson from the Kinder Scout mass trespass winning the right to roam can be seen on Google Earth today: let in the troops and they'll trash the place.) There are horrified country people driven to proposing that visitors to the countryside should have to pass a test before they could be allowed to visit; I'm not inventing this, and it seems to me that convention organisers are going to find themselves in the same position. Pass an exam in social behaviour before attending a con? Post a bond for good conduct? You see what's coming. You can't force free people to be responsible without taking away some of their freedom.

Today a convention, tomorrow the world. To get your combined passport/ID card you'll have to pass an exam in citizenship, post your good conduct bond to be allowed to vote, and sign up to taking full financial responsibility for all misbehaviour, road accidents etc. - and not have any penalty points on the card unless you want to lose it. Then con organisers could say "National ID card required" to members in the hope that harassment problems would be confined to the streets outside.

The alternative, the nice conserving way, is to have Inappropriate Behaviour Officers, social workers and street pastors on hand to defuse the problem situations. Do you believe that conventions - or the world - will have the resources or personnel to set that up?

As you see, I'll be very interested to see the responses *Journey Planet* gets to your Back Section. I may even have to write a science fiction story about it.

- 16 April 2010
Haverfordwest, Pembrokeshire, UK





Lloyd Penney

This issue looks very much like an issue of Exhibition Hall. The two titles are starting to merge a little; not a complaint, but an observation. A section on London is a good idea, with this current London Worldcon bid on the go, and the back section highlights some problems I wish I could help with.

I have been reading about modern-day zeppelins, and how they seem to be viable in transporting up to a ton of cargo at speeds approaching 85mph. Yet I hear very little about them, and they seem to be permanently stuck in the experimental stage of development. They seem to be also stuck in steampunk fiction, with not much chance of becoming a reality.

There is an awful lot of history in London, more than a thousand years of it, and interesting to read that some of it is fictional and legendary, just like anywhere else, I imagine. The history of London, plus some of the ghost stories, will make going to London in 2014 all the better.

Given how many conventions have a steampunk theme, and seeing how many steampunk conventions are happening (Victoria, British Columbia and Parsippany, NJ over the last couple of weeks; Dearborn, MI this coming weekend), no one can say that steampunk is dead. However, it certainly has changed, and I can't see many original steampunks being very happy with that. It's become too popular, so much that Disney has embraced it. I know of people upset with steampunk in the Magic Kingdom.

Conventions may seem to be islands of civility, as we're all there to have a good time, but we know that we are humans, and sometimes we go a little too far. We find ourselves in social situations that we never asked for, and that we're not experienced with.

Conventions usually have their own security force, and I have to wonder if we must ask that our convention security people have some training, or be clearly marked for anyone in trouble or in an insecure situation to go to and ask for help. We seem to need convention police more than convention security. I wish the convention experiences of Pepper, Kari and those others who contributed



anonymously had been less stressful and more enjoyable, without being assaulted. I've never heard of that kind of experience at Canadian conventions; but then no one's usually so forthcoming to say that they were sexually assaulted at a con. The idea of CONFIDENTIAL is a good one, but I would wonder if fans can stay by a phone to offer information, support and sympathy, or simply have a recording handle the incoming calls. I have tried to be a friend to those in trouble, and I do believe that I can have female friends. I know that I must monitor the level of comfort should I be close, and that I would never go further than what I perceive to be that level. As a result, I do have lots of female friends, and I am pleased with that, and careful.

I hope that writing about these bad experiences at conventions has helped those who have been assaulted to feel somewhat better, and will instruct over-eager guys that women are not for you to simply take and do with what you will. This is a topic that should be revisited regularly.

- 27 May 2010

Etobicoke, Ontario, Canada

Anne Gray

I found the pieces in the latest *Journey Planet* on sexual safety (or non-safety) of cons very interesting, and most of them very thoughtfully written. Though I see you are encouraging people to LoC rather than discuss this online, I thought I might share a few online discussions on a related topic that I thought went well earlier this year:

- ☪ 'The Safety Dance: Helping End Sexual Harassment at Conventions' by Jer Lance (users.livejournal.com/jer_/370098.html)
- ☪ my response: 'Ending Sexual Harassment at Cons' by Anne K.G. Murphy (netmouse.livejournal.com/674877.html)
- ☪ and Carrie's further call for specific suggestions on how to improve things: 'Fandom is not your personal Hands-On Museum' by Carrie Dalton (myopicgreen.livejournal.com/38153.html)

We will be having a panel titled 'How to Con without the Creepy' at Penguicon this year, led by Greg Williams, Jer Lance, Carrie Dalton, and K.T. Fitzpatrick. Other related projects include the Con Anti-Harassment Project, www.cahp.girl-wonder.org, and the BackUp project, backupproject.org.



While the discussions above have focused on harassment, rather than rape, I see many of the same themes involved in terms of helping people be aware that they are not alone, that they can seek help and hope to receive support, and that they are not being unreasonable to think that they deserve to be free of unwanted attention, advances, and assault. Though as conrunners we also concern ourselves with trying to educate the well-intentioned but clueless on how not to trap someone and make them feel threatened, it is not the responsibility of the victim to educate his or her assailant on exactly why no means no. We all need to take responsibility for spreading, and enforcing, that message.

Thank you for publishing on this rather serious topic.

- 13 April 2010

Ann Arbor, Michigan, USA



John Nielsen-Hall

I enjoyed everything. I think *JP* is probably the best fanzine anyone is putting out right now, but I am singling out for special mention James' 'Comic Heroines'. I haven't read any of these comics or collections, and I have never been very interested in comics at all, but it is testament to James's skill that he can engage me in these plot summaries and brief critiques. I might even seek some of these out, who knows?

I was very pleased with the London section. I lived in London for 18 years (1969-1987) and at some stage I became besotted by its history - particularly when I lived in Cable Street. In those days I could walk to work in the City through many ancient streets and alleyways, still there however changed, and there was always something new to discover, usually by reading about it. One of the greatest sources was Pepys' diary. He walked everywhere (if he didn't go by boat) and the diary is full of place names and churches and taverns,

many of which are still extant. There's a little garden in Seething Lane where the Admiralty Houses - Pepys' home when he worked for the Navy - once stood. In the diary you can read about the view from the 'leads' (roof) where he drank and sang songs with the same neighbour he argued at other times with over whose shit had overflowed the primitive arrangements in the communal cellar (17th century sanitation - you don't want to know.) The well-known passages about the Great Fire afford an insight into the visual geography in a city that had no tall buildings, other than the medieval St Paul's cathedral or the Tower, or thoroughfares broader than the width of two horse-drawn carriages. Pepys talks about the glow and the smoke, visible from his windows and also, fearing his own home might be at risk, hiring a horse and cart to take all his furniture and valuables out of harm's way into the countryside - his wife's uncle's house in Bethnal Green!

By way of a change, and two hundred years later on, you can read of a different London in Dickens. This place, mud streaked, dilapidated and overcrowded, its streets a polluted miasma of chimney smoke and foul river-borne stenches is much more visible, particularly in the City itself. Tony Keen's article refers to a London almost invisible by comparison. Prior to reading it, the only Roman antiquities I knew of in the City were bits of the walls and a few things in the Museum of London in the Barbican. It is a vexation to me that I am now so deeply embedded in Wiltshire that searching for these things would mean a major expedition to the capital, rather than a diversion on the way home from work. Thanks, Tony, for telling me things I didn't know.

The Back Section: I don't go to many cons, but that doesn't prevent me from holding views. Certainly, James' modest proposal seems like a good idea, but what have we come to that it should even be necessary? The writer of 'When Fandom Is Not Such a Safe Space' brought tears to my eyes.

But honestly, would it not be better if women were not so lacking in self-confidence that they can feel intimidated and oppressed in this way? Truly, I don't understand when the writer describes her assailant as



“big and strong”. This is a fan we are talking about: not many of us work out, you know. The ‘big’ probably translates as ‘fat’ and the ‘strong’ was probably the impression he made before he took his kit off! Why the fuck didn't she just clock him one? I know, I know, she didn't want to make a fuss. Can you imagine this situation with the roles reversed (c'mon - you read SF, don't you?). Can you imagine a bloke who really didn't want to have sex, which I accept could be pretty unlikely, not wanting to make a fuss? My point is that what's really needed is not a helpline, but self respect, assertiveness training and basic self defence. It ought to be on the National Curriculum and it would be more useful at cons than polite bondage workshops.



While I am being this offensive, I'd like to offer a comment to the writer of ‘Why I Don't Go To Cons’. She writes: “I felt physically unsafe. And I felt stupid for feeling so, because of the parading corsets through the bar and the women strutting their stuff and the men all over getting tits stuffed in their faces, making me feel like sex was the done thing and I am a prude.” I have to say that by the sound of it, on that occasion at least, sex was the done thing and so you were a prude. You witnessed the power of your own sex, the ease with which it's possible for women to reduce men to vulnerable gibbering children incapable of rational thought, and you seem to have felt threatened by it.

Likely these paras will prove to be very foolhardy of me to have essayed. But since the *JP* editors have been enlightened enough to bring this subject into the open, I think I can do no more than bring my true views squirming into unaccustomed daylight as well. Censor me if you will, but if there is to be actual progress on the issues raised by the three articles, you really have to do more than open a helpline and say tut at the unreconstructed nature of male sexuality. Women have to be proactive and assertive around socially and emotionally inept men, such as, I admit, are very numerous in fandom generally. I just don't think there is any other way.

- 19 May 2010

Ramsbury, Wiltshire, UK

Anon

I think you have a fantastic idea in CONFIDENTIAL. I think it would be an especially valuable resource for teenagers and young people, who often don't know how to assert themselves and tell someone to leave them alone, or even that they can.

Most of the articles on the topic dealt in part with an inability to communicate the point at which attention ceases to be flattering (if it ever was in the first place) and begins to be annoying and then threatening. The CONFIDENTIAL idea bridges this communication gap for someone like the writer of the last article - whose story, as she points out, probably would have turned out very differently if she had been able to turn to somebody without worry that she would be ‘bothering’ them. This is such an important point. Women in particular are still so conditioned to please people - to avoid making a fuss, to put their own needs last, to assume blame when something goes wrong, as several of these stories illustrate.

My reaction to the ‘Why I Don't Go To Cons’ article was mixed. On my first reading, the article seemed to suggest that women bear some sort of responsibility to keep the male animal at bay by dressing and behaving modestly. The phrase “women putting the wrong image out there” particularly irked me. (What's the ‘wrong image’? What's the ‘right’ one? Who says so and whose business is it anyway what other women are doing?) Women have traditionally been placed in the role of gatekeepers of chastity, and the last thing they need is yet more directives on how they ‘ought’ to dress and behave.

But when I mentioned these thoughts to James, he suggested that I consider it not in the light of placing blame, but as someone's private thoughts, rarely expressed - and when he pointed that out, I went back and read the article quite differently. I liked that idea; I think the writer was courageous for putting the thoughts out there. The first thing I noticed on my re-read was that she makes a point of stating as one of her concerns that cons create an atmosphere which threaten to resurrect the old canard that a woman dressing or acting a certain way is ‘asking for it’ - and if I'd paid more attention to that,

I might have read the rest of the article in a similar spirit. What also struck me is that many of the sentiments expressed are similar to the current conversation in feminist circles, at least in the US, about the rise of so-called 'raunch culture' and its effect on women, particularly girls and younger women - its insistence that things like porn stars as role models and pole-dancing classes are empowering actions, rather than things which suggest a very limited definition of sexual expression, and one which is restrictive to many women who, like the writer of this article, don't necessarily want "to live up to this bastion of convention womanhood."



I did think - even on the first reading - that the article made a good point that elements from con programming to people's dress might create a sexually charged atmosphere which may make some attendees uncomfortable, but I'm not sure where the line can be drawn. I'm not in favor of conventions, which are primarily social events, enforcing some kind of written code of conduct, which I've heard suggested before. I can't come out in favor of regulating adults' behavior to that degree even if the failure to do so means some people are less comfortable (and by extension, I guess less safe) than they might be.

I hope people who respond to the pieces take time for careful reading and consideration first. We respond to anything based on our own experiences and expectations, of course, but this is particularly true for this topic. I know that even in what I thought to be my own measured initial response, I jumped to at least one conclusion about the Eastercon article which I don't think is entirely fair on further reflection.

- 24 April 2010
(name and contact info supplied)

Tony Keen

I'm not sure what I can say in response to the pieces in the back of *Journey Planet* #6. But I'm very glad you published them.

On to more pleasant discussions. I refer Steve Sneyd to Suzette Haden Elgin's 1986 story 'Hush My Mouth', in which the Union rejects the notion of



using African-American troops, and as a result the Confederacy wins but is so exhausted that it soon collapses, to be replaced by African-American rule. This was published in *Alternative Histories: Eleven Stories of the World As It Might Have Been* (ed. Charles G. Waugh & Martin H. Greenberg), but can now be found in *The Mammoth Book of Alternate Histories* (eds. Ian Watson & Ian Whates), a volume that does demonstrate that there is more to alternate history than 'Hitler wins', 'Confederacy wins' and Zeppelins (see my forthcoming review in *Strange Horizons*).

I also have to add a couple of corrections to my piece. First, Lewis Spence did not himself originate the legend that Boadicea is buried under King's Cross station, though it seems to have emerged from people who had read his book, which situates the final battle between Britons and Romans in the local vicinity. Secondly, I'm afraid I got the two naves at St Helen's Bishopsgate the wrong way round - the one on the left of the photo was for the convent, and that on the right was the local parish church.

- 11 June 2010
Tonbridge, Kent, UK

Ben Yalow

Some thoughts on 'Graf Zeppelin': overall, it was an interesting viewpoint on an alternate history. However, I'm still a bit skeptical of the plausibility of some of the scenarios.

The first scenario listed assumes that the *Bismarck* task force sees *Norfolk/Suffolk* in time to avoid being met by the *Hood* group. My problem with that is that this would require keeping an air screen up continuously, once the task force knew it was being shadowed. And that would require constantly turning into the wind to launch/recover aircraft, which would slow the motion along the line of advance. And the carrier couldn't even operate at full speed for that, since if she did she would become separated from her gunnery screen, and become vulnerable to surface attack from *Norfolk/Suffolk* (as *HMS Glorious*, and RAdm Sprague's Taffy 3 demonstrated, operating carriers near enemy ships with guns was not healthy for the carrier). So either the *Bismarck* task force can keep aircraft up and

detect *Hood/Prince of Wales*, or can evade - but not both.

The scouting scenario also assumes that the British carrier aircraft would be intercepted by an air screen. There weren't enough fighters to keep any plausible screen up continuously (with ten fighters, especially a short ranged platform like the BF 109E, I don't see how you can keep enough airborne to maintain coverage, without constantly launching new fighters, which ends up back in the launch/retrieve cycle mentioned above).

The other scenario listed assumes that carrier aircraft from a single carrier could make a plausible threat against a manoeuvring warship at sea. This *might* have been true of a US carrier near the end of the war; it wasn't true of anyone at the beginning of the war, and *Graf Zeppelin* carried a relatively small air group. Assuming it was the variant with the Fi 167s, the number of attack aircraft was about half of what an American Essex carried.

It's certainly possible that *Graf Zeppelin* would have made a difference - but it took the US/Japanese navies many years of practice to figure out how to use carriers for sea control (and it's unclear if the RN ever mastered that). So assuming that a navy with a single carrier would have learned enough to handle the task is somewhat optimistic.

But, overall, it was a great article, and gave me a chance to rethink the *Bismarck* scenarios. Thanks for running it.

- 29 May 2010
New York, USA



John Birchby

I was most impressed with Stephen Burke's article on the *Graf Zeppelin*, which was new to me as I only knew of the rigid airship of that name - which I saw flying over Wembley in the latter 1930s. It flew over the garden I was in on a lovely bright warm day, and the fuselage echoed to the beat of the engines which were mounted on outriggers. Many years later I was reminded of it when I saw the first *Star Wars* film in 'cinemascope' in Soho - when the great ship appears to fly overhead and keeps coming out of the screen!

Stephen's article was scholarly as well as very informative.

I enjoyed the choice of artwork, particularly the 'arm wrestlers' on p. 23. Is the 'House collective' image on p.50 one of Banksy's works? It looks like his style. As you may know, he created a lovely one in Newman Street on a gable end wall of shops or houses adjacent to the post office yard. This was then obstructed by Westminster council, who did not like the title 'One Nation Under CCTV'.

I also enjoyed the info on steampunk, which sounds like what I'd hoped *Anti-Ice* and *The Difference Engine* would be like.

- 17 April 2010
Chingford, London, UK

Claire:

We received this letter from John (with his usual generous contribution of postage stamps) six weeks before he died, at the age of 79. Like many of his friends in SF fandom and the variety of other communities in which he was active, we'll miss him. And we'll miss his letters.

Steve Jeffery

The first impression is that that is a really spectacular cover from Michelle Guererro and, especially when seen in the context of other recent zine cover images in efanazines.com, makes *Journey Planet #6* look more like a small press magazine than a fanzine. An impression that's reinforced by Elle Harrow's back cover image and the (highly readable) contents page. Love the cute illustration on p.4 too.

Who are Michelle Guererro and Elle Harrow by the way? If, as I suspect, part of the agenda (do we say manifesto, or is that a step too far, even for the Garcia/Bacon alliance?) of *Journey Planet* is to bring interesting new contributors and artists to our attention, then a note on the contributors would be a nice idea. In the meantime there's Google... Is that the right spelling for Michelle's surname by the way? Google only comes up with a Michelle *Guerrero*, who is a member of the femmefatale and solidarts collectives.

There are several comments about zeppelins in the letters column following on from your last alternate histories issue. In the wake of nearly a week when all air transport has been

grounded due to an incontinent Icelandic volcano, I wonder if we would have had this trouble if we had proper airships. After watching a documentary last night, I suspect not, since it appears that the real problem of volcanic ash to jet engines is that it is largely ultra-fine airborne silica (why aren't the redtops suddenly panicking about silicosis?) and can melt into sticky droplets of molten glass at the pre-heat temperatures inside jet engines, and deposit on the intake and turbine blades.



I'm not a great WW2 history or militaria buff, but if there's an interesting sounding documentary on I tend to watch it. Stephen Burke's fascinating article on the *Graf Zeppelin* read like the sort of informed speculative documentary that I keep an eye out for. Sometimes I wonder how we ever won the war, and then I read something like this and realise it's probably because we were less worse at making strategic decisions than the other side.

Linking this issue's London theme and that of the last, I've often wondered what it would be like if Wren's plans for rebuilding London as a properly planned city after the Great Fire were actually carried through, and not bogged down in interminable wrangles. If the plans are anything to go by it would have been spectacular, although whether the carefully planned views and vistas would have survived the onslaught of 1960s office blocks is another question. In fact Wren's proposed radial symmetry of long avenues, radiating from the new St Paul's, reminds me oddly of Philadelphia and the long open approach to the Museum of Modern Art.



One of my favourite women in comics isn't strictly even yet a woman (and sadly never gets to be). It's the transsexual Wanda in Gaiman's *Sandman: A Game of You*. Sharp, sassy, kooky and at the same time intensely vulnerable, she comes across as a fully rounded person. As does Hazel, who appears in the same series and whose story continues in another later book. And I have a real soft spot for Delirium, perhaps even more than for her older sensible sister Death.

OK, now the tough bit. I'm aware that fans are just as much a mixture of the socially aware and inept as any

other group of people, whether it be other hobbyists or work colleagues, and this really shouldn't have been a surprise, but it set me back more than a little, especially the realisation that, for some, fandom and conventions might not be regarded as a physically safe place.

Partly, I think, it's because it's always appeared that women fans are, as a whole, often more socially confident and aware than some male fans. A sweeping generalisation I know, even if that confidence sometimes shades uncomfortably into the sort of fetishistic exhibitionism that has put me off going to certain cons. Not out of prudery, but rather that, in quite a few cases, such displays are aesthetically unappealing and not a little embarrassing in a public space.

I would be horrified if I felt that any fans thought that this was either an invitation to, or an excuse for, unwanted advances, let alone actual assault or even rape. But perhaps I have an unwarranted cosy view of fandom that, touchy-feely as we can be with people we know, there are boundaries we know not to cross. The articles on this topic showed this isn't always the case. (There's an article by Sandra Bond in a recent *Quasiquote* that shows how fans can be just as inept and hurtful in other, non-sexual, ways.)

James's idea seems sensible but with the rider that if there's any indication of actual assault or threat, then rather than try to handle it ourselves, the professionals or police should be called.

- 3 May 2010

Kidlington, Oxfordshire, UK

Chris replies:

I'm actually working on getting Michelle (who is a, wait for it, high school student) and Elle (one of Michelle's classmates) to get their Deviantart pages set up! I ran across them at an art exhibit at the local small museum which did a Best of the District event where they both showed pieces. My cousin Claire introduced me and they've given me a few pieces. I really think they should be doing more art for folks, but they've got other interests that seem to be taking up their time.

Pamela Boal

Britain was fine in '79, so I took my family to the Worldcon in Brighton. Our daughter, just short of her twenty-second birthday, had worked behind a bar in London, so was well equipped to fend off unwanted attention. Nevertheless, those attentions were so offensive and so persistent that she has never become a fan. Although the items by Kari and Anon make me sad they do not surprise me. Well done both for sticking around and finding a compatible fandom.

True fandom is a different place today; in '79 there were still only a small minority of females accepted as fans in their own right. Despite the soul searching about the lack of female representation in fanzines and literature, there are considerably more females recognised as fans today. Societal norms have changed; it is understood that females having fun with their mode of dress are not saying "Come and get me; I'm available". Alas, it would be naive to expect that alcohol-fuelled young men are any better at controlling their basic instincts or that young women are any better equipped to deal with them. I think the idea James offers is a good one. If I were able to attend cons I would certainly volunteer to help new young fans safely get the fun out of fandom that I have enjoyed.

While I, as a true Londoner, am happy to welcome Claire as a Londoner, Croydon for me will always be a pleasant small town a few miles outside of London. Do you happen to know when Croydon was swallowed up by Greater London?

I enjoyed the different looks at London and wonder could one ever exhaust its many facets? As a child living in Southfields, part of the borough of Wandsworth, I had access to two commons, three major parks and a number of small parks and recreation grounds, all within walking distance - given that in those days three miles was a reasonable walking distance to a healthy child. The parks and gardens of London are a volume on their own.

Then, of course, there are volumes in the museums and galleries. The histories attached to the theatres are often entrancing. Hidden London, mews and courtyards, Underground London - far more extensive than

those parts that carry trains. Churches, buildings, etc. etc. Our capital city is a treasure, and incidentally the Thames is now arguably the cleanest capital city river in the world.

- 22 April 2010

Wantage, Oxfordshire, UK

Claire:

Croydon was amalgamated into Greater London in 1965, I gather (so it was part of London by the time I was born in Kent). What I hadn't realised until looking that up was that Croydon appears in the Domesday Book and is reckoned to have been a settlement for some centuries before that. 1960s architecture has quite a bit to answer for, so I'm oddly pleased to know someone thinks of Croydon as a pleasant small town. 'Small' doesn't quite fit now, at least not for someone brought up in East Anglia...

Staying at least slightly in the past, we conclude with a letter on issue 5 that arrived just a little too late to be included in issue 6:

Mike Meara

As someone who seeks variety, I am not surprised that I have some problems with your themed approach to *Journey Planet*, especially when there is so much material in each issue. It's like being served a meal consisting of a huge portion of just one dish, and being expected to eat it all. However tasty the dish, one tires of it eventually. And the dish this time is tasty indeed, although it's served on a plate that's logically impossible.

I found that the tastiest morsel was John Scalzi's hilarious story. It would make a terrific film of Time Guardians battling a team of obsessive assassins who are stuck in a Hitler loop. Such a film could be achieved on a modest budget, and I and my popcorn would be first in the queue to see it. This would have to be in an alternate universe, of course, since such films never get made in this one.

Next, my critical fork found Steve Green's delightful TOFF report. I was able to convey my appreciation to Mr Green in person at Corflu, for which he was much pleased. He was also amused at my suggestion that the young Peter Weston bore a striking similarity to the young Eric Idle. No Carol Cleveland in that photo, though,



so I guess that proves she's not a fan, not in that universe anyway.

Another appealing titbit was the Spinrad film saga. Lots of research went into this, I feel sure. Including Marilyn Monroe was a masterstroke; I'm a sucker for anything involving her. I can't help feeling I would have enjoyed it even more had I known more about film and therefore picked up more of the divergences. A fine piece of work which bears re-reading.

Flagging a bit now, and with incipient mental indigestion, I find I just have room for a few slices of Bacon. The first, in which James discusses Luft '46, had the delicious flavour of polystyrene cement. I too made those Airfix kits as a lad, and I also had at that time a series of pocket-sized hardback books detailing the fighter planes of World War II, wherein I was fascinated to read of weird and wonderful aircraft such as James describes. If kit models of these had been available back then, my joy would have been complete, but instead I had to make do with the Me262 (in my view more beautiful than the Spitfire) and the rocket-powered Me163 Komet, which were pretty cutting-edge in themselves.

I picked at the rest, before regretfully leaving it unfinished. But I greatly enjoyed what I did have.

In conclusion, I should mention that Pat now spends some time actually living in an alternate universe - or at least, the top half of her does. Married to me for almost forty years,

it's quite understandable that she would wish to, you might say. But no: I'm talking about the T-shirt for Atlanta 1995 - a Worldcon which never happened in our timeline - which she picked up for £1 at an auction. Or at least, that's what she told me. She wore it again at Corflu in Winchester. I have to watch her all the time when she wears it, in case the top half of her slips sideways through a wormhole in space-time, taking the rest of her with it...

- 29 March 2010

Spondon, Derby, UK

Thanks also to: Farah Mendlesohn ("Great issue. Thank you for the particularly splendid articles on London"), and all those who offered to help in some way with the CONFIDENTIAL scheme or other practical action.

If you want to appear here next time, send your letters:

- ☉ By email to:
journeyplanet@gmail.com
- ☉ By post in Europe (c/o James) to:
55 Cromwell Road, Croydon,
Surrey CR0 2JZ, UK
- ☉ By post in North America (c/o Chris) to: 962 West Weddell Drive,
Apt. #15, Sunnyvale, CA 94089,
USA
- ☉ By post from anywhere else in the world to whichever of those addresses you prefer.



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Edited by
James Bacon

fanzone

First, some comments from James: I sent out an e-mail full of questions, and I know many readers are just too busy to respond so I'm always grateful to those who do. Interestingly, I am pleased that the respondents are 'doers' here. **Jim Mann** is a conrunner of the highest echelon, currently running Programme for the 2011 Worldcon. I was impressed with the Hugo awards ceremony in Montreal that he and Ian Stockdale managed. **Dave Angus** builds planets, literally, but smaller. He's contributed to con programming as well as being an artist and I'm always fascinated by his work, and was so pleased he responded - a fan who I've conversed with greatly in email but rarely in person. **Lynda E. Rucker** is on the path of a professional author, and **Caroline Mullan** is currently running Foundation. **Mark Meenan** is incredible, a conrunner but also more. I saw his work in 2005 in Glasgow and had the pleasure of working with him in 2009, and he is a very focussed achiever.

What I love is that these folks have taken the time to reply - it gives me an insight into them, and reminds me that we're here because of the books. I wonder if all conrunners should have to answer similar questions if they actually want to run an SF convention. Basic principles. I'm here because I like the books that take me away and yet also bring me home with the message.

Is there any one book you can pinpoint as giving you that sense of wonder about space? Tell us why it

fascinated you, and what you found special about it.

Jim Mann: Arthur C. Clarke's *The City and the Stars* is one, especially the sequences near the end where the characters find out the true story of our history. This book is one I always point to when someone asks me which books I think inspire sense of wonder. More recently, Alastair Reynolds's books (not just *Revelation Space*, but others such as *House of Suns*) have done a great job in that they, unlike some books, give a feel for how big space really is. And I also like Stephen Baxter's novels, and think several, such as *Ring*, really invoke a sense of wonder.

Mark Meenan: There's not one book as such - but I liked the problem-solving stories in alien environments (eg. Isaac Asimov's Robot stories, Arthur C. Clarke's *A Fall of Moondust*), as well as First Contact stories, most recently Ken MacLeod's *Learning the World*.

Caroline Mullan: Poul Anderson's *Tau Zero*. Sense of scale of the universe, and the possibility of falling off the edge.

Dave Angus: This question's a bit like judging the Miss World competition. There are different kinds of beautiful women. I can't point to any one book but several must have had some effect. From my early days of reading SF I guess it was books like *Galaxies Like Grains of Sand* by Brian Aldiss and the old hardback *Captain W.E.*

Johns series. *Analog*, too, was quite formative, as was Isaac Asimov: I thought his short story 'Nightfall' was true genius and would make a first-rate play. And a story being set on another world reminds me of Hal Clement's planet Mesklin, from *Mission of Gravity*: strange new planets fascinate me and makes me want to know what's out there.

Do you think that science fiction film and television has added to that sense of wonder, or made outer space seem more commonplace?

Jim Mann: Probably both. A lot of it has made space seem commonplace - which isn't a bad thing, in that I think by making it commonplace, it has a lot of people now assuming that "of course we'll go into space", rather than questioning our doing so. But there are times when it still invokes a sense of wonder. A few *Doctor Who* stories have done so. And the *Stargate: Universe* episode 'Light', where the starship needs to plunge into a star to refuel itself, also did a good job of invoking sense of wonder.

Mark Meenan: Not really. By and large they're in two separate compartments for me.

Caroline Mullan: Made it more commonplace. Your imagination (fed by the printed word) is richer than someone else's vision realised on a screen, in my opinion. And many modern space operas are written as if they want to be films which is not good for sensawunda - see comment below.

Dave Angus: Yes it can add to my sense of wonder although I wish it would do so more, and to as many people as possible before it's too late. Particularly documentaries at the expense of soap operas and those bloody property programmes, though the film *Avatar* was a good try at a sensawunda. I do feel disturbed when an outer space news event is relegated to the rear behind news such as Dierdre shagging Grant, or whatever's going on in *EastEnders*.

Tell us what worked for you and whether there was anything that spoiled the dream.

Jim Mann: What works for me is both SF that shows how wonderfully fascinating, beautiful and strange the universe is, as well as some of the great things we can do. I don't know of anything that spoils it, although maybe SF that gets it all wrong, that makes the whole universe seem small and mundane, which is more an issue with movies and TV than written SF.

Dave Angus: What's always worked for me has been my powers of imagination. What's always screwed it for me has been the petty tyranny of the trivial (no money). In other words, Mundania.

Are you interested in/fascinated by outer space beyond a setting for fiction - stars, planets, cosmology or astrophysics?

Jim Mann: Yep - I like reading books on cosmology and astrophysics (and physics in general).

Caroline Mullan: Yes, there isn't time to do this as well as everything else, but I still read the articles about cosmology and physics that come my way.

Dave Angus: Oh, definitely! I build planets (check out my website www.daplanets.co.uk), so what fascinates me most is exploring alien planets and the forms they might take. Having said that, if I become passionate about a subject there's a learning spin off into other areas which is necessary with planetary formation anyway. Star formation is one example. A lot of the cosmology and astrophysics I have trouble getting my head around, but one of my favourite ways of ending a day is to blow my mind with an outer space documentary - such as cosmology or astrophysics - while under the influence of a good bottle of red wine. You feel an all-understanding, all-knowing benign being even if you remain largely clueless and there is an incremental gathering of knowledge, however small. Hope this answer appeals to your sense of humour.

Is there a link that exists for you between real science and science fiction in this way?

Jim Mann: Cutting edge physics and

astrophysics can invoke the same kind of sense of wonder as SF.

Caroline Mullan: Yes. The fact that a science fiction writer has tried to stick to the rules underlying the universe helps your faith in the story.

Have you read classic 'space' novels (such as the Lensman books, Starship Troopers, the Foundation series, the Sector General series, etc.), and later novels set in space (such as Consider Phlebas, Revelation Space, Ender's Game and the Vorkosigan series)? Would you say there are significant differences in style and message - what were your preferences and why?

Mark Meenan: Yes. It's only a generalisation but the earlier examples tended to have the engineers/scientists (or doctors in the case of Sector General) as an enlightened guiding force whereas the more recent tend to be more realistic and have the societies/situations having to deal with self-serving individuals/groups, be they politicians, corporate bodies etc. The age of the reader plays a part here, I think - I would still recommend some of the older books to a younger reader - I think for the sense of optimism that exists in many of those stories.

Jim Mann: One big difference is that modern space novels seem to have far more detail worked out about the worlds and societies. I'd also say that the best modern SF also portrays the reality of space better. Compare 'Doc' Smith, where in some sense space is a backdrop, and the inertialess drive pretty much lets the characters ignore it as they zip through it, to the rich, complex universe of Alastair Reynolds's 'Revelation Space' series, as an example.

Caroline Mullan: Yes, all of the above and more. The early ones are often about people grappling with the nature of the universe, and so in a way the nature of the universe becomes an essential element of the story. The later ones are more likely to have space and a rich plot and characters who are people, but often the characters don't engage with the actual universe so much as with other characters. So the universe sometimes

dwindles into the scenery in which the story is set, rather than being an essential element of it.

Dave Angus: I've read or watched *Starship Troopers* and read *Consider Phlebas*. There are bound to be differences because the authors are different, particularly in terms of politics, Heinlein and Banks being examples. I don't know about preferring one at the expense of the other but Iain M. Banks's Culture really appealed to me and I do wish I lived in that sort of civilisation.

How do you think that space as a setting for science fiction has been affected by the mood and opportunities of the time for real space exploration and space travel? Was the mood of the time you read the stories more relevant for you than when they were written?

Jim Mann: To a degree, yes. But I also think it's been influenced by a growing understanding of what it's really like out there. From a scientific perspective the universe is much richer, complex, and stranger than we ever imagined it to be in the 1940s.

What are your favourite 'space' science fiction stories? They can be any novels or stories set in space, by any authors; although I'm hoping that, like me, some of you have a favourite from an earlier era and one more recent (mine are, respectively, James White's Sector General (1957), and Mark Long and Nick Sagan's Shrapnel (2009), which is a comic, in fact).

Jim Mann: I listed a number above. But just to give a fuller list here: Alastair Reynolds: *House of Suns*, *Revelation Space* (and sequels); Stephen Baxter: *Ring*; Iain M. Banks: the 'Culture' novels; Vernor Vinge: *A Fire Upon the Deep* and *A Deepness in the Sky*; Arthur C. Clarke: *The City and the Stars*, *Rendezvous with Rama*; Poul Anderson: *Tao Zero*; Robert Heinlein: *Have Spacesuit, Will Travel*, *Time for the Stars*. I could go on, though it's hard to actually define what's meant by 'space SF', since I'm not sure all SF just set in space counts as 'space SF' here. I wouldn't list Leigh Brackett or Ray Bradbury, for example. I love Jack Vance's works set in space, but is

Planet of Adventure really 'space SF'?

Caroline Mullan: Naomi Mitchison's *Memoirs of a Spacewoman* (1962, but I read it much later); Poul Anderson's *Tau Zero* (1967), travel to the end of the universe - as above; C.J. Cherryh's 'Company Wars' books: *Downbelow Station*, *Rim-runners*, et al, and *Merchanter's Luck* (mostly '80s and '90s); Elizabeth Moon's short stories in *Lunar Activity* (1991); Stephen Baxter's *Titan* - space shuttle to Jupiter (1997); Greg Egan's *Diaspora* (1998) - travel to the end of the universe! (Don't ever let anyone tell you the women don't go there, and if you get lists of all male authors it might be worth asking why the respondents either didn't read, or don't remember, the women.)

Would you take the opportunity to travel in space? Why? Where would you want to go?

Jim Mann: If you asked me twenty years ago, the answer would have been yes. Now, the answer is "only if we develop a space elevator or a transporter, because I don't really want to undergo all those G-forces."

Mark Meenan: I would love to see the Earth and Moon from space.

Dave Angus: Yes. But given the present state of space travel and my age, it would be limited to orbiting the Earth. I'd like to do another John Glenn who went up again when he was old and I'm on the verge of that. That would still be a fantastic experience and a professional one. I've modelled all land parts of this planet and built it a couple of times, not to mention older versions such as Lower Cretaceous Earth, and I could finally see the real thing for myself. A friend is more adventurous, being certain that he would accept a one way trip to Mars if it was offered. Finally if there is an afterlife and it turns out to be a benign one, for me I would like my soul to do a Grand Tour of the worlds I've modelled, which would be: the Moon, Mars, terraformed Mars if time travel is available and our species was up to it; Io, Europa, Titan, then twenty-one light years out to 82 Eridani to see if the Earthlike world I modelled - or something Earthlike - is there, followed by the nearest three Earthlike planets to Sol - I've built three - and a

general exploration of our stellar neighbourhood out to about a hundred light years. I modelled Betazed, the home world of *Star Trek's* Counsellor Deanna Troi too, then a time travel voyage across the galaxy to two thirds of the way round the rim - the first passion of my life was dinosaurs and Lower Cretaceous Earth was there - and then the opposite side of the galaxy to see Pangea. Then I suppose we could continue on to whatever else awaits me in Heaven.

Lynda E. Rucker: Yes! Well, maybe. I've spent pretty much my whole life longing to travel in space. As an atheist, I suspect that the idea of travelling in space fills me with the same sense of the numinous that a religious person would feel at the thought of visiting their holiest sites. I am awed by the natural world, and our origins are out there somewhere in the universe. I used to imagine I'd be very reckless about it - I'd go even if it were extremely dangerous and untested. I'd certainly hop aboard an alien craft, no questions asked. In recent years, I seem to have either grown more attached to Earth or more cowardly or perhaps a combination of both, because I don't feel nearly as much bravado when I think about it as I once did. Nowadays I am less willing to take a big risk to do it. Obviously it's not going to become a routine form of transportation in my lifetime, so I guess it's kind of moot.

Where would I go? Anywhere. I don't care. I used to think I'd like to take a space voyage when I was very old, as I was dying, slipping off this mortal coil while gazing into infinity. But again, I seem to have changed and decided I like Earth too much. Now I'd rather check out while sitting in the sun, someplace gorgeous.

And having said all that, if someone were standing right in front of me, making me the offer, it's hard to know what my choice would be...

Finally, have you read any recent SF works that were reflective of the current world, or which included a message or a metaphor?

Jim Mann: I've just finished James Morrow's *Shambling Towards Hiroshima*, which certainly includes a message and reflects on our current world.



BEGINNINGS

Jean Martin

Qver since I was a little girl, I was fascinated by the heavens. The sun, moon and stars held some celestial magic and I was just in awe at the beauty, diversity and vastness of God's creation. However, at the time, these heavenly bodies all seemed so far away, mysterious and unknowable. Unlike things on Earth that are tangible and a part of daily life, galaxies and universes seemed like the realm of science fiction to me then.

Nowadays, space exploration is more commonplace and reaching for the stars is a more realistic goal. Since childhood to this day, I've had a lifelong interest in astronomy (which led into my love of science fiction) and have kept up with progress in this field of endeavour. I've read, watched and listened to topics about the actual science of space as well as

the flights of imagination that others have created.

I was born in the 1960s, the decade when the Space Race was at its fever-pitch. I was too young to really understand what was happening; I was two years old when men first landed on the moon, but I could feel the excitement that we were living in historic times and entering into a new era of human accomplishment. The world has simply not been the same since we have ventured into space, and it seems like the sky is not the limit anymore. Homo Sapiens history has constantly been about exploration. We are a curious species and I am sure we will continue to expand our horizons into as yet undiscovered destinations.

Galileo was my first inspiration, but it was Carl Sagan's *Cosmos* TV documentary series from the 1980s

▲
A crescent moon is visible in this view of Earth's horizon and atmosphere, photographed by an Expedition 16 crew member on the International Space Station. NASA, 2007.

that really changed my life. His depiction of a beautiful and harmonious universe and our place in it was inspiring and resonated with my positive view of life. I also have an enduring thirst for knowledge and he presented so many different themes from atoms to stars, from history to the modern day, and from art to science. One of the segments that captured my interest was Johannes Kepler's attempt to explain the planetary motions using the concept of the "music of the spheres."

So I thought of majoring in astronomy or some related field in college, but there was only one university in the Philippines that had an observatory, and my parents said that it was not a field you could live off of. And being near-sighted, prone to motion sickness, and not a US citizen (not to mention not living in the US), I thought there was no way I could ever become an astronaut. More recently, I've realized that I wouldn't have been a good scientist anyway because I'm more right-brained than left-brained, and I'm better with words and ideas than with math and technical details.

Still, I have far from given up on astronomy. I have an amateur's love of the romance of space and its exploration, and a lifelong learner's passion for expanding my knowledge on this and various other subjects.

After I moved to the US, I joined the Planetary Society and through them was able to enjoy Space Camp at NASA Ames in Mountain View for one day several years ago. This is sadly no longer there, but I still remember the feeling of weightlessness using the Zero-G tank... it was like flying in space. And the Lunar-gravity simulator... where I discovered that my ballet dancing skills worked really well. I also remember going back to NASA Ames to visit one of the clients of the high-tech public relations firm I was working for, and got to try out the Mars Rover simulator before it was even implemented (and I believe it is now available for public use).

But it wasn't until a few year ago when I dated a Welshman who had a Master's Degree in Spacecraft Engineering (and who worked briefly for Intelsat) when I started attending more space-related events and lectures. I got to see scientists talk at NASA Ames about the Cassini-

Huygens mission to Saturn (and one of my first views of the Ringed Planet from a portable telescope), heard Frank Drake talk at Foothill College about his Drake Equation for predicting the possibility of extraterrestrial life, listened to a Stanford scientist about cosmic microwave background radiation, and had the privileged of watching the British theoreticist Stephen Hawking live, at the San Jose Center for the Performing Arts (which is coincidentally where I also saw Patrick Stewart several years previously). Andy and I also went to Lick Observatory for one their special music events and got to use their telescope to see the Ring Nebula. We also both liked to watch for satellites (using a tracking program) and even got to see the International Space Station (ISS) with a space shuttle docked to it when we were in the west coast of Wales. We saw it very bright overhead as it whizzed by really fast a few times. Due to the way the ISS revolves around the Earth and the high level of light pollution in San Francisco's Bay Area, viewing it in a caravan park off of Cardigan Bay was vastly superior to seeing it here.

Writing and editing for the Bay Area online news zine Science Fiction/San Francisco as well as befriending more people like myself in fandom has also spurred on my attending astronomy events. Through the Klingons, I discovered their yearly "Day of Honor" celebration at the Chabot Space and Science Center in Oakland. I haven't been to this event in a few years; but last year I did go back to Chabot for the Greater Bay Area Costumers Guild's "Starry Night of Steampunk". I was able to use the telescopes there again (one time I saw Jupiter with four of its moon across its equator like a diamond necklace) and finally even got to see the planetarium show, which I thought was more enjoyable than the one at the California Academy of Sciences. I was able to cover one of the Space Elevator Games at NASA Ames (based on one of Arthur C. Clarke's ideas).

Also through SF/SF, I was able to attend Yuri's Night (celebrating cosmonaut Yuri Gagarin's achievement as the first man in space) at NASA Ames twice. This event combines science and technology with art and music in a very Burning Man-like atmosphere. At the first one I went to

in 2007, I got to hear Anousheh Ansari speak about her experience as one of the first self-funded space tourists and the first self-funded woman to fly to the ISS. She showed footage of her at the ISS (she looked beautiful and happy) and her landing back to Earth (which brought tears to my eyes). Here's a woman who's only six months older than me, and also from a foreign country, who did not let anything get in the way of her dream of going into space. I so admire her strength, courage, resourcefulness and determination.

Inspired by her, I am now in the process of taking the small step of traveling to Florida to see one of the last Space Shuttle launches later this year. This has always been a dream of mine and I know I would regret it if I don't see it at least once. It is sad that these flights will come to an end and that funding for space exploration is dwindling. But it seems like commercial space ventures are now going to take its place.

Which leads me to thinking and planning for the bigger step of saving and waiting for Virgin Galactic or other space tourist-type flights to get off the ground... literally. I suppose I should try my hand at the Zero-G planes first. I'm afraid that motion sickness might prevent me from enjoying that much, and discouraging me from my more ambitious goal. They're not called the "vomit comet" for nothing. Perhaps I'll never get to do any of these but it's good to dream.

I also got to meet the second man on the moon, Buzz Aldrin, at the 40th anniversary of the Apollo 11 mission at the *USS Hornet* (docked in Alameda), which was the aircraft carrier that recovered the three astronauts from the ocean. I wrote about this for SF/SF last year, which also happened to be the International Year of Astronomy (IYA). I bought an official 'Galileoscope' through an IYA-certified organization. This was a modern replica of the telescope that Galileo invented and shows what he would have seen as the first person to see the skies in much closer detail. I had to put it together myself, with a lot of help from my friend Mike. Also, last year, I got to go to an astronomy camping party at Fremont Peak near San Juan Bautista for my friend Bryan's birthday. The observatory's

telescope was a lot larger than I expected. Also last year was the first annual SF/SF picnic, which was held at the Rosicrucian Museum in San Jose. Their planetarium show was an interesting blend of mysticism and science as it focused on the 'Mythraic Mysteries'. It just goes to show that humans throughout history have been interested in astronomy, albeit from a more superstitious angle.

So far this year, I've only gone to one space event for SF/SF, a lecture by Jill Tarter, Director of the Center for SETI Research at the SETI Institute in Mountain View. I was thrilled to meet such an important figure in the search for extraterrestrial intelligence and who was the basis for Jodie Foster's character Ellie Arroway in Carl Sagan's novel and the subsequent movie *Contact*. I also met one of Jill's SETI colleagues, Seth Shostak, at BayCon a couple of years ago. He was actually a judge at the masquerade competition, which our group won for Best Presentation. Life is funny like that sometimes.

While I enjoy doing all these things in and of themselves as part of my life, they hold a bigger place in the larger scheme of it all for me. These remind me that we are all Earthlings and share this wondrous planet, and really, we live in just a small part of the greater cosmos. There is not only a bigger universe out there to explore; but also, we need to take care of our 'home' and make peace with one another. We may be alone or there might be life 'out there' but we are more alike than not and we are all in this together. Our accomplishments in the field of space exploration show us that we are capable of incredible feats and can be successful in achieving our dreams. A proof of this is *When We Left Earth*, an amazing account of the space program with gripping footage and excellent interviews. The documentary shows that mankind has the expertise, courage and ingenuity to collaborate toward common and worthy achievements.

So, in summary, what does space and space exploration mean to me? It makes my life richer and more interesting here on Earth, helps me connect with like-minded people, and gives me hope for a positive future for mankind. And maybe I'll even get to fly to the stars one day; and if not myself, then future generations.



OUR FUTURE IN SPACE

James Shields

FAs a child I was always fascinated by everything to do with space. Aren't all kids?

On of my favourite childhood books was called *The Next Fifty Years in Space* by the very great Patrick Moore. I'm sure a few of you will have read it. It was written in 1976, a year after Apollo and Soyuz mated, promising a great future of cooperation in space.

Sadly the book was out of date almost before the ink was dry on its pages, as the Space Shuttle was beset by delays and hold-ups, missing its launch date by several years, and plans for permanently manned space stations would only have the Russian space programme to keep them alive for another twenty years.

The Space Shuttle is possibly the most amazing machine ever built, but sadly it fell far short of our hopes for it. Instead of heralding an era of low

cost, high frequency manned launches, the shuttle proved over-complicated and unreliable, requiring major overhauls between missions. And far from being safer than conventional launch vehicles, the *Challenger* and *Columbia* disasters showed up flaws not just in its design, but in the entire culture at NASA.

This year, President Obama cancelled the Orion programme, which was to be NASA's replacement for the Space Shuttle. In my opinion, Orion was ill conceived, trying to recreate Apollo from left-over shuttle parts, and its cancellation is no great loss, but it does mean that for the first time in its history NASA is left without a manned space programme.

The Russians seem to be doing only marginally better. They had been developing an interesting reusable spacecraft called *Klipper*. At one point



'Liftoff Space Shuttle Discovery',
(STS-131).
Chris Hagood, 2010.

it looked like Europe and Japan might have been joining the project, but budget cuts have meant the project has been on hold since 2008. Their manned space programme has had its funding cut to the point where all it can do is keep churning out Soyuz rockets to ferry cosmonauts to the International Space Station. As nobody else will have any rockets that can carry people to the station after the shuttle retires later this year, it's certainly in the interests of the ISS partners to make sure that the station is still serviced, and most importantly, make sure their astronauts can get there. If the Russians were to start ramping up the price they charge for a seat, it would serve everyone else right.

Of course, there's also the Chinese space programme, but they are out in the cold as far as the rest of the world is concerned. Their manned craft is really just a re-badged Soyuz, anyway.

By Patrick Moore's timetable we should not only have permanent bases on the Moon and Mars by now, but also have astronauts exploring the moons of Jupiter and Saturn. Mr. Moore looks to be a very long way off the mark.

So it seems that the future of manned spaceflight lies in the hands of the private sector, which some would argue is where it should have been in the first place. I'm sure everyone reading this is well aware of Burt Rutan's *SpaceShipOne* and the Ansari X Prize. This has formed the basis of Virgin Galactic's bid to carry fare paying passengers into space next year. A whole host of others are hoping to do likewise.

However, in case you're thinking "problem solved", they still have a long way to go. To win the X Prize, *SpaceShipOne* just had to make a jump over 100km. While this is the official definition of Space, it's a long way from the ISS or even a stable orbit. All a \$200,000 ticket on *SpaceShipTwo* will get you is about six minutes of weightlessness before an hour long glide back to Earth.

Still, it would be pretty amazing. You would see the curvature of the Earth below, and the sky above would be black, and you might even see stars if you turned off the cabin lights. It might be a good idea to save the inflight meal for the way down, though.

It's been compared to the barnstorming days of flight, when the only way normal people could get in a plane was in the back seat of a two seater at an airshow. There was no destination, you just went up, saw the earth from above, and went down again. Let's face it, even for the likes of us, used to routine air travel, that would be a pretty mindblowing experience, but in the early twentieth century, it would have been life-changing.

But I'm not sure if the comparison to air travel is a valid one. With aircraft, it's a fairly natural progression that you can take an existing design, make it a little bit bigger, give it a longer range, and off you go. Every once in a while revolutionary changes like jet engines will come along, but it's a pretty natural progression from the Wright Brothers to the Airbus A380.

However, in space things are a little bit different. There is a certain amount of progression that suborbital hops can make, getting passengers a little bit higher, and experiencing weightlessness for a little bit longer, but at some point someone will have to make a leap from a hop to a jump into orbit, and it's a very big leap. I have no doubt it will happen eventually, probably on the back of a government sponsored prize fund.

Of course, there are plenty who argue that the way into space is not on a rocket but an elevator. Roald Dahl was possibly more prophetic than he could have imagined, and there are prizes for developing the science of space elevators too, though so far developments leave a lot to be desired. We have lots of fancy theories, but a long way to go to put them into practice. Constructing a lift cable from carbon nano-tubes is a nice idea, but so far we've only been able to make tubes a few microns long. Once we figure out how to make them a bit longer, then weave them into a cable 38,000km long, we then have to use conventional rockets to transport that cable to space, and somehow feed it back down to Earth. Once we've done that, the first robot cable crawlers will probably just be dragging more nanotube cables up to make it strong enough to support larger payloads. After that, larger crawlers can bring up real payloads, and if it all works we will have easy

and cheap access to space. That's the theory, anyway. The tricky bit is putting it into practice, and 38,000km really is quite a long way to go by cable.

Once we've sorted out the getting into space problem, we return to the question of what we do when we get there. If the space programme is being driven by commercial interests, then the objectives will have to be profitable ones. During the "barnstorming" sub-orbital phase, the only feasible profit motivation will be once in a life-time trips by fairly well-off individuals. There seem to be no shortage of these at Virgin Galactic, and other potential operators are also finding plenty of clients.

However, once there's a commercial manned route to orbit, a whole lot of possibilities will be opened up. The first thing up for grabs will be lucrative contracts to service the International Space Station. There are also numerous proposals for space hotels, but aside from tourism, what can you usefully do in Earth orbit?

Well, there are hundreds of universities and corporations that compete to get their research projects on the limited number of space agency missions. Presently, if their project needs human input, all they can hope for is that an astronaut will be able to find time for it during the mission, but they would be love to be able to send up their own researcher to be fully dedicated to the project. There are many areas from medical research to materials science where this could be of huge benefit. There are also manufacturing processes that benefit from weightlessness, so low cost access to space might make these commercially viable. It's possible that our future space hotels will have a wing off to one side for researchers.

Will we one day have giant rotating stations like the one from *2001: A Space Odyssey*? I don't know - it possibly depends on how long it takes us to get beyond Earth orbit, for once we do it's questionable how much need there will be for such a station.

Once we do get beyond Earth, and I'm sure we will, we'll be faced with a whole new set of challenges. Ships will need to be totally self contained with the ability to deal with any emergency. They will need to repair themselves, fabricating replacements for anything

that should be destroyed or damaged. Most critically, they will need to be able to care for crew members injured - turning around and rushing home just won't be possible.

President George W. Bush set the Moon and Mars as our target, and I'm sure both will be visited, but I expect that commerce-led space interests will push straight past them and head for the asteroids which have enormous potential for exploitation, and while the Moon and Mars have a fraction of Earth's gravity, making it easy to get your work into space, the asteroids have almost none, making them the ideal source of raw materials for space construction. Many are rich in iron, a very suitable construction material, and most of the needed materials for living in space can be found in asteroids and comets.

The main asteroid belt between Mars and Jupiter may contain only 4% of the Moon's mass, but it is the ease of access that makes it attractive. There could be hundreds of small human colonies all running mining operations, and trading with other colonies for materials they don't have access to. The availability of plentiful supplies of raw materials could see huge orbital cities develop, that will house tens of thousands of people living permanently in space. These could be orbiting the Sun with the asteroids, close to their raw materials, or they could be set into elliptical orbits that would take them between Earth and the asteroid belt at regular intervals, picking up or dropping off people at the Earth end of the orbit, and building new sections to allow for population increase at each pass of the asteroid mines.

By this stage I'm sure we'll also have a permanent settlement on Mars, and we may even have started terraforming the planet to make it more Earthlike. Thicken the atmosphere a little, and add some greenhouse gases, and it could warm to the point where you could go outside with just an oxygen mask instead of a spacesuit. Of course, the environmentalists will be up in arms about destroying the ecosystem of Martian bugs...

I'm sure this brings us well beyond the next fifty years. Where will we go beyond that? The gas giants and the outer Solar System would certainly be possible, but will we have the

motivation to go there? The huge volumes of gases in the atmospheres of Jupiter and Saturn might be one reason. These could be used to fuel interstellar spacecraft.

Will humans ever head for the stars? Well, that's a tough one. Assuming we don't discover faster-than-light travel any time soon, it's going to take a very large leap of faith to get in a spaceship when you won't be around to see its destination. Would you want to condemn your descendents to a difficult life in a cramped, dangerous environment? On the other hand, extrasolar planets are being discovered at such a rate that it

seems only a matter of time before one that could be habitable by humans is found. At that point, the temptation might just be too great to expand beyond our own little system.

It's perhaps a little sad how few of Patrick Moore's predictions have come to pass. The next few years will either see the blossoming of private manned spaceflight, or will see us retrenching back to an Earthbound species. I certainly hope for the former.

It may take more than fifty years - possibly a lot more - but as a science fiction fan, I have to believe mankind can have a future among the stars.



In my own view, the important achievement of Apollo was a demonstration that humanity is not forever chained to this planet, and our visions go rather further than that, and our opportunities are unlimited.
- Neil Armstrong, 1999



THE BRITISH SPACE PROGRAMME

Nicholas Hill

Space means many different things to many different people. For some, it is the thrill of astronauts orbiting the Earth in the International Space Station or stepping foot on the Moon; for others, the spectacle of the giant rockets that launch them there. For the scientist, there are the stunning pictures from the Hubble Space telescope or the pictures of volcanoes on Saturn's moon, Io. For the men in the pub, there is Sky television; and there is the even more successful but more overlooked revolution in communications. What was Britain's role in all of this.

I want to concentrate in the main on a corner of Britain's history now long forgotten by anyone but a handful of enthusiasts: the launcher programme of the 1950s and 60s. Unknown to the man in the street, a satellite circles the Earth every hun-

dred minutes, passing over Britain one a day; a satellite built in Britain, launched by a rocket designed and built in Britain, and launched into orbit from a site in Australia. The satellite was called Prospero, and the launcher called Black Arrow - built in a hangar in Cowes on the Isle of Wight, tested at the Needles at the end of the island, and transported to Woomera for its launch.

There are two questions: how did we ever come to have a satellite launcher in the first place, and why did we abandon it?

In the early 1950s, it became apparent that the days of the strategic manned bomber were soon going to be over as a consequence of the progress being made on surface to air missiles. It soon became clear that the ballistic missile would replace aircraft. In those days, Britain still saw itself as

▲
One of a series of images taken by British space enthusiast Robert Harrison. His Icarus Project in 2009 utilised a helium weather balloon and a Canon PowerShot camera, launched from his back garden in Swindon, Wiltshire.



An Australian first day edition commemorating the launch of an ELDO Europa rocket at Woomera in 1969.

one of the 'Big Three', and if a missile was needed to deliver the 'independent deterrent', then we would have to go ahead and develop one.

This was easier said than done. Britain had spent a good deal of time and money on missile work, but this was almost exclusively defensive, resulting in the deployment of such missiles as Bloodhound (in service in the UK from 1958 until 1991, and in Switzerland until 1999). After long debate, it was decided to use American technology - Rolls Royce acquired the S3 motor from Rocketdyne (part of North American Aviation, who had produced the Merlin engine under licence in the war), anglicised it as the RZ1, and redesigned it as the RZ2. Two of these motors were to power the missile. The technology for the tank was the same as that of the Atlas missile, and was to be built by de Havilland Propellers. The complete vehicle was to be called Blue Streak.

Blue Streak was a controversial military project, although the reasons for that are better discussed elsewhere. Suffice to say that in April 1960, it was cancelled as a military project. At the same time however, the Government announced that development would go ahead as a satellite launcher - but whether this announcement was to deflect criticism that the money spent so far had been wasted is an open question.

And herein lies one of the interesting parts of the saga. The Royal Aircraft Establishment (RAE) was a large autonomous Government establishment in Farnborough - famous in its time for, among other things, the investigation of the crashes of the Comet airliner in the 1950s and the role of metal fatigue. In

the early 1950s, Desmond King-Hele was asked to investigate the possibility of reconnaissance from satellites - but, of course, at that time there was no way of launching a satellite. That didn't prevent him from investigating the possibility of a launcher based on a first stage using Blue Streak, a second stage using a rocket called Black Knight, and a small solid fuel third stage. Indeed, he went as far as calculating the payload - approximately one ton in low Earth orbit. He wrote this up on a paper dated May 1957 - five months before Sputnik was launched into orbit.

These studies were developed further so that when the Government announced that Blue Streak was to be converted to a satellite launcher, Saunders Roe had an impressive brochure prepared for what it called Black Prince. This was an unofficial name - in Ministry papers it was referred to by the more mundane title of BSSLV, or Blue Streak Satellite Launch Vehicle. Again, by the standards of time, it was a very competent launcher - a ton into orbit in 1960 was a substantial payload.

The Ministry of Aviation drew up a schedule whereby the first orbital attempt would have taken place in 1964. But political and financial realities intervened. It was all very well for the Government to decide to convert the missile into a satellite launcher, but how was it going to be paid for? Total development costs were put at around £60 million - which might sound peanuts today, but can be multiplied by a factor of around twenty-five to put into today's inflated currency, making one and a half billion, at a time when Britain was a good deal less well off than it is today. The Ministry of Defence were not going to fund it, the science budget certainly could not afford it (the development costs would have swallowed up the entire UK science budget without blinking), and the Treasury was chafing at paying for even the 'tick over' costs.

There was another possibility: international co-operation. Find someone else who would be prepared to shell out for the development costs. Commonwealth countries were sounded out, but apart from Australia, which was providing the facilities at Woomera, there was no interest - perhaps an indication of how little

significance the Commonwealth had become by then. France, on the other hand, was very much interested. A party of French officials toured the British rocketry facilities in September; parties of British technical experts visited Paris. In January 1961, a brochure for an Anglo-French launcher was produced, with the British second stage replaced by a French design, and with a small British third stage (although one interesting variation was a third stage designed by Saunders Roe using liquid hydrogen/oxygen). A conference was then held at Lancaster House in London to persuade other European countries to join the consortium.

To say that the rest of Europe was lukewarm would be an understatement - there was very little enthusiasm for the project, but one by one they came on board, and by 1962 the preliminary convention had been signed to set up the European Launcher Development Organisation, or ELDO. As well as Britain, France and Australia; Germany, Italy, Belgium and the Netherlands had joined, making seven members in all.

ELDO was a text book case of how not to set up a joint technical programme. The Secretary General was a politician rather than a technical man; indeed, there was no one in overall technical command of the new vehicle, christened Europa. The story goes something like this. The British converted all the old Imperial measurements of Blue Streak into metric, and arrived at Woomera with their manuals written in English. The Brits, of course, could only speak English. The French, who were building the second stage, arrived with their manuals written in French, and would speak only French. The Germans, responsible for the third stage, arrived with their manuals written in German, and presumably had to be trilingual. As for the Italians, who were providing the test satellite and its fairings...

The French second stage used dinitrogen tetroxide with UDMH (Unsymmetrical DiMethyl Hydrazine). There were four chambers, and they were pressure fed rather than pump fed, which meant relatively heavy fuel tanks. Pressure for the tanks was provided by a steam generator. The German third stage used dinitrogen tetroxide with Aerozine 50, which was

a 50:50 mixture of UDMH and normal hydrazine, again pressure fed, using helium under pressure. There were three chambers, one main chamber and two smaller 'vernier' chambers. Europa's performance was about the same as the earlier Black Prince design, but two years later in gestation.

The first phase of the development programme began with the firing of three single stage Blue Streaks. A dummy nose cone was added for ballast, and the vehicle's appearance if it had been developed as a missile would have been very different. With the exception of a hiccup in the last few seconds of the F1 flight, they were textbook launches.

F1 succumbed to 'slosh' - this happens when the vibrations of the rocket cause the liquid fuel to slosh back and forward in the tanks. If the frequency of the vibrations is the same as the natural slosh frequency, resonance occurs, and the sloshing suddenly becomes much greater. The sloshing eventually defeated the autopilot's attempts to keep the vehicle on course, and it suddenly tumbled end over end. Despite this, the vehicle stayed intact, leading someone to remark that it must have been built too strong!

Later flights had less success. F4 was Blue Streak with dummy upper stages, and the launch began successfully enough, but then the Australian Range Safety Officer, in a rather controversial decision, decided it was heading outside the range boundaries and pressed the destruct button. F5 was a repeat of F4, but with a happier outcome. Then came the launches with live French and German stages, which all failed as the upper stages refused to ignite or simply exploded. Finally, on the tenth launch, all the rocket stages functioned as designed - but ... the test satellite failed to reach orbit. The fault this time lay in the Italian part of the design.

The fairings were supposed to be jettisoned during the second stage burn. A cable ran from the fairings down to an electronic timer, connected via a plug and socket. This had worked successfully on previous launches (before the third stage exploded, that is), but this time it failed. Post flight analysis by the RAE discovered the reason. Previous plug/



The nose cone of Blue Streak, Britain's abandoned missile project, at the National Space Centre in Leicester, England.

sockets had been connected and disconnected several times. This one was new, and fitted well. Too well. The air trapped between the plug and socket was sufficient in the near vacuum of high altitude to blow the plug out, disconnecting it. The lack of a retaining ring says something about the engineering standards of the vehicle - exacerbated by each individual country being in charge of its own particular section, without anyone in overall technical command.

This was not quite the last flight of Europa - a new purpose built launch site had been constructed at Kourou in French Guiana. Europa had been extended by the additional of an apogee stage to enable it to put a satellite in geosynchronous orbit, and an equatorial launch site was needed. Lift off was successful, but the

launcher lost control after around a hundred seconds and broke apart. Post flight analysis revealed another problem: electrostatic charges had built up on the fairings; the air inside had been heated in the ascent, and in the low pressures the charge was able to arc across to the third stage, disrupting the electronic guidance. The technical review panel set up by ELDO was scathing about the engineering of the German stage (which today seems something of a surprise) and of the earthing of the electronic systems. The report concluded that:

“...the main technical problems lie in the third stage. Its design is complicated and its wiring needs to be thoroughly revised. Its integration has been particularly deficient. Three major systems in this stage have not been qualified: the sequencer, the middle skirt separation system, and the guidance computer. The latter, moreover, which is a prototype product, is not flightworthy.”

After eleven failures, Europa was abandoned. The tank section of Blue Streak F12 lies in the jungle of French Guiana, its stainless steel still gleaming. From the ashes of Europa, the phoenix of Ariane would emerge.

The technical failures of ELDO were matched by its political failures. The project had been instigated by a British government trying to find a use for a failed missile, but the Conservative government had been replaced by Harold Wilson's Labour administration in 1964.

The Wilson government was not a fan of the rather grandiose projects it had inherited: there was an economic crisis, and the Treasury had opposed the likes of Concorde and ELDO from the outset. Now it was to receive a sympathetic hearing. Wilson believed that Britain's technical talents would be better employed elsewhere - which is a reasonable point of view. Unfortunately, the UK was bound to Concorde and ELDO by international treaties - the compensation it would have to pay if it were to abrogate these treaties might well outweigh the cost of completion. Instead, the Government embarked on a policy of foot dragging, hoping to kill ELDO as a result. One of its first acts was to renegotiate the financial terms - to demand its money back (a tactic that would be used by a later Prime

Minister in rather similar circumstances!).

The situation was further exacerbated by the French. To be fair to the French government, it was one of the first to recognise the implications of geosynchronous communications satellites, and for this Europa, or ELDO A as it was also referred to, was quite inadequate. In 1965, the French proposed abandoning ELDO A and replacing it by a much more advanced design, ELDO B. This would have liquid hydrogen/oxygen upper stages. In true French style, they announced that they would stop funding ELDO A, since it no longer represented value for money. Britain responded by saying that the treaty specified ELDO A, and not any other design. Thus the French were refusing to fund ELDO A; the British were refusing to fund ELDO B. Legally, the UK Government were correct. ELDO B was held over as an aspiration for the future.

Indeed, the British went further, and said they would fund ELDO A and only ELDO A, since that was what they had signed up. The hope was the result would be the collapse of ELDO. Instead, the Wilson Government found itself paying out a lot of money for something it knew to be quite inadequate. The technical failures put pressure on the budget, which meant further rows about money. ELDO lurched from crisis to crisis, with the British managing to alienate the other six members quite effectively, to the despair of the Foreign Office.

Somehow ELDO survived, due mainly to the tenacity of the French, until the failure of F11 at Kourou. At that point, it became clear that not only was Europa inadequate as a launcher, but also that after nine years of development and eleven launches, it still was incapable of putting a satellite into orbit. A new requirement was drawn up for a Europa III (Europa II was the original vehicle plus the apogee stage needed for a geosynchronous orbit), to be capable of putting at least 750kg into geosynchronous orbits.

One option was an uprated Europa. Various configurations were modelled, with various strap on boosters and liquid hydrogen upper stages. They would have fulfilled the criterion, but at considerable cost, and with a vehicle incapable of being stretched any further. Another was for

a vehicle powered by four Rolls Royce RZ2 motors instead of the two of Blue Streak. This was quite a sensible option, but not really acceptable politically. It was dismissed on the grounds that Europe lacked experience in liquid oxygen/kerosene technology (it is hardly the most sophisticated of technologies!) and because it "represents from the engineering standpoint a compromise with the EUROPA I and II vehicle system". The RZ2 motor was one of the few features of Europa that had worked right from the outset! The winning contestant was a French design, and 'Europa III' would become Ariane - but that is another story.

HSD (Hawker Siddeley Dynamics, into which de Havilland had become subsumed) came up with some last gasp attempts to keep Blue Streak going. One proposal was to use the American Centaur upper stage - the first liquid hydrogen rocket developed in the US. Technically quite interesting, and with a useful payload - but a complete lack of interest from the Government. To be fair, finding a launch site might have been a challenge, as the French would probably have been unwilling to allow the use of Kourou.

Another idea was to strap three Blue Streaks together side by side. The motors of all three would ignite at lift off, but the outer two would top up the core section during flight, so that when empty, they would drop away leaving a fully fuelled Blue Streak to carry on upwards. This idea might have been technically feasible, but would have been an expensive option, as Blue Streak did not come cheap. Another limitation would be that the factory at Stevenage only had the capacity to built four Blue Streaks a year! This was taken up by Stephen Baxter in his story 'Prospero One', originally published in the science fiction magazine *Interzone* (#116, October 1996), of which more will be said later.

But what has this to do with the real Prospero and the Black Arrow launcher? This story runs parallel to the Blue Streak story, with one very important connection.

The technology that ended with the cancellation of Black Arrow began back in German during the Second World War. As well as the V2 or A4, the Germans were working on other

rocketry projects - one being the rocket propelled fighter, the Me163 or Komet. This used hydrogen peroxide (as known as High Test Peroxide, or HTP) as a oxidant, and the British became interested in hydrogen peroxide technology for rocketry and other uses (one being submarines!).

One problem was that hydrogen peroxide needed a catalyst for decomposition, and the catalysts used had been distinctly messy. The British solution to the problem was both unique and elegant. The HTP was forced through a silver plated nickel gauze, the silver acting as the catalyst. The gauze was not that thick - a matter of a few centimetres. At the other end of the gauze, the HTP had been converted to steam and oxygen at a temperature of well over 500°C. Indeed, the HTP could be used in this fashion as a monopropellant, but this was not very efficient. A much better idea was to inject a fuel such as kerosene into the hot gases, which would burn in the liberated oxygen. A further advantage was that there was no need for any external ignition device: at those temperatures the fuel burned spontaneously. The ratio of HTP to kerosene was 8.2:1, meaning the kerosene tank was very much smaller than the HTP tank.

Any choice of rocket fuel involves some degree of compromise - as indeed does any engineering decision. Rocket fuels are generally extremely corrosive and need very careful handling. Often the fumes are poisonous. Some are cryogenic. Compared with many other fuels, HTP was relatively easy to handle if the correct precautions were taken. Certainly the British safety record was very good. It also had the advantage that if spilled, the best way to get rid of it was simply to flood the area with water.

Although Armstrong Siddeley had produced two rocket motors powered by liquid oxygen (the Snarler and Screamer), in 1952 the decision was taken that all future UK liquid propellant motors would use HTP. Many small motors were developed, mainly for rocket assistance for aircraft - the Sprite, Super Sprite, and the Spectre from de Havilland, the Skorpion from Napier, the Stentor from Armstrong Siddeley, and so on. HTP motors were also developed at the Rocket Propulsion Establishment (RPE), part of

the Ministry of Supply, and based at Westcott in Buckinghamshire. There were the Alpha, Beta and Gamma series of motors.

The idea of Rocket Assisted Take Off (RATO) soon died as jet engines became more powerful. The idea of the rocket interceptor did not, and the Air Staff issued a requirement for such an aircraft. Saunders Roe, based in Cowes on the Isle of Wight, insisted that a small turbojet was also needed to 'get you home' once the rocket fuel was exhausted, and were awarded the contract, producing the SR53. This did exactly what the Air Ministry had asked for - but the snag was that such an aircraft was by now inadequate, as it was too small to carry radar, and so could only operate in daylight and good weather. A larger aircraft with an interception radar was needed, and Saunders Roe came up with the P177, also with a de Havilland Spectre motor.

Development of the P177 was well under way when the much maligned 1957 Sandys Defence White Paper was published. The P177 was one of the projects cancelled by Sandys, but it is easy to see why. The nuclear threat was moving from bombers to missiles - interceptor fighters were then redundant. In addition, the UK had spent a lot of time and money developing guided missiles, and the (highly successful) Bloodhound surface to air missile was about to be deployed. Missiles are less flexible than manned aircraft, but once deployed, the cost is minimal. There was no contest.

To return to ballistic missiles ... when Britain, America and the Soviet Union were first developing long range weapons, there were many unknowns. One of these was the re-entry problem.

To send a warhead over a distance of 2,000 miles or more means that it will send most of its trajectory in the vacuum of space. It will also be travelling of speeds well in excess of four kilometres per second. The problem comes when it re-enters the atmosphere at the other end. As everyone knows, most meteorites are vapourised when they hit the atmosphere. (The heating is usually attributed to 'friction', but it is not: the majority of the heat produced comes from adiabatic compression of the air in front of the vehicle.) There were

two questions: what shape should the re-entry vehicle (REV) take, and how should it be protected from the heat?

A sphere is aerodynamically unstable: it will rotate in a spiral fashion. The alternative shape was a cone with a rounded base. This could be used so that it entered blunt end first ('high drag' configuration) or sharp end first ('low drag'). Examples of the 'blunt end first' would be the Mercury, Gemini and Apollo capsules. The heating effect was not so severe for the high drag configuration, as it began to lose speed in the higher, more tenuous, part of the atmosphere. The low drag configuration had its peak deceleration much lower in the atmosphere, and as a result got hotter - but decelerating as late as possible was a better option for the re-entry

The body of a Black Knight rocket, the UK's first home-grown attempt at a re-entry vehicle circa 1955, at the Royal Museum of Scotland in Edinburgh. It is approximately 11 metres tall.



body of a nuclear warhead. The RAE at Farnborough opted for the low drag entry body.

There was only one way to find out whether the design was correct - fire a model REV out into space and see what happened when it came back. That needed a reasonably substantial vehicle to propel it that high. First thoughts revolved around the use of solid fuel motors, but the ones available were all too small - they would have to be clustered together in a very clumsy arrangement. The alternative was a liquid fuelled rocket.

The contract to build the vehicle was given to Saunders Roe, who already had experience with HTP from the SR53 rocket interceptor. The motor was to be made from four Gamma chambers which had already been developed at RPE, and the job of developing the new motor, called the Gamma 201, given to Armstrong Siddeley. The vehicle was christened Black Knight.

Code names for projects being developed by the Ministry of Supply were made from a colour of the rainbow plus some totally random word. Thus, for example, the warheads considered at different times for Blue Streak went under the names of Orange Herald, Green Granite, and Red Snow. Other exotic names included Violet Club, Indigo Hammer, and Yellow Sun. Black Knight was not a military weapon, but a research vehicle - hence 'Black' instead of a rainbow colour. Thus also Black Arrow and Black Prince (the satellite launcher which combined Blue Streak and Black Knight). 'White' was never used.

Black Knight was a very simple vehicle, as its main function was to lob the dummy re-entry heads as high as possible. There were four small fins for aerodynamic stability, with pods on two of them. One pod contained a transponder to help in tracking; the other held an electronic flash gun, set to flash every four seconds. Long exposure photography (all the flights were held at night) could record the vehicle's track for post flight analysis. Each of the four chambers could be swung in one plane only, which was radial to the vehicle. By swivelling them in combination, the vehicle could be steered in any direction.

The Black Knight body was built in Cowes, and the engine bay in Anstey,

*Rocket testing site,
High Down on the
Isle of Wight.*



near Coventry, where Armstrong Siddeley had a rocket motor testing site. The assembled vehicle was then taken to High Down, at the western end of the Isle of Wight, overlooking the Needles rocks and lighthouse. Here it was erected in a gantry, filled with fuel, and static fired (without being released!). The vehicle was then shipped out to Woomera for firing. All the launches bar one took place on clear moonless skies, so that the progress of the re-entry head, looking exactly like the streak of a meteorite, could be photographed and tracked by radar.

The first launch, BK01, took place in September 1958: it appeared to be a text book launch until the last few seconds of flight, when the vehicle appeared to explode. This was another classic example of how something relatively trivial could wreck a flight. Apparently a false signal was picked up by the aerial to the self destruct mechanism, triggering the explosive charges which fired manganese dioxide into the HTP tank.

The second flight, BK03 (BK02 never flew) was a completely successful re-run of BK01.

The first flight with a separating re-entry head was BK04, which validated the low drag choice. Whilst Black Knight had now done the job for which it was designed, several other interesting phenomena had come to

light. The low drag re-entry head had another useful property: it was what would today be described as 'stealthy' - in other words, it had a very low radar cross section. On the other hand, the wake of ionised gas behind the head did reflect radar. Further series of experiments followed, codenamed 'Gaslight' then 'Dazzle', working in co-operation with the Americans. Improvements were made to the vehicle: a small second stage was added in the form of a Cuckoo solid fuel motor. Unusually, this was not fired on the way up, but on the way down, just before re-entry. It was thus mounted 'upside down' on top of the main stage.

Another improvement made was the replacement of the original Gamma chamber by the small chamber from the Stentor motor which powered the stand off missile, Blue Steel. This new motor, the Gamma 301, was more efficient and was capable of a higher thrust.

In all, twenty-two Black Knights were launched, all but one as part of the re-entry studies (BK14 was used to test the range facilities for ELDO). RAE had long considered ways of converting Black Knight into a satellite launcher, but the vehicle was really too small to be used as the main stage. Thus evolved Black Arrow - a 'small satellite launcher based on Black Knight technology', as the RAE



A Black Arrow launch vehicle in the rocket park at Woomera, South Australia, similar to the one that launched the UK's first satellite in 1971.

report put it.

Black Arrow's first stage motor, the Gamma 8, was effectively a doubled up version of the Gamma 301 from Black Knight, using eight chambers in place of the four of Black Knight. The second stage also built on work Saunders Roe had done for other projects, and was powered by a two chamber motor. The only new part of the design was the solid fuel third stage, the Waxwing (the Superintendent at the RPE was a keen ornithologist, hence all the motors which were produced there were named after birds!).

Black Arrow was approved late in the life of the Conservative Government; it was put 'on hold' for a long time by the new Labour Government - indeed, some of the problems in the unsuccessful firings

might be due in part to the 'start stop' nature of the funding.

There were four launches in all: two failures, two successful. R0 failed probably due to a break in one of the control wires in the feedback mechanism to one pair of engines. Instead of making small corrections to keep the vehicle on track, the motors swung back and forward to their full extent - something that can be seen quite clearly in the film of the launch. This eventually overpowered the control system, the vehicle tumbled, and was destroyed by the Range Safety Officer. R1, a repeat of R0, was a complete success. Neither of these were orbital attempts - each had a dummy third stage.

R2 was the first orbital attempt, which failed due to a leaking valve in the second stage. The loss of gas needed to pressurise the HTP tank meant the motors shut down prematurely.

By this time, the new Conservative Government of Edward Heath had decided to cancel Black Arrow, but R3 was almost ready for launch. Permission was given for this to go ahead, and so Britain's only satellite was launched after the programme had been finally cancelled! Prospero will continue to orbit for at least another hundred years, and passes over the UK roughly once a day. But Prospero also showed up the limitations of Black Arrow. It weighed a mere 66kg. By the time allowance had been made for the structure, solar cells, battery, tape recorder and transmitter, there was very little left over for any useful scientific payload.

And that, as they say, was that. Now for the post match analysis.

Firstly, was the UK correct to abandon Black Arrow? The answer, sadly, is yes. The point of a satellite launcher is to launch satellites - and the problem was that no one in the UK wanted to launch satellites. The main functions of satellites are earth observation and communications. Earth observation means mapping terrain, military reconnaissance, and weather observation. There is no way Black Arrow could launch a payload which might fulfil any of these functions.

Could an enlarged version of Black Arrow been of more use? There were two very sensible proposals (from the technical point of view!) which

involved replacing the first stage motor with a motor using the large chamber from the Stentor motor. This would give a thrust of around 92,000lbs as against 50,000lbs, making for a much more capable launcher. But even for this vehicle, there would have been few, if any, applications.

Could the UK have built a launcher large enough to put a respectable payload into geostationary orbit? Up to a point. The RPE at Westcott had test fired several rocket motors using hydrogen as a fuel; building a second stage for Blue Streak similar to the American Centaur or the ELDO B design would be technically feasible. Even so, strap on boosters for Blue Streak would have been needed: four stripped down Black Knight vehicles would have done that job nicely. The resultant vehicle might have been able to put 700-800kg into geostationary orbit - quite good by 1970s standards. A bigger hurdle would have been an equatorial launch site, although the tip of Australia - Cape York, near Darwin - had at one time been considered by ELDO.

Could the UK have put an astronaut into orbit? The Gemini capsule, which is about the smallest manned vehicle capable of doing anything useful, weighed around 8,500lbs. The original Black Prince design had a payload of around 2,400lbs, and even with tweaking the design as much as possible, it still would not have been enough. The liquid hydrogen design mentioned above could probably have coped, but at a cost. Developing such a vehicle would have cost at least £250m, at a time when the entire annual defence budget, amounting to 7% of GDP, was around £2,000m.

The subject of money brings us to another major obstacle: the Treasury. The influence of the Treasury in the British Government should never be underestimated. All Government spending has to go through and be authorised by the Treasury. The system in America whereby Congressmen or Senators can insert projects into legislation simply does not exist in the UK. And the Treasury was - and still is - implacably opposed to Blue Streak (both military and civil versions), Black Knight, Black Arrow, ELDO, and anything else vaguely space

related.

An anecdote: When the initial development of Blue Streak had begun, the Ministry of Supply wrote to the Treasury asking for money to begin work on the 'underground launcher' (what would today be called a missile silo). No, said the Treasury, it hasn't been decided by Ministers. But the latest Defence White Paper specifically mentions that Blue Streak will be launched from underground sites, replied the Ministry of Supply. Well, said the Treasury, we're not sure whether a White Paper actually constitutes official government policy, and so we'll come back to you on that one.

The Ministry of Supply got its money in the end, but all these constant queries and delaying tactics by the Treasury meant that the project moved much more slowly than it need have done - and often delays end up costing more money in the long run.

Another anecdote: this concerns a Treasury memo on Black Knight, written soon after the military cancellation of Blue Streak: "On balance I think I recommend approval of this proposal - just. Any doubts I have are stilled by one further consideration which may appear cowardly but is, I believe, realistic: I do not think we have any hope the present moment of killing the Black Knight series of experiments, and even if we had, to persuade Ministers to do so now would ruin our chances of killing the Blue Streak launcher project, for we could not hope to persuade Ministers to face the political odium of two further cancellations close together. Black Knight, although pretty expensive ... is at least working successfully. It has had a good press. It provides a useful vehicle for a certain amount of incidental upper atmosphere research of the kind Universities can share in. Its cancellation would be very strongly opposed in the Ministry, would draw a great deal of adverse criticism in public - after all, we have now got over the most expensive early stages - and would only save less than £1m a year. Far better, I think, to keep our sights on the larger fish, Blue Streak, than to spoil Ministerial appetites with this smaller fry."

Firstly, the condescending tone of 'a certain amount of incidental upper

atmosphere research'. Secondly, 'pretty expensive'. There is a story - probably apocryphal - that when the Americans asked how much the whole Black Knight programme and re-entry studies cost, they were told that the total was £10m. They queried this. Surely a zero had been left off the figure...? And finally, the cynicism that forcing the cancellation of Black Knight would jeopardise the chances of killing Blue Streak.

Similarly, progress on Black Arrow was delayed and hindered by the Treasury. When a project looks as though it may well be cancelled, then the Treasury will only allow funding on a three monthly basis - in other words, avoiding long term financial commitment. Thus if Saunders Roe had spent their allocation ten days early, then they had to sit and twiddle their thumbs - or go on spending money without any guarantee that they'd get it back.

Never underestimate the power of the Treasury!

But why was the Treasury so much against the programmes, and why were Whitehall and Westminster so apathetic? The Wilson Government came to office at a time of financial crisis, a crisis that deepened and resulting in devaluation of the pound in 1967. Projects such as TSR2, Concorde, and ELDO were regarded as 'prestige' projects, wildly expensive, and with little or no hope of an economic return (and they were right about that!). But the antipathy was not confined to the Government; in post colonial, post imperial Britain, the generation brought up on *Dan Dare* and *Biggles* had turned their back on the Final Frontier. We were no longer interested in competing in the Space Race.

Baxter's story, referred to earlier, is of interest, not from a literary point of view, but because it encapsulates perfectly the view held by many of the engineers who worked on the projects at the time. They felt betrayed by the politicians, who were not interested - indeed, were actively hostile to - their shiny new toys. This was due to not knowing the reasoning behind the cancellation of the projects, and lack of information gives rise to rumour and speculation, which can often grow into conspiracy theories of one sort or another. Engineers are often very conservative in both a social and a

political sense, and most would have been very hostile to the Wilson Government, blaming it for most of the cancellations. Part of Baxter's story involves the burning of blueprints and the cutting up of partly built Blue Streaks at Hatfield whilst the count down proceeds at Woomera for the first and only launch of British astronauts - a clear reference to what was thought to have happened after the TSR2 cancellation, although whether that is an urban legend or not is difficult to discover. (The full story with annotations by Simon Bradshaw can be found at homepage.mac.com/sjbradshaw/bacterium/prospero.html)

Ironically, however, it was not the Wilson Government that cancelled Black Arrow but the new Heath Government in 1970. Baxter fingers the Right Honourable Anthony Wedgwood Benn (as Tony Benn was known as in those less demotic days) as one of the villains, but as Minister of Technology, he was one of the supporters of Black Arrow. (A Treasury memo in the late 1960s bemoans the failure of their latest attempt to engineer the cancellation of Black Arrow, and notes that the "Minister of Technology defended his corner very successfully.")

The reasons for the cancellations were much more mundane: neither Black Arrow nor Europa could put a useful payload into orbit, there was no market for satellites in Europe, and Whitehall saw the projects as money pits - and who can blame them?

Could an indigenous launcher programme be restarted? In a word, no.

Although Britain still has engineers, they lack what is called 'tacit knowledge' - in other words, people who have worked in a particular field know what works and what doesn't. Newcomers have to find out by trial and error.

A second problem is the lack of facilities - rocket test sites need to be remote from civilization. Can you imagine, in this NIMBY age, the reaction to a proposal to re-open the rocket test site that overlooks the Needles lighthouse?

And a final problem - where in the world would you launch it from?

But for anyone who thinks Britain is no longer in the 'space business' - just Google 'SSTL'.



THE SPACE RACE, MARK II

Liam Proven

Unless you're a denialist, hiding behind a wall of adamant refusal to listen to mere facts and solid peer-reviewed science with the creationists, you have to face up to something.

We're fucked, we residents of Planet Earth, unless we pull a very big bunny out of a tiny and pretty shagged-out hat.

It's not all about climate change, although that's heading off the rails even faster than the most pessimistic predictions. We're also busily filling the oceans with rubbish, chopping down and burning all the forests, turning streams and lakes into stagnant stinking green slimeholes with fertiliser runoff, and generally overpopulating the hell out of a rapidly faltering planetary ecosystem. And never mind not showing any sign of stopping or even slowing down - oh no, the rate of rapine is accelerating.

It's all likely to go epically pear-shaped real soon now. As in, within a generation or two, not centuries into the future.

But we're all devoted science fiction readers here, right? The path to the future lies off-planet, as any spotty twelve year old fan knows. Rockets taking off on a pillar of fire, just like Heinlein and the hypothetical deity intended, taking us to other planets.

The snag is that while the governments throw money at bigger and better toys for obliterating hapless Middle Eastern countries (but not each other, 'cause we're all friends now - honest) and bailing out criminally inept and avaricious bankers, and occasionally witter on about pointless crap like biofuels, the big ones are unfortunately not spending much on space any more. It's cheaper to send

▲
Virgin Galactic's Sir Richard Branson shows off the WhiteKnightTwo aircraft that will carry SpaceShipTwo into sub-orbital space. David Malkoff, 2008.

robots than people, but the current and foreseeable generations of robotic space probes are little more than very-slightly-smarter remote-control cars with fancy cameras. They're all well and good, and I for one hung on every word of news of Spirit, Opportunity, Cassini, Beagle and the others, but they aren't going to be building any asteroid mines in a timeframe anyone reading this is likely to live to see.

India and China are both throwing resources at spaceflight, partly as a badge of national pride, but both are enormous struggling countries with incomprehensibly vast numbers of hungry mouths to feed.

It's the fat bloated old West that has the big money and the thriving satellite industry, but neither India's Chandrayaan-1 nor China's Shenzhou-5 are poised to shake up the current hegemony of big American aerospace companies with both government and military backing, and the European Space Agency and Glavcosmos, Russia's contract agency for space affairs, trotting along behind.

But several smaller American private companies are. In particular, two of them have already got there and repeatedly gone into space. What's interesting is the relative amount of hype that the two have achieved.

Both companies have designed and built two different models of spacecraft: an early, limited version and a successor model that's bigger, more powerful and has considerable future potential. Other than that, though, the techniques they are using could hardly be more different.

One uses radically non-traditional technology, focussed on lobbing tourists out of the atmosphere for a few minutes, but with no way of actually putting anything there permanently. Despite this, it has received a massive amount of press coverage, worldwide publicity, massive backing and investment from both individuals and large companies.

The other is doing things in the traditional style: big white phallic symbols that take off like, well, er, rockets - only lighter, cheaper, built with new technology and a judicious leavening of commodity parts. Smaller, faster, cheaper than Low Earth Orbit ever was before. And the chances are that unless you're a space nut, you've never heard of them.

The big small but famous company is, of course, Burt Rutan's Scaled Composites of Mojave, California, whose *SpaceShipOne* was lifted to the edge of space by *White Knight* and thence made a short ballistic hop out of the atmosphere, and thus won the Ansari X-Prize of ten million US dollars. And this was back in 2004 when ten million bucks was a lot of money, although even then they spent more than two and a half times that much to actually build the thing. Happily, Microsoft co-founder Paul Allen footed the bill.

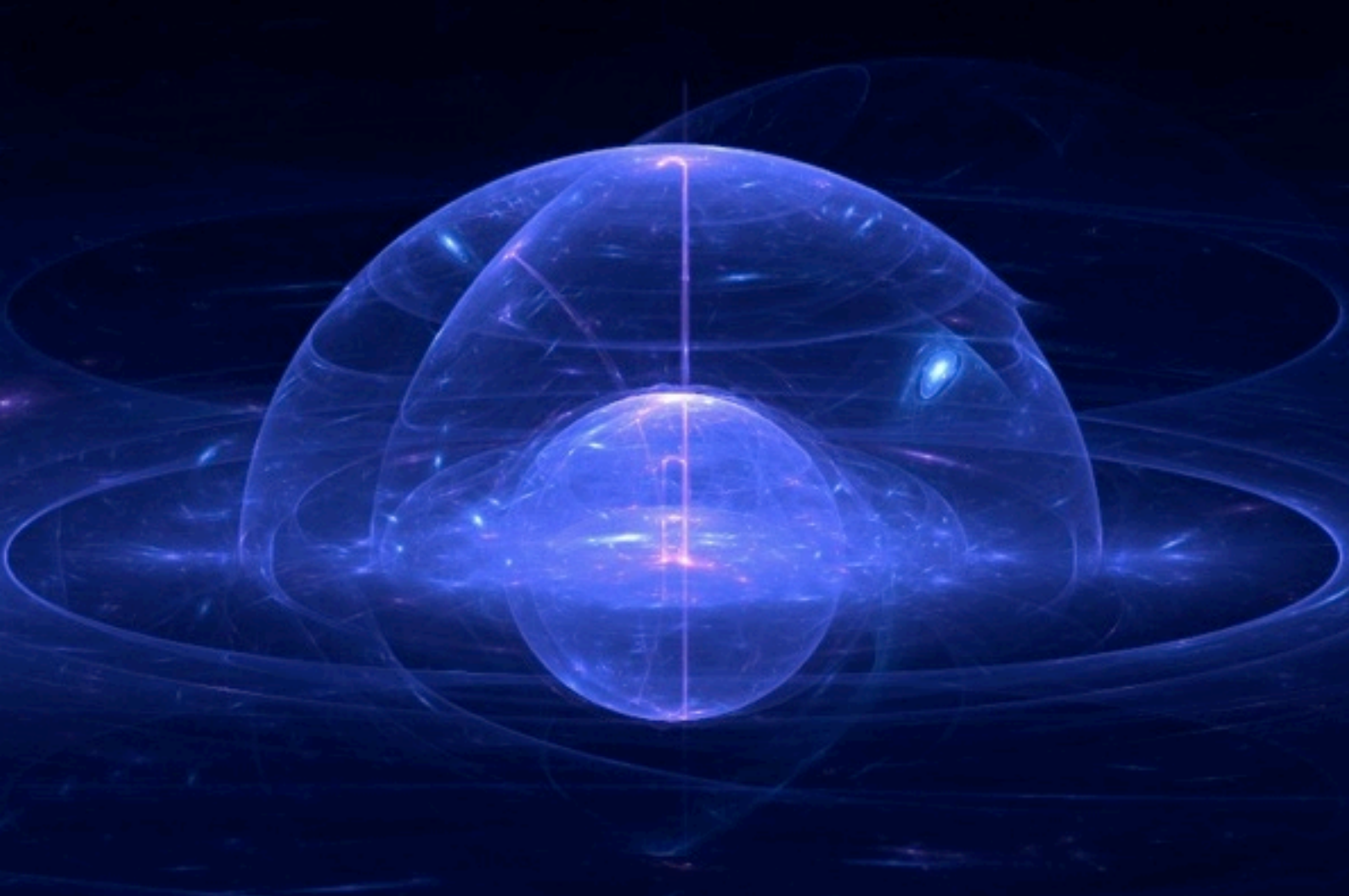
Allen is one of the cooler computer billionaires: after a near-fatal fight with cancer, he stopped running computer companies and started doing fun stuff, like building the world's coolest private yacht, the *Octopus*, with two helicopters, four tenders and a submarine with its own onboard dock. Blofeld would be sick with jealousy. Some of Allen's other interests are distinctly relevant to *Journey Planet* and SF fandom in general, though: he finances Seattle's Science Fiction Museum and the Living Computer Museum, an important collection of historic vintage computers. And directly salient to this article, he also bankrolled Scaled Composites.

I don't for a moment wish to knock Burt Rutan and his company. What they have achieved is fantastic: *SpaceShipOne* was a remarkable technological feat which blurs the lines between aviation and space flight. With the backing of Virgin, it should become commercial, taking tourists into space slowly and comfortably. The snag is, they won't stay long.

SpaceShipOne and the as-yet-unfinished *SpaceShipTwo* are spaceplanes, but they can only reach a little over Mach 3 and skip out of the atmosphere. To get into orbit, you need to be doing better than Mach 25 which requires about sixty times more energy.

The Space Transportation System orbiter, better known as the Space Shuttle, slows down markedly to re-enter at about ten times that speed - which would instantly incinerate a returning Virgin Galactic flight.

Which goes to show that jumping briefly into space is impressive, hard to do and jolly expensive, but staying there is a very great deal harder.



INTO THE SUPERUNKNOWN

THE DEATH OF HARD SF, AND WHY THIS IS POSSIBLY A GOOD THING

Alastair Reynolds

Isn't it about time we took Hard SF into the back yard and put it out of its misery?

It's not been very well lately, it would seem. It has a dreadful image problem, and besides, there's that embarrassing business of the name. It's supposed to connote the serious, scientifically-rigorous aspect of the subgenre, but all it succeeds in doing is sounding like a big, crudely-scrawled Keep Out sign nailed to the big SF treehouse. The genre, already an impenetrable form to many, apparently feels the need to cordon off a part of itself that's even *more* exclusive, with even more stringent entry-requirements. It's like a roped-

off area inside a nightclub, one which already has a strict door policy.

I don't hate Hard SF, though. It would be strange if I did: I grew up reading the stuff. In fact, my early SF reading consisted of little else, to the point where I had scant idea that this was a highly specialed subgenre, rather than simply the *thing* SF was. Blame Arthur C. Clarke, I suppose – it was his short fiction that did it. Early exposure to seminal Clarke works such as 'Transit of Earth', 'Into the Comet' and 'A Meeting with Medusa' wired the perceptual inputs of my formative brain in such a way that meant I could really only ever think of that type of story as the default mode



'Transparent Blue'.
Sue Jones, 2009.

of SF. Later exposure to Asimov's Robot stories offered only a variation on the same theme.

SF, for me - as defined by these templates - was fiction set in a technological, generally space-bound future, in which characters - usually engineers or explorers of some sort - were put in situations where a mystery or dilemma would be first presented, grappled with, then resolved, all in terms of scrupulous attention to scientific accuracy. Being eight years old, I didn't know very much in the way of actual science. What I did have - hazily - was a notion that there was a fundamental distinction between this thing called science and this other thing called magic. Dragons, wizards, warlocks, and their ilk failed to interest me then, and they don't hold much fascination for me now.

Scientist figures on the other hand - Spock, the Doctor - loomed large as role models. The SF I was reading served both to validate this rationalist worldview and to offer gentle instruction in the scientific method: bold enquiry, the ruthless sifting of possibilities, the discarding of false hypotheses. It also offered me my first dawning insights into the sheer mindblowing scale and antiquity of the universe. It was through SF that I grasped the existence of other planets, other solar systems, the possibility of other intelligences elsewhere. I might have decided to become a scientist without SF to spur me on, but if nothing else it made that career path all but inevitable.

I broadened my reading somewhat as I went into my early teens, but not radically so. I devoured James White, Bob Shaw, Harry Harrison and Larry Niven, and in my later teens I discovered the likes of Gregory Benford, Joe Haldeman and John Varley. All men, of course: there have never been that many women writers drawn to the form, although there are more now than there were back then. And not all of these writers were purveyors of Hard SF by first inclination, but much of their work was still grounded in that same sense of speculative rationalism I'd first encountered in Clarke and Asimov. Science and technology would bootstrap each other into the future; the world was knowable and governed by laws of nature, not the capricious

whims of supernatural entities. The world of tomorrow would be unlike that of today, and not merely by the accumulation of many trivial details. It could even be radically, wrenchingly different. It might be good, it might be bad, it might be a combination of the two, but it would not be merely the present writ larger.

This is still the mode of SF that I find it most easily to get excited about, and the type most likely to induce genuine sense of wonder. It's also, not accidentally, the type of SF that I'm perhaps best known for writing. I'm not surprised by that; given that I have a background in the sciences, and my stuff does *tend* to involve future settings and a goodly amount of technology and space travel, it's entirely understandable that I'm assumed to be both an admirer and producer of SF at the Hard end of the spectrum. But my relationship with the form is a good deal more complex than that, and encompasses as much dissatisfaction as it does unbridled affection.

I don't read much of it now. There is perhaps less of it being written than thirty or forty years ago, but my turning away probably has more to do with changing reading tastes than the amount of the stuff still out there. *Interzone*, which I started reading in my late teens, had a lot to do with widening my reading tastes within the genre. Gradually I began to realise that a lot of Hard SF was in fact quite crudely written, as well as being politically unpalatable. *Interzone* also opened my eyes to Cyberpunk, which was shaking up the entire field at the time. The works of William Gibson, Bruce Sterling and so on struck me as radically fresh and exciting, much more so than the sort of "Trad" Hard SF I was finding at the time.

Round about then I seem to remember trying to read an issue of *Analog*, and being appalled at how babyish and crude the contents seemed. It struck me as pandering, wish-fulfilment rubbish. In hindsight, I suspect I probably wouldn't have nearly so negative a reaction now - I was probably blanking on what was enjoyable and fun about some of the stories - but at the time Cyberpunk seemed to offer everything that I wasn't finding in Trad Hard SF. It was sharp, invigorating stuff about the real, coming future, not some lost

dream of conquering the universe. Better still, there was a lot of actual science and proper science fictional speculation going on. I was getting the sense of wonder jolt from Cyberpunk that Trad Hard SF just wasn't delivering any more. In fact, it seemed fairly obvious that Cyberpunk wasn't necessarily functioning as an alternative to Hard SF, it was showing what Hard SF ought to be like, done properly.

This was rammed home by the publication of Sterling's magnificent *Schismatrix*, a solar-system space opera as drenchingly supersaturated with real scientific speculation as anything I'd ever read. If Clarke and Asimov had rewired my brain at eight, *Schismatrix* came in, opened my skull and did the same thing again when I was twenty. As I've said elsewhere, it felt as if every previous SF novel, even the ones I'd loved and been influenced by, had been done in black and white. The effect for me was as if Sterling had found SF's colour switch. There was, for me, absolutely no going back.

If *Schismatrix* blew my mind, it had the unfortunate effect of rendering almost all conventional forms of Hard SF hopelessly dated and ineffectual, at least to my cyber-hardened sensibilities. Unless it stimulated the same area of my brain Sterling had managed to light up for the first time, I couldn't take it seriously. Generally, most of it was found wanting: I read little of Clarke's later novels and bailed out on Asimov.

The problem was one of suspension of disbelief. *Schismatrix* had that rare quality of convincing strangeness. It was realistic enough to feel plausible, but tinged with sufficient exoticism, sufficient off-hand weirdness, to have the authentic texture of direct reportage from the future. That quality, more or less, was what I was now looking for in SF, and not finding in sufficient quantities. It was out there, if I looked hard enough: especially in the wave of books that might loosely be termed post-cyberpunk. I got it in Michael Swanwick's *Vacuum Flowers*, Greg Bear's *Eon*, and a handful of other works, generally with futuristic, space-borne settings and an emphasis on exploring ideas about human evolution. It's a shiver of recognition, a feeling that this is what the future will actually feel like.

None of these works was exactly Hard SF but they were un-equivocally science fiction. Looking back now, in these genre porous, post-New Weird, post-slipstream times, some of them probably look harder than they did at the time. The critic and editor Gardner Dozois has often spoken of "Core SF" or "Centre-core SF" and I would suggest that these works sit squarely in that tradition. They may not be bolted together with the engineering rigour of a Hal Clement or Robert Forward novel, and they may not have the didactic intent of an Asimov or Clarke story, but they are essentially books set in universes which run according to scientific principles. Impossible or unlikely things may happen - space may get folded, people may travel back in time - but the implication is that these are not supernatural events; they are things that happen according to physics as it is understood *at the time that the books are set*. Crucially, though, it doesn't have to be a physics that dovetails easily with our own. It might even be a physics that appears wrong or nonsensical based on our current understanding.

Isn't this contrary to the very spirit of Hard SF? Shouldn't we be championing SF that tries as hard as it can to operate within the parameters of established science, rather than opening the floodgates to fanciful speculation, speculation that might well take us into the realms of what, in the here and now, appears to be impossible?

I suppose it depends on what you want your SF to do. Let's consider, briefly, two very different works about the colonisation and growing independence of Mars, in the coming centuries. On the face of it, Kim Stanley Robinson's *Martian Trilogy* (beginning with *Red Mars*) is thematically similar to Greg Bear's *Moving Mars*. Both works begin with a scrupulously realised vision of a settled Mars, drawing on cutting edge planetary science and an acute awareness of the social and technological challenges that would need to be met in establishing a colony on another world. Both works then go on to explore the political tensions between Mars and Earth, as the colony struggles towards independence. In both cases, colonial delegates travel back to Earth so that

we may glimpse the contrasts between the old and the new worlds - a template that goes at least as far back as Clarke's *Imperial Earth*, and probably further.

In other respects, though, the works couldn't be more different. Despite some stuff later in the trilogy about theory of mind, Robinson pretty much assumes that our current view of the universe is correct and, if not complete, then nor is it seriously deficient. The underpinning physics of *Blue Mars*, which extends into the twenty third century, is essentially that of *Red Mars*, which commences only a decade or so from now. There have been breakthroughs in materials science, a pulsed fusion spacedrive, advances in longevity, and there's some talk about an interstellar expedition, but there's been no shattering paradigm shift, nothing to compare with either relativity or quantum mechanics in the twentieth century.

Moving Mars soon takes a very different tack, depicting the emergence not just of a new, radically strange kind of physics - one which is being researched by scientists on Mars - but the application of that physics to bring about a startling new technology. This new applied science permits the characters to literally teleport Mars out of the Solar System. This is obviously impossible given our current state of knowledge, but in Bear's book it is our worldview that is shown to be incomplete. Crucially, Bear makes it all appear plausible, at least while we're turning the pages. Although the events that happen are truly bizarre, they flow logically from the underlying premise of his new imagined science. One of the ways in which Bear lends his inventions credibility is to latch onto some genuine real-world speculative idea and use it as an imaginative seed from which wilder speculation can flourish. In *Moving Mars*, that seed is the intermittently fashionable notion that the universe can be understood as a kind of self-sustaining software program. The scientists in the book learn how to hack into this program and selectively tune some of the parameters.

For me, this third kind of SF has always seemed ultimately the most convincing in conveying the elusive *feel* of futurity. In fact, here lies

something of a paradox. The first kind of hard SF - typified by *Red Mars* - endeavours to honour our existing understanding of the universe by sticking close to respectable "textbook" science. There's nothing wrong with this at all, and if you're writing about life fifty years from now, or even a hundred, it might be a perfectly valid strategy. It's more or less the pattern I'm following in the current book in progress.

Yet what about a book set several centuries, or even thousands of years in the future? Given the pace of scientific discovery since Einstein, it seems highly unlikely that our current view of reality is going to be the end of the story. In fact, we can be fairly sure that it won't be. The theories that replaced the Newtonian cosmology - General Relativity and Quantum Mechanics - offer an incomplete description of reality, and what's worse, they refuse to play nicely together. While there have been any number of potential candidates for a Theory of Everything, we don't seem to be all that closer than we were thirty years ago. In fact, with cosmologists worrying about Dark Energy, with string theory tying itself in ever more complicated knots, and particle physicists not quite sure what's going to pop out of the Large Hadron Collider, the game is still thrillingly wide open.

Besides: even if by some chance we *did* stumble upon a Theory of Everything tomorrow, we wouldn't necessarily know if we had, and it wouldn't stop people proposing competing theories that they claimed were in some way more self-consistent or elegant. We'd also be no closer to understanding a whole raft of complex emergent phenomena, such as consciousness or the origins of life.

Everything in our experience of the last three hundred years suggests that our current worldview will be replaced by something else, and that this process will continue. Of course, our current science might continue to be useful for certain applications, just as Newton's equations are still applicable to many situations. But we know they're not exactly right. It seems to me that any SF novel set in the reasonably distant future ought to reflect this inevitable stampede of intellectual progress, even if that means scaffolding the book with a

kind of make-believe pseudo-science. This might only require a single sentence in the entire book - after all, we don't spend out entire waking lives talking about GR and QM. Well, most of us don't. But in my view, if the writer wants to suggest a convincing futuristic ambience, some thought has to be given to this.

It's here that I find Trad Hard SF lacking - mostly - because it so often shirks this imaginative burden. It's not just in the science, either. Social institutions, organisations, politics and customs are bound to mutate in unexpected, unsettling ways. Much will stay the same, but much will alter. Any SF which doesn't reflect this welter of change never has a hope of feeling genuinely futuristic. For me, a successful SF novel has to feel like an immersive, 3-D experience. I may feel disorientated and a little perplexed, but I shouldn't feel like I'm reading a thinly-disguised version of the present, scaled up to interstellar proportions. So here's that paradox: the more "realistic" a futuristic SF story aspires to be, the less "realistic" it will seem. If you make something rigorously plausible all the way through, it will be plausible but it won't feel convincing.

In other words, I want some weird with my fries.

There's a problem here, of course. By and large its weirdness that puts people off SF. And I'm saying it needs to be *more weird* to work. That it needs, on some level, to feel implausible. If it doesn't, it's not being adventurous enough.

I think there's a bit more going on here than just tailoring SF to meet my exact reading tastes, although I would obviously approve of that. An adherence to rigorous Hard SF, I'd argue, is the enemy of longevity. Trad Hard SF withers and dies with appalling swiftness, and doesn't get re-read very much.

One of my favorite short story writers is Cordwainer Smith. Smith's work, in my view, represented a kind of controlled lunacy. It can't, in any reasonable sense, be called Hard SF. While Smith was churning out nuggets of beautiful madness like 'The Game of Rat and Dragon', or 'The Crime and the Glory of Commander Suzdal', his near-contemporaries in the hard SF arena were writing thrilling stories about bolting together space stations,

or landing slender, tail-finned rockets amid the craggy mountains of the Moon. The technical details were rigorously conceived given the knowledge of its time, but most of those stories are now little more than quaint period pieces. Smith's work, by contrast, remains thrillingly, intoxicatingly readable. Because it was so weird, because it was so detached from what might be called the orthodox fifties worldview, it's largely immune to technical obsolescence. In their very bizareness, his stories feel like authentic documents from some impossibly-distant era of cat people, planofforming and psychic projection.

Much the same could be said of Herbert's *Dune*, which, for all that it may have been somewhat tarnished by its sequels, still has a freshness - a compelling strangeness - lacking from many contemporary works. There isn't much in the way of the sober extrapolation of trends going on in *Dune*, and the science of space-warping and spice ingestion doesn't bear much resemblance to anything in our current knowledge-set. But one suspects that *Dune* doesn't feel any more or less futuristic than it did forty years ago, for all that the foreground narrative is barren of modern SF tropes such as nano-technology and computers. It's also still massively popular, and not just within the established SF readership. It's a book without an obvious shelf-life.

The same can't be said of all of Clarke's novels. *Earthlight*, *A Fall of Moondust*, *The Sands of Mars* - even later novels such as the aforementioned *Imperial Earth* - seem little discussed now, but these are precisely those which fit most neatly into the mould of Hard SF as an exercise in rigorous, extrapolative speculation: Trad Hard SF, in other words. By contrast, when Clarke allowed the science to bend a little, as in *Childhood's End*, *The City and the Stars*, even *Rendezvous with Rama* and *2001: A Space Odyssey* (all of which contain intrusions of human or alien "superscience") he produced works which, while dated in some aspects, are still read and admired now. The mystical side to Clarke's imagination, while perhaps in conflict with the Hard SF writer's instinctive desire to keep things as notionally "correct" as possible, bestowed on these books an imaginative dimension

which has enabled them to engage with generations of new readers. No one really cares about the “dusty moon” hypothesis upon which *A Fall of Moondust* is based, since we now know that it was incorrect. We also know that the real Mars isn’t at all like the Mars of *The Sands of Mars* even though that book was written with the best knowledge available at the time. Yet the themes of cosmic transcendence and loss of innocence running through *Childhood’s End* and *2001* still resonate with us now.

What I’d argue is that Clarke’s most enduring works weren’t actually Hard SF at all, but something softer, more yielding – something that places them closer to *Dune*, or even *Schismatrix*, than it does to – say – Hal Clement. Once or twice I’ve jokingly proposed the emergence of something called Ductile SF, to identify the fertile middle-ground where Hard and Soft SF interact. However, since I’ve already suggested that any kind of ring-fencing within the genre isn’t a particularly useful thing, I’ll let that one quietly die. (Total number of Google hits for “Ductile SF” as of June 2010: *one*, in an interview with me. I think the universe may be trying to tell me something there.)

Rather, I think, Gardner Dozois said it already when he spoke of Core

SF – and perhaps nowadays we don’t even need the qualifying “core”. This is just SF doing what it does best: taking inspiration from science, playing fair with it to a degree, but not being afraid to break the rules or assume that science will evolve, often into something unrecognisably different, if that’s what the story requires. As Soundgarden put it, it’s about going into the “superunknown.”

I don’t hate Hard SF, no. Occasionally, when someone like Greg Egan pulls out all the stops, I can still get a real jolt of sense of wonder from it – or at least a sense of bracing cosmic vertigo. Egan’s hardly a typical practitioner of the form, though.

Yet at its most inflexible, when it displays a stubborn refusal not to break the laws of physics, or deviate from the holy scripture of the contemporary textbook, Hard SF risks being a creative and commercial dead-end. It fails as immersive fiction, because it lacks the necessary intrusion of weirdness. And because it fails to escape the prison of the time it was written, it has little hope of longevity.

So perhaps the time really has come to put it out of its misery. I don’t think that would be at all a bad thing.



You must accept one of two basic premises: Either we are alone in the universe, or we are not alone in the universe. And either way, the implications are staggering.
– Wernher von Braun

NOTES: 'SPACE' IN SPACE OPERA

Dick 'Ditmar' Janssen and Bill Wright

*The following observations were culled from Dick 'Ditmar' Janssen's cover notes in Bill Wright's fanzine **Interstellar Ramjet Scoop**, December 2009, available at [eFanzines \(efanzines.com\)](http://efanzines.com)*

Contrary to what many older fans might have believed when they were young, early Space Opera by such greats as E.E. 'Doc' Smith, A.E. Van Vogt and Ed Hamilton is *not* science fiction. For science *must* conform to current well-established, validated theory, or at least, if supposedly belonging to future discoveries, must be at least plausible. So little real science is present in those early stories that they must be labelled 'fantasy adventure'. But they do possess one key, defining characteristic of SF; which is *a sense of wonder*. If one can shove disbelief well below the conscious level, then the early epics of space opera are pure, immersive, entertainments - set in what must be an alternate universe.

For example, in Ed Hamilton's 'Captain Future' stories, every planet, and almost every moon in the solar system is habitable and inhabited. Each possesses an atmosphere, breathable by humans. Temperatures may be high or low, but never ineluctably inimical to human life. Vast oceans of water, some in an unceasing turmoil, exist even on the outermost planets - Uranus's moon Oberon is one such storm-raddled location. Sentient alien life, some of high intelligence, abounds through the solar system.

Interplanetary space flight is a hazardous undertaking because of the incredibly vigorous space-currents in the luminiferous ether, which tend to converge to a curious volume in the solar system where ships are trapped, to float eternally adrift in *The Sargasso Sea of Space*. And so on.

These are errors which any of today's final-year high school students studying physics can identify (and so far as watery oceans on the outermost planets and moons

are concerned, could correct). But to object on those grounds would be nit-picking, because the stories are meant as *entertainment* and the plethora of non-scientific and bad-scientific errors are irrelevant to Hamilton's intentions.

Dick 'Ditmar' Janssen

Postscript:

Post-Sputnik fans are right to question

The science in tales by Edmond Hamilton.

Now that we've ventured past Earth's sheathe of air

We know a lot more about what is 'Out There'.

Bill Wright





MISSION: ATLANTIS

Ang Rosin

When Mum suggested we all travel to Florida this year to celebrate her 60th birthday my family's reaction was "Disney!", while mine was "NASA!". I've an interest in the history and politics of space travel more than a "good gosh golly wow look at the size of that rocket" wish to see hardware but the Space Shuttle is the first mission that took place in my personal time frame. I remember the initial manned launch (I was ten years old), the *Challenger* disaster and the launch of Hubble. Plus I knew that the programme was coming to an end soon and that this could be a vanishing opportunity.

In the year running up to the trip I worked on my family to try and drum up enthusiasm for a day out but reaction was mixed. By Christmas I had a few people agreeing it would be cool if we could see a shuttle launch

and then we looked at the schedule: we'd booked our holiday for just about the worst time if the intention of the holiday was to see a rocket in flight. Disappointed, I abandoned the idea of a family day out and my brother and I decided we'd definitely go there for the day just to see the facility, taking anyone else who seemed enthusiastic at the time with us.

Then Eyjafjallajökull erupted in Iceland and our much-anticipated, once-in-a-lifetime, family celebration was just another casualty of that damn volcano. The kids were crushed, Mum doubly so, but we rescheduled the holiday. It turned out to be at just the right time to see the last launch of the Space Shuttle *Atlantis*.

I checked that tickets were still available and we booked a day trip for the whole extended family, much to

▲
'The Rocket Garden at Night'. Samantha Decker, 2010.



The reconstructed Saturn V.

Mum's disgust as she was hoping she could stay at home with my eight year old niece who professed no interest in space at all.

The volcano smiled favourably on our rebooked trip and we found ourselves in a Kissimmee hotel car park at 5am on 14 May, waiting for our tour bus. Kennedy locks down on shuttle launch day and there are a lot of people to move around so you are

encouraged to arrive as early as possible. We got there at about 7.15am giving us two hours free before we had to queue up for our coach to the viewing site. We hopped on to a guided bus tour with the first stop the Apollo/Saturn V Center. Immediately herded into a darkened informative experience and already fairly jaded (we'd been on the Disney treadmill for a week by now) I expected the children to develop information fatigue. How wrong could I be? After a fascinating introduction to the history of the Apollo missions we passed into the second part of the display - a simulator. Not the traditional "this is what it's like to fly in space WHEEE!" type of simulator, oh no, this was a countdown in the Apollo firing room, complete with the effects of the rocket firing on the building. Incredible!

By now, completely over-simulated, we passed into the main body of the exhibit, centrepiece a reconstructed Saturn V. Good gosh golly WOW! Look at the size of that rocket. Stretching the length of the floor with the command module tiny in the distance the sheer scale of space operations suddenly became reality and my family would have won gold if we entered a synchronised jaw-drop competition. We wandered



Been there, done that, bought the t-shirt...

around gawping at the other notable artefacts of the missions.

By the time we'd finished marvelling at space suits, peering at moon dust and buying space tat for gifts it was 8.30 and with my wanting to go to the Rocket Garden and everyone else wanting to see the IMAX presentation we set off back to the main visitor complex. There we missed the IMAX presentation by about five minutes, had a look at a mocked-up Space Shuttle (which, frankly, is big but it's no Saturn V) and got into the bus queue. This stretched all the way back to the Rocket Garden, meaning that at least I got to see that. Two hours later we were at the causeway, the closest public viewing area to the launch site at just six miles away.

After queuing again, this time for a burger and a drink, we settled down for the wait. *Atlantis* was on pad 39A and a distant dot, albeit a fairly sizeable one. The wait was enlivened in my case by the public address system and I closely followed the countdown hold points (we got there after T-3 hours) meaning I was aware, but my family not, that a ball bearing had been found at T-9 and holding, would it be a mission critical problem? It turns out not and the countdown continued, after about twenty minutes of fascinating ball

bearing discussion.

Which brings to me to try and describe the launch itself. It's an overused phrase but I think the best way of putting it is "truly awesome". Even I was wondering how good something would have to be to justify a six hour wait to stand six miles away but not only did it live up to, it exceeded my expectations. With the firing of the boosters the inert dot swells and comes alive, surrounded by the steam from the combination of the rockets and the noise dampening system... As it lifts into the air there is streak of light and you forget that you are so far away that you can't hear anything, well, until thirty seconds later when the sound wave reaches you, the ground rumbles and you watch the ship arc into space with the huge grin on your face. My grin stayed in place even through the long, long queue to get back off the causeway after the launch.

The pro-trip adults named it the highlight of the holiday so far. My niece declared it an excellent day, my nephew loved it, and even Mum was impressed and was glad we'd done it.

This was the final launch for *Atlantis*, but there are two more scheduled launches, *Discovery* on 1 November 2010, and then *Endeavour* will be the last shuttle mission, scheduled for 26 February next year.

The final launch of Atlantis on STS-132, 14 May 2010.





WOMEN IN SPACE

THE PROGRAM THAT ALMOST STARTED TWENTY YEARS EARLIER

Anne Gray

In April of this year, four female astronauts had a rendezvous in space. Dorothy Metcalf-Lindenburger, Stephanie Wilson, and Naoko Yamazaki went up on the space shuttle *Discovery* to the International Space Station and met Tracy Caldwell Dyson, who had arrived on a Russian Soyuz capsule three days earlier. It was the most women who have ever been in space at the same time, but the media gave it almost no attention. Bill Gerstenmaier, NASA's associate administrator for space operations, said, "Maybe that's a credit to the system, right, that I don't think of it as male or female? I just think of it as a talented group of people going to do

their job in space."

NASA started admitting women to its astronaut program in 1978. Twenty years earlier, people were already asking how women would perform as astronauts, but the prevailing attitudes were very different at the time in the United States.

Not as much so in the Soviet Union, where the first woman astronaut, Valentina Tereshkova, flew into space in the *Vostok 6*, on 16 June 1963. But she was not a pilot, her performance was unfairly criticized, and the next Soviet woman to go into space was not until August 1982, when Svetlana Savitskaya participated

▲
'Space... The Final
Frontier in HDR'.
Peter Talke, 2010.

in the *Soyuz* program. Savitskaya was a pilot, and was also the first woman to take a space walk, in July of 1984. Her first flight was followed less than a year later by the first trip into space of the American astronaut Sally Ride, on 18 June 1983.

Ride was a member of the first group of female graduates of the NASA astronaut training program. The other five women who completed the training in that group were Shannon W. Lucid, Margaret Rhea Seddon, Kathryn D. Sullivan, Judith A. Resnik, and Anna Lee Fisher. Ride was the first into space, followed by Resnik, Sullivan (who was the first American woman to walk in space, in October of 1994), Fisher, Seddon, and then finally Lucid - all in space by June of 1985. In 1995, Eileen Collins was the first female shuttle pilot and shuttle commander, on STS-63. She was followed in 1997 by shuttle pilot Susan Still Kilrain and in 2007 when pilot Pamela Melroy became the second shuttle commander, on STS-120.

A total of fifty-four women have orbited in space, out of some 517 people who have gone out there, and the Soviet and American women named above were certainly pioneers. But there were other women who aspired to be astronauts, and were even tested and found capable, way back in 1962. They had a groundswell of public support, but the astronaut program only accepted Air Force test pilots, which women were not allowed to be, and NASA declared it had no requirement for female astronauts. That blocked resources to a testing program that could have put women in space almost twenty years before we finally did.

50 Years Ago

Dr. W. Randolph Lovelace II was chairman of NASA's Life Sciences committee in 1959 and had helped develop the fitness tests for the 'Mercury 7' - the seven men chosen to be astronauts in the *Mercury* space program. Curious as to how women would perform in the same tests, in 1960, Lovelace invited record-holding pilot Geraldyn "Jerrie" Cobb to undergo the same tests as the men. She accepted, and passed the first phase of tests, then helped make a list of prospective other women pilot candidates to also undergo testing.

At the time there was no plan at NASA for women to become astronauts, but Lovelace spoke as though the Women in Space program was a very real possibility, and the women who were approached or who heard about and volunteered for the tests mostly felt that their participation could help start such a program by demonstrating they were good candidates for the astronaut program. Nineteen more women were recruited and tested; eventually thirteen women including Cobb passed the same initial tests as the 'Mercury 7'. Over time they became known as the 'Mercury 13'.

It might be tempting to think that outstanding female pilots were few and far between in 1960, but the truth is far from it. A women pilots' organization call the Ninety-Nines had over 1,300 active members and seventy chapters across the country that year. The FAA reported ten thousand women involved in aviation in America at the time, 782 of which held commercial pilot's licenses. The All Women's Transcontinental Air Race (AWTAR) and other races, dubbed "Powder Puff Derby" races by the male media, attracted serious competition each year, with women competing either alone or in two-person teams.

Just over a thousand women had served the US in World War II as part of the Womens Air Service Pilots (WASP) civil service organization, which was directed by the famous pilot Jacqueline "Jackie" Cochran. Those pilots were instrumental in ferrying military aircraft during the war, though they did not receive military benefits when they returned home. All of them had their commercial pilot's licenses, however, and many found work in industry or as instructors after the war. They influenced and inspired younger female pilots such as Cobb.

Institutional Barriers to Testing Women for Space

Some of the testing of the male astronaut candidates took place at the Lovelace foundation in Albuquerque, New Mexico and some at the Wright Air Development Center's Aero-medical Laboratory at Wright-Patterson Air Force Base in Dayton, Ohio. Another member of the NASA Life Sciences committee, Brigadier

General Don Flickinger of the Air Force, was also interested in finding out how women would measure up to the men. After a failed petition in the late 1950s to get NASA to consider evaluating women as astronauts, he joined Dr. Lovelace in attempting an end-run around NASA. They felt that if they gathered data that supported women's performance as astronauts and *then* took it to NASA, their scientific position would be irrefutable. They recruited Cobb to be their first test subject.

"There is no question but that women will eventually participate in space flight therefore we must have data on them comparable to what we have obtained on men."

- Dr. Randy Lovelace, 1960

General Flickinger sought use of the testing facility at Wright-Patterson to give Cobb access to the spaceflight simulation evaluations and psychological exams he had designed for testing the 'Mercury 7' astronauts. He was hoping to set up a "girl astronaut program" starting with Cobb and a set of twelve other women pilots he and Cobb had compiled a list of, but that effort was unsuccessful. Unfortunately an earlier test run Flickinger had helped set up for fifty-eight year old pilot Ruth Nichols caused consternation in the Air Force (possibly due to media attention) and consequently left them unwilling to have more women use their test facilities.

Nichols held records in speed, altitude, and distance, and was one of the few women in the country to have flown a jet plane. In 1959 she sampled some of the Wright-Patterson astronaut tests, including weightlessness, isolation chamber and centrifuge tests. She handled the tests easily and urged Air Force personnel to use women as astronauts, an idea they apparently reacted to with horror. That set the stage for denial of Lovelace and Flickinger's request to use the same systems to test any women. Aeromedical leadership at Wright Patterson told Flickinger outright that they did not think a girl astronaut program should be pursued. Flickinger told Lovelace he gave the whole program over to him since the Air Force would not support it.

The Mercury 13 Pass Phase I Testing

Cobb reported for testing at the Lovelace Foundation in February of 1960. She took seventy-five different tests over the course of six days to measure her physical capability and endurance. Cobb's test results were revealed at an international space medicine symposium in Stockholm later that year; Cobb was found to have "successfully completed the tests given to the seven men in the United States men-in-space project," the *New York Times* reported. A note by Lovelace accompanying the test results announced that Cobb required less oxygen per minute than the average male astronaut, indicating female astronauts would require less oxygen *by weight* than male ones.

"We are already in a position to say that certain qualities of the female space pilot are preferable to those of her male colleagues."

-Dr. Randy Lovelace, 1960

After the Stockholm report, Cobb's testing was covered in a *Life* magazine exclusive arranged by Dr. Lovelace. A *Life* photographer had attended the testing to get photographs, so the article was a fully illustrated photographic layout. The media began referring to Jerrie Cobb, pictured here posing with a Mercury Space capsule, as the nation's first "lady astronaut."

Dr. Lovelace was good friends with Jackie Cochran, who found out about his plans to test more women at his Lovelace Foundation in Albuquerque after Cobb passed her tests. Cochran offered to fund transportation and housing for those women to come be tested, and made some suggestions of her own for further candidates. She went on to feature two of the candidates she suggested, the attractive twins Jan and Marion Dietrich, in a *Parade* magazine article that described the testing and labeled Jan and Marion "First Astronaut Twins." Cochran also described her own involvement with the program in the article and invited women pilots to write to her directly if they wished to be considered as candidates. The article suggested women probably would not be astronauts for at least six or seven years, but stated that participation in the tests "may" lead to a role as an

astronaut.

Ultimately, thirteen women passed the tests at the Lovelace Foundation. They were all impressive pilots, as you will see in the table at the end of this article. All of them aspired to be astronauts. Only one, Gene Nora Stumbough, expressed significant doubts that the women in space program would amount to something. Three of them gave up or lost their jobs in order to participate in the program.

The six women who participated in the initial testing but were not approved to continue were Virginia Holmes, Women's Aeronautical Association President Pat Jetton, Fran Bera, who had more Powder Puff Derby wins than any other woman, construction firm pilot Joan Merriam, who at twenty-four was the youngest woman in the country with an airline transport rating (ATR), Georgianna McConnell, and Betty Miller. Holmes believed she had been eliminated due to her claustrophobia. Jetton and Bera were both told they had a brain abnormality (neither were able to

Jerrie Cobb alongside a Mercury capsule



verify this with later neurological testing). Merriam and McConnell were simply told that they had not passed the tests. Miller had sinus problems and decline immediate surgery to correct the problem, which may have been the cause of her disqualification.

After the first phase of tests, Cobb arranged for the second phase, psychological testing, to be held at the Oklahoma City Veterans Hospital, in the lab of Dr. Jay Shurley. Jerrie Cobb, Rhea Hurrle, and Wally Funk were able to participate in these tests, which included time in one of the few true isolation chambers in the country, a sensory deprivation tank that suspended the subject in liquid, simulating weightlessness while eliminating sound and light from the environment. The women broke all previous records for tolerance of sensory deprivation and isolation, lasting upwards of ten hours in the isolation chamber with no ill effects. Previously six hours in the tank was thought to be the limit of human tolerance. In comparison, John Glenn lasted 3 hours in the Wright-Patterson isolation chamber, which was pitch-black but otherwise a normal room furnished with a desk and chair and writing supplies. The male astronaut candidates were never tested in a sensory deprivation chamber.

Other members of the Mercury 13 were invited to optionally take the Phase II tests, but most focused on arranging their schedules to make time for Phase III of testing, which was to include spaceflight simulation tests. Lovelace arranged for Phase III tests to take place at the US Naval School of Aviation Medicine, in Pensacola, Florida. Cobb again lead off the group, reporting for testing in May. Originally the rest of the testing was scheduled for July, but Jackie Cochran, who had not been previously involved in planning that phase, stepped in and requested that testing be put off until September so she could attend it and observe. Lovelace bowed to her request.

Unfortunately before the tests could proceed in the Fall, the Navy got wind that NASA might not support the women in space program (probably via a letter from Cochran, who around that time notified Lovelace she was too busy setting new flying records to attend, herself, anyway). Upon inquiry, NASA reported

that it had no requirement for women to be tested, and the Navy regretfully withdrew its offer to host the testing, which was canceled abruptly with only cursory notification to the Mercury 13 group by telegram. Jerry Cobb was ultimately the only member of the group who completed the Phase III tests, though Wally Funk pursued other opportunities for similar testing after the women in space testing program was canceled.

After the tests were canceled, Jane Hart and Jerry Cobb used Hart's Washington connections to arrange a meeting with Vice President Johnson. They argued that women were found able to withstand more heat, noise, and vibration than men, as well as more isolation. They weighed less, ate less, and used less oxygen than men per weight. How did it make sense to discontinue testing of women astronaut candidates? Hart had a draft letter she was hoping Johnson would send to NASA. Instead of signing it, after they left, he wrote "Lets Stop This Now!" across it and put it away.

Letters from the public followed, however, and in 1962 Congress held a hearing before a special Subcommittee of the House Committee on Science and Astronautics investigating the possibility of gender discrimination and the question of whether or not

NASA should permit women into the astronaut program. The hearings, scheduled for three days, were shortened to only two. The committee heard testimony *for* women astronauts from Jerrie Cobb and Jane Hart and testimony defending the existing admission requirements (military test pilot status and an engineering degree) from NASA's George Low and astronauts John Glenn and Scott Carpenter, who probably knew little about the context of the hearing. Glenn said a number of sexist things about how having men fly planes and spaceships was just the existing social order, but ultimately he said he had no objection to women astronauts, he just didn't see the requirement for it.

The hearing could possibly have gone either way, but unfortunately Jackie Cochran also testified eloquently against the idea that NASA's program was discriminatory. She spoke in favor of women astronauts, but only in a program that was run appropriately (*by her* was the implication), that tested and trained women for some period far in the future, and that did not take resources or attention away from the men's space program efforts. A young politician who was not well-liked in the committee took Hart and Cobb's

A gathering of some of the Mercury 13 group at the launch of Space Shuttle mission STS-63 (piloted by Eileen Collins) on 3 February 1995.

Left to right: Gene Nora Jessen, Wally Funk, Jerrie Cobb, Jerri Truhill, Sarah Ratley, Myrtle Cagle and Bernice Steadman.



side of the argument, which might have been the final nail in the coffin. One way or the other, the chair of the committee called an end to the hearings and declared the committee to have found NASA's policies acceptable. That decision would not be reversed until fifteen years later when the overall legal climate on sexual discrimination had changed. None of the Mercury 13 would be further tested, nor would they ever go into space.

There were a few gatherings of subsets of the Mercury 13 group, but the whole group never gathered together in one place and time. Eileen Collins invited all of the women to attend her space flight launches as her guest if they wished. Janey Hart, Irene Leverton, Wally Funk, Jerrie Cobb, Jerri Sloan Truhill, Sarah Gorelick Ratley, Rhea Hurrle Woltman and Bernice "B" Steadman gathered to watch the launch of STS-93, in which Collins became the first female space shuttle commander (Myrtle Cagle and Gene Nora Jessen, unable to attend due to ill health). Georgianna McConnell and Fran Bera, who had also taken the Lovelace tests but had not passed them, were also there to see Eileen Collins command STS-93 and make their mutual dream finally come true.

There is little doubt that the efforts of the Mercury 13 paved the way for later women astronauts. Especially influential was Jane Hart, who became a founding member of

the National Organization for Women (NOW), which continued to petition congress to eliminate discrimination against women in all hiring, including by NASA. Jerrie Cobb also continued to speak out against NASA's policies long past the disappointing congressional hearing.

The future of the US space program is uncertain at the moment, but I believe we can be confident that women have demonstrated their worthiness to serve in any space program. The first to prove that were the Mercury 13. They deserve to be remembered for that, as well as their general willingness to fight sexism and be outstanding pilots, showing generations to come how far and fast women can fly.

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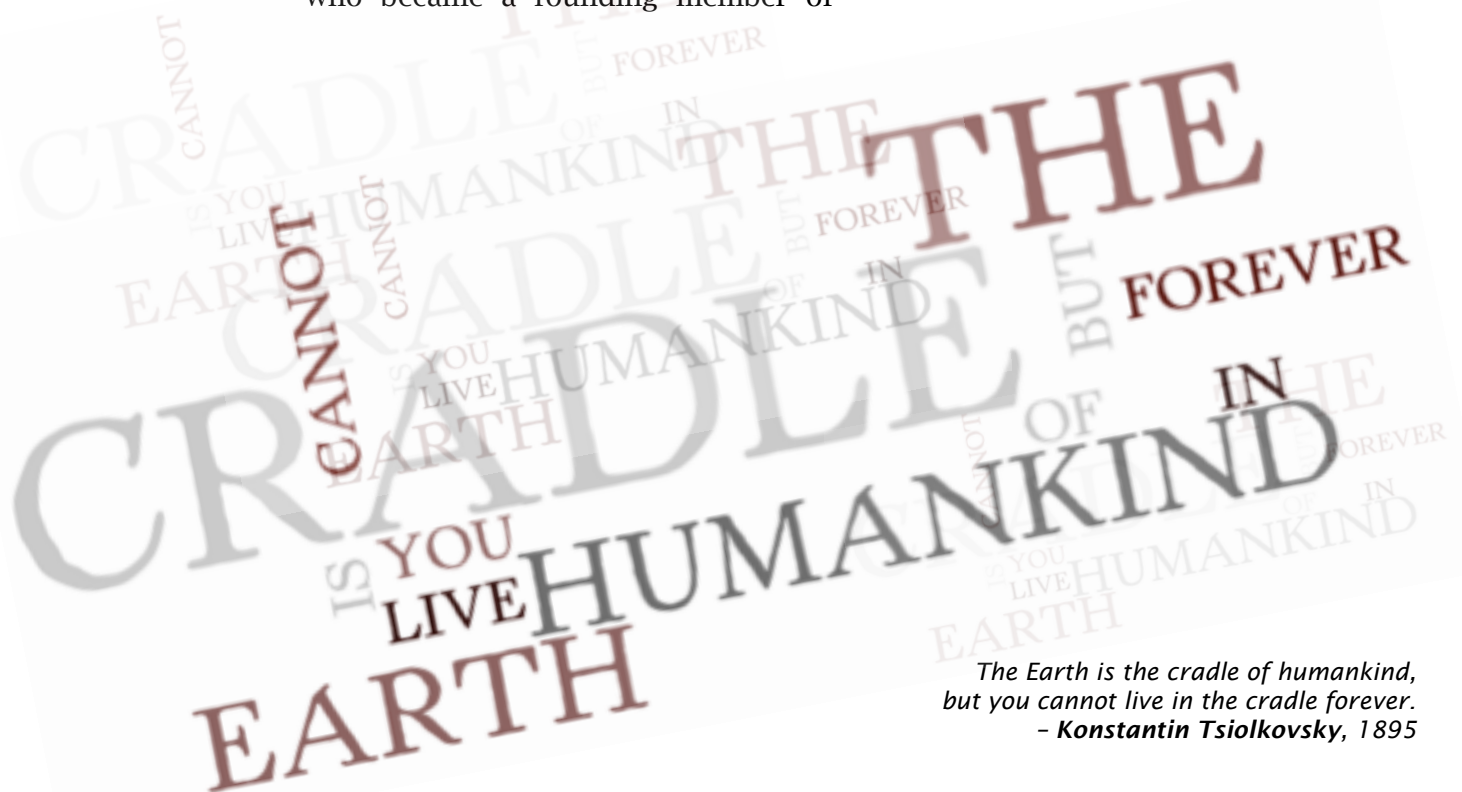
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The following two pages detail the careers and achievements of the Mercury 13.



Pilot	1961 Flight Hours	Ratings, Degrees and Records	Background and Awards
Myrtle “K” Cagle	4,300	Ratings: Multi-Engine, Airline Transport Rating (ATR)	Flight instructor from Georgia.
Jerrie Cobb	7,000	Ratings: Multi-Engine, Instrument, Flight Instructor, Ground Instructor and an Airline Transport Rating (ATR). Had flown a Delta Dagger TF-102A jet fighter plane. Records: (All in Aero Commander airplanes): <i>1959:</i> world record for nonstop long-distance flight; World light plane speed record <i>1960:</i> world altitude record for lightweight aircraft (37,010 feet).	Executive pilot from Oklahoma. First flew at 12. Earned her private and commercial pilot’s licenses at ages 17 and 18. Ferried military surplus aircraft to countries in South America, Europe and Asia. Awards: 4th American to receive the Gold Wings Award from the French Fédération Aéronautique Internationale. <i>1949:</i> Amelia Earhart Gold Medal of Achievement. <i>1957:</i> Amelia Earhart Memorial Award. <i>1958:</i> Named ‘Woman of the Year’ in Aviation. <i>1959:</i> Named ‘Pilot of the Year’ by the National Pilots Association.
Jan Dietrich	8,000	Ratings: Airline Transport Rating (ATR) Degree: University of California at Berkeley	Identical twin with Marion. Noted later that Dr. Secrest (one of the test administrators) indicated she was in the “upper 10% of the 65 astronaut applicants and test pilots who have gone through the astronaut testing programs.”
Marion Dietrich	1,500+	Ratings: seaplane, flight instructor Degree: University of California at Berkeley	Like Jan, had gotten her pilot’s license as a teenager. Served in the Civil Air Patrol and ferried planes, sometimes across the Atlantic. In 1961 she was a general reporter and feature writer for the <i>Oakland Tribune</i> .
Mary Wallace “Wally” Funk			At 22, the youngest to be tested. From Taos, New Mexico, and thus of interest to physicians since she had been raised at high altitude. Taught military personnel at Fort Still, Oklahoma.
Sarah Gorelick (Ratley)		Degree: Denver University, majoring in Mathematics with minors in Physics and Chemistry.	Engineer and racing pilot from Kansas City. The only pilot candidate with such a technical background, she hoped to do communications work and build on her experience as an engineering assistant at AT&T.

Pilot	1961 Flight Hours	Ratings, Degrees and Records	Background and Awards
Janey Briggs Hart		Ratings: Helicopter pilot's license	Wife of a US Senator from Michigan, and a mother of 8 children. Nineteen years of flying experience, including service as a Captain in the Civil Air Patrol.
Jean Hixson	4,000+	Ratings: high-altitude flying, explosive decompression experience low-pressure chamber indoctrination. Degree: Graduate degree in education, specializing in Science and Mathematics, University of Akron. In 1957 broke the sound barrier in a Starfire F-94 C jet plane.	Air Force Reserves officer from Akron. A former WASP, flew B-52s as a test pilot. Also ferried planes, helped develop automated pilot measurements for the T-31, and measured weather conditions from the air. When she broke the sound barrier she was a third grade teacher. She became known as the "supersonic schoolmarm", and developed an aviation curriculum.
Rhea Hurrie (Woltman)			Executive pilot with a small aircraft sales and engineering firm in Houston. Participated in air races and had an interest in seaplanes.
Gene Nora Stumbough (Jessen)			Aviation instructor from the University of Oklahoma. Later became a demonstration pilot for Beech Aircraft.
Irene Leverton	9,000	Ratings: Airline Transport Rating (ATR)	Forest service pilot from Chicago with experience fire-fighting from the air. Charter pilot and flight instructor at a Santa Monica fixed base operation at the time of testing; taking time for the tests may have cost her the Charter work and she later left that job and relocated to LA.
Jerri Sloan (Truhill)	1,200	Commercial Pilot's license, multiengine rating, air-race honors. Experience flying B-52s to test infrared surveillance equipment. Degree: University of Kansas, Aviation	Air-race competitor from Dallas who ran an aviation business called Air Services.
Bernice "B" Trimble Steadman	8,000	Ratings: Airline Transport Rating (ATR) Won all the major women's air races at least once.	Owner of Trimble Aviation, a flight operation in Michigan. Later served as president of the Ninety-Nines.



SPACEWAR!

VIDEO GAMING'S SPACE RACE

Christopher J. Garcia

Computers and space exploration have always been in a tight embrace. Many of the most important advances in the history of computing were for use by Aerospace. The integrated circuit was first put into use on missiles and in the Apollo Guidance Computer (the only device that's been both on the moon and in my car). At least half a dozen programming languages were invented to deal with the needs of determining orbits and to handle design problems. As the computational needs of NASA increased, the computer companies kept providing faster and more powerful computers... which were then copied by the Soviets for attempted use by their space agency.

It is also interesting to consider

the fact that science fiction came into greater prominence in the 1950s, especially in the area of film. Yes, I know there was SF dating back to the early 1900s (I love Méliès!), but for the most part, young people in the '50s were seeing large amounts of SF film for the first time. It wasn't unusual to have twenty or more different SF films showing in different parts of the country at the same time. There were thousands of B-movies made in the '50s, and a couple of dozen mainline films as well. It was also at that time when the second generation of computer designers were coming of age; the first generation had largely been engineers who had come to computing either during or right after the War. These guys were typically not

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'Video Game Night, Invasion from Space #2'. Patrick Brosset, 2009.

young, many of them being on their second careers. The folks who started in computers in the late '50s and early '60s tended to be younger, people who had missed the War but had grown up in the early days of TV, researchers like Ivan Sutherland, Fred Brooks, Marvin Minsky, Don Knuth were young guys coming up and out into computing's wheelhouse in the late '50s and early '60s.

It should be no surprise that the first real video game came out of MIT, nor that the game was based on a space battle. It might shock you that it was based on the novels of E.E. 'Doc' Smith and the Toho films from Japan.

Steve Russell designed one of the first games: SpaceWar!, on the PDP-1 mini-computer. It's not easy to call it a mini-computer because it was still the size of three refrigerators. I've moved them a few times and there's nothing mini about them. It had a large round screen which made it attractive for designers to create exciting programs. The game, based on one of 'Doc' Smith's space fights, featured a wedge and a needle flying through a star-filled background. The stars were also accurate from different points in space (a program called Expensive Planetarium provided that function) and the laws of physics could be altered to make the game more challenging or faster.

Russell never copyrighted the game (it's doubtful that he could have at that point), and Digital Equipment Corporation sent the paper-tape out everywhere, leading to dozens of labs having it on all the time (when there was nothing important being run). This led to so many guys playing it.

It also helped that all of the guys at the various labs and universities were sci-fi geeks. It's weird to listen to the Oral Histories our museum collects and to hear almost all of them talk about SF and *Star Trek* and how the stuff they did was so cool. Ivan Sutherland specifically mentioned Heinlein, which made me sad, but it was a different time. Even Linus Torvalds, the man behind Linux, said that he'd always been a big SF reader. He liked Asimov. That was slightly better.

In the earliest 1970s, Nolan Bushnell designed Computerspace, an arcade game before Pong which was basically a version of SpaceWar! built with a space-age cabinet. Nolan, a legend, was super-cool, always had

been. To this day he's the coolest guy in the history of video games. Okay, Jordan Rechner of Price of Persia and Will Wright of The Sims fame might come close. Nolan has always been a star, and he rightly thought that if video games were going to penetrate the arcade, they were going to need space games. The controls of Computerspace weren't easy to work so it never was a big seller, but you can see it in the movie *A Clockwork Orange*.

Another guy, at almost the exact same time, designed a game called Galaxy Game. His name was Bill Pitts, and along with his friend Hugh Tuck, they designed a simple version of SpaceWar! that played on a PDP-11 that was then put into a huge container. I may be the world's greatest expert on the game's inner workings. Not the technical inner workings but the physical nuts-and-bolts, since I helped Mr. Pitts put it back together to get it up and running. It's good, a lot of fun, plays much faster than SpaceWar!, which is also up-and-running at the Computer History Museum on the original PDP-1.

The most important early computer game and the first two arcade games were all space-related. The early history of arcade games is also full of space: Space Invaders was perhaps the most important. It featured attacking aliens and a series of shields that one could shoot through if you felt so inclined. Asteroids was hugely significant in the design of easily controlled games without overly simplistic storylines. Galaga was another, and pretty much every time a new game came around that pushed the technology it was somehow space-related. Movie tie-in games, like Dark Forces from the *Star Wars* universe, and console games like StarFox or Space Harrier, all pushed the technological limits.

It never stopped. The first PC games featured plenty of space as it's always been good for graphics. Games like Space Eggs were very popular. The text-based games from companies like Infocom were often SF-themed. Two of the three biggest sellers, Hitchhiker's Guide to the Galaxy and Planetfall, were space-based. In fact, H2G2 was probably the most important of the text-based games.

It appears that when it comes to video games, space is always a good thing!





MY LIFE AS A SPACE ALIEN

Claire Brialey

The Hitchhiker's Guide to the Galaxy is a wholly remarkable book. It has been compiled and recompiled many times over many years and under many different editorships. It contains contributions from countless numbers of travellers and researchers.

The introduction begins like this: 'Space,' it says, 'is big. Really big. You just won't believe how vastly hugely mindbogglingly big it is. I mean, you may think it's a long way down the road to the chemist, but that's just peanuts to space. Listen...' and so on.

After a while the style settles down a bit and it begins to tell you things you really need to know...

— Douglas Adams, *The Hitchhiker's Guide to the Galaxy*, 1979

▲
'St. Huberts Star Trail 2.0'. Adam Currie, 2009.

I've written too much before in fanzines about space to be able to start from the beginning again. When James suggested space as a theme, I was immediately enthused, but it's an

emotional reaction rather than an intellectual one. For science fiction, space now serves more to free our imaginations than to create the conditions for a story in itself. There have been great stories of space travel and space exploration - including some recent ones, like Jed Mercurio's *Ascent* and some of my favourite Stephen Baxter novels, which successfully work with the stuff of what went before them in literature as well as in history - and there have been fabulous fictional cities and space stations and other settlements on other worlds. But science fiction for me now works best when it looks at people and societies, using the potential of the future to make me think more about the present.

Even in that context, though, being able to envisage new worlds orbiting other planets provides blank

canvas for a story – and I don't mean that in the sense of virgin territory ripe for 'discovery' and colonisation. There are, of course, many works of science fiction that tell some element of that story; personally I much prefer the ones which do not present the invaders (American, British or their extrapolated future analogues) as the unquestioned and victorious good guys. But if you can start without the history, geography, culture or even science that the reader considers familiar about Earth, a reader can experience from the outset the frisson of dislocation and possibilities that such unfettering provides.

And that's also one of the few aspects of space travel that would ever appeal to me: the opportunity to stand under a different sky at night and see different stars and know fundamentally that I was really somewhere else in the universe.

This is the planet Earth, the planet where we live. It is ... one among millions of others in the universe. And it's interesting to turn away from the Earth and imagine that we have a big telescope which will allow us to look at other stars: stars like ours, but far stranger than ours. And perhaps on one such star somebody is also sitting comfortably with a telescope and is scanning the sky, hoping to catch a glimpse of old friends.

— **Oliver Postgate**, *Clangers*: 'Visiting Friends', 1969

I often look at the sky. I like to gaze at clouds, watching them move and cross and hint at layers of the atmosphere. I like to spot the moon, especially during daylight, because it reminds me that I'm also standing on a lump of rock in space and because the thrill has not yet worn off that human beings have walked on that one too. I like to see a night sky full of stars, for all that many of them are planes or satellites or random bits of space junk – which is a marvel in itself, really – although I don't generally know what I'm looking at; and I'm a city dweller, so the whole sodium glare thing means that the second-best view of space I ever had was during a late-night power cut.

The best one, though, was in the central Australian desert. I hadn't been entirely convinced that a night-time excursion into the middle of nowhere was a productive use of time,

particularly not when we would be getting up before dawn the next day to go to watch Uluru change colour, but I was only planning to go to the Red Centre once so thought I might as well wring out of it all the experiences the time allowed. What follows here is adapted from our Australian trip report over ten years ago (*Banana Wings* #15); I still wish I could remember the name of the astronomer who acted as our tour guide, because he deserves the credit for all my sensawunda:

Our astronomer pointed out several constellations which can't be seen from the northern hemisphere, including Scorpio which, to my considerable surprise, actually looked plausibly like the outline of a scorpion. He also pointed out the North Star ('under the ground over there') and explained how to find the South Pole since it doesn't have an equivalent star. (It's easy when you can see the Southern Cross; when you can't, it calls either for various exercises in advanced trigonometry, or alternatively to just look straight up from that tree.) The astronomer was so genuinely enthusiastic about his job that it was hard not to be swept up in it; when he got excited about the stars and the planets that he could see through the telescopes, which after all he was expecting to be there, we knew we were about to see something pretty good. But even the astronomer couldn't be as enthusiastic as the three girls from Melbourne who ran out of superlatives before we even got near the telescopes. 'Wow!' they chorused every time he told us what we were about to see. 'That is *so COOOOOL!*' they repeated every time they actually saw it. And, gifts to satire that they were, the real problem with all this was not concealing my reaction to the comic effect but that they left me with nothing to say. Because it was.

All I know about Alpha Centauri I learned from Douglas Adams and Robert Sawyer. Until now. Because now I have looked through a telescope at the southern sky and realised that the reason Alpha Centauri always looks slightly blurry is not because it is twinkling, as we all know that little stars do, and not even because my contact lenses are fuzzing slightly, but because – just like they said – it's a binary star system. A binary star

system with – and I do realise this is tautological but I feel I need to emphasise the impact of actually seeing this – two stars. Two stars you can see so distinctly that when you look away from the telescope and gaze upwards to prove to yourself that it's all really there, you can just about make them both out through the familiar blurriness. Two stars. Alpha Centauri. I mean... *two stars!* Wow. That is so *cool*.

And it keeps happening. You look at a long grey smudge through a telescope and suddenly all the stars come out in the rest of the Milky Way. You look at an apparently blank area of sky and thousands of tiny, tiny stars are arrayed in front of you in fractal patterns, so far away that they might not even be there any more. It's mind-bending. It's awe-inspiring. And it's quite beautiful.

But we're islanders, British and Australians alike, and even faced with a parade of stars it's hard not to be appropriately insular and stay fixated on the solar system. Seeing is believing and all that, so I now believe that Mars is red – well, kind of orange – and that Saturn has rings, and that Jupiter has stripes and when I can focus away from all this stuff in front of it on the lens... oh. And that Jupiter has *moons*. And our own primary moon has all these craters, which I could see so clearly that I expected Clangers to pop out at any moment, and it glows and – I realise that if you haven't had the experience of looking at the sky through a telescope with virtually no artificial light to stop you, you may find it hard to come to terms with this particular revelation – it's in *space!* No, it is. I mean, you can see the *edge* and the sky just curves away from it and there's these craters like I said and it's white and it's just *up there*, look.

And yet, while the astronomer was setting up the telescopes and falling in love with the night sky all over again, and while I was waiting my turn to see the next marvel, my eye kept being drawn back to Mars and its illusory twin Antares. Mars is our nearest neighbour, where old science fiction tells us the threat comes from and new science fiction tells us our salvation may rest. And it was there, in the night sky, visibly red even without the telescope once I knew where I could find it – and then I

glanced down, in the light of the torch, and saw the red sand, and Mars was there too. The impression of standing on a Martian landscape was reinforced so strongly that I kept expecting, each time I stepped towards the telescope, to find the Earth waiting for me in the sky. And my head would spin from the wonder of it all and my eyes would swim from the effort of focusing through both my glasses and a telescope – at least I think that was why – and I would step back to find Mars still above me after all. Standing in the desert in the dark, the clarity of reality was suddenly sharper than the cold.

This is space. It's sometimes called the final frontier. (Except that of course you can't have a final frontier, because there'd be nothing for it to be a frontier to, but as frontiers go, it's pretty penultimate.
— Terry Pratchett, *Moving Pictures*, 1990

I was a science fiction fan before I got into space. Perhaps because of its military roots, or perhaps because it was all over by the time I was really paying attention, I was a late convert to the wonders of the space race, to the extent that it was only once I was sitting in a cinema with fellow SF fans in the mid-'90s to watch the new movie *Apollo 13* that I realised I didn't actually know what happened. As I wrote at the time, for all my friends it was both fictionalised history and some sort of childhood nostalgia; but for me it was all fiction and everyone else had been given an unfair advantage by being allowed to read the script first. I couldn't bear the suspense; every few minutes I had to lean across to Noel, who was sitting next to me, and make quiet enquiries about what was really going on:

Me: Was that it?

Noel: Was what what?

Me: The disaster. Was that it?

Noel: No, of course not. That was take-off.

[Pause]

Me: Was that it then? Was that meant to happen?

Noel: Of course that was meant to happen.

Me: But a bit just fell off!

Noel: (Sigh) Of course it fell off. You see, they had these rockets ... (Long whispered explanation)

[Pause]

Me: Noel ...

Noel: (Sigh) What now?

Me: Why did they need to do that? Was that meant to happen?

Noel: (Extremely deep sigh) Yes, look, that's the command module and... (Even longer explanation)

I still think it wasn't my fault. I hadn't had the benefit of seeing all of this before. I didn't know what went wrong with Apollo 13 or when or how the accident actually occurred; I didn't even know whether the astronauts survived. Not having sat through endless rocket launches in my youth and at that stage not been bitten by the space programme nostalgia bug – although *Apollo 13* bears some of the responsibility for my eventual late development – I really didn't know how many stages of rocket were meant to fall off before the spacecraft actually settled down to the comparatively routine flying-through-space bit. I also didn't realise that the only way to get the command module and the lunar module the right way round for the lunar module landing was to disengage from the launch position in space, turn the command module round and reconnect. ('Just like a man,' I muttered darkly in the equal darkness of the cinema. 'They get a new vehicle, they have to prove they can bloody reverse it and park.')'

The space shuttle excited me a bit more, because it was new and suggested that space could be part of my future as well as the past; but for much of my childhood I couldn't see the original point of the space race nor why everyone still kept going on about it now. Indeed, it would take another decade beyond the first shuttle flight before I really began to see what we'd got out of the space programme, because that was how long it took to launch and properly focus the Hubble Space Telescope.

Fangirl though I am, it's one of the things that I still feel Douglas Adams got wrong. His Total Perspective Vortex works on the basis of showing you exactly how insignificant you are in the universe ('When you are put into the Vortex you are given just one momentary glimpse of the entire unimaginable infinity of creation, and

somewhere in it a tiny little mark, a microscopic dot on a microscopic dot, which says, "You are here".') But Hubble works for me partly because it operates on such a grand scale. It looks not just across the galaxy but into the heart of other galaxies; through Hubble images I have seen vast star systems whose light started travelling towards us before human history, themselves containing thousands of stars and yet being only one fraction of the vastness of the cosmos. The distances make my brain want to leak out of my ears, but it's only my lack of brain power rather than anything about the scale which makes me feel insignificant. I have seen many momentary glimpses of the unimaginable infinity of creation, and I think it's the most wonderful thing the space programme could possibly have given us. I am a microscopic dot on a microscopic dot, many times over, and the perspective doesn't bother me at all.

A V2 killed my grandfather, you insensitive clod

Having quoted myself, as well as Douglas Adams, several times already in this article, I won't rehearse again how I came to stop worrying (because I suspect this will never actually happen) and learn to love at least that part of the space programme I'd already missed; nor how emotionally attached I've always felt to those stubby little Space Shuttles that followed it and now are about to follow Mercury, Gemini and Apollo into history. If anyone has managed to miss me maundering on about such subjects before, I will pause only to exhort you to watch the Australian film *The Dish* and the US documentary *In the Shadow of the Moon*, and indeed to read the articles in this issue by fellow fans who've been lucky enough to see a shuttle launch.

But it's what makes me wish that someone, somewhere, is enough of a rich geek to make possible some variant of the scenario Stephen Baxter proposes in *Titan*, where all the museum pieces and relics left in storage are brought together when the planet most needs them for one last hurrah of the Saturn V.

It's what I realised had impressed itself on my brain so much as visual imagery that when I stared in disbelief at footage on the news of the World

Trade Center towers collapsing in 2001 I had, and still have, no better way to describe it other than as watching a rocket launch in reverse. (And only later realised that Jon Courtenay Grimwood had already imagined just that image in *Lucifer's Dragon*, published in 1998.)

It's what made *Challenger* so shocking to me in 1986 - remembering also that the shuttle was my first contemporary spaceship. We knew how rocket launches went (even if I didn't then know what happened afterwards) and they involved the rocket rising inexorably from the pad followed by a sound that indicated it was ripping apart the sky, by which time the rocket itself was already almost beyond sight but clearly turning to escape the atmosphere before soaring onwards to explore space - and absolutely didn't involve a new cloud of smoke and the rocket ripping apart itself.

You can say whatever you like about phallic symbolism, but that isn't why - despite the way my heart lifts with the rocket, every time, and then sticks in my throat until I know it's passed the *Challenger* point - I'd want to inject a note of caution into the triumph and glory with which we imbue the technology. Triumph and glory, after all, is just another way to say shock and awe; it all depends which side of the narrative you're on.

My father has a map of the area where he grew up, or at least the area where much of his family lived while he was growing up, since the area was Bethnal Green in the East End of London during the second world war and he himself spent some part of the time evacuated to a farm in Cheshire. The map was completed with the help of his older sisters and some of their aunts and uncles, and it shows a lot of addresses that aren't there any more: a succession of buildings in which members of a large extended family lived and put one another up before they in turn were destroyed or made uninhabitable by bombs falling nearby. And sometimes when bombs fell members of the family died.

On 15 November 1944, like so many other nights in so many cities in too many countries during that war, bombs fell again on Bethnal Green. At least one of them fell on 78 Treadway Street, and as was often the case people were killed. One of them was a

fire warden, off-duty and at home, having swapped shifts as a favour to a colleague. He was forty-six, he had a wife and five children who were all away in the country, and he was called William Henry Brialey. I'm the last of his descendents to bear his surname, and that's just one of the reasons I feel it's important to remember and commemorate him.

Without the V2s, neither the USA nor the Soviet Union might have had the space programme we remember. But just as those space rockets that take my breath away were developed from active weapons which achieved that effect far more literally hundreds of times over, the space race was hardly free of military drivers. And that's the way it's always been: the wonders of most ages have been expressions of someone's power and influence, for all that some enthusiasts may have invested their own efforts because they believed they were contributing to an end rather than a means. Many of the currently realistic arguments for any country - or any private enterprise - to invest in space vehicles again are equally about military or political advantage. Much of the rationale for any future space exploration will be economic or an even more fundamental grasping for survival. If we go back into space we won't go just because it's there, or because we can; and we're probably not really in any position to indulge ourselves with the joy of discovery and increasing the sum of human knowledge.

It would be an even greater endeavour to change human nature and if I really wanted to try I'd have picked some other medium than fanzine articles. But I wish more people would spend just a bit more time looking up, and out, into the sky and on into space; and thereby could recover some greater sense of perspective.

Gazing at the stars is a pleasure available to everyone, even if you are 'in populous city pent', as Coleridge had it. Despite the best attempts of scientists to explain the universe, gazing at stars will still fill us with wonder and sweet delicious confusion.

— Tom Hodgkinson, *The Book of Idle Pleasures*, 2008

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