

# Vector

1  
8  
8

THE CRITICAL JOURNAL OF THE BSFA

£2.25

August 1996



**Bob Shaw**  
**1931-1996**

also, Books of the Year – 1995 & The Science of *The Time Machine*

## Contents

### 3 Bob Shaw 1931-1996

BoSh remembered and appreciated by  
**Dave Langford, Andy Sawyer,  
Brian Stableford, and James White**

### 8 Books of the Year - 1995

Vector Reviewers pick their favourites,  
edited by **Paul Kincaid**

### 12 Cognitive Mapping 3: Aliens by Paul Kincaid

### 14 Wild Extravagant Theories The Science of *The Time Machine*, by Stephen Baxter

Cover Art by Sue Mason from the cover of *A Load of Old Bob* and courtesy of Becon Publications and the artist. The booklet *A Load of Old Bob* is a collection of some of Bob Shaw's 'Serious Scientific Talks' from 1974 to 1988 and was produced by Becon Publications for Confabulation, the 1995 British National SF Convention. The booklet is still available from Becon Publications at 75 Roslyn Avenue, Harold Wood, Essex RM3 0RG and is priced £5.50. All profits from the sale are donated to the RNIB Talking Book fund.

## VECTOR

Published by the BSFA © 1996. All opinions are those of the individual contributors and should not necessarily be taken as the views of the editor or the BSFA.

### EDITOR

**Tony Cullen** 16 Weaver's Way, Camden,  
London NW1 0XE Email: gumnitch@iysa.vnet.co.uk

### FEATURES EDITORS

**Andrew Butler** - Flat 3, 28 Louis Street, Hull, HU3 1LY

Email: A.M.Butler@english.hull.ac.uk

**Gary Dalkin** - 5 Lydford Road, Bournemouth, Dorset,  
BH11 8SN

### HARDBACK REVIEWS EDITOR

**Paul Kincaid** 60 Bournemouth Road, Folkestone,  
Kent CT19 5AZ Email: nks\_pk@ix.computlink.co.uk

### PAPERBACK REVIEWS EDITOR

**Tanya Brown** E73 DuCane Court, Balham High Road,  
London, SW17 7JL Email: amaranth@iysa.vnet.co.uk

### PRINTED BY:

PDC Copyprint, 11 Jeffries Passage Guildford, Surrey GU1 4AP

## EDITORIAL

### INVECTIVE

Before the modern era of semi-mainstream acceptance, which is to say before *Star Wars*, things were simple. Bookshops were stocked with, in random order, Asimov, Ellison, Heinlein, Clarke, Watson, Cowper, Priest, Roberts, Coney, Holdstock, Moorcock, Simak, Wyndham, Farmer, Shekley, Bester, Anderson [Poul], Bradbury, Ballard, Delany, LeGuin, Wells, Blish, Dick, Zelazny. The only fantasy not in the Children's section was *The Lord of the Rings* and a few titles in the Ballantine Adult Fantasy series. [not what it means today.]

Post-*Star Wars* everything changed. *Star Trek* returned. *Dungeons and Dragons* spawned an industry, created a new hobby and, eventually, a publishing category. Media novelisations went nova, and an entire genre, High Fantasy, was born from the continuing enthusiasm for one book: the aforementioned *Lord of the Rings*.

Today many of the above writers have vanished from the shops. Some as part of the process of the old making way for the new, but others because of the demand for shelf space created by the new forms of publishing - the book of the calendar of the T-shirt of the recipe book of the CD-ROM of the RPG of the video of the Theatrical Motion Picture of the TV show of the comic book, etc.

Now at the risk of being lynched, I will reveal a personal prejudice. I detest high fantasy as a genre, while accepting the exceptions which prove the rule. I also loathe novelisations and spinoffery in all its multivarious forms. This may be a sign of my age, but to me these things have as little to do with SF as the telephone directory has to do with Shakespeare. However, judging by the stock of any bookshop, I am clearly of a minority opinion. Therefore, as a reactionary bigot trying to do my task impartially I would like to know what you, the reader, would like to see in *Vector*.

Which authors mean something to you? Perhaps more importantly, should we be elitist and concentrate only on 'proper' written SF, or should there be equal room for High Fantasy, non-generic fantasy, horror fiction, 'slipstream', surrealism, spin-off novels, media related pieces, RPGs, computer games, filk, comics and graphic novels, anime, Hollywood movies... or are these things not relevant, or already covered sufficiently in other, glossy, magazines?

And if you would like to write about any of the above for *Vector*, please write and tell us. We can't promise to print unsolicited articles, but if you have something interesting to say we will try to find the space for you to say it, regardless of profoundly ingrained, pathologically illogical editorial prejudices...

So send your abuse to the address below.

**by Gary Dalkin**

5 Lydford Road, Bournemouth, Dorset BH11 8SN

## The British Science Fiction Association Ltd.

Limited by guarantee. Company No. 921500.

Registered Address: 60 Bournemouth Road, Folkestone, Kent. CT19 5AZ

### BSFA Membership

UK Residents: £18 or £9 (for unwaged) per year. Please enquire for overseas rates

### RENEWALS AND NEW MEMBERS - PAUL BILLINGER, 82 KELVIN

ROAD, NEW CUBBINGTON, LEAMINGTON SPA CV32 7TQ

USA Enquiries - Cy Chauvin, 14248 Wilfred Street, Detroit, MI 48213 USA

### BSFA Officials

**Administrator** - Maureen Kincaid Speller, 60 Bournemouth Road, Folkestone, Kent CT19 5AZ Email: mks\_pk@ix.computlink.co.uk

**Treasurer** - Elizabeth Billinger 82 Kelvin Road, New Cubbington, Leamington Spa CV32 7TQ

**Publications Manager** - Steve Jeffery, 44 White Way, Kidlington, Oxon, OX5 2XA

**Orbiters** - Carol Ann Green, 5 Raglan Avenue, Hull, HU5 2JB

**Awards** - Kev McVeigh, 37 Firs Road, Milnthorpe, Cumbria, LA7 7QF

**Publicity/Promotions** - Claire Briarley, 26 Northampton Road, Croydon, Surrey, CR0 7HA & Mark Plummer, 14 Northway Road, Croydon, Surrey CR0 6JE

**London Meeting Coordinator** - Paul Hood, 27 Strawberry Lane, Tiptree, Essex CO5 0KX

**Foreign Liaison** - Bridget Wilkinson, 17 Mimosa, 29 Avenue Road, London N15

### Other BSFA Publications

**Focus** Carol Ann Green, 5 Raglan Avenue, Hull, HU5 2JB

Julie Verner, 42 Walgrave Street, Newland Avenue, Hull, HU5 2LT

**Matrix** Chris Terran, 9 Beechwood Court, Back Beechwood Grove, Leeds, West Yorkshire LS4 2HS

# Bob Shaw 1931-1996

## Wreath of Stars

by Dave Langford

It's still hard to believe and harder to write: Bob Shaw died on 12 February 1996. The shockwaves of dismay that raced around the sf world (bad news travels too fast by Internet) signalled the hugeness of the loss. Bob was such a pillar of our universe, as a lifelong sf fan, admired writer, popular speaker, unflappably genial conversation-alist and all-round good guy, that somehow we never thought he could leave the fannish party. Indeed, unless Barry Malzberg is still chafing a bit at Bob's negative review of *Beyond Apollo* in 1975, it's impossible to imagine anyone in fandom not liking him.

Bob was born in Northern Ireland in 1931; by the end of the decade he'd fallen in love with sf as, he said, an escape from the dullness of suburban Belfast. In 1950 he discovered fandom and fanzines, and was soon famous in these inner circles – the Wheels of IF or Irish Fandom – as 'BoSh'. As every fanzine fan knows, he and Walt Willis wrote *The Enchanted Duplicator* (1954), which is the *Pilgrim's Progress* of fandom; its Profan, the kindly pro author who also remains a fan, was modelled on Eric Frank Russell but might just as well have been Bob himself at any time after about 1970.

His own 1950s fanzine column (a staple of *Hyphen* from its first issue) was called 'The Glass Bushel' because, belying his genuine modesty, Bob claimed this was the only kind of bushel he was prepared to hide his light under. These are still good funny columns, all the funnier because they're not afraid to be serious... it was Bob who advised aspiring fanwriters that if they wished to raise a laugh they should write in merciless detail about the most horrible, ghastly experience of their lives, whereupon fandom would fall about in appreciative hysterics.

Also in the 50s, Bob made some early fiction sales to sf magazines – and maturely decided that these early pieces weren't good enough, that he needed more real-life experience. Off he went to work in Canada and see the world. So the true beginning of Bob's professional career was the strong 1965 story '...And Isles Where Good Men Lie' in *New Worlds*, followed the next year by 'Light of Other Days' in *Analog* – rather astonishingly shortlisted for both Hugo and Nebula despite being only the third published story by the new Bob Shaw. 1967 saw his first novel *Night Walk*, a fast-moving sf thriller powered by a personal phobia which plenty of us share: the fear of losing one's sight and ability to read. The hero is blinded and

discovers an eerie way to see through others' eyes by electronically reading the activity of their optic nerves...

I conducted a fanzine interview with Bob in the mid-70s, and questioned him rather ineptly about the special emotional charge attaching to eyes and vision in his work. It wasn't just that he once suffered a sight-threatening eye disease (which occasionally flared up again; he would appear in some hotel bar wearing dark glasses and observe, puzzling fans until the penny dropped, "I take a dim view of this convention."). The nasty incident in his novel *Ground Zero Man* alias *The Peace Machine*, where a chap's eye is taken out by a steel reinforcing bar and he cradles it pathetically in his hand, actually happened to a boyhood friend and stuck in Bob's imagination all his life. The migraine-induced visual disturbances which I'd found so fascinating in *The Two-Timers* were part of routine existence for Bob, who went through this subjective light-show

(*hemisrania sine dolore*) about twice a year. I've never been so grateful to Bob and sf in general as when in the late 80s I started getting it myself, and was saved from abject panic by realizing this was the *harmless* phenomenon about which he'd been writing.

Further fine books followed, and the *SF Encyclopaedia* will give you all the facts; the inventor of 'slow glass' and author of (to pick some more favourites) *The Palace of Eternity*, *Vertigo* and *A Wreath of Stars* would be a notable sf figure even if he'd been a recluse living in

a cave. But Bob still moved happily between sf's professional and fan circles, in a way that denied that they are really different circles or that one outranks the other. I unknowingly saw the birth of a legend at my own first Eastercon, Tynescon in 1974, where Bob was guest of honour and spoke hilariously on 'The Need for Bad Science Fiction'. This led to his famed 'Serious Scientific Talks' at convention after convention. Newcomers would be bewildered as the bars emptied and the entire membership crowded to hear a presentation called, say, 'The Bermondsey Triangle Mystery', replete with demented science and excruciating puns delivered in that mournful Irish voice... which conveyed mild surprise that these peculiar listeners should be laughing so hard that it hurt. The speeches have since been published in various editions, but you have to imagine the voice.

With slightly poisoned irony, it was these transcribed talks and other fanzine writing that brought Bob the acclaim deserved for his fiction: the 1979 and 1980 Hugo

**Newcomers would be mystified as the bars emptied and the entire membership crowded to hear a presentation called, say, 'The Bermondsey Triangle Mystery'**

awards, but for Best Fan Writer rather than Best Novel. (*Orbitsville*, however, had deservedly won the 1976 BSFA Award.) Privately he sometimes wearied of the speeches, which conventions tended to take for granted, and for which of course he asked no payment. There were times, he said wryly, when he dreaded registering for a con because by return of post the committee would send their draft programme with 'Bob Shaw's Serious Scientific Talk' in a prime slot. Fandom can be thoughtlessly cruel to those it loves; we loved Bob a little too much. Some of the 'serious scientific' humour also surfaced in less frenetic form in his funny 1977 sf novel *Who Goes Here?*, which remains pleasantly rereadable.

After a period of professional quiet in the early 1980s, Bob made a popular come-back with his biggest sf project: the trilogy of *The Ragged Astronauts* (1986; BSFA Award winner; Hugo shortlist), *The Wooden Spaceships* (1988) and *The Fugitive Worlds* (1989), set in a universe of audaciously daft physics where pi has an unfamiliar value, twin planets can share an atmosphere, interplanetary balloon flight is feasible, and the gravitational constant is "whatever it needs to be to make my solar system work". Things looked good as the 1990s began. There seemed every reason to expect sf gatherings to be gladdened for the foreseeable future by Bob's familiar bearded, heavy-eyed face: "Cartoons of me look like Ming the Merciless," he would complain.

But then came the run of evil luck. Bob's wife of many years, Sarah ('Sadie' – herself a legendary figure of Irish Fandom), died with shocking unexpectedness in 1991. For a while Bob tried, as he put it, to drink the world dry. In late 1993 he suffered a grim cancer operation which left him unwell for a solid year. "At one stage of the surgery," he told me cheerfully, "they must have been able, literally, to look right through me and out the other side." Last year there were gleams of good cheer: Bob was on good

conversational form at the 1995 Eastercon and declared himself to be writing again at last (he'd delivered part of a second sequel to *Who Goes Here* in 1994, but had abandoned it owing to poor health). True to his own maxim about extracting humour from bad experiences, he published a funny article about smuggling dope in the colostomy bag which he had once dreaded. His 'serious scientific talk' at Intersection downplayed the traditional puns in favour of a moving appreciation of his 50-year association with sf and fandom; even before the dismal clarity of hindsight, many of the listeners felt that Bob was saying goodbye.

December saw his second marriage, to Nancy Tucker in the USA; but illness persisted. After returning to England this February, enjoying dinner with his son's family and Nancy, and paying a last visit to the Red Lion pub, Bob died peacefully in his sleep that night. The funeral took place on 19 February.

I still can't believe it. Goodbye, Bob.

Footnote: Bob Shaw's fanzine material is no longer easy to find, but the convention speeches up to 1988 are still in print as *A Load of Old BoSh* (1995) from Becon Publications, 75 Rosslyn Avenue, Harold Wood, Essex, England RM3 0RG... £5.50 post free in the UK, all profits to the Royal National Institute for the Blind 'Talking Books' fund. If ordering from the USA I would suggest a \$10 cheque to Becon proprietor Roger Robinson, who has a dollar bank account. *The Best of the Bushel* (Inca Press 1979) assembled 13 *Hyphen* columns with an introduction by Walt Willis, but is probably now fairly rare.

I drafted this piece at half the length as a memorial appreciation for *SFX* magazine in Britain, and am grateful to *Vector* for the chance to expand it with a few more personal reminiscences. Of course it isn't adequate. What could be?

## Bob Shaw: 1931-1996

### by Andy Sawyer

Bob Shaw was close to British sf fandom in a way which even in the informal network of science fiction was exceptional: for many people the news of his death was the loss of a personal friend.

His loss also marks the loss of an important writer, though, and it's this on which I want to concentrate for the moment. It's easy for fandom to think of Bob the guy at the bar, or the 'Serious Scientific Talks', but my most illuminating moment concerning him comes from one of those frequent inquiries I get concerning the story you read once whose author you can't remember and whose title you've forgotten.

In this case, the plot of the story as described was simple. The viewpoint character discovers that 'she' is a man and that 'her' children are in fact aliens. The home in which 'she' lives is a world on which 'she' and 'her' co-pilot

crash-landed.

It was a story I knew well but unfortunately I too had forgotten both author and title. Still, this should cause no trouble: confusion of identity, a certain bleakness of tone, a shift between personal and 'real' reality – it was quite clearly Philip K. Dick. Yet a skim through the Collected Works proved that it wasn't. Getting back to my inquirer, I discovered that the word "Dumbo" might have been in the title.

This wasn't much use either, as the bibliographies of short stories I consulted didn't come up with anything relevant. However there was now enough information for the mass of sf fans on the Internet – and you, no doubt, are way ahead of me here – to inform me that the story was in fact Bob Shaw's 'Call Me Dumbo' from the collection *Tomorrow Lies in Ambush*.

**...Bob's view that sf should not be a matter of flashy style or techno-obsessive preaching, but should make its point by the "wee thinky bits".**

Why is this interesting to me? Partly, I think, because there is this natural assumption to think of Bob as a fannish friend we have lost. But he was also one of our top writers and I think just as it's possible to make excuses for shoddy writing in someone who's a good-mate, so it's also possible to undervalue someone for the same reasons. With my lit-crit hat on, I'd like to suggest that Bob was, if anything, undervalued purely as a writer. Simply because he made no pretensions, seemed to think of himself as just a guy doing a job, which happened to be telling stories, it's possible to slip into the idea that, well, it was easy.

Of course, no craft is easy and the craft of effective story-telling is as difficult as most and more than some. Since Bob's death several people have told me how difficult he found writing his *Serious Scientific Talks*. I have no idea how easy he found his fiction, but the wealth of ideas in it and the transparent style with which it is written suggests that it never was dashed off on a wet Sunday afternoon. Reflecting on Bob's fiction, I think that it's interesting that I could make this confusion between one of his stories and one of Philip K. Dick's.

This isn't the place to give a literary comparison between Shaw and Dick, but I still feel that there is something Dickian about the story. While Dick is one of the breed of Definitely Sexy writers in those elements of academe which have discovered sf, Bob is probably filed under 'Other British Writers'. But if his fiction isn't as lacerating and self-parodying as Dick's, he is more of a natural story-teller and in many ways his prose – the simple, narrative prose of a story-teller rather than a 'literary artist' is actually superior.

Bob was, despite his 'Serious Scientific Talks', not a naturally comic writer, in the sense that he did not usually write 'funny' books (there was something laboured about the second 'Warren Peace' novel, although given the circumstances of Bob's life when it was written, that is not surprising). That does not mean that there were not humorous, even slapstick, episodes. Seemingly out of nowhere in the fix-up *Other Days, Other Eyes* comes a scene where two characters have a long-running joke in which all the great scientists who have given their names to discoveries are children in a classroom under the eyes of a harassed teacher – "Make your mind up, Heisenberg! Stop fiddling with your belt, Van Allen!" – and some of the humorous implications of 'slow glass' are hinted at in the idea of chips of the stuff being used in showers and other potentially compromising locations, but the novel itself is rather dark. As in other of Bob's novels, the protagonist is a somewhat Dickian 'little man' (in fact the invention of slow glass makes him extremely wealthy, but emotionally and socially he is, like us, a bit of a nerd) trapped in a loveless marriage. In the short stories which are the heart of the novel, we catch glimpses of other emotional wastelands.

But Bob's fiction was also marled by what he identified as the real feature of good, entertaining science fiction. I can't remember the context, but I recall reading several times Bob's view that sf should not be a matter of flashy style or techno-obsessive preaching, but should make its point by the "wee thinky bits". By this, I've always taken him to mean those elements of sf which cause you to think, "Yes, that's exactly right!" or "Oh, so that's what could happen if...": a somewhat more downbeat and ironic restatement (typically Shavian) of the 'sense of wonder'. These are not always the obvious images: in fact one recently struck me for the first time as I was re-reading Bob's space adventure story *Ship of Strangers*:

The thing Dave Surgenor detested most about high-gravity planets was the speed at which beads of sweat could move. A trickle of perspiration could form on his brow and, with a rush like that of an attacking insect, be down the side of his face and under his collar before he could raise a hand to defend himself (Gollancz, 1988, pp. 7-8).

This is a fairly undramatic passage, designed to set atmosphere near the beginning of the book, but it's pure science fiction and doesn't it cause you to step back and think, yes, we've read all about the physically fatiguing element of moving about it high gravity when our weight is increased, but what about the actual sensation of sweating under increase muscular exertion? Not having experience of working in high gravity I have no idea whether Bob was right in this, but then I never thought of it before.

A commemorative party was held on March 23 1996 for Bob's friends and fans, organised by Henry and Cherry Newton and others of Bob's local friends, kicked off by Ramsey Campbell recalling one of Bob's worst-ever puns. During the afternoon, I remember a group of us talking

**...his fiction is as  
much about  
people and their  
glorious  
idiosyncrasies as  
it is about  
concepts and  
technology**

with Bob's daughter Claire about Bob's fiction. It was his observation that we recalled most: the fact that his fiction is as much about people and their glorious idiosyncrasies as it is about concepts and technology. It's no accident that Bob was a punster: the ability to make puns is the ability to see connections between totally different ideas. What gave Bob's fiction an edge was this ability to yoke together disparate elements in a story and create something more than a combination of contrasting parts. 'Wit' is the word I'm groping for. I have this fantasy of Bob quaffing ale in an Elizabethan tavern with John Donne and Ben Jonson and the rest of the crew, resplendent in ruff and doublet, and trading puns with them all. He would have held his own, and more so.

Sf causes you, as someone once said, to think things you wouldn't otherwise have thought. Bob brought us plenty of these thoughts, scattered through his works, the subtle, well-turned "wee thinky bits" of a master of his art. Thank you, Bob.

# Bob Shaw: An Appreciation

## by Brian Stableford

I can no longer remember when or where I first met Bob Shaw. I know that we were on a panel together at a con in 1976, but I think we already knew each other then. It is, I suppose, possible that I had never actually spoken to him before, but I had certainly grown used to his peripheral presence, as a person as well as a collection of writings. I had known what he looked like and what he sounded like for some time. If there is a conclusion to be gleaned from this muddy recollection it was his was – for others, as well as for me – a *distinctive* presence. It was a presence he always seemed to be trying to understate, but it imposed itself nevertheless. I will miss it from now on.

I have a sharper memory of our paths crossing in a corridor at another con in 1979. "Hi Bob," I said, as I hurried by. "Loved *Vertigo*." As compliments went it was decided clipped, but it was enough; it seems impossible that a man of such gravity could be lifted by so slight a force, but he was. He was by no means a vain man, but he loved the idea that he could inspire in others the same delights that he had always taken in the reading of science fiction. So far from vanity was he that he always seemed slightly surprised when people liked his work, and slight uncomfortable with the idea that he too was a science-fiction writer, and thus a communicator of the sacred sense-of-wonder – but that only meant that the pleasure of finding it out was constantly renewed. He liked meeting his readers, and liked it when they liked meeting him.

In his 1976 contribution to *Foundation's* ready-made confessional, 'The Profession of Science Fiction', Bob recalled with great affection the magical way in which the science-fictional revelation had transformed his life, but he also recalled that transformation had not been unproblematic. "One side of my nature was fervently convinced that devotion to science fiction was my path to happiness," he wrote. "The other side was keenly aware of my father's disappointment and shared his conviction that a life of industrious responsibility in a recognised safe job was no more than the family's due." Given that he was an Ulster Scot, it is perhaps not surprising that he never quite managed to shake off the vestiges of that guilt, although he learned to endure it with proper fortitude.

In the last of the 'Serious Scientific Talks', delivered at the Glasgow Worldcon in 1995, Bob offered the deadpan revelation that he had recently recovered memories of having been kidnapped by aliens, who had rendered him incapable of following a mundane existence. He supplemented his observation with a painstakingly detailed account of the way that incapacity had been manifest in his early life, as an absolute inability to take everyday life and

humdrum work seriously. He confided that the aliens had recently offered to undo their work and release him from the toils of their experiment, but that he had told them exactly what to do with their offer. There were no more than a handful of trivial jokes in the entire oration, but every sonorously-delivered line was shot through by such an acute sense of the utter absurdity of dull normality. It was not comedy in any conventional or accepted 'alternative' sense, but it was desperately funny. The Serious Scientific Talks were always like that; it wasn't so much that the manner of their delivery was all-important, but that the manner so accurately reflected the individuality of the man.

That sharp consciousness of the absurdity inherent in trying to meet opposing demands of the speculative imagination and the making of a mundane living affected Bob's work as profoundly as it affected his life. His characters are continually faced with awesome possibilities, but they remain in bondage to the rigours of everyday responsibility; the step into the unknown, however exciting

and appealing it may seem, is never easy to take – and once taken, cannot forbid or confuse the uneasy backward glance. He was always a writer of great ambition, eager to tackle grandiose themes and deploy exotic imagery, but he felt a simultaneous need to anchor these visions within a context

that was oppressively and awkwardly mundane. This did not obliterate their power; instead, it gave an extra twist of poignancy to their dazzling seductions.

Bob wrote at least a dozen book worthy of being remembered; *The Palace of Eternity*, *Orbitsville* and *Vertigo* are among the best of them, while *Who Goes There?* is the funniest and *Medusa's Children* the most underrated. He once told me that he thought of himself as a "natural short story writer" who found writing at novel length uncongenial, but I think he was mistaken. He certainly wrote some fine short stories, but his best work benefited greatly from the kind of gradual and methodical extrapolation that he found so taxing. He was never a *fast* writer, and he often found his work hard going, but when he stayed the full distance he was impressive. The readiest yardstick with which to measure his originality, his manner and his method is, of course, slow glass. It was the archetypal Bob Shaw invention: modest, unassuming, tricky in spite of its transparency.

Having introduced the idea of slow glass in the brilliantly understated 'Light of Other Days' (1966) – a fine example of the perfectly-formed sf story – he continued to explore and illustrate the unexpectedly convoluted implications of the hypothesis in the main narrative of *Other Days, Other Eyes* (1972) and its other 'sidelights'. That

**Bob offered the deadpan revelation that he had recently recovered memories of having been kidnapped by aliens, who had rendered him incapable of following a mundane existence**

main narrative neatly but irresistibly demonstrates that slow glass – whose most obvious application might be the provision of pleasant rural views for town houses – would also have the power to transform the business of everyday life and redraw the moral boundaries of human society.

Science fiction does not bring about that kind of dramatic transformation in the majority of its readers, let alone the world in which they live, but its discovery certainly transformed Bob Shaw as dramatically as he was

capable of being transformed. He was grateful for that, and not ashamed to say so – and we, his readers, should be grateful too.

(Brian Stableford wrote at much greater length on Bob Shaw in a 1981 booklet published by the BSFA. That article was reprinted in *Algebraic Fantasies and Realistic Romances* [Borgo Press: 1995]. More recently he wrote 'Escape to Reality: A Profile of Bob Shaw' in *Interzone* 67 [January 1993])

## Bob Shaw – A Light From Other Days

### by James White

I knew Bob Shaw well for thirty-eight years and two years longer than that if you count the times he passed me every morning, when I was waiting for the tailor's shop where I was an apprentice to open, and he was headed for the construction company where he was apprentice draftsman. Not realising at the time that we were both 'star-begotten', we barely nodded to each other. The news of his death was especially sad to us, because he was always regarded as the 'kid' of Irish Fandom and, as we all know, it is particularly sad when the youngest member of a family or fan group goes first.

When he joined Walter Willis, George Charters and myself at Oblique House, the meeting place of the Belfast fan group, he was a thin – in those days weren't we all? – but immensely strong young man who once, without the aid of lifting tackle, changed the heavy gear box of his old banger while lying flat on the ground underneath it with only a piece of plywood to support its weight on his chest. Those, of course, were the DIY days when he didn't have enough money for garage repairs. His reflexes and vision were fast and sharp, too, especially while playing what we liked to call Ghoomdinton, which was a kind of badminton for commandos, and his wit was even sharper. Whenever he grew bored with helping us set type for our fanzine, *Slant*, he didn't complain or try to start a union or anything – he just made us laugh too much for any serious work to be done that day. We sold our first professional stories within months of each other and became 'vile pros' together, but everyone who ever met him at a convention knows that with Bob Shaw vile professionalism didn't quite take – there was always the true fan inside trying to escape, which he did, frequently. Those were legendary days and his contribution is widely known and respected throughout fandom, as was his reputation as a first-rate professional writer of imagination and sensitivity. His beautiful short story, 'The Light of Other Days' really should have taken the Hugo that year.

For two years we worked together in the PR department of our local aircraft company, Shorts, and got together every lunchtime to discuss each other's current work, sf work, that was, which was the only time we really got to talk about what really interested us, because it was a very busy

department. My favourite memory of that period is when he passed a note to me through a slit in the partition dividing our offices reading, "Help! I am a prisoner in a press release factory."

But then the troubles came. Bob, his first wife Sadie and their three children moved to England, and the only chance we got to talk was at conventions, which we did as often as possible. But apart from growing a beard and becoming a lot more three-dimensional, he didn't change much. Single novels and block-buster series like the 'Orbitsville' and 'The Ragged Astronauts' trilogies he continued to turn out with welcome regularity. But the old, or rather the young Bob Shaw was still hiding not very successfully behind the eminent literary figure, as was proved by the popularity of his hour-long Serious Scientific Lectures that were the highlight of many UK and overseas conventions. Actually they were scheduled for half an hour duration but a lot of time had to be spent getting the audience, who were usually rolling about in the aisles, back to their seats.

Fate then dealt him a really cruel double whammy with the tragic loss of his wife, Sadie, and deteriorating health that included a liver problem, bowel cancer and diabetes. He remarked once, in his usual dead-pan style, that if sf writers like H. G. Wells and James White were diabetic, he might as well join the club.

Even though his writing output slowed almost to a stop in recent years, and he was in really bad shape, the young Bosh – that was his own, irreverent name for himself – was still in there, and I believe that he was beginning to rise above the troubles that would have caused a lesser man to sink without a trace.

Then recently he met and became engaged to Nancy Tucker and they were married last December. by all accounts she is really nice, the kind of person who would have loved and supported and encouraged him back to health and a full writing career. We were all glad and wished them long life and every happiness together. But that was not to be, and now we all are sharing in her, and our own, tragic loss.

From now on there are going to be a lot of gaps in the 'Just Published' shelves in the bookshops, and a very large, Bob Shaw-sized hole in future sf conventions. Ah, well.

# Books of the Year – 1995

Edited by Paul Kincaid

What a difference a year makes.

Last year, we were struggling to find books to recommend and the book that came out top in our annual poll of Vector reviewers (*Complicity* by Iain Banks) wasn't even science fiction. Last year, the winner of the Arthur C. Clarke Award (*Fools* by Pat Cadigan) didn't appear in the books our critics recommended, and only two British authors were among the top ten chosen by our critics. A pretty dismal showing in a year from the Hugo winner would be chosen at a British Worldcon.

This year things are dramatically different. The four books that fought it out for the top spot were also contesting the Clarke Award – and if the eventual winner of the Clarke Award finally came third in our poll, it only reflects how close the contest was in both instances. Perhaps even more significant is the fact that the top three books in our poll were all by British writers – something we haven't seen in a long while.

As ever, the reviewers have been given *carte blanche*. The idea is to give you a snapshot of what has been read and enjoyed by the people whose opinions you read every mailing. So you will find non-fiction on the list as well as fiction, non-sf as well as sf, old books alongside those only just published.

This year, for instance, there are 11 non-fiction titles on the list, only one of which is directly related to science fiction. (And it was strange that John Clute's *Illustrated Encyclopedia of SF* didn't rate a mention, or any of the excellent books that have been coming out from Liverpool University Press – are people not reading so much criticism these days?). Though it is interesting to note that there were only five works of fiction that are not overtly sf, fantasy, horror or in some other way fantastic; and most of those were by writers generally associated with genre fiction. There is even one record on the list: *Heartbeat of the Earth* by Inkubus Sukkubus, which Brian Stableford describes as: "Music at the cutting edge of pagan poplar culture".

As has been common in these lists, there is a fair sprinkling of older books, though far more than usual come from the last couple of years. Either reviewers are finding it easier than before to keep up with current books (economic factors affect us all, and most of us have to wait for paperback publication), or there is more in the current crop that catches people's

attention.

Out of all that, the book that emerged as the clear favourite was *The Prestige* by Christopher Priest, his first new novel for several years. This was a book that clearly provoked a very strong reaction from the people who read it. Steve Jeffery called it: "An assured sleight-of-hand from Priest, who plants both clues and misdirections with equal care throughout the text, before bringing the whole thing to an unnerving conclusion." Andrew Seaman said: "Like, I suspect, many others I was entranced by the literary legerdemain performed by Priest in this fine book. A novel about magic and illusion that is, quite simply, magic." And Paul Kincaid and Andy Sawyer both made the same comment: "Simply the best novel of any kind I read this year." But it was Stephen Payne who perhaps gets closest to the appeal of this book: "To Priest, the novel is a sleight of hand aimed at us, the readers. It is his stage act, his card trick, a rabbit drawn from the hat of his imagination, and we are the willing conspirators in his fabrication, just as an audience wants to be deceived by the stage magician. It's the show that counts, after all, and *The Prestige* is a novel that questions the nature of its artistic creation and our (the art consumers) relationship with it."

But if Priest won plaudits, so did Stephen Baxter, who came a very close second with *The Time Ships*. It was, said Brian Stableford, "A worthy addition to the great tradition of British scientific romance". Paul Kincaid said of it: "Updating *The Time Machine* to bring in modern scientific notions while maintaining the Wellsian tone and knowing references to a host of Wells's work makes this Baxter's best book to date", and Andy Sawyer concurred: "An intelligent extrapolation of Wells's *The Time Machine* which manages to be scholarly as well as fast-moving and imaginative". For Norman Beswick it was simply "A personal triumph for Baxter", though Gary Dalkin went further than many critics when he said: "A temporal paradox: I think Baxter's book is in many ways better than the one which inspired it. (Calls of "Heresy", shock and outrage on the BSFA terraces, demands for impeachment, etc). It is certainly more ambitious, more inventive, more imaginative, more exciting, and filled with an even greater sense of wonder. But, of course, *The Time Ships* will never be as important as the original, because, a) the original was



just that, and you can only be the first once, b) the competition is now very strong indeed, and c) Baxter has the benefit of hindsight, of building upon a whole genre's worth of ideas (rather than virtually inventing a whole genre), and of incorporating a century's worth of further scientific discovery and theory. Perhaps it is merely that Baxter's revisionism (while remaining completely true to the Wellsian spirit) makes his book more relevant to our present."

The race for the top three places was very close indeed. One vote either way could have made all the difference, so it is perhaps no more than a testimonial to the strength of British sf publishing during 1995 that the Clarke Award winner came a fraction further back in third place. But there was no diminution of the critical response. *Fairlyland* by Paul J. McAuley "Takes the collision of sf and fantasy from Swanwick's *The Iron Dragon's Daughter* and Tepper's *A Plague of Angels* and the living dolls from Calder's *Dead Girls* and pushes it about as far as it will go", said Steve Jeffery. Paul Kincaid said much the same thing: "A clear and believable vision of our near future, a rigorous extrapolation of its scientific base, and this book still takes us close to fantasy in the end." Steve Palmer was in no doubt: "Undoubtedly the best novel of the year, a brilliant evocation of a near future Europe where genetic and mental manipulation is the norm", while Andy Sawyer summed it up: "Genetic engineering and a deeply-imagined post-cyberpunk Europe combine to create a dark tale of something realistically spooky just around our collective corner."

The other book to make a strong showing in the list, and the first non-British writer to make the chart, was also on the Clarke Award shortlist: *The Diamond Age* by Neal Stephenson. As Steve Jeffery said, it is: "A unique combination of neo-Victorian and Confucian moral codes in a world of nanotechnology for which the term 'steampunk' is entirely inadequate."

Given how strongly these four books have shown, it is perhaps a little surprising that the work which came a close second in the Clarke Award, *The Star Fraction* by Ken MacLeod only gathered one vote, while there were no votes at all for the remaining Clarke nominee, *Happy Policeman* by Patricia Anthony, though another of Anthony's books, *Brother Termite*, did make the list.

Even so, in any exercise such as this there will be unexpected omissions from the list, but there can be no real surprise at the books which made it to the top of the pile. Nevertheless, one has to wonder at books which might have been expected to gather more votes than they did. Books such as *Flux* by Stephen Baxter ("Unique for Baxter's wooden star city of Parz, a

sf'nal tour de force, wondrously fanciful, yet analogically on the nail." - K.V. Bailey), *Chaga* by Ian McDonald ("Meaty contemporary sf" - Brian Stableford), Octavia E. Butler's *Parable of the Sower* ("A little miracle of a novel" - Norman Beswick) or Greg Egan's *Distress* ("A book which expects its readers to engage their brains and consciences, and makes no concessions to anyone not prepared to pay full attention to every precisely chosen word. SF really does not get much better than this." - Gary Dalkin). The Egan in particular is a bit of a mystery, his stories consistently do well in *Interzone* Readers' Polls and he is undoubtedly one of the most engaging and exciting of contemporary authors, but his novels never seem to do as well in these polls as one might expect. Nevertheless, in any other year one might have expected to see these titles - and a few others, such as *Mortal Remains* by Christopher Evans or *Hotwire* by Simon Ings - standing out. Maybe they don't because there was an exceptional amount of good fiction this year?

Of course, it is all too easy to look at a list such as this as representing, in some way, the best books of the year. But there needs to be nothing elitist about such a notion, as many of the reviewers are careful to point out in their comments, "best" can often mean simply the most enjoyable or the most entertaining. For instance, Tanya Brown says of Elizabeth Willey's *A Sorcerer and a Gentleman*: "Not really a great work of literature, but so compulsively (re)readable - and probably gave me more pleasure than any other book last year." While Cherith Baldry selected Lois McMaster Bujold's *The Vor Game* because "all her books have given me tremendous pleasure - for the wit and style and panache, and also for the world and the characters, rather than the actual stories." For Andy Mills, *Monsters in Orbit* by Jack Vance was "not a classic, but still knocks the spots off most!" and Vikki Lee called *Warhost of Vastmark* by Janny Wurts: "One of those stories that leaves you sad that it has finally ended."

Still, the sheer, old-fashioned excitement of good science fiction and fantasy is one of the things that keeps us coming back for more. And the comments of the critics on the books they chose revealed a lot about what it is we look for in good sf and fantasy. Steve Palmer chose *Feersum Endjinn* by Iain M. Banks because: "One quarter of this is infuriating, but the whole is superbly done, showing unrestrained imagination." Andy Mills chose the same author's *Against a Dark Background* for not dissimilar reasons: "Not the best of his space operas, perhaps, but lots of zap nevertheless. And a Lazy Gun." For Andrew Seaman, *Kaleidoscope Century* by John Barnes stands out

because "Barnes packs in enough ideas to keep other writers going for several novels." For John D. Owen, *Permutation City* by Greg Egan is "buzzing with ideas, crashing information theory headlong into abstruse physics and coming up with mindblowing concepts." *The Nano Flower* by Peter F. Hamilton was on Gary Dalkin's list: "An ingenious, unpredictable plot with a whole future's worth of technology efficiently integrated." And when he chose *When Heaven Fell* by William Barton, Ian Sales described it as: "Bleak sf, with unlikable narrator that still manages to sustain interest in the narrative; some neat aliens too."

Again and again, it seems, it is the ideas that capture our interest. Though there are other features that stand out also. According to John D. Owen, Maureen F. McHugh's *China Mountain Zhang* has: "Great characters, a very human-sized storyline and a wonderful line in architectural theory." Andy Mills liked Patricia Anthony's *Brother Termite* because it was "distinctly odd, refreshingly different". For K.V. Bailey, A.S. Byatt's *The Djinn in the Nightingale's Eye* stood out as: "Arabian Nights in postmodern key... wickedly witty" while Alasdair Gray's *A History Maker* was: "Something special - inventive, satirical, funny, quasi-romantic." Helen Gould found Paul Kearney's *Riding the Unicorn* "Dark, psychotic and incestuous - but the writing drew me straight in to both worlds." Tanith Lee's *A Heroine of the World* was "fantasy at its best, prose to be savoured", or so said Andy Mills, and another fantasy, *Silverhand* by Morgan Llewellyn and Michael Scot, earned the following comment from Vikki Lee: "One of the darkest fantasy books I've read this year. Weirdness of the highest order." So style also counts high.

There is also an opportunity to relish discovery. Terry Dowling's collection, *Twilight Beach*, "should place Dowling in the front rank of SF; the uncrowned heir to Bradbury and Ballard" according to Gary Dalkin. For Lynne Bispham, *Rhinegold* by Stephen

Grundy was "head and shoulders above anything else I've read this year." Paul Kincaid considered Ken MacLeod's *The Star Fraction*: "A spirited, invigorating debut" while for Cherith Baldry, *Glimpses* by Lewis Shiner "makes the process of creation - in this case music - really come alive."

Alongside the new, there was also a relishing of the old. Brian Stableford welcomed two collections from years gone by, *Master of Fallen Years* by Vincent O'Sullivan ("Classic Decadent weird tales") and Clark Ashton Smith's *Tales of Zothique* ("Definitive collection of ultra-Decadent fantasies"). Steve Palmer chose Robert Holdstock's *The Hollowing* because he "seems still able to evoke new parts of his mysterious forest." While for Andy Mills, *Red Dust* by Paul J. McAuley "brings the sensawunda back to Mars."

In general, though, what most united the critics was work that made them think. K.V. Bailey chose Simon Ing's *Hotwire* "for its imagination-stretching mindscapes and landscapes; and for the innovative integrating of text and (primitive) art designs which makes this an adventure in fiction format." John Crowley's *Love and Sleep* is, says Steve Jeffery, "an extraordinary, multi-layered and deeply structured work that combines fantasy, historical novel and psychological mystery." For Martyn Taylor, *Whit* by Iain Banks "proved, yet again, that his 'mainstream' world is orders better and more imaginative than his SF. Martin Amis never even dreams of being this good." Norman Beswick considers that in *Memnoch the Devil* "Anne Rice changes tack in mid-novel and creates a searching challenge to Catholic faith." And subversion is always welcome, as in *Harm's Way* by Colin Greenland, with its "playful mocking of the dreams of spaceflight characteristic of so much genre sf", according to Joseph Nicholas.

### The chosen books, in order:

1. Priest, Christopher - *The Prestige*  
(Simon & Schuster)
2. Baxter, Stephen - *The Time Ships*  
(Harper Collins)
3. McAuley, Paul J. - *Fairyland* (Gollancz)
4. Stephenson, Neal - *The Diamond Age* (Viking)

5. Banks, Iain M. - *Feersum Endjinn*  
Baxter, Stephen - *Flux*  
Joyce, Graham - *Requiem*  
Kress, Nancy - *Beggars in Spain*  
McDonald, Ian - *Chaga*  
McHugh, Maureen F. - *China Mountain Zhang*  
Stephenson, Neal - *Snow Crash*  
Sterling, Bruce - *Heavy Weather*

# Other nominated books:

- Ackroyd, Peter – *Blake*  
 Anthony, Patricia – *Brother Termite*  
 Austen, Jane – *Persuasion*  
 Ballard, J.G. – *Rushing to Paradise*  
 Banks, Iain M. – *Against a Dark Background*  
 Banks, Iain – *Whit*  
 Barnes, John – *Kaleidoscope Century*  
 Barnes, John – *A Million Open Doors*  
 Barnes, John – *Mother of Storms*  
 Barton, William – *When Heaven Fell*  
 Bradfield, Scott – *What's Wrong With America*  
 Bujold, Lois McMaster – *Mirror Dance*  
 Bujold, Lois McMaster – *The Spirit Ring*  
 Bujold, Lois McMaster – *The Vor Game*  
 Butler, Octavia E. – *Parable of the Sower*  
 Byatt, A.S. – *The Djinn in the Nightingale's Eye*  
 Calder, Angus – *The Myth of the Blitz*  
 Cantor, Mark – *Ember From The Sun*  
 Card, Orson Scott – *Earthfall*  
 Cherryh, C.J. – *Foreigner*  
 Cherryh, C.J. – *Fortress in the Eye of Time*  
 Cherryh, C.J. – *Invader*  
 Crowley, John – *Love and Sleep*  
 Delany, Samuel R. – *Atlantis: Three Tales*  
 Dick, Philip K. – *The Shifting Realities of Philip K. Dick*  
 Dowling, Terry – *Twilight Beach*  
 Eddings, David & Leigh – *Belgarath the Sorcerer*  
 Egan, Greg – *Distress*  
 Egan, Greg – *Permutation City*  
 Evans, Christopher – *Aztec Century*  
 Evans, Christopher – *The Insider*  
 Evans, Christopher – *Mortal Remains*  
 Francis, Peter – *Volcanoes: A Planetary Perspective*  
 Fromm, Erich – *The Art of Being*  
 Godwin, Parke – *The Tower of Beowulf*  
 Goodkind, Terry – *Stone of Tears*  
 Gray, Alasdair – *A History Maker*  
 Greenland, Colin – *Harm's Way*  
 Griffith, Nicola – *Slow River*  
 Grundy, Stephen – *Rhinegold*  
 Guenon, Rene – *The Great Triad*  
 Haldeman, Joe – *The Hemingway Hoax*  
 Hamilton, Peter F. – *The Nano Flower*  
 Hawkes-Moore, Julia – *Dancing in Circles*  
 Hoeg, Peter – *Miss Smilla's Feeling for Snow*  
 Holdstock, Robert – *The Hollowing*  
 Holdstock, Robert – *Merlin's Wood*  
 Hutton, Will – *The State We're In*  
 Ings, Simon – *Hotwire*  
 Inkubus Sukkubus – *Heartbeat of the Earth*  
 Irwin, Robert – *Exquisite Corpse*  
 Jones, Gwyneth – *North Wind*  
 Jones, Gwyneth – *White Queen*  
 Kay, Guy Gavriel – *The Lions of Al-Rassan*  
 Kearney, Paul – *Riding the Unicorn*  
 Lee, Tanith – *A Heroine of the World*  
 Lerner, Gerda – *The Creation of Patriarchy*  
 Lethem, Jonathan – *Amnesia Moon*  
 Lethem, Jonathan – *Gun, With Occasional Music*  
 Llewelyn, Morgan & Michael Scott – *Silverhand*  
 McAuley, Paul J. – *Pasquale's Angel*  
 McAuley, Paul J. – *Red Dust*  
 McDevitt, Jack – *The Engines Of God*  
 McDonald, Ian – *Scissors Cut Paper Wrap Stone*  
 MacLeod, Ken – *The Star Fraction*  
 Milne, Seumas – *The Enemy Within: MI5, Maxwell and the Scargill Affair*  
 Modesitt Jr., L.E. – *Of Tangible Ghosts*  
 Noon, Jeff – *Vurt*  
 Norton, Andre – *The Hands of Lyr*  
 O'Sullivan, Vincent – *Master of Fallen Years*  
 Powers, Tim – *Last Call*  
 Pratchett, Terry – *Soul Music*  
 Rankin, Robert – *The Most Amazing Man in the World*  
 Rice, Anne – *Memnoch the Devil*  
 Robinson, Kim Stanley – *The Wild Shore*  
 Rucker, Rudy – *The Hacker and the Ants*  
 Sampson, Fay – *Daughter of Tintagel*  
 Savage, Marshall T. – *The Millennial Project*  
 Shiner, Lewis – *Glimpses*  
 Simmons, Dan – *Endymion*  
 Smith, Clark Ashton – *Tales of Zothique*  
 (Necronomic Press)  
 Smith, Michael Marshall – *Only Forward*  
 Springer, Nancy – *Larque On The Wing*  
 Stableford, Brian – *The Carnival of Destruction*  
 Swanwick, Michael – *The Iron Dragon's Daughter*  
 Taylor, Roger – *Whistler*  
 Tepper, Sheri S. – *Shadow's End*  
 Vance, Jack – *Monsters in Orbit*  
 Warrington, Freda – *Sorrow's Light*  
 Weir, Alison – *The Princes in the Tower*  
 Weiss, Margaret & Tracy Hickman – *The Seventh Gate*  
 Willey, Elizabeth – *A Sorcerer & A Gentleman*  
 Wolfe, Gene – *Calde Of The Long Sun*  
 Wurts, Janny – *Warhost of Vastmark*

# Cognitive Mapping 3:

by Paul Kincaid

# Aliens

*Scriber Jaqueramaphan had been all over, mindlessly running around. He'd collect in twos or threes and execute some jape that made even the dour Tyratbeth laugh, then climb to a height and report what he saw beyond. He'd been the first to see the coast. That had sobered him some. His clowning was dangerous enough without doing it in the neighbourhood of known rapists.*

*A Fire Upon the Deep* (1992)  
Vernor Vinge

*He heard a scrabbling sound, thrust the light at it and saw a dark shape wriggling in one of the crumbling slit windows. She dropped to the ground. Dim light welled between her fingers from a short, red, glowing dumbbell. She came towards him, then stood and gazed for a long time. The strangeness of her face began to melt. The split lip and concave nose became as invisible as the features, the beauty even, of a face loved and familiar. Maybe, he thought, she was trying to see him as human too.*

*White Queen* (1991)  
Gwyneth Jones

The alien is the most familiar creature in science fiction.

If that seems like a contradiction or a conundrum, it shouldn't. We have never met an alien outside our imaginings, so the aliens we put into our fictions are drawn almost entirely from within us. Every alien is a human in disguise, though the disguise can be more or less convincing.

Aliens, in one form or another, have been with us in our dreams for as long as we have dreamed. They are the monsters who gather in the shadows beyond the flickering glow of the fire. They are the things over there, the personification of everything that is unknown. When European travellers first began to explore along the coasts of Africa they found people who were as black as if they had been burned. If such strange beings existed on the fringes of what was known, what might be found deep in the unknown? And so early travellers reported what they had been told, about men not yet found but who surely existed, men with no heads, whose eyes were in their chest and whose mouth in their stomach; about men with one immense foot which they held over them as shelter from the cruel sun. These people were never seen, but they existed.

As the blank places on the map began to be filled in, so the utopias and curiosities of our imaginations

were shifted off planet. We began to tell stories of journeys to the Moon and elsewhere. And, of course, we found people there. People just like us – though generally kinder, more beautiful, an idealised us – and people like the strange beings we had imagined before, strange creatures whose humanity was at a visible remove from our own.

The strangeness of life about us has constantly nourished our imagination. We need to discover such curious beings about us, it is an impulse as old as humanity, an impulse that gave birth to myths and stories, an impulse thousands of years older than science fiction, yet it is the identical impulse that we feed when we read science fiction. And the alien is common to both. The alien is two things: a being better than us, which in less sophisticated times was simply seen as identical to humanity yet more beautiful in aspect; and a being worse than us, the bogeyman, the nightmare made flesh, the threat that is always in the shadows that surround us.

Sometimes we make this alien – Frankenstein's creature was an alien, so was Mr Hyde – but more often we go to them, or they come to us. The first spectacular meeting of science fiction and the alien was in *The War of the Worlds* [1898] by H.G. Wells. This was no more than a step beyond the tales of German or Japanese invasion that were commonplace

**American science fiction of this isolationist era was full of bug-eyed monsters threatening something essentially American (usually a woman) and being defeated by the all-American heroism of the protagonist**

in late Victorian Britain. But in turning this xenophobia into a story of a genuinely alien incursion, an invasion from the darkest corners of our minds, Wells did something that was at once much more dramatic and much more symbolic.

Ever since then, the aliens we create have shown something about us. During the years between the World Wars, for instance, British science fiction rarely featured the alien as such. There were monsters still to be found in the remote corners of our Earth (*The Maracot Deep* [1927] by Arthur Conan Doyle) and there were those good aliens, our future selves, achieving some moral, political, social or technological perfection in *The World Below* [1929] by S. Fowler Wright, *Last and First Men* [1930] by Olaf Stapledon or *The Shape of Things to Come* [1933] by H.G. Wells. But in American science fiction of this era, like Wells's Martians, the alien represented the fear of the outside. During the communist scare of the post-war era this became translated into a fear of the inside, the stranger among us, an atmosphere perfectly represented in science fiction by works such as *The Body Snatchers* [1955] by Jack Finney, and perhaps even more by the film version, *Invasion of the Body Snatchers* [1956].

In Britain at this period, aliens were noticeably less human, from the plants of John Wyndham's *The Day of the Triffids* [1951] to the wasps of Keith Roberts's *The Furies* [1966], though they were just as implacably hostile. But not always so, the devil-aliens who trigger mankind's transcendence in *Childhood's End* [1953] by Arthur C. Clarke indicate that the dual nature of the alien continues to exert a powerful hold. By the early 1970s, aliens weren't simply good or bad, they were essentially mysterious, as illustrated by their overshadowing absence in both Arthur C. Clarke's *Rendezvous with Rama* [1973] and Frederik Pohl's *Gateway* [1977]. It is the mystery of the aliens, their very alienness, which is the most notable feature of the beings in Vernor Vinge's *A Fire Upon the Deep*. This is a richly imagined and baroque space opera peopled with as many strange races as the bar in *Star Wars* (and that brief scene in the 1977 film, which simply and unquestioningly accepted the diversity of alien life, has probably been as influential as any in establishing the new attitude towards the alien which Vinge's novel represents). The dog-like beings, who are vital to the plot, have their most unsettling characteristic casually introduced in this extract: that one of them collects "in twos and threes" seems almost meaningless at

first, but we soon come to realise that they exist in units of several different individuals, that individual members of the group can die and be replaced, yet the being, the single identity, continues. This is alien indeed, and even Vinge himself probably doesn't get fully to grips with how very different – in society, in mindset, in behaviour, in morality – this would make them from humanity, though he makes a more than decent fist of it. Yet in the very moment that their inhumanity is first suggested, so is their humanity made clear: they fear rape.

Vinge's aliens are the polar opposite of their most common traits throughout the history of American science fiction. They are not benevolent, neither are they hostile, they might fight but they are not the fascist or communist invader of earlier stories. Despite appearances, they are like us: this is a story which does not tell us to fear the strange but simply to accept it, to learn from it.

And if we can accept the alien on those terms, then we can also use the alien to examine ourselves. The old, simplistic view of the alien may have gone, but the political weight it carried has not. The alien girl who meets with our white, male protagonist in this scene early in *White Queen* by Gwyneth Jones does not meet with our human preconceptions at all. For a start, she is not a girl. But Jones's use of pronouns when referring to her 'Aleutians' is deliberately misleading, it doesn't just indicate the inability of her humans to fully comprehend the true nature of the aliens, it also stands more broadly for a failure of communication. *White Queen* and its sequel *North*

## The alien, in other words, is anything outside us.

*Wind* [1994] are both freighted with a considerable political content. The relationship between humans and the alien invaders mirrors the colonial experience, and this has been a thread running through all Jones's books since *Divine Endurance* [1984]. But more than that the books represent another form of alienation, between men and women, and the failure of understanding that stands forever between them.

The alien, in other words, is anything outside us. Not just outside our world or even our country, but outside ourselves. And in so far as science fiction rests upon the 'science' (knowledge) in its name, then it is about learning the outside, about coming to appreciate other ways of seeing and being, about the nature of the alien. Which is what makes the alien the central most important figure in the history of science fiction – and the most familiar.

# Wild Extravagant Theories

## The Science of *The Time Machine*

A paper given by Stephen Baxter at Picocon 13,  
Imperial College, 6 February 1996

"Long ago I had a vague inkling of a machine... that shall travel indifferently in any direction of Space and Time, as the driver determines."

Filby contented himself with laughter.

"But I have experimental verification," said the Time Traveller.

*The Time Machine* by H.G. Wells, p6. [1]

Here I am with the double handicap of the graveyard slot (straight after lunch) and opposite an *X-Files* video. But what I have to talk about is something of an 'X-File': the strange case of H.G. Wells, Albert Einstein and Physical Optics.

Perhaps the most common question you're asked as an sf author is: "Where do you get your ideas from?" And that question has never had more point than when asked of H.G. Wells, about his first novel *The Time Machine*. And once I was invited to come and talk here - at Imperial College, where Wells began work on *The Time Machine* - I knew I had a topic I had to dig into.

Now, *The Time Machine* was 100 years old in 1995, and it remains a wholly remarkable book. With its novel premise of time travel as a matter of engineering, and its 'desolating myth' of man's decline in the far future, it was hailed as a work of genius on its first publication, and it caused an explosion of interest in the possibilities of time travel and the fate of humanity on the far future.

And one of the most remarkable aspects of Wells's book is its scientific vision. The language Wells uses of a four-dimensional spacetime - of time as a 'direction' - is familiar to us now; it's the language of Einstein's Relativity: or rather, Minkowski's geometric formulation of the theory of Special Relativity, with time presented as a fourth dimension, in addition to the three of space.

Now, in 1886 or 1887 - when Wells started to work on the tale that would become *The Time Machine* - there was much speculation about the existence of a fourth dimension. And many of the elements of Special Relativity were in the air. In particular, in 1887 was published the result of the celebrated Michelson-Morley

experiment on the anomalous behaviour of light. And Einstein would eventually come up with his theory by pondering the peculiar properties of light.

But, remarkably, *The Time Machine* - with all its relativistic language - was published, in 1895, a decade before the publication of Einstein's first Relativity papers. And Minkowski's geometric formulation was not presented until even later: 1908, in a talk in Cologne called 'Space and Time'.

It's true that in 1895, Albert Einstein was already speculating on the relativistic consequences of Lord Maxwell's formulation of the laws of light and electromagnetism. What would happen if you could travel with a beam of light through space?... [2].

But in 1895 Einstein was only sixteen years old.

So where did H.G. Wells get his idea from? How did he come up with what we would recognise as a relativistic explanation of time travel, so many years before Einstein? Did he know about four-dimensional geometry, and Michelson-Morley?

And what has Imperial College got to do with it?

Now, I have to tell you that what follows is my own

answer to these questions, based on my own research, sometimes going back to the source documents. The fact is the various biographers and literary analysts of Wells have tended to avoid digging too deeply into the scientific origins of books like *The Time Machine*, perhaps because they tend in general to hail from the Eng-lit side of the arts-sciences divide. To such scholars, General Relativity perhaps is an alien topic as post-modernism is to, well, me.

I'll start with a brief summary of the plot of *The Time Machine*. Then I'll talk about how Wells wrote the book; what I

want to demonstrate is that Wells's ideas on time travel were pretty much fixed by 1887 or 1888, here at Imperial, so wherever he got his pre-Relativity ideas from, that was when he got them. Then I'll try to reconstruct what Wells must have been reading and hearing when the ideas started to form.

The plot:

*The Time Machine* is the story of a late-Victorian

**Wells's first  
time travel  
story... features  
a mad inventor  
called Moses  
Nebogipfel, who  
is working on a  
time machine in  
a ruined manse  
in Wales.**

scientist – who we know only as The Time Traveller. Actually, the Traveller is more of an inventor, or engineer, than a scientist. He puts together a bicycle-like Time Machine, in a boarded-up conservatory on the back of his house in Richmond. The introduction of the book depicts a dinner party one Thursday evening in which the Traveller discusses the principles of time travel – and we'll talk more about that later. Then, the next morning, the Traveller boards his Machine for his first journey into time.

After his journey through time the Traveller finds himself on a lawn with rhododendron bushes, in the shadow of a huge White Sphinx, in the year 802,701 AD. At first the world seems idyllic: the climate is lush and sunny, and England has become a huge, somewhat dilapidated garden.

The Traveller meets gentle, rather childlike people called the Eloi. He befriends one, a female, called Weena. It seems to the Traveller that humanity has advanced to an extraordinary degree, to the point where nature has been conquered, and humanity has become decadent.

But eventually he begins to uncover a darker side of the idyll. The Eloi's physical needs are met by an altogether more unpleasant race called the Morlocks, who live beneath the earth in huge caverns filled with machinery. (The way Wells reveals the existence of the Morlocks, hint by dark hint, is reminiscent of the techniques of a modern horror novel – and, incidentally, that's another aspect of the book which has largely been left unexplored, as far as I know.)

Anyway, the dark secret of the future world is that in return for sustaining the Eloi, the Morlocks are using their cousins as cattle: at the dark of each moon Eloi are culled and butchered. The Traveller realises that far from being advanced, both Eloi and Morlock are actually 'degraded' forms of humanity. They have evidently devolved from a split of mankind into an upper and lower caste; and the lower caste had been thrust into underground servitude. The Traveller observes:

But, clearly, the old order was already in part reversed. The nemesis of the delicate ones was creeping on apace. Ages ago, thousands of generations ago, man had thrust his brother man out of the ease and the sunshine. And now that brother was coming back – changed!

(*The Time Machine*, p52.)

The Morlocks steal the Traveller's Time Machine. In the second half of the book, we follow his efforts to get the Machine back. He eventually succeeds, and escapes back to his present – although he loses Weena to the Morlocks.

Back in the 1890s he updates his dinner companions with an account of his adventures – which is supposedly the account we read in the book – and then sets off into time again, to bring back proof. But he never returns... at least not until 1995. [3]

Now let's look at how Wells came to write the novel.

H.G. Wells started work on *The Time Machine* in the mid 1880s. In 1884 at the age of eighteen he'd come to the Normal School of Science (later the Royal College of Science, eventually later merged into Imperial). And the education Wells received here was crucial in shaping the ideas that led to *The Time Machine*.

The courses he took here were enlightened, geared at producing teachers of science. Wells did fairly well. He took biology, maths, physics, geology, geometrical drawing, and astrophysics. He got a first or second in every course he took except astronomical physics, which he failed in 1886, but repeated and passed in 1887. He did well in zoology, taught by T.H. Huxley.

He left the school to take up teaching, fell ill and returned to London after a football accident (which is another story... watch this space), and returned to London to finish his degree. He went on to graduate in 1890 with first-class honours in zoology and second-class in geology.

In the middle of all this, Wells began to conceive the ideas that would lead to *The Time Machine*. He would produce his first time travel story in 1888, and would keep redrafting it until its final publication as a book in 1895.

Wells's first publication of a time travel story was called 'The Chronic Argonauts'. It was published in 1888, in three parts, in the *Science Schools Journal*, a magazine Wells helped to found here at the Royal College. Wells was just twenty-two at the time. 'Argonauts' doesn't bear much relation to *The Time Machine*. It features a mad inventor called Moses Nebogipfel, who is working on a time machine in a ruined manse in Wales. We don't see any actual time travelling, but we do hear that Nebogipfel kills a man in the past, and the climax of the story is the local villagers storming the house, accusing Nebogipfel of witchcraft. So this was a bizarre mad-scientist epic more reminiscent of Mary Shelley's *Frankenstein* than anything by the mature Wells. Wells was later embarrassed by this "imitative puerile stuff" (his words), and would destroy every copy he found.

Over the next three years, Wells produced two more versions of his story, which are now lost. But the first of these introduced the idea of the upper and lower worlds in the future, although mankind hasn't yet evolved into separate species. (This story seems reminiscent of Wells's 'A Story of the Days to Come' (1897), and of his novel *When the Sleeper Wakes* (1899), which feature dystopian arcologies. So we can speculate that, given the common source of these works, Wells was developing, if implicitly, a kind of 'future history' – a portrait of a consistent future, with the upper-lower arcologies of 'Days to Come' prefiguring the evolution of the Morlock-Eloi duality.)

The second of these lost drafts got rid of Nebogipfel, and showed a future world ruled by an elite who use mass hypnosis to control their fellow humans.

In 1894 – by which time Wells had left the College – the next draft was published in the *National Observer* magazine, as three linked stories under the title of *The Time Machine*. The date is 12,203 AD, and we now have the Victorian gentleman-traveller of the final novel. The future is shown much as in the final version, with the Morlocks named (but not the Eloi), and the structure of the story is very similar, with the time travel justification by spacetime dimensions as in the final novel. But there is no Weena, and Wells shows the Morlocks rather plainly, rather than revealing their existence horror-novel style through the plot, and there is no voyage into the further future.

The editor of the *National Observer*, W.E. Henley, left the magazine before the publication of Wells was finished. Henley moved to another magazine called *The New Review* in December 1894 and commissioned Wells again, and the book was serialised again, under the title *The Time Machine*.

Wells lengthened his text and tried out a lot of new material, much of which was never printed. Wells's manuscripts included versions in which the Time Traveller journeys into the past. He encounters a prehistoric hippopotamus, and travels to 1645 to meet Puritans. In one version, time travel kills him.

The version of the story eventually published in the *New Review* was substantially the one that finally appeared, in May 1895, in book form. For the book, Wells did rewrite the introduction, in which the Time Traveller justifies his Machine, and he cut some sections of the final chapters in which the Traveller journeys to the end of time. In the cut sections the Traveller makes more stops, where we see more of the degradation of life on Earth, and Wells drops broad hints that the sad creatures we encounter are human descendants, further devolved from Eloi and Morlock. But he cut all this, leaving the final vision much more stark, but richly ambiguous. (Wells would later do some tinkering with later editions, but that's beyond our scope here.)

Now, the point of my relating that long and complex saga is to show that the changes Wells was making, between 1888 and 1895, were to do with the heart of the novel – the vision of evolution in futurity – rather than the justification for time travel itself. He wasn't really interested in the 'mechanics' of time travel, except as a device – and as the spark that launched him on the story in the first place – and he certainly wasn't interested in following up some of the aspects of time travel which would intrigue later generations of sf authors. It seems clear that he thought this would detract from the main story he had to tell.

So from his drafts, Wells cut ruthlessly any of the history-changing possibilities of time travel – of modifying the future, of perhaps averting the Morlock-Eloi catastrophe (in my sequel I confront the Time Traveller with the history-changing consequences of his

first return to the 1890s). One of the best and most famous examples of history-changing in later science fiction is 'A Sound of Thunder' by Ray Bradbury (1952), a poignant tale in which the time-travelling protagonist, despite elaborate precautions, accidentally steps on a golden butterfly in the deep past. When he returns to his present he finds himself in a world altered subtly and darkly. And Wells steered clear of time paradoxes. If I had a Time Machine I could go back and murder my grandfather. There is a paradox (apparently) because if my grandfather is killed before he sires my father, I could never be born. But if I am not born, I cannot go back to murder my grandfather... *ad infinitum*, and apparently without hope of resolution. One entertaining exploration of such paradoxes in science fiction is 'All You Zombies' by Robert Heinlein (1959), in which a man travels into the past to become his own father and mother. Later, in fact, Wells showed that he didn't really believe in time travel anyhow, and thought that history would be pretty much immune to changes. In 1927 J.W. Dunne published a book called *An Experiment with Time*, a serious study of time travel which was at least in part influenced by *The Time Machine*. Wells read this, and commented, according to Dunne, that he never intended his description of time as a dimension to be taken seriously. And in a lecture to the Royal Institution in 1902 called 'The Discovery of the Future', Wells says "The portion of the past that is brightest and most real to reach of us is the individual past, the personal memory. The portion of the future that must remain darkest and least accessible is the individual future." Wells did believe you could prophesy trends on a large scale, using the laws of physics to predict the return of a comet or the death of the sun, for example – and, on the human scale, using such statistical means as actuarial tables. But individual futures would remain unknown. And of history-changing he says, "I must confess I believe that if by some juggling with space and time Julius Caesar, Napoleon, Edward IV, William the Conqueror, Lord Roebury and Robert Burns had all been changed at birth, it would not have produced any serious dislocation of the course of destiny. I believe that these great men of ours are no more than... the pen-nibs fate has used for her writing, the diamonds upon the drill that pierces through the rock."

But we do know possibilities of history-changing and time paradoxes did occur to Wells when he was working on *The Time Machine*. As I said, in *The Chronic Argonauts* Nebogipfel is the victim of a paradox when he kills the man in the past. And even in the final version of *The Time Machine* Wells drops some hints of the wider implications of time travel in the book's introductory dinner party, in throwaway remarks about viewing great historical moments – like the Battle of Hastings – or using time travel to become rich through compound interest investments.

But Wells cut all this. He deliberately decided against



sending his Traveller back in time in the final draft – for it is backwards travel which changes history, and causes paradoxes.

So the mechanics of time travel didn't actually matter much to Wells's final novel. As he redrafted *The Time Machine*, Wells was working towards his final, complex Morlock-Eloi fable of evolution and social decay, and it was this aspect of the book that the more mature Wells was interested in.

Without the idea of time travel in the first place, there would have been no novel. But it seems clear that Wells had formulated his ideas on time travel by 1888, and wasn't interested in developing them further, and he ruthlessly cut anything which would detract from the grandeur of his central idea – and he showed remarkable restraint in this, for some of the stuff Wells cut would be sufficient to support lesser writers' whole careers.

So where, at Imperial in 1887, did Wells get his idea?

In foreword to a 1932 edition of *The Time Machine*, Wells himself says: "[The idea of the novel] was begotten in the writer's mind by students' discussions in the laboratories and debating society of the Royal College of Science in the eighties..." And in a biography by Wells's son, Geoffrey West, we learn that the idea came during the reading of a particular paper by another student in a college debating society.

The paper in question was about four-dimensional spaces, and, probably, a four-dimensional space and time.

Nowadays, the idea of many dimensions is a common mathematical tool. You can use it to visualise, and apply geometric ideas to, any system with many variables: the motion of a multi-particle system, for instance, or in optimisation problems about, perhaps, stock quantities in a supermarket.

Some theories of physics posit that extra dimensions actually physically exist – that they aren't just mathematical conveniences. For instance some variants of superstring theories describe 7, 8 or 13 extra dimensions. These are rolled up so tightly we can't see them – but they determine the physical constants (like the speed of light) that govern our universe.

In Wells's day, however, theories of multi-dimensional spaces were on the fringe of physics and mathematics, but there was a good deal of published speculation on the subject. One authority on higher dimensions who we know Wells read (I'll explain how we know later) was Professor Simon Newcomb. Newcomb was an astronomer, who went on to become the President of the American Mathematical Society – and he had been publishing papers on the topic of four dimensions since 1877. He spoke to the New York Mathematical Society on the subject, in December 1893. [4]

Newcomb's talk was a speculation on a variety of future directions in mathematics. He touched on the "fairy land of geometry". "When [the mathematician] enters fairy land he must, to do himself justice, take

wings which will carry him far above the flights, and even above the sight, of ordinary mortals..." Newcomb spoke of the idea of a space direction as the fourth dimension, rather than time. As an example he talked about escaping from an enclosed sphere by a four-dimensional transfer. And he says, "Add a fourth dimension to space, and there is room for an indefinite number of universes, all alongside of each other, as there is for an indefinite number of sheets of paper when we pile them upon each other". (Wells liked this image, and would use it in two parallel-world novels, *The Wonderful Visit* (1895) and *Men Like Gods* (1923).) Newcomb goes on to speculate on curved-space geometries, mathematical techniques which would inform much of the Relativity theory to come.

Now, as I've said Newcomb was talking about the fourth dimension being spatial. The idea of time as the fourth dimension, rather than space, is an old one. You can trace it back to the eighteenth century [5]. For example, in 1751 the French physicist d'Alembert wrote of "a clever acquaintance of mine [who] believes... that duration could be regarded as a fourth dimension... [the idea] seems to me [to have] some merit, if only that of novelty."

The most prominent thinker on spacetime geometry in Wells's day was probably Charles Howard Hinton, who published a paper on "What is the Fourth Dimension?" – the answer being "time" – in 1880. It was later reprinted in his 'Scientific Romances No. 1.' [6]

(Hinton incidentally was an intriguing character [7]. He was British, and he took an MA at Oxford. He married Mary Boole, one of the five daughters of George Boole, of Boolean logic fame. But he left Britain in disgrace following charges of bigamy. He knew Simon Newcomb, and Newcomb eventually got him a position at the Naval Observatory in Washington DC. By the time he died in 1907, Hinton was an examiner in the United States Patent Office.

(Hinton achieved a certain notoriety as an inventor himself, for example of an automatic baseball pitcher. It shot balls with charges of gunpowder and could be adjusted to produce a pitch of any speed or curve. The Princeton team practised with it for a while, but after a few accidents the batters were afraid to face it.)

Hinton speculated widely on higher dimensions. He used the fourth dimension to justify ghosts, God and an afterlife. He wrote an ambitious book about a flatland – a two-dimensional world. This was more ambitious than the more widely known *Flatland* of Edwin Abbott; it featured physically reasonable two-dimensional stars and planets, and the plot was a socialist melodrama.

Hinton developed a method of building models of four-dimensional structures (in three-dimensional cross-sections) using hundreds of small cubes, labelled and coloured to represent 'height' in the fourth dimension. (You might have seen one of Hinton's representations of

four-dimensional cubes, in Salvador Dalí's *Corpus Hypercubus* (1954), which shows Christ crucified against an opened-out Hintonian hypercube. And in Robert Heinlein's 'And He Built a Crooked House' (1941) a Californian architect builds an opened-out Hinton hypercube – and an earthquake shakes it into the real thing.) By working with his cubes for many years, Hinton maintained he taught himself to think in four dimensions. "For my own part, I think there are indications of such an intuition..." But Hinton's method would attract critics, who said his "visualisation" amounted to a dangerous form of autohypnosis.

Now Hinton certainly influenced later thinkers on spacetime geometry. But did H.G. Wells read Hinton? We do not know. It's interesting that it is Hinton who seems to have coined the term 'scientific romance', to title collections of his speculative essays and stories, in 1886 and 1898. This is, of course, the phrase that Wells would later use to label his own science fiction. And even if Wells didn't read Hinton he may very well have seen the favourable review of his 'Scientific Romances' which appeared in *Nature* in 1885 [8]. *Nature* was a weekly news sheet at the time, the nearest thing to a 'pop science' paper like our own *New Scientist*, and we know Wells read it.

The *Nature* review summarises Hinton's ideas of spacetime as a rigid four-dimensional geometry, with movement being generated as an illusion, by an object passing through a three-dimensional surface. "Each part of the ampler existence which passed through our space would seem perfectly limited to us. We should have no indication of the permanence of its existence... Change and movement seem as if they were all that existed. But the appearance of them would be due merely to the momentary passing through our consciousness of everlasting realities."

A few weeks later *Nature* published another brief piece on the fourth dimension. This was a letter by an author who signed himself (or herself) only as S. [9] This letter was evidently a response to the Hinton review. "What is the fourth dimension?... I propose to consider Time as a fourth dimension... Since this fourth dimension cannot be introduced into space, as we commonly understood, we require a new kind of space for its existence, which we may call time-space. By picturing to ourselves the aggregate formed by the successive positions in time-space of a given solid during a given time, we shall get the idea of a four-dimensional solid, which may be called a sur-solid... As an example of a solid which satisfies this condition sufficiently well, is afforded by the body of each of us. Let any man picture to himself the aggregate of his own bodily forms from birth to the present time, and he will have a clear idea of a sur-solid in time-space."

Who was S.? Nobody knows...

So this is the material around, and accessible to Wells, at the time. Maybe Wells read the Hinton review, and S.'s

reply. Or maybe Hinton, and S., were referred to in the paper Wells heard in the famous college debate.

Certainly, the idea of spacetime geometry – the vision of space and time as a sort of huge museum, with historical events fixed like exhibits, amongst which the explorer could wander – caught Wells's imagination. Wells wrote a paper on the subject called 'The Universe Rigid' (which was never published). And he began to think of the idea as the seed for a new sort of time travel story. (There had been such stories before *The Time Machine*, of course, but these were generally fantastic. They'd featured such 'justifications' as angels and reincarnations. For example, Mark Twain's Connecticut Yankee made it to Camelot through a blow on the head.)

Let's look now at the final novel. You can clearly see Wells's influences – what he must have read – in the language with which the Time Traveller justifies his Time Machine, to his guests at the famous dinner party the night before his first venture into Time.

The Traveller says, "Any body must have extension in four directions: it must have Length, Breadth, Thickness, and – Duration... There are really four dimensions, three which we call the three planes of Space, and a fourth, Time..." (*The Time Machine*, p4.)

The Time Traveller briskly dismisses the idea that the fourth dimension could be a spatial direction, as propounded by "foolish people [who] have got hold of the wrong side of the idea." He mentions Professor Simon Newcomb, who was "expounding this to the New York Mathematical Society only a month or so ago". (*The Time Machine*, p4.) Well, as we've seen, Newcomb was a real scientist. And he really did talk to the New York Mathematical Society, in December 1893 (which, incidentally, dates the Traveller's dinner party as January or February of 1894). And Newcomb's talk was reprinted in full in *Nature*, and we know Wells read *Nature*, so this is how he must have heard of Newcomb's talk.

But Newcomb's talk wasn't actually all that relevant to *The Time Machine*, because he was talking generally about a space direction as the fourth dimension, rather than time. Perhaps Wells was using the hoary old hard-sf author's trick of quoting a real, prominent and reasonably relevant scientist, to give his work some spurious plausibility.

After slagging off Professor Newcomb, the Time Traveller goes on to discuss four-dimensional space and time. "I do not mind telling you I have been at work upon this geometry of four dimensions for some time. Some of my results are curious. For instance, here is a portrait of a man at eight years old, another at fifteen, another at seventeen, another at twenty-three, and so on. All these are evidently sections, as it were, Three-Dimensional representations of his Four-Dimensional being, which is a fixed and unalterable thing." (*The Time Machine*, p5.)

In this passage, I contend, you can clearly see the

influences of the *Nature* articles I've mentioned, on Hinton and by S. Recall the S. article: "Let any man picture to himself the aggregate of his own bodily forms from birth to the present time, and he will have a clear idea of a sur-solid in time-space." Compare that to Wells's succession of portraits. And recall the quote I gave from the Hinton review: "Each part of the ampler [four-dimensional] existence which passed through our space would seem perfectly limited to us...Change and movement seem as if they were all that existed. But the appearance of them would be due merely to the momentary passing through our consciousness of ever-existing realities." Compare this to Wells's talk of a "Four-Dimensioned being, which is a fixed and unalterable thing."

The closeness of the language in the *Nature* articles to what's in *The Time Machine* – not to mention the "scientific romances" link to Hinton – convinces me that Wells must have seen these articles. He may have been pointed to them by other students, after the famous college debate. One authority on Wells, Professor AM Bork [10], has even speculated that Wells knew the mysterious S. himself (or herself).

Or perhaps – we can but speculate – Wells himself was the mysterious S.? Perhaps the article in *Nature* is an extract from his 'Universe Rigid' piece?

Sadly, I'm afraid we're never going to know for sure.

So that's the source of Wells's speculations about a four-dimensional spacetime. But what about the physics of Relativity? Is it possible the young Wells was aware of Michelson-Morley and subsequent speculations, and was influenced by them in the construction of *The Time Machine*?

The Michelson-Morley experiment was notorious at the time Wells was drafting *The Time Machine*, because it was proving impossible to accommodate in any Newtonian framework. But the contemporary debate around Michelson-Morley was all to do with the existence, or not, of the 'luminiferous ether', the hypothetical substance that was supposed to be the 'sea' on which light propagated as waves. The ether theory had to be killed off before the physicists could make themselves ready for Relativity. And a generalist reader of *Nature*, as Wells was, would have had trouble spotting the significance of Michelson and Morley. They were there, however; in 1887 there is a brief review of their report in the *American Journal of Science*. "From the delicate researches here described... it is inferred that, if there be any relative motion between the earth and the luminiferous ether, it must be small..." [11]

The controversy over Michelson-Morley developed in the following years, as Wells worked on *The Time Machine*. In the pages of *Nature* you'll find, in 1892, a Dr Oliver Lodge defending the ether hypothesis – saying that the ether must be dragged along with the earth. [12] But wiser heads were coming to terms with the true

implications of the Michelson-Morley experiment. By 1892, the Leiden physicist Hendrik Lorentz, presumably in a desperate attempt to come up with a consistent physical framework that could accommodate Michelson-Morley, had devised a basic scheme of space-time contraction, which would later form an integral element of Relativity. (Crudely, rulers are shortened and clocks slowed by motion, to make observed light-speed come out at a constant value, regardless of the observer's velocity.) This was written up in a major treatise in 1895, and a few years later Lorentz and others began to proclaim the death of the ether hypothesis, and physics was ready for Relativity.

This stuff is rather austere, is couched in the language of ether, and at the time must not have seemed as earth-shattering as it does in retrospect. It is certainly not as sexy a topic to a jackdaw mind like Wells's, as four dimensions. It's not clear to what extent even Einstein himself – let alone Wells – was aware of Michelson-Morley, and as we've noted it was not until 1908 that Special Relativity was merged with four-dimensional geometry, by Minkowski.

One authority on the behaviour of light Wells might have seen, however, is the French astronomer and writer Camille Flammarion. In 1873 he published a story called *Lumen*, about an adventurer who travels back through time faster than light and he witnesses, among other things, the end of the Battle of Waterloo before the beginning.

You only comprehend the things which you perceive. And as you persist in regarding your ideas of time and space as absolute, although they are only relative, and thence form a judgement on truths which are quite beyond your sphere, and which are imperceptible to your terrestrial organism and faculties, I should not do a true service, my friend, in giving you fuller details of my ultraterrestrial observations...

Flammarion gives us a very crude outline of Relativity theory, and such speculations seem remarkably close to what must have been going through the young Einstein's mind in 1895. But could it have influenced Wells?

Flammarion's story was published in English in America in 1874, so it doesn't seem likely that Wells can have been aware of it directly. But Flammarion's essays were reprinted in the popular magazines where Wells worked, and he may have encountered these ideas there. (Flammarion's disembodied cosmic wandering is, however, very reminiscent of a Wells short story about an out-of-body experience during surgery, 'Under the Knife' (1896).)

In any event, presumably, the physics of Relativity was not a key source of influence on *The Time Machine*.

But... that's not the end of the puzzle.

Wells's Time Traveller was an expert in 'physical optics.' Wells notes, in passing, the Traveller's 'seventeen papers' on the subject in *Philosophical Transactions* (*The*

*Time Machine*, p60.). It is tantalising to speculate that even if Wells didn't know about Michelson-Morley, the Time Traveller surely would have known of it, and the mysterious consequences of Maxwell's equations. (I explore this idea in *The Time Ships*.)

After eight years of redrafting, no element in *The Time Machine* is there by accident! So why would Wells make the Traveller an expert in a field of physics so relevant to Relativity?

I'm afraid this too is an open question, and I think Bruce Sommerville's explanation [13] – that the Time Traveller was an optical illusionist who hoaxed the whole journey – is too contrived to be convincing!

At last, in 1895, *The Time Machine* was published – and, it must have delighted Wells, it got a review in *Nature* itself. "Apart from its merits as a clever piece of imagination, the story is well worth the attention of the scientific reader, for the reason that it is based so far as possible on scientific data, and while, not taking it too seriously, it helps one to get a connected idea of the possible results of the ever-continuing process of evolution... From first to last the narrative never lapses into dullness." [14]

(Incidentally the other great source of the ideas in *The Time Machine*, of course, also derives from the Royal College. This was Huxley's teaching on evolution. Wells, we should remember, was one of the first generation of young people to be taught as a matter of course of evolution – and the immense geological age of the earth, and the sweeping distances of space, and the existence of such different eras as the Stone Age. But the idea of evolution, in particular, was still being absorbed, rather painfully, into the public consciousness. Wells was dissatisfied with what he saw as the general complacency of mankind in the face of the

**Wells was one of  
the first  
generation of  
young people to  
be taught  
evolution as a  
matter of course.**

issue of evolution. Why should we assume that we are the crest of the evolutionary process, and the only way forward is onwards and upwards? In fits and starts, as Wells started working on the project that would finally become *The Time Machine*, he set out to dramatise how civilisation could fall, and the human species itself slip backward, under the pitiless shaping of evolutionary forces.)

We've seen that *The Time Machine* sprang from the notion of spacetime as a four-dimensional structure, making travel in time possible. Around this primitive seed snail coalesced, in the mind of the maturing Wells, a fictional means by which he could express the themes and issues that concerned him. And as he worked on his book Wells wrote out paradoxical passages of backwards time travel, to focus his tale on what the Traveller would find when he reached futurity.

But, of course, to tell the story, Wells did have to leave in one backwards journey: from the remote future visited by the Traveller, back to his 1890s present. And (as I argue in *Time Ships*) surely the dread warning of his account of Eloi and Morlocks would serve to change history in itself.

Wells, after 1900, became, more self-consciously, a prophet. In his later books he was trying to write for the future – he was trying to shape it, through exhortation – rather than of the future. And his writing and thinking did have a lot of impact at the time. But for us, it is perhaps in the careful, compressed genius of *The Time Machine* that Wells as prophet has been, ironically, most effective.

Wells tried to avoid history changing. But we live in a history which has been changed, by Wells's own *Time Machine*.

Thank you.

## References

1. H.G. Wells, *The Time Machine*, Heinemann 1895. Page numbers in the text refer to Everyman's 'Centennial' edition, ed. John Lawton, 1995.
2. Ronald Clark, *Einstein: The Life and Times*, Avon, 1984.
3. Stephen Baxter, *The Time Ships*, HarperCollins 1995.
4. Simon Newcomb, 'Modern Mathematical Thought', *Nature* v49 p325-329 (1894).
5. Paul Nahin, *Time Machines*, AIP Press 1993.
6. Charles Hinton, 'Scientific Romances No. 1: What is the Fourth Dimension?'
7. Martin Gardner, *Mathematical Carnival*, Knopf 1975.
8. Review of Hinton's 'Scientific Romances', *Nature* v31 p431 (1885).
9. S., 'Four Dimensional Space', *Nature* v31 p481 (1885).
10. AM Bork, 'The Fourth Dimension in Nineteenth-Century Physics' *Isis* v55, p326-338.
11. Michelson-Morley paper in the American Journal of Science summarised. *Nature* v37 p162 (1887).
12. Oliver Lodge, 'Aberration Problems', *Nature* v46 p497 (1892).
13. Bruce David Sommerville, 'The Time Machine: A Chronological and Scientific Revision', *The Wellman*, 1994.
14. Review of *The Time Machine*, *Nature* v52 p268, 1895.

Acknowledgements: thanks to Brian Stableford, who commented on an early draft of this article.