



An Association for Retired Professional Engineers

NEWSLETTER April 2025

President's Message

Hello everyone, as this season comes to an end, welcome to the April Newsletter.

This season we have had another full year of monthly talks and are already working on September onwards.

The talks have been varied and well attended averaging 30 / 35 on each occasion.

As we now move towards the summer, our thoughts turn to visits, your committee is working hard to find suitable places to go, and we will always welcome suggestions from you.

Please email myself or Mike if you have a burning desire to go somewhere.

The Coffee mornings continue each month, with members meeting on the 3rd Thursday of the month at the Spotted Cow and the last Thursday of the month at the Swallows Return with partners, room available if you want to give it a go.

The AGM will start off our new season on Tuesday September 16th and once again the usual cry goes out for new members to join us.

We do value the input of the membership to arrange talks and visits as new / different thoughts bring fresh ideas. So if you feel this is for you, please talk to me or anyone else on the committee for more information.

I would like to place on record, my sincere thanks to my fellow committee members for ALL their hard work and long may it continue.

All that remains is to wish you all a pleasant summer, keep your eye on emails from Mike and look forward to September when we can do it all again.

Take Care and stay safe.

George Woollard

President

April 2025

PROGRAMME OF EVENTS April 2025 – September 2025

24th April	Thursday	Coffee – with Partners at Swallow’s Return
15th May	Thursday	Coffee – at Spotted Cow, Angmering
29th May	Thursday	Coffee – with Partners at Swallow’s Return
19th June	Thursday	Coffee – at Spotted Cow, Angmering
26th June	Thursday	Coffee – with Partners at Swallow’s Return
17th July	Thursday	Coffee – at Spotted Cow, Angmering
31st July	Thursday	Coffee – with Partners at Swallow’s Return
21st August	Thursday	Coffee – at Spotted Cow, Angmering
28th August	Thursday	Coffee – with Partners at Swallow’s Return
16th September	Thursday	AGM & talk - Small Modular Reactors
18th September	Thursday	Coffee – at Spotted Cow, Angmering
25th September	Thursday	Coffee – with Partners at Swallow’s Return

All Talks and Meetings will commence at 2.30 pm and be held in the Pavilion, Field Place, Worthing, unless another venue or time is indicated. Timings for visits and outings will be as printed in the detailed description of the activity.

Coffee mornings commence at 10.30 am.

We do sometimes have to cancel/rearrange talks and visits, in which case we will inform our members of changes to our programme by email. Members can always look on our website for up-to-date details of events.

Website of the RCEA

Our website, www.rceasussex.org.uk carries the very latest information on all our events.

New Members and Speakers for Talks

The RCEA needs new members and speakers to ensure that we can continue as a thriving organisation. Please think of appropriate people you know and encourage them to come along to our talks and hopefully join the RCEA.

We also need more speakers to give talks to us at our monthly meetings on Tuesday afternoons from September to April.

We are aware that many members have the knowledge from their working careers to provide interesting talks. If you are willing to give a talk, please let us know.

New Members

- Harry Hogg, Worthing
- Keith Mills, Littlehampton
- Richard Vernon, Hove

RCEA Insurance

Members need to be aware that the insurance policy that the Association holds is solely for the protection for the assets and liabilities for the Association as an entity. The policy does not provide cover for personal injury or loss to individual members. Members attend the Association's events at their own risk although under some circumstances there may be some cover from the insurance arrangements of the venue owner.

Brief Details – Talks, Outings and other activities. April 2025 – September 2025

AGM & Talk

Tuesday, 16th September 2025 - Small Modular Reactors

David James - Member

Recent news items suggest that Small Modular Reactors are the future of nuclear power in the UK. But what are they? Why is there a growing interest in their development? What technologies do they use? And when are they likely to be putting power into the grid? This talk hopes to shed some light on to these questions.

Reports

Click on a title to go to that report.

1. '[Families, Friends and Foreigners](#)', Frances Farrer-Brown, 10th December 2024
2. '[First Light](#) - Exploring the Formation of Galaxies with Super-Computer Simulations and the James Webb Space Telescope', Stephen Wilkins - Professor of Astronomy and Public Understanding of Science, University of Sussex, 14th January 2025
3. '[Why water engineering?](#)', Geoff Gibbs, 11th February 2025
4. '[A Naval Weapons Engineer's Life](#)' Philip Sherwin, Captain RN(WE), 11th March 2025
5. '[I remember, do You?](#)', Ray Parsons, 8th April 2025
6. '[The Amberley Museum](#)'

Talk

Tuesday 10th December 2024

Families, Friends and Foreigners

Frances Farrer-Brown - Wife of Member

Our final talk of 2024 was completely different to our usual talks, bringing entertainment as we enter the festive season rather than technical content. Frances (known as Fran)

described the highs and the lows of offering Bed and Breakfast accommodation to all and sundry, resulting in chuckles from the audience on many occasions.

It was in 1983 that Fran and her husband David, a GP, bought their first house on the outskirts of Littlehampton, a house with two acres of garden, many rooms, but only four power points. After taking in two students for a while (who were studying 'the sex life of greenflies') it was David who 'suggested' that it might be a good idea for Fran to run a Bed & Breakfast business from the house. David's contribution was to produce a hand-painted B&B sign. To their surprise and shock, ten minutes after putting up the sign their first visitors called!



Fran gave anecdotes about various guests, including the 'couple from hell'. After their first night they complained that their room was too hot, so Fran explained how to operate the radiator thermostat in their room. After the second night they complained that their room was too cold, again the operation of the thermostat was explained. Following the third night they complained that the room was too noisy (there is a railway line at the bottom of the garden and they are on a main road). After the fourth night they didn't like the colour of the bed linen! When they asked if they could stay an extra night Fran explained that their rooms were fully booked; she lied.

On another occasion some Swedes complained that the hooting of owls had kept them awake. However, Fran said that generally people are lovely. About 40% of their guests are English, with the rest mainly from Germany, France, a few from Italy and lots from the Netherlands. Fran had difficulty with American's use of English, referring to their garden as a back yard and with their expectation to visit many far-flung tourist sites in one day. Australians and New Zealanders always say that they are 'coming home' even if they are third or fourth generation Antipodeans. It seems that many can take a three-month break and set off to 'do Europe'.

Apart from David's hand-painted B&B signs, Fran used the AA and the local Tourist Board to advertise their business, but now get many referrals. She also finds that wedding guests are a good source of business, even though on one occasion she had to rewrite a best man's speech. Then there was the bride groom's parents who were having a blazing row when they arrived. It seems that the mother had bought a new outfit, in green, but her husband had left her new hat at home. So Fran lent her a black one, which, since she was tall and thin, made her look like a runner bean with a touch of black fly!

Fran stressed the need to have good third-party liability insurance if you are renting out rooms or properties. Her insurance is for £2M, whereas that provide by AirB&B is only £50K. This is also one of the requirements of the Tourist Board, who carry out unannounced annual inspections. On one occasion a single gentleman was staying for one night, but they heard furniture being moved around and found that the bed had been pulled apart. It was a Tourist Board inspector who looked for dust in every nook and cranny and inspected the mattress. At another time it was lucky that Fran always gives her guests a receipt, since that particular guest happened to be a tax inspector!

Some years after starting their B&B business Fran and David had an old stable block converted into self-contained accommodation as a 'granny annex' and then self-catering accommodation. With multiple guests they would often find lots of children, of different nationalities, running around the garden, all playing happily together.

Fran doesn't normally provide an evening meal. However, she once had a group of Dutch men working locally for a while and agreed to provide them with an evening meal. She found that they'd never had fruit crumble and, having tasted it, wanted more. So as to keep it interesting she tried all sorts of fruit. Apparently banana doesn't work well in a crumble! She also discovered that guests ask a lot of questions about the area and about tourist attractions, particularly in London. Having genned up on all this information she decided to make use of it by becoming a Blue Badge Guide.



Comments from guests usually included words such as 'family atmosphere' and having guests in the house helped her children realise the importance of knowing other languages and customs. A Japanese family were very confused about tipping, so they left a tip for the dog. One guest wore a very nice gold pendant around his neck which he said was made from other people's fillings. Luckily he was a dentist and not a mafia boss. Then one single gentleman, whose shirt Fran had ironed for him, paid his bill before going out for the day, but didn't return in the evening. Later the police called to say that he had been arrested as part of a car theft gang!

When it came to question time, Fran said "Before you ask, £80 per couple per night." Sounds like good value and why did she do it? Because it was fun and you meet lots of people.

David James

Talk

Tuesday 14th January 2025

First Light - Exploring the Formation of Galaxies with Super-Computer Simulations and the James Webb Space Telescope

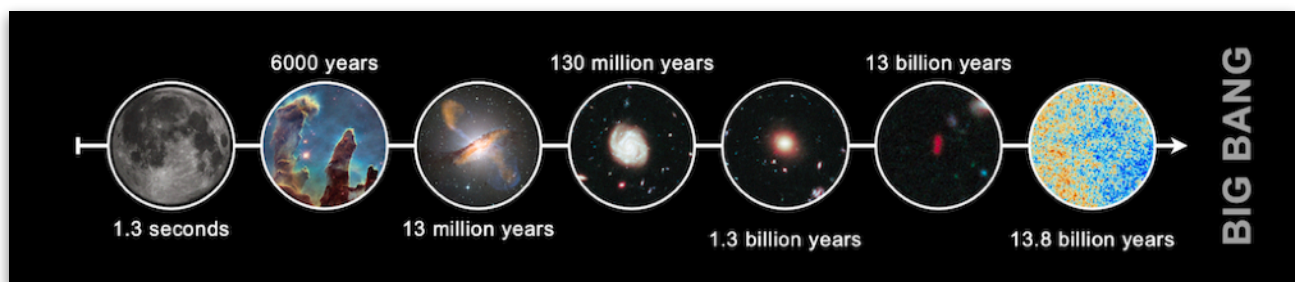
Stephen Wilkins - Professor of Astronomy and Public Understanding of Science, University of Sussex

In his talk, Stephen explained how astronomers can explore the earliest times of the universe. Having developed an interest in space when playing the 'Elite' series of computer games as a youngster, his research now focusses on understanding the formation of the first stars, black holes and galaxies, using both observations and super-computer simulations.

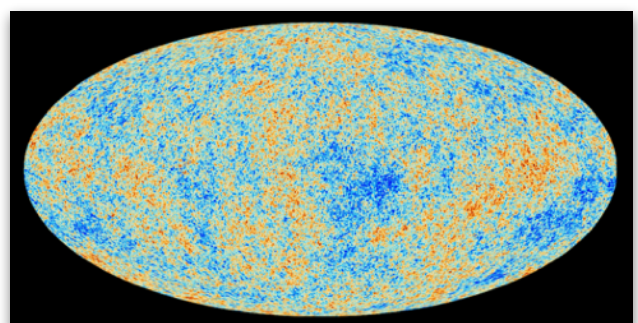
The Early Universe

Stephen explained that, since the mid-20th century we've known that our universe is expanding, since we see the frequency of light from distant galaxies moving towards the infra-red. So the earlier universe was hotter and denser and at some point in the past (about 13.8 billion years ago) the contents of the Universe were 'all next to each other', a point known as the singularity.

Due to the finite speed of light we are able to look into the universe and see it as it appeared in the past. For example, we see the moon 1.3 seconds ago (but see below).



Up to 300,000 years after the Big Bang the contents of the universe was a plasma, a mix of mainly hydrogen nuclei (protons) and electrons. However, as the Universe continued to expand it cooled and eventually neutral atoms could form and light (photons) could travel mostly unimpeded through the Universe. We see these photons today as the Cosmic Background Radiation, this is essentially a snapshot of the Universe when it was only a few hundred thousand years old. This image (observed by the Planck satellite) is the full sky cosmic background



radiation, showing inhomogeneities in the matter distribution. By this time, gravity was starting to pull denser areas together to form structures.

Stephen went on to explain that, with the continued expansion of the Universe, these background photons were shifted into the infrared, leaving the Universe devoid of visible light. These were the cosmological ‘dark ages’.

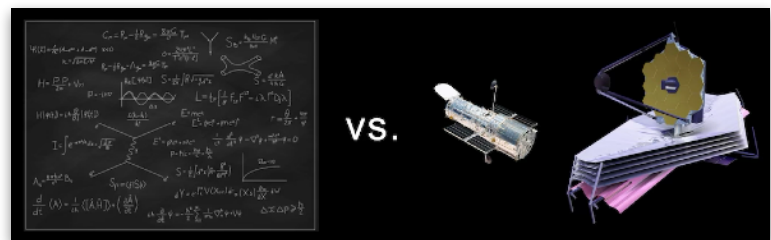


After about 100 million years the gas was able to cool enough to allow the formation of the first stars, supermassive black holes and thus galaxies.

It seems that there are still a number of unanswered questions about the early universe, such as:

- How did the first super-massive black holes form?
- What was the source of photons responsible for re-ionisation?
- Were the first stars different from subsequent generations?
- How was the early Universe enriched with heavy elements and how much was locked up in dust.

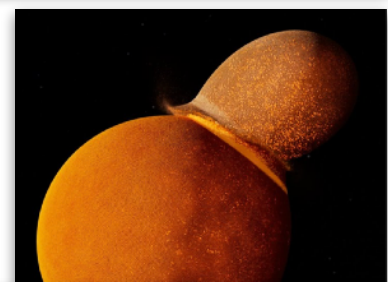
Stephen said that these questions can (only) be answered through the synergy of state-of-the-art observations and modelling.



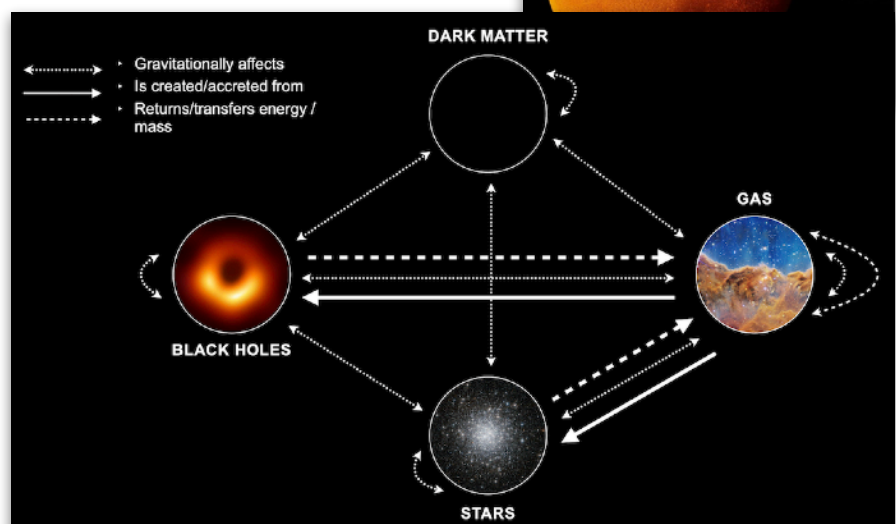
Simulating First Light

Much of Stephen’s research is associated with building models from the theory and comparing the outcome with observations. If the model fails the test then they need to refine or update the model.

Stephen explained that galaxy formation is messy. They can’t write down a simple set of equations that describe the formation and evolution of galaxies; instead they need to run simulations. These astrophysical simulations can include simulations of planets (as shown), star clusters, individual galaxies, or even entire Universes. It is these large - “cosmological” - simulations that they use to model the early Universe.



In practice they often model the Universe as containing particles representing dark matter,

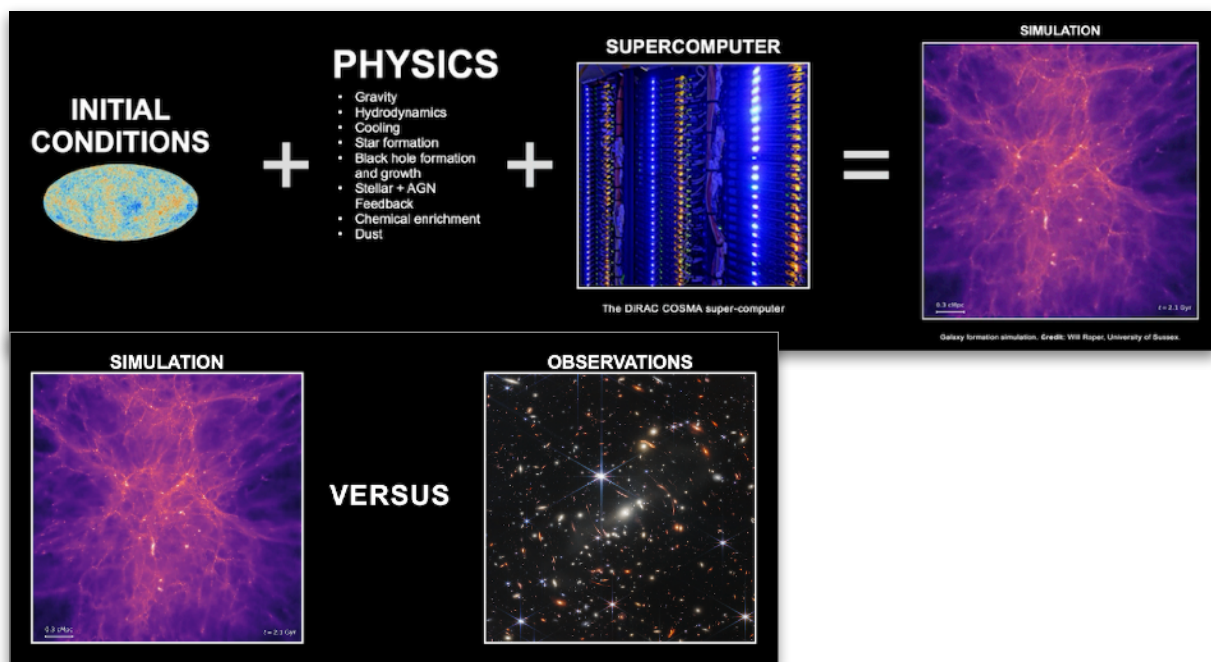


gas, stars, and black holes, where a 'star' particle could be made up of millions of actual stars. These particles interact with each other in various ways and all particles gravitationally influence each other, typically following Newtonian gravity. The rules in the simulations allow gravity to transfer gas to stars and stars to feed back material and energy to gas.

In passing, Stephen showed this image of a star that had recently exploded, generating heavy elements and adding material back into the fields of gas.

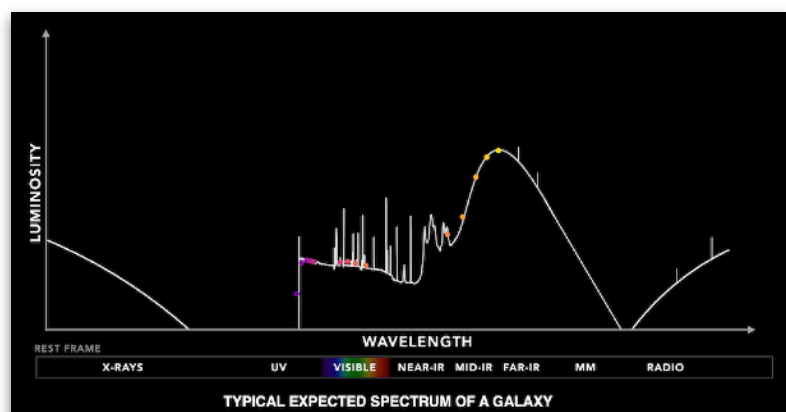
Once they have the relevant physical laws (equations), a set of initial conditions, and a big computer they can run a simulation.

The predictions of these simulations are then compared with observations to test the model. In order to test the effects of tolerances on choice of parameters, a number of computer runs are performed and the results compared.



Observing First Light

Stephen reminded us that galaxies emit light across the electromagnetic spectrum. Starlight, which dominates in most galaxies, emerges in the UV, optical, and near-IR. However, the expansion of the Universe causes the wavelength of light emitted by distant galaxies to be stretched. This is



the cosmological redshift and for galaxies in the early Universe this effect causes the starlight to be shifted into the near-IR.

Unfortunately, this makes the emission from these galaxies very difficult to observe from the ground as most of the infrared is blocked by the Earth's atmosphere. For this reason, to study the first galaxies it is often necessary to observe them from space. Another complication is that the first galaxies are very faint. Both because they are very far away but also that they haven't yet had time to form large populations of stars.

Consequently observing the first galaxies requires using our most sensitive space-based observatories, like the Hubble Space Telescope and its successor the James Webb Space Telescope (JWST).

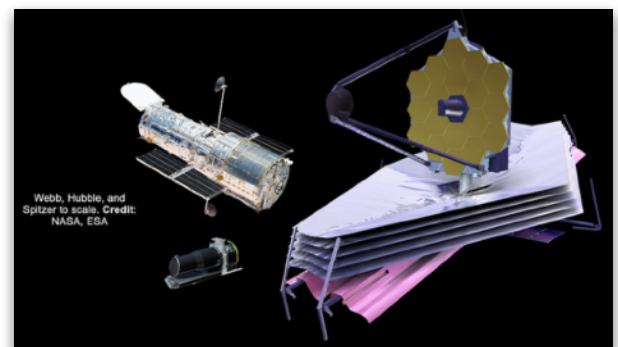
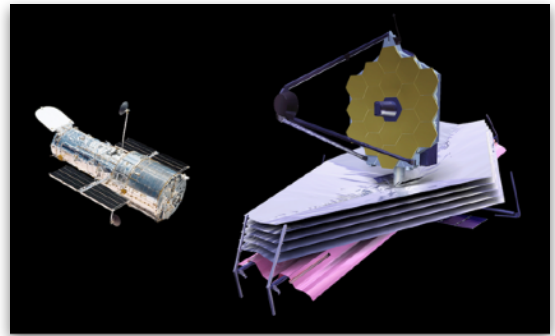
The NASA/ESA Hubble Space Telescope was launched in 1990 and was subsequently upgraded 5 times, including in 2009 with the installation of wide field camera 3 (WFC3), maintaining its position as our preeminent optical/near-IR astronomical observatory until the launch of Webb.

Beginning in 1995 Hubble obtained its first "deep field", the eponymous Hubble Deep Field. The HDF revealed thousands of galaxies stretching across much of cosmic history. This experiment was repeated with the Hubble Ultra Deep Field (HUDF, 2004), the eXtreme Deep Field (XDF, 2012), and the Frontier Fields project (2012). The XDF and Frontier Fields utilised WFC3 giving Hubble the opportunity, for the first time, to probe into the first billion years of the Universe's history. Stephen showed this image to illustrate the most sensitive view of the Universe before JWST: the Hubble eXtreme Deep Field. It contains thousands of galaxies extending over ~90% of the Universe's history, but required exposures of 100,000 seconds and the field of view is only 2-3mm square at a distance corresponding to your fingertips when your arm is stretched out.

However, Hubble had several important limitations:

- Hubble does not probe far into the infrared, limiting it to the study of the rest-frame UV and limiting how far back into the early Universe it can see.
- Hubble lacks any sensitive spectroscopic capability, limiting its ability to measure many properties, particularly the chemical evolution.
- Hubble's relatively small mirror means that galaxies are not well resolved and fainter objects are beyond its capabilities.

Specifically designed to overcome these limitations is the NASA/ESA/CSA James Webb Space Telescope. This was a joint



venture between NASA, the European Space Agency (ESA) and the Canadian Space Agency (CSA ASC), plus hundreds of universities / research institutes, thousands of individual scientists and industrial partners. Webb is the scientific successor to both the Hubble and Spitzer space telescopes.

The mirror on the JWST is almost 6x larger than Hubble and almost 50x larger than Spitzer and, Unlike Hubble, Webb is designed to observe the near and mid-IR. It also has extensive spectroscopic capabilities.

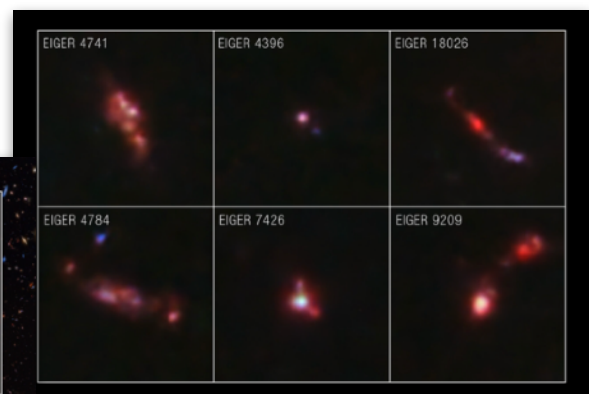
In the context of distant galaxies, spectroscopy principally allows us to do three things:

- Determine their redshift - i.e. confirm they are truly distant and fast moving away from us.
- Ascertain how the galaxy is powered - i.e. whether the light comes from stars or accretion on to a super-massive black hole.
- Measure their chemical composition.

Since it's launch on Christmas Day 2021 Webb has conducted a large number of different surveys, including both imaging and spectroscopy. Two of the largest (and most productive) have been the Cosmic Evolution Early Release Science (CEERS) survey and the JWST Advanced Deep Extragalactic Survey (JADES), both with strong UK involvement.

Stephen explained that the key to finding distant galaxies are deep near-infrared images. By studying the objects in these images it's possible to identify candidate distant galaxies.

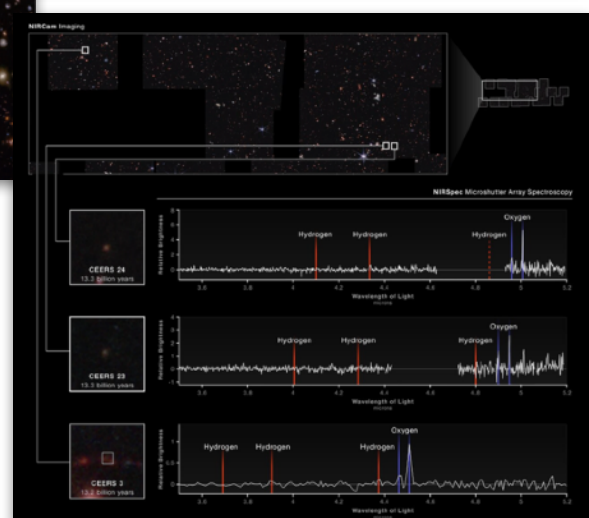
The oldest galaxy discovered so far (JADES-GS-z14-0) is just forming its first generation of stars.



Also, the James Webb Space Telescope has been instrumental in confirming the existence of distant galaxies through spectroscopic observations.

Stephen pointed out that, unlike Hubble, Webb was designed to study the first galaxies, as such it has fewer limitations. However, it does still have some:

- It's small field-of-view means that it will only



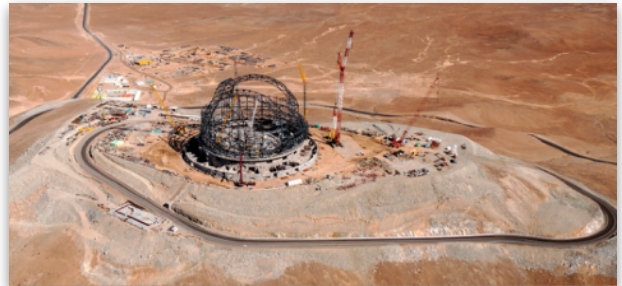
observe a small fraction of the sky over its entire mission. Probably only a few sq. degrees. This means it will probably miss the most massive, luminous objects.

- While greatly improved relative to Hubble its spatial resolution still means many of the galaxies we are observing are only barely resolved.

However, there are other space and terrestrial telescopes either in operation or being built. ESA's Euclid telescope, which launched in 2023, has a much larger field-of-view, around 0.5 sq. deg. This, together with its dedicated focus on mapping the sky, means that Euclid will survey a much larger area than ever possible with Webb. In fact, Euclid will map 1/3 of the entire sky over its 6 year mission. Euclid will complement Webb by finding rare bright objects present in the early Universe.

NASA's Roman Space Telescope, which should launch in the next few years, is similar - it will survey a smaller area than Euclid (a few thousand sq. deg.) but much deeper, approaching the depth of Webb's shallowest observations. However, both Roman and Euclid only extend a limited way into the infrared meaning they can't do much other than find distant objects - interesting objects need to be "followed-up" by Webb and/or other telescopes. Both Roman and Euclid are much smaller than Webb and only extend a limited way into the infrared meaning they can't do much other than find distant objects.

The European Southern Observatory's Extremely Large Telescope is a large, ground based observatory under construction in Chile. The ELT will have around 40 times the collecting area of Webb providing higher spatial resolution. However, the ELT will have much lower survey efficiency (in other words, it can't observe the all important infrared wavelengths) meaning it will mostly be used to study individual interesting objects.



Conclusions

Stephen said that they were only two years into what is likely be two decades of observations with Webb, so this is really just the beginning.

His team - including undergraduate students - will soon be receiving and analysing new deeper observations, allowing them to push further into the Universe's history and provide much more detail. At the same time his team are also working to refine our galaxy formation models.

Questions

The following comments were made in response to questions from the audience:

1. In addition to the valuable information being sent back from the telescopes described above, the need for yet more telescopes giving coverage of the whole sky and the full range of the electromagnetic wave spectrum, was highlighted. In this context Stephen mentioned the contributions being made, or yet to be made, by X-ray telescopes and radio telescopes.
2. Mike W reminded Stephen that the audience was mainly composed of engineers, who were interested in not only all the astronomy stuff, but also engineering things. And so any snippets of information would be greatly received.
 - When the JWST underwent pre-launch vibration testing, a number of screws fell out. Apparently the technician who originally fitted them, found that they were too long and hence protruded from 'the back of the panel'. So instead of finding shorter

screws, he unscrewed them sufficiently to stop the pointed end extending beyond the panel!

- A meteorite has already pierced one of the JWST mirrors. This was to be expected, although it was hoped to be not as early on as has occurred. Luckily the damage is not too great and the slight blurring of the received images can be allowed for.
 - Mike W remembers an earlier talk about the Hubble telescope. Apparently the builders had used the 'wrong ruler'(or mis-used the right ruler?), and parts of the telescope did not fit together as intended. But once again the operators have managed to live with this fault, and still manage to get good images.
3. Stephen is also a keen promoter of public (especially children) interest in science, although he is finding that the increased workload of being a professor is restricting his ongoing contributions to this activity. He mentioned the impending lease-expiry and thus closure of the popular and educationally-valuable Hurstmonceaux Science Centre. If any readers know of a suitable new venue, preferably nearer Brighton, he would be very interested to hear about it.

David James

Talk

Tuesday 11th February 2025

Why water engineering?

Geoff Gibbs - Member

From growing up in Ferring through to present day STEM volunteering, Geoff described his career through traffic engineering, waste water treatment and flood risk management, to advising Government planners.

Geoff opened his talk by describing his early schooling, failing the 11plus, but nevertheless getting a good education and some STEM 'A' levels, which lead to a degree in civil engineering. He initially joined Worthing Council, doing traffic modelling, but found this a bit dull, so he transferred to sewage engineering which was much more interesting. By way of introduction, Figure 1 shows an 1893 notice put out by the Borough following an outbreak of typhoid in which 194 residents died, due to poor sewage disposal arrangements contaminating drinking water.

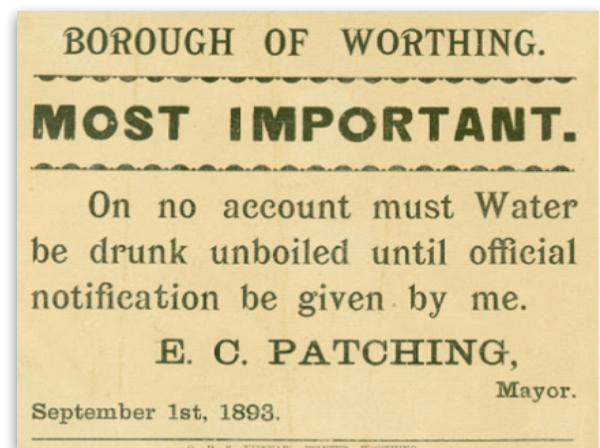


Figure 1

Geoff started his water engineering career, planning and supervising new sewers (under Worthing; we were shown a photo of a then new 1m diameter sewer under Montague Place) and soon moved on to helping design a new waste water treatment plant serving Worthing and Lancing at the NW corner of Brooklands (see Figure 2). The plant has since been upgraded, but in those days it was designed to provide primary treatment only – basically screening, and grit and sludge

removal – before discharging the effluent into the sea. It is interesting to note that the plant generated all its own electricity using gas (methane) from the sewage being processed.

Geoff then moved (via Scotland) to a post with Southern Water in 1975 and worked on updating the processing plant at Littlehampton. Figure 3 shows the physical model used to test the design. Geoff explained that he considered the cost of the model (about 2 or 3% of the total construction cost) well worthwhile as, for example, it helped optimise the internal flow arrangements, and establishing pump operation levels to avoid sucking air. Figure 4 shows the plant which removes the smell from the sewage by firstly covering it and then feeding in air via the large low level duct and introducing ozonated water into the outflow stack. Figure 5 shows the semi-treated sewage exiting from the beach outflow pipe at Seaford in East Sussex.

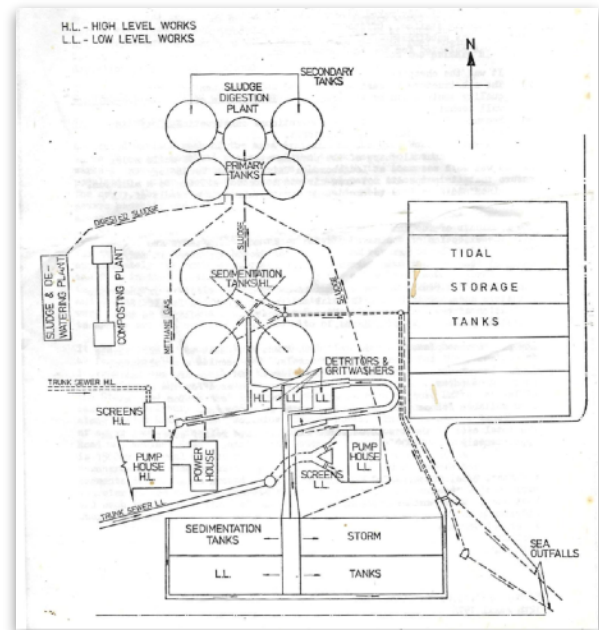


Figure 2

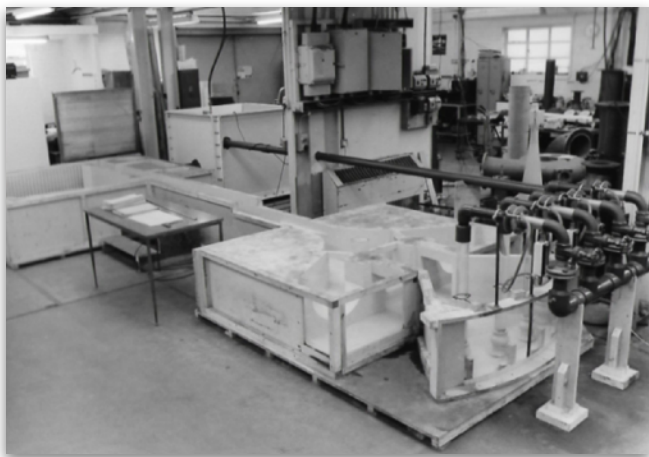


Figure 3



Figure 4



Figure 5



Figure 6



Figure 7

After a MSc in Water Engineering Geoff spent some time in the USA studying their approach to sewage treatment. One approach used by Geoff was to install a long outfall (3Km) at Seaford. Another involved discharging the effluent direct into the ground water. See Figure 6.

Southern Water was privatised so Geoff joined the then National Rivers Authority which subsequently metamorphosed into the Environment Agency. One of Geoff's first jobs was to be project engineer for a flood management scheme on the two rivers flowing into the town of Ashford in Kent. Figure 7 shows a bend in the river upstream, where the construction took place. It will be seen that there is a long curved 'S' shaped shallow bank with some hollows excavated in the ground to the right of the bank. The hollows were formed when clay was extracted and mechanically puddled to form the embankment. Figure 8 shows a fibre mesh geotextile being laid over the spillway, (which allowed the storage



Figure 8



Figure 9

area to overflow when full) before being covered with top soil. The mesh prevents the spillway being eroded if and when the storage area overflows. An example of said overflow (taken to be a 1 in a 100 year event) has already been experienced. The spillway successfully withstood the overflow, although, of course, some property flooded as was to be expected. Figure 9 shows a device used as part of the project, for keeping the water flow rate roughly constant as the input head increases. Water enters the large 'slot' shown parallel to the ground and its energy is dissipated by vortex action within the conical chamber behind.

Figure 10 shows another of Geoff's projects at Elmer (near Bognor); actually the Environment Agency constructed the four east-most breakwaters, whilst Arun District Council did the four west-most. The justification being that the eastern ones were more about preventing inland flooding, whilst the west ones were more about defending the houses from an eroding beach. The breakwaters are unusual in appearance, but this



Figure 10

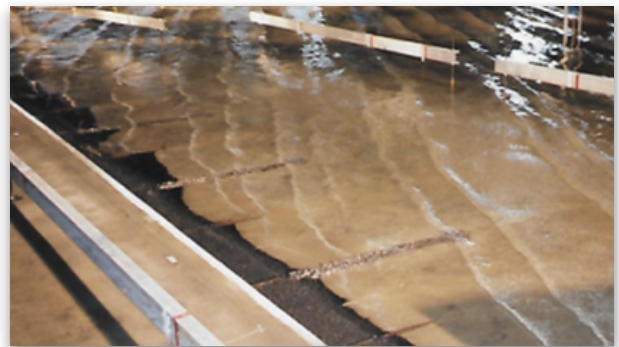


Figure 11

design was found to be the most cost effective during hydraulic modelling of the coast in a large (shallow) test tank in the then named Wallingford Hydraulics Research Centre (see Figure 11).

Figure 12 shows the huge barge used to transport the granite rock across the North Sea from Norway (apparently a sort of byproduct from the production of granite



Figure 13



Figure 12

panels used for up market buildings).
Figure 13 shows the rocks being unloaded
(one wonders about the wording of the job



Figure 14



Figure 15

description and Risk Assessment for the scoop loader driver working on deck). Geoff was responsible for the correct positioning of 75,000 tons of rock! Figure 14 shows shingle being 'pumped' from a ship to complete the breakwater construction.

Geoff then went on to describe his role creating guidelines for dealing with flooding when considering building in flood risk areas. The content of one of his guides (Figure 15) is now incorporated in the National Planning Policy Framework and he thinks the information therein is

still used to inform planning decisions. But one sensed a feeling of exasperation on Geoff's face when he informed us that it's content is only advisory; It is for planners to implement alongside other planning considerations. He showed some Newspaper headlines (both old and new) which queried the wisdom of building houses on flood plains. (Post meeting note. When Google is asked about insuring said houses, we are told that if the property was built before 2009, the insurance premium payable is subsidised by an underlying, government promoted scheme called Flood Re. This in turn is funded by £135m per year taken from normal house insurance premiums; that is, it would seem that prudent people who don't build on flood plains are paying for 'gung ho' people who do.)

Geoff also introduced some simple but obvious science, showing how Nature deals with rainfall. It's a mixture of Infiltration into the ground, Air Evapotranspiration from vegetation, and Run Off. But when man constructs buildings, roads etc, the Run Off increases significantly and has to be dealt with. Figure 16 shows an example of where this simple fact has been ignored. The flooded road



Figure 16

happens to be called 'Water Lane.' When Water Lane was widened the watercourse known as the Black Ditch was replaced with a pipe that has proved to be too small. One may smile at the water lifting inspection covers, but when pedestrians walk through the flood water, when calmer, the submerged, invisible inspection holes can present a significant safety hazard. Another statement that Geoff displayed was a headline from the West Sussex Gazette:

'Flood plains are for floods - not houses.'

Finally, in recognition of the talk's title 'Why [choose] Water Engineering?' Geoff told us about conveying his enthusiasm to youngsters via STEM activities. He also carried the message via his Governorship at a local school. Also, Geoff's son noticed his father's Job Satisfaction and became a Civil Engineer, before specialising as a Risk Engineer and thence becoming an advisor to the Insurance industry. This in turn takes him to interesting places, for example twice a year to the Panama canal (see Figure 17). Its also much better paid!

During questioning, just to end on a light note, Geoff did state that he would never swim in any of our rivers. This is due to the possibility of contracting Leptospirosis, also called Weil's disease. It is spread in the urine of infected animals, most commonly rats, mice, cows, pigs and dogs. You have been warned!

Mike Wooldridge/David James but checked by Geoff himself.



Figure 17

Talk

Tuesday 11th March 2025

A Naval Weapons Engineer's Life

Philip Sherwin, Captain RN(WE)

Philip started his talk by explaining that he came from a naval family – his father having postings in South Africa and Malta. Philip thought he'd like to be a Supply [Logistics] officer, but the Navy had other ideas. He went to Hurstpierpoint College and gained a scholarship to Dartmouth – but was too young to enter that year. So he took some more A levels in the meantime and presumably got ear-marked as a 'bright kiddie' – just what the Navy needed to become Weapons Electrical Officers.

The following list provides an overview of Philip's career. His talk was packed with interesting facts and observations, and regrettably my notes do not do justice to everything. The attached photos and organisation tree capture the essence of his talk. From here on I will just list interesting highlights and snippets.

42 Year Career Path

1962-1968	Training: Dartmouth Cadet (<i>including Training Squadron, West Indies</i>), Midshipman <i>HMS Surprise</i> , 3yr Degree in <i>Electrical Engineering</i> , Naval Application Training (<i>Gunnery, Torpedo, anti-submarine, Communications, Maintenance, Firefighting, Damage Control, NBCD.</i>)
1968-1971	DWEO, HMS EURYLUS
1971	Junior Staff Course, Greenwich
1972-1975	Scientific Officer [AUWE Portland]
1975-1977	Instructor, Digital Systems School HMS COLLINGWOOD
1977-1982	HMS BROADSWORD First Of Class Trials DWEO/WEO
1982-1983	Staff Weapons Engineer, Chatham
1984-1987	MoD Tri-Service Satellite Requirements Officer
1987-1989	Frigate Squadron WEO
1989-1990	Future Projects MoD Procurement Executive
1997 2004	Retired as Captain RN(WE), then Defence Scientific Civil Servant, retired 2004

The Navy consulted him re his first posting, and he replied 'Modern ship anywhere – but preferably somewhere different from Malta'. So he was posted to HMS Surprise based in Malta – see photo! This was the oldest ship in the Navy and had triple expansion steam engines, along with two 110v dc generators! She had been converted as a temporary Royal Yacht for the 1953 Coronation Fleet Review– note the brown, varnished Admiral's barge on the davits, and the substantial derrick for hoisting cars such as Rolls Royces. Apparently the ammunition store became a makeshift wine store!



HMS Surprise, Bay Class Frigate, launched 1945 off Malta

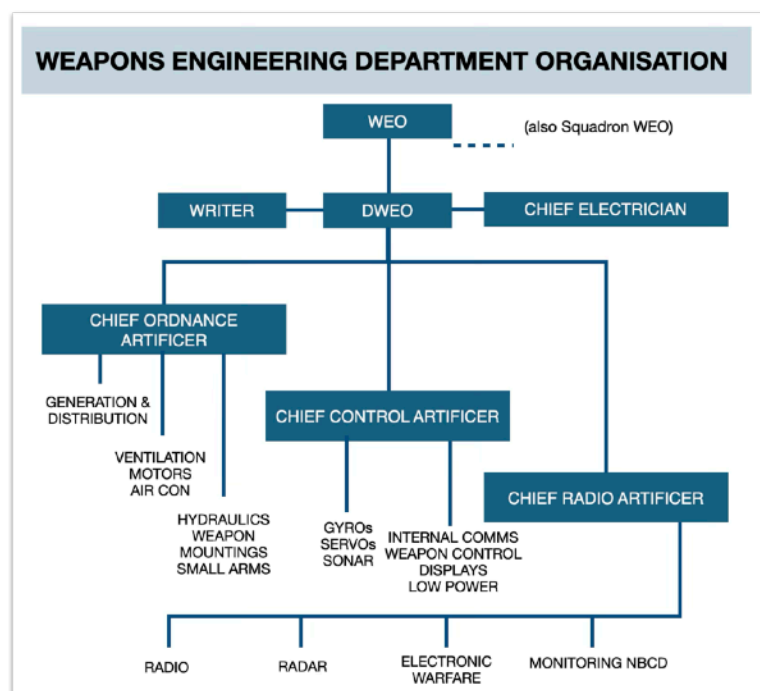
The next photo shows a nostalgic shot of a Spithead Naval Review by the then Queen. The number of large warships – many of which were from Dominion navies – show how grand things used to be.



Spithead Review

In 1968 he was appointed DWEO (Deputy Weapons Electrical Officer – see diagram for said officer's responsibilities) in HMS Euryalus – a Leander class frigate. Before the ship set sail for a tour of the far east, married crew members were given leave for the weekend. Philip was a bachelor at the time, and was left in charge of the ship. He realised that his Boss and a very experienced Ordnance Artificer were unable to go on leave because they were not able to rectify an intermittent slight vibration on the azimuth and elevation movement of the main 4½ inch gun turret. This he recognised as his passing-out exam test fault, a dry joint on one phase of the gun's 3-phase re-setter servo motor. Interestingly, it only went open circuit at certain points in the gun's travel, and hence, like all intermittent faults, was a challenging problem to solve. The Boss achieved his pre-deployment weekend at home and

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The Captain was amused and probably impressed by Philip's ability to solve a snag where the experts had failed (and no doubt this added favourably to his career record).

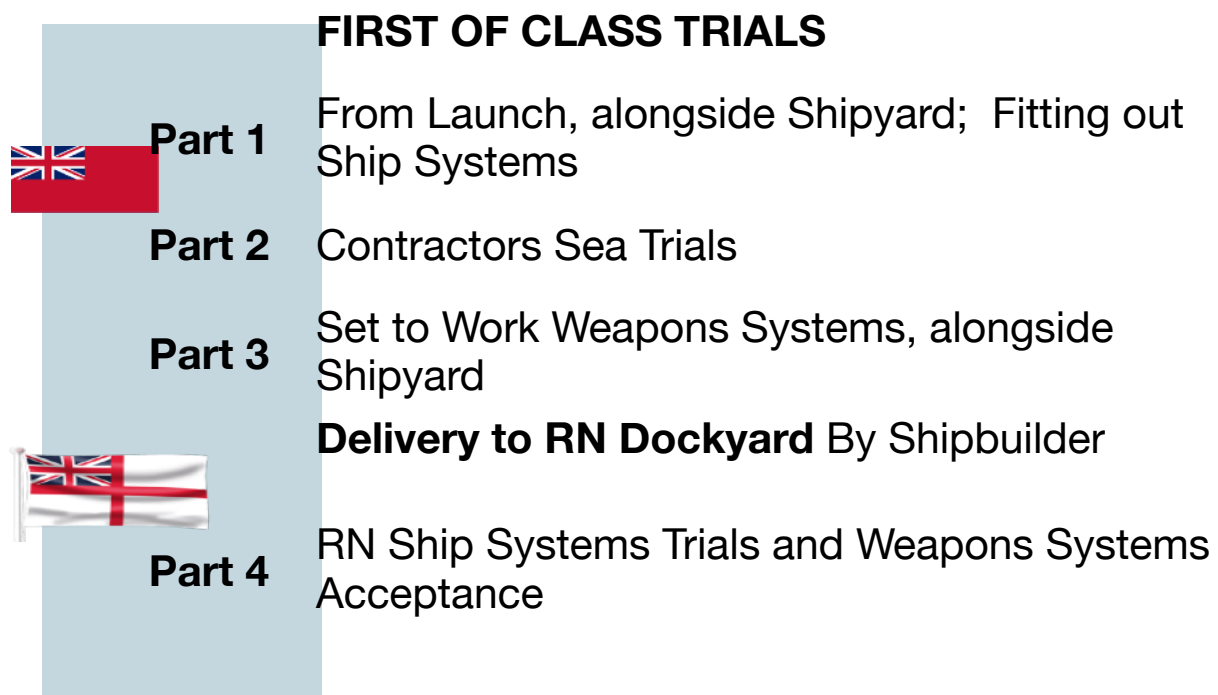
While working as a Scientific Officer at AUWE Portland, Philip carried out research on what early digital computers could do for submarines.

In 1977 Philip was appointed as Weapons Engineer for the First of Class Type 22 Frigate HMS Broadsword, an all digital, all missile ship, then being built in Glasgow. See photo, which clearly shows the exhausts from the powerful new engines, namely 2 Rolls Royce Olympus (same as Concorde) and 2 Rolls Royce Dart (same as the then very successful Vickers Viscount). Broadsword was a so-called 'Peacetime Frigate', which meant she could carry a nuclear depth charge arsenal with two larger helicopters for distributing these to other naval ships when required, highly secret at the time.



First Type 22 frigate, Launched 1976

The diagram below shows how responsibility transfers from the ship builder to the Navy when a new First of Class ship is commissioned. Broadsword was manned to a new engineering scheme; all high power electrical responsibilities being transferred to the Marine Engineers and Philip becoming exclusively a Weapons Engineer. At this point, Philip happened to mention the confusion that can result from the use of two words, hitherto used by different engineering disciplines. An Electrical Engineer talks about a Circuit Breaker being Open (= no power flowing) or Closed. But a Marine Engineer



(working with steam/hydraulics) talks about a Valve being Open (= power being delivered) or Closed. This difference in meaning has led to a serious accident in the past. (The writer is reminded of similar confusion resulting from the word 'Inflammable' before we dropped the prefix 'In'.)

Broadsword, like all sonar fitted warships blew air through small holes in the propellers, but was also fitted to blow air along the side of the hull in order to reduce the sound from the ship being picked up by enemy sonars. But regrettably, said aerated water also got sucked into the cooling water intakes and thus impacted on the efficiency of the cooling system. So, although the idea worked, it had to be dropped from the design.

Another Broadsword anecdote relates to the alignment exercises. The missile tracking Doppler radars required a doppler simulator for accurate alignment. The ideal set up is to find a ground position to act as a sensor/reflector (such as the top room in a hotel that is within line of sight of the ship being calibrated). This can be a popular job for an able seaman, complete with room service in order to preserve secrecy, and was in fact about to be used for initial Broadsword alignment in Glasgow – until it was discovered that the Russians had booked the hotel room below! Hovering helicopters can also be used to carry the doppler simulator for Alignment testing at sea – but this is to be avoided where possible as a helicopter uses far more effective engine hours when hovering.

Broadsword also had a large sonar dome mounted under the hull. This is capable of providing 'eye watering' (or was it 'mouth watering'?) detection ranges – but even after 25 years, Philip was not sure whether he could give further details – even if he knew them.

Amongst the other commissioning tests for a 'First in Class' ship, is 'full reverse from full forward'. This would only be used for an emergency stop, as the ship will stop in two lengths – thus putting huge stresses on the propeller shaft, other parts of the ship, and indeed the crew. As an aside, Philip offered a personal view that the recent prop shaft problems on HMS Queen Elizabeth (our new aircraft carrier) may have resulted from such an exercise.

Being powered by gas turbines, Broadsword (and subsequent naval ships) do not have a ready source of steam, which in the past was used to de-ice deck equipment in arctic conditions. Instead, a clever scientist proposed an anti icing gel, it didn't work and he did not know how to remove it! The Canadian dockyard's estimate for removal was VERY expensive. Broadsword was sent across the Atlantic for cheap labour available in Gibraltar to scrape and repaint the ship!

QWS 25 [Seawolf] Trials - 36 Missile Firings

- Blast & Ice
- Sub-sonic Sea Skimming Missile type target
- Supersonic Diving Missile type target
- 4 under guidance simultaneously, - 2 v Skimming, 2 v Diving
- High Supersonic aircraft type target

Philip was heavily involved in trials of the new Sea Wolf missile system, and spent some time based on the Aberporth firing range. The bullet points above highlight the type of trials being carried out. Apparently the aerial intercept of an incoming 4½ inch shell was almost too successful. The missile actually hit the shell, which immediately put the monitoring telemetry out of action, thus depriving Philip and his team of the closing bits of test data! The most complex missile trial demonstrated that the ship could guide two GWS25 missiles from each launcher at two different targets simultaneously, four missiles in the air, under guidance, at the same time. The Exocet test firing came close to emulating a previous ship that had inadvertently engaged a local Welsh cow; Broadsword's

Defence Satellite Communications SKYNET 4
Initially a 3 Geostationary satellite system

4 x SHF Channels 70° Earth Cover
North Hemisphere Cover
Europe Cover
Steerable spot beam

1 x SHF Uplink – UHF Downlink

1 x UHF Channel

Crypto Covered Command & Control

Exocet was 5 seconds from launch before misalignment of gyros was detected; a close call for a career limiting incident since the error was made by one of Philip's Artificers.

Later in his career, Philip was involved in the Skynet satellite system as its MoD desk officer sponsor. Apparently the launch of the satellites was to be carried out by the American Shuttle craft – but at the time the Shuttle experienced the well publicised and fatal (for the crew) failure which grounded the program for an extended period. So the MoD switched to the European space launching rocket. But this involved considerable re-design of the satellite, due to the much higher G forces involved. Philip also mentioned the inevitable incompatibilities, such as the Navy using spread spectrum communications and the Army using frequency hopping.

Philip went on to discuss his subsequent involvement in military research, which were often challenged by old school admirals asking what the benefits would be, and not keen on hearing about potential failures amongst hoped for successes. One eye catching (literally) research project regarding camouflage for NATO ships in Norwegian fiords, against possible enemy air attack was described. Apparently enemy pilots have a very short window (a few seconds) in which to focus their attack having entered the fiord airspace. Simulation suggested that the projection of a nude woman picture on the mountain face can be just enough to cause a sufficiently long distraction! Sadly no real trial was authorised!

And on that note Philip finished his talk bang on time for tea, followed by questions.



1972

Mike Wooldridge, but checked by Philip Sherwin.

Talk

Tuesday 8th April 2025

I remember, do You?

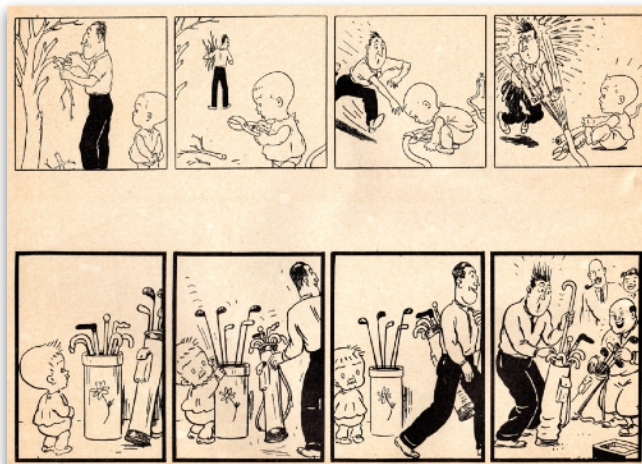
Ray Parsons - Member

Our final talk of the 2024/25 season was completely different. Ray, our oldest member and whose memory is much better than mine, gave us entertaining recollections from when he was four years old in 1936, through the Second World War and to his time working for the CEGB at the old Shoreham power station. The images have been collected by the note taker so as to help readers visualise Ray's stories.

Ray was born, grew up and worked in the Brighton area all his life. He recalls his Grandfather showing him the 'Little Nipper' cartoon in the newspaper every morning and riding on Brighton Trams, being taken by his father to see the first and only Brighton tram accident near the Level. It seems that currently one of the Brighton trams is in the process of being restored (see <https://www.bbc.co.uk/news/articles/cdjyw74781yo>).

Trams had a cab at each end, but when they were replaced by trolley busses in 1940, the likes of Dyke Road could not be served because one side of the road was in Hove and they wouldn't let posts to hold the cables be put up! Ray also mentioned that the trams had two foot pedals in the cab, one to ring the bell and the other to drop some sand on the rails (presumably to stop wheel slip). When the driver wasn't looking, children would press the pedal and then look underneath at the small pile of sand.

In 1937, whilst in Bognor, Ray's father said 'Come and look at this!'. It was a large object floating in the sky, and Ray has since deduced that it must have been the Hindenburg on its way to its fatal docking in New York when it caught fire with 36



Little Nipper (Reproduced from 'Brian White Archive')



Trams at Lewis Road depot (Reproduced from BBC News website)



Brighton Trolley Bus (Reproduced from David Bradley Online website)

resulting deaths. In 1938 Ray visited HMS Courageous which was moored off Brighton on a goodwill visit. Ray recalls going up on the aircraft lift. Sadly, the ship was the first to be sunk in WW2.

Ray also recalled travelling on the British Railways line up to Devil's Dyke. Other members mentioned the funicular railway that was built down the northern escarpment to Poynings and the cable car that linked the two.

In 1939, when the trams stopped running, the rails and posts were sent for scrap. However, the wooden blocks that were used as the rail mountings at junctions were made freely available for residents to take for their fires. They burned well, but, the grit that was embedded in the surface of the blocks 'exploded' out of the fire and led to their subsequent dis-use for this purpose.

The first bomb to land in Brighton destroyed a house near where Ray lived and killed the mother of a girl at his school. The first of many future 'prefabs' was built on the site for the girl and her father. In passing, Ray said that the bench in his workshop is made from the Morrison shelter that was in his parent's house and which he often used.

Not only were the beaches mined, but gaps were made in both piers in order to hinder potential enemy landings. Later, when the gaps were closed after the war, it was found that the free end section had been moved about two feet by the tide. So the girders joining the two parts are bent.

Any metal was sent for scrap, including WWI tanks that were often displayed in parks, apart from one in Ashford that Ray had seen converted to hold switchgear. Also, sign posts were removed (so that they could not be used by any invading troops) which meant that Ray, a keen cyclist, had to keep the Downs in sight so as to know in which direction to cycle to get home. It seems that Ray still has his identity card, which had to be produced if you were stopped.

Of course, food rationing was in progress, so Scouts (and Ray was a Scout) held their camps on farms and by doing jobs for the farmer they were given extra rations. One job they did was to find German 'doodlebugs' that had crashed or otherwise brought down and recover the wings. These were then used as seats and to repair barns.

The older Scouts had joined the army, and as such were in a position to show their erstwhile younger troop members, interesting military debris on the Downs. In particular, Ray mentioned ordnance that had not gone off. Ray and his fellow scout chums would



HMS Courageous - This photograph comes from the collections of the Imperial War Museums(collection no. 4510-02), Public Domain



Devil's Dyke Funicular Railway (Reproduced from Urban 75 website)

use a slip knot to attach a 20 yard rope to the tail fin of any such items discovered. They would then lie flat on the ground and pull the rope. If there was a loud bang, it was HE (high explosive), but if not, then it was a parachute flare. These were then taken apart so that the boys had both a parachute and a firework! (Ray pointed out that their respective mothers never knew about these activities!)

On one occasion Ray met a Canadian soldier who let him fire a Tommy gun. It knocked Ray over and he sprayed bullets into the air. This was his only injury (and a minor one at that) during the war! After the war Ray and a friend built a canoe. On one occasion they paddled out of the harbour and beached the canoe, dragging it up to where they stored it adjacent to Shoreham Basin. Only then did someone tell them that the mines had not yet been cleared from that part of the beach. So they clambered, with some difficulty, down one of the groins to retrieve their paddles that they had left by the water's edge. Ray commented that they didn't think at the time that the path they had used to drag the canoe up the beach, clearly didn't have any mines.

Ray's first job was with Allen West, a firm that made switch gear and electric motor control gear. (An audience member, who had been an AW apprentice, pointed out what a successful firm they had been – employing some 3000 people.) The firm regularly paid bonuses and Ray remembers receiving one in the form of a large, paper, five pound note, the most money he had ever been given – equivalent to a week's wages. Notes of that denomination had to be signed by everyone who owned them. Ray worked for Allen West from 1948 and in 1952 moved into the drawing office.

Ray recalled that during the 'winter of discontent', while working at Brighton power station, pickets came down and climbed into the cab of a crane, preventing them from unloading coal. The crane drivers were paid piece work and hence were not best pleased at such action. They welded the cab door shut and left the pickets in there overnight, with no power or heating. They didn't see the pickets again!

Ray's final recollection of the afternoon was about the restrictions that were placed on building sizes. In 1954 he bought a bungalow in Shoreham. All the bungalows/houses were different, but they all had the identical ground floor areas, the maximum that was permitted.

The audience enjoyed Ray's recollections and thanked him in the usual way.

David James/ Mike Wooldridge

Foot note, typed by Ray's daughter 2 days later, sent to Mike Wooldridge, and included here:

Firstly, an apology that I left out a rather important part of my talk. I was about to get to it when we broke for tea, but when we came back I missed it out and carried straight on. So Mike is going to add it to the notes for you to read and if anyone has any questions, do please ask me next time we meet.

In about 1943 a German hit and run raider was coming over Brighton, heading for the Station, when it was intercepted and attacked by a British Fighter. Immediately, the enemy aircraft dropped its bomb, which fell into Viaduct Road. At this point the bomb did not explode but its tail fin broke off and went through a double sheet hanging on the clothesline of a house in Yardley Street. The bomb itself ricocheted up and went in through the front and out at the back of a house in Argyle Road on the West side of London Road. It then hit the ground again in the playground of the Technical School at

the bottom of Dyke Road Drive, shot up in the air and finally exploded underneath one of the brick arches of the Railway Viaduct immediately above.

The explosion blew all the bricks out of the arch, leaving the railway lines suspended across the gap with a few sleepers attached.

Southern Railway, having numerous viaducts, had already stock piled a large amount of repair materials at Three Bridges and Redhill goods yards. By the following day, repair items were already being delivered to Lovers' Walk sidings at the top of Dyke Road Drive and brought down to the damaged section of the Viaduct. It took the Railway about four days to complete the scaffolding repair, with planks and wood bracings, enabling them to get one set of rails safe for trains to cross the Viaduct.

The day after the repair was completed and checked, Southern Railway arranged for one of the Brighton Steam Drivers, a Mr Jim Killick, to drive a Brighton Atlantic engine onto the temporary repair to test it.



I can vouch for what followed, because I had it "from the horse's mouth". Jim Killick was one of the founder members of the Beech Hurst miniature railway club, which I later joined. He taught me to drive a steam engine and, knowing I lived in Brighton during the war, he told me of his experience driving the test engine.

When he got on to the waiting Atlantic [class loco], the Engineer in charge of the repair came along and said "Take your engine out onto the middle of the repair, between the surviving brick piers, and stop there." Jim asked if he had not enough confidence in the strength of his repair to get up on the engine too. The Engineer replied: "Don't worry, Driver. I'm not coming up with you because if it fails, you will be better off than me. You have a good chance of landing on top of the engine. I am going down onto the scaffold platform underneath the gap, to check how much the temporary repair deflects when the engine comes onto it. So if it fails and the engine comes through I shall be worse off than you because the engine will land on top of me."

So, Jim Killick drove the engine onto the repaired gap, stopped there for about five minutes and finally the Engineer came back up and said: "It's okay, Driver, the movement was less than an eighth of an inch. Now, please drive the engine back off the viaduct onto the station ground, then at five miles per hour drive it across the Viaduct to London Road Station. Then, reverse it back over the Viaduct to Brighton Station."

When this manoeuvre was completed, the Engineer also said there was no sideways movement from the moving engine, so the repair was safe.

From then on one train at a time was allowed on the viaduct, travelling at no more than 5mph across the repaired rails, until the Viaduct was fully repaired. It took railway employees a year or more to finally rebuild the whole section in brick, and remove the temporary scaffolding, at which point trains were cleared to run normally once more.

Finally, to return to a small domestic detail: the tale of the damaged double sheet.

I can also vouch for this part of the story as living in the house in Yardley Street were my future wife and her parents. My future father in law worked at Allen West and as the factory had no canteen, he needed to live close enough to get home for lunch.

My future mother in law was able to take the damaged sheet to the Town Hall, where it was assessed as War Damaged. She was then awarded the cost of the sheet as compensation, and given clothing coupons sufficient to replace it. She was allowed to keep the damaged sheet for rags but being a thrifty housewife swiftly managed to convert the undamaged section into a single sheet.

Ray Parsons

The Amberley Museum

This is an interesting place to visit, especially if you are looking for something to do with your grandchildren. We went there on Weds 9 April. There are many exhibits featuring crafts and engineering, but the one I want to highlight here is the Electricity Pavilion.

The first thing one sees on entering, is a 375 kVA alternator driven by a double expansion steam engine. Whilst gazing at said machine, a very helpful chap said 'do you want to see it working?' So we said 'yes', and he switched on the 3 (hidden) Henry vacuum cleaners that were coupled to the exhaust port of the steam engine. This supplied enough power to just get the crankshaft turning, and the alternator producing 10volts ac on a handy voltmeter.

I told the guide how much I enjoyed the demo, and that I was an MIET. He then said, wait for it, that he was a past president of the IET in 2016/7. Name: Professor Jeremy Watson. So we had quite an interesting conversation, and when subsequently demonstrating the HV (well actually E E E HV?) 'Jacob's ladder' spark machine followed by an even higher voltage machine, he let me into a design secret. Both coils are designed to have their own resonant frequencies, and to be very loosely coupled to enable this to happen.

So, it was not only an exceptionally interesting visit for me, but also kept the grandchildren occupied with hand wheels to turn (thus powering some LED lights), and also 'housewives' (dare one use that term now days?) occupied, seeing all the old household appliances on view from yesteryear.

Mike Wooldridge

End of Newsletter