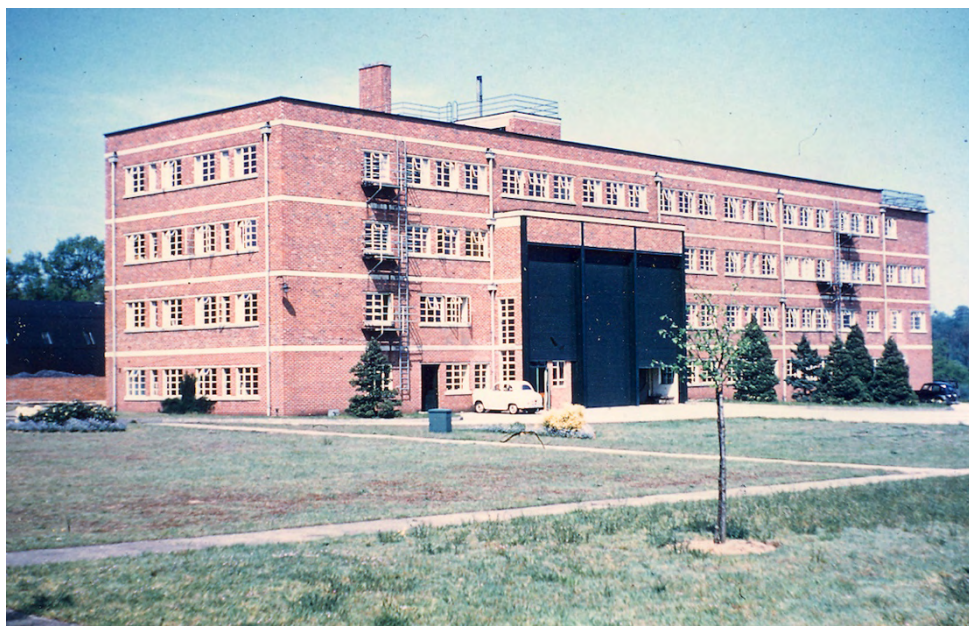


The Witley¹ site – What happened before NIO?

John Gould (wjg@noc.soton.ac.uk)

February 2019



*The ex-Admiralty Signals Establishment at Witley in the mid 1950s.
(Image courtesy of National Oceanographic Library Archives.)*

Before 1953, the year in which the National Institute of Oceanography moved from its scattered locations in London and the home counties to the building next to King Edward's School at Witley in Surrey, the site had been occupied since 1942 as a part of the Admiralty Signals Establishment (ASE). ASE had other local sites both in King Edward's School itself and at Lythe Hill House just outside Haslemere. This article is an attempt to compile information about what happened between 1942 and 1953 in what became the NIO building.

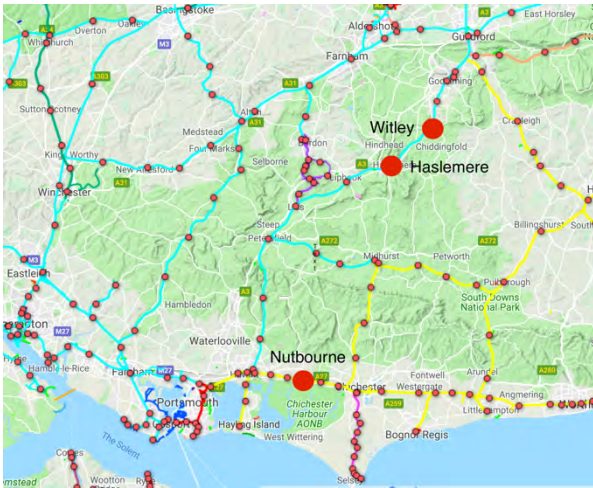
Fortunately, some very eminent scientists worked at ASE and their biographies have been a rich source of information.

The Admiralty Signals Establishment (ASE) move to Surrey

At the start of WWII the ASE had sites in Portsmouth and at Nutbourne east of Chichester. The Wikipedia entry on HMS Mercury II states :-

"The Admiralty Signal Establishment moved in April 1941, and was established in Lythe Hill House, Haslemere. The Production department had been set up in Whitwell Hatch Hotel at Haste Hill, Haslemere by the end of May that year, with a small part of the establishment remaining at the old Signal School in Portsmouth. This became independent in August when the main facility moved. Soon after the opening of the main centre of HMS Mercury, the Experimental Section in Lythe Hill House and the Production and Development Section at Whitwell House were commissioned as HMS Mercury on 25 August 1941, and opened as an independent command on 27 August. Later developments saw the establishment of laboratories and workshops at King Edward's School, Witley, valve production going to Waterlooville and aerial manufacture to Nutbourne."

¹ Though those of us who worked at NIO/IOS always referred to the location as Wormley, throughout this document I will refer to it as Witley since that is the name used in all the documents to which I refer (it is also the name of the nearby railway station).



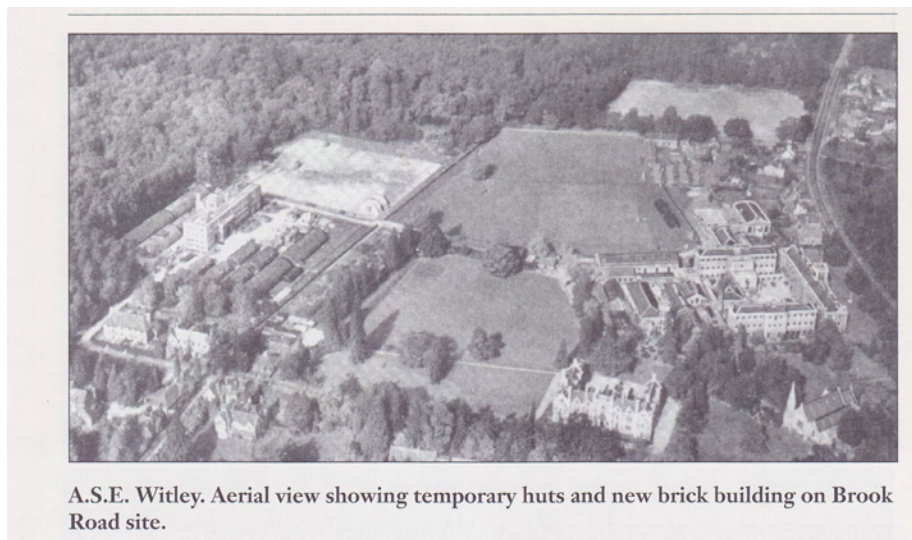
**Map showing WWII-era railway lines and the stations mentioned in the text.
(Nutbourne to Witley by train is around 35 miles)**

There are two other interesting insights into the move. The first is from the book “Signal!: A History of Signalling in the Royal Navy” By Barrie H. Kent. On page 122 he notes that:-

“...The search began for new sites. Basil Willett took the Experimental Department to Lythe Hill at Haslemere, and King Edward (sic) School, Witley (adjacent stations on the Portsmouth-London line). Broadly Headquarters and Radio went to Lythe Hill (which had been requisitioned the previous year to provide space for the expanding department), and Radar to Witley (the schoolboys moved to the old workhouse at Hambledon nearby, which some local people thought very cruel of the Admiralty!”

John Moorey, whose first job was at Lythe Hill² comments

“In fact King Edward's School was evacuated in 1939 or 1940 and ARE were in occupation of the school by 1940. My brother Ron started work for ASE in the last few months of 1939 at the Marine Barracks Portsmouth. In 1940 he moved to Witley School. There were many wooden huts erected in the school grounds long before the 1943 building was there”.



A.S.E. Witley. Aerial view showing temporary huts and new brick building on Brook Road site.

King Edward’s School and the new building. Note the many black Nissen huts surrounding the “NIO” building. (Courtesy KES archives)

A more detailed statement about the way in which the various activities were divided between the sites can be found on the HMS Collingwood Radar Museum web site. The following is an extract from O.L. Ratsey³ “As We Were-Fifty Years of ASWE History”, MS held by the Museum with various extracts available on their web site.

² This date is at odds with the school records which state that “The School left on 16th December 1941. The ASE left in 1948 and the School reopened in April 1949”. John Moorey also comments “ASE also occupied Aldworth House on Blackdown Common, once the home of Alfred Tennyson. In 1944 I started work at ASE Lythe Hill House. Very extensive grounds. They even had a cricket pitch but it was covered with rows of huts with concrete roads. I worked on the cricket pitch, as did John Swallow in 1942, he then moved on to India”.

³ Peter Herring tells me that “We lived in Godalming in the 1940s. I believe the Ratseys lodged with us for a while, and became great friends of my parents. I think they went to live in the I.O.W.”



Lythe Hill – more huts! (ASRE photograph)

“The Moves to Haslemere and Witley

Steps had been taken in 1940 to provide evacuation plans for the headquarters of the Experimental Dept of Signal School, and by mid 1941 Lythe Hill House, Haslemere had been prepared. The 50cm and 10cm developments were already away from the RNB at Onslow Road, Southsea and Eastney Fort East respectively. The dept became Admiralty Signal Establishment, Haslemere officially on 26.8.41. with the production dept at neighbouring Whitwell Hatch. The Experimental Captain became Superintendent Captain, ASE on that date (Capt B R Willett DSC CBE). It was necessary to gather the Radar groups together for better integration of the warning, gunnery and IFF and electronic warfare (EW) programmes. This was done by the move of the staff groups to King Edward’s School at Witley the latter being the next station up the railway to Waterloo. from Haslemere. The new Radar dept organisation of Sept 1942 was a radical departure from the previous concentration of staff rather on a ‘wavelength’ basis necessary to secure rapid development of the related basic techniques; it consisted of three ‘equipment’ divisions RE1, 2, 3 and nine ‘techniques’ divisions (RC1-9) serving them as necessary with the Aerials, Transmitters, Receivers, Displays, Test Equipment and Measurements, Servos, Mechanical Equipment, AJ and Research, and Theory appropriate to their systems ie Warning, Tactical and Anti-sub RE1 (S E A Landale) ; Gunnery RE2 (J F Coales); and IFF, Navigation and Countermeasures RE3 (H E Hogben). Mr H Bainbridge-Bell, one-time member of Watson-Watt’s original team at Slough, was head of Library, Publications and Information Services. King H-George VI visited Haslemere in June ‘42 and Witley Mar ‘43; photos are in ‘Archives 7.’ The Measurements Group (S J Moss) of the Radio side of ASE moved to the Cavendish Lab, Cambridge, (100 years old 16. 6. 1974). Perhaps only those hallowed buildings were thought fit to house the Establishment’ frequency standard.”

It seems that the requisitioning of King Edward’s School was not easily arranged, as the following excerpt from Bondi’s book *Conflict in the Cosmos* reveals.

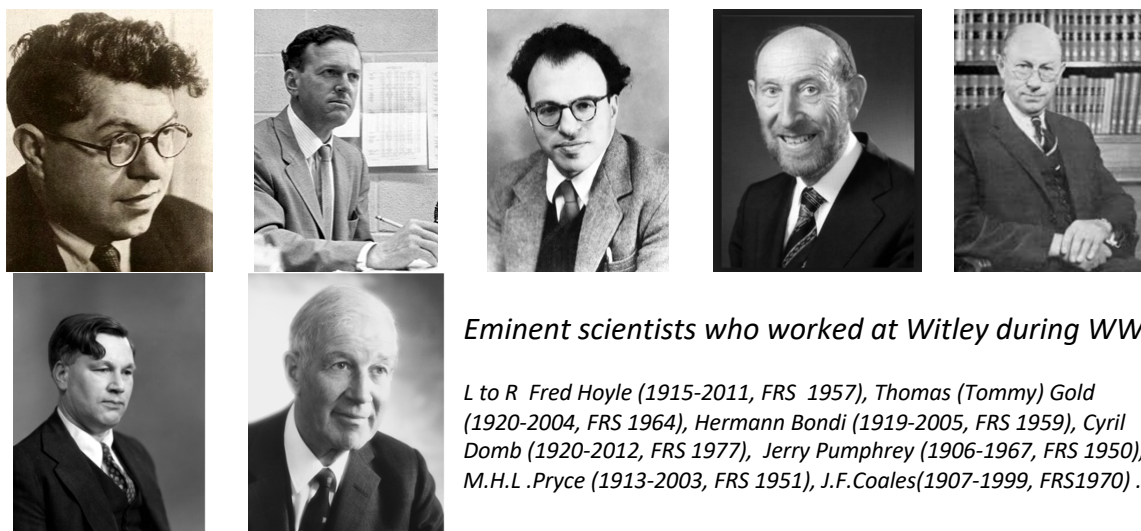
“The time had come to evacuate, the more so since the Experimental Division alone now had a staff approaching 1,000. ASE transferred its operations to a country estate, Lythe Hill House at Haslemere, and King Edward’s School, Witley at that time served by adjacent railway stations on the Portsmouth-London line. ~Other government departments had previously tried to requisition King Edward’s School, but its trustees were a powerful body. The school had a Royal Charter and Queen Mary was its patron. The Admiralty referred the requisition to Churchill, who obtained permission from King George VI to use the school only for as long as was absolutely essential for the war effort. The school reduced its roll from 280 to 120 boys, who moved out to the old workhouse at nearby Hambledon. Hoyle and the radar section continued at Nutbourne for a few weeks . They moved to Witley in autumn 1942, leaving Pryce in charge of the remnants at Nutbourne”.

Who worked there?

Radar was a key new technology in WWII and so the ASE work in Surrey used some of the brightest (young) brains. Notable among these were the (later) cosmologists Fred Hoyle (1915 - 2001), Thomas (Tommy) Gold (1920 - 2004), Hermann Bondi (1919 - 2005) and the less well-known Cyril Domb (1920-2012). Gold and Bondi were refugees from Austria. All later became Fellows of the Royal Society and their biographical memoirs refer to their wartime work.

The following is an extract from Royal Society's Biographical Memoir of Bondi and tells us something about how the group worked.

*"Hermann Bondi returned to Trinity College, Cambridge, from internment in the summer of 1941 and started to work for a PhD with Harold Jeffreys as his supervisor. He was keen to do something relevant to the war. Through the efforts of Maurice Pryce (FRS 1951) he was sent to work on naval radars at Eastney Fort East, Southsea on 1 April 1942. This was the main establishment (where both Pryce and Bondi worked), but they had an outstation at Nutbourne for testing and improving the aerials of their sets. Soon Bondi heard that a remarkable man was based there, a very unconventional and original scientist, 'a wild man', Fred Hoyle. They met several times and became friends. In June 1942 they were all moved to Witley, Surrey, and the establishment was reorganized as the Admiralty Signals Establishment, Witley, with a small theory division having Fred as its head and Bondi as his deputy. It might be worth mentioning that five of the members of this small unit later became Fellows of The Royal Society (Hoyle, Bondi, Tommy Gold, Cyril Domb and the late Jerry Pumphrey)".*⁴



Eminent scientists who worked at Witley during WWII

L to R Fred Hoyle (1915-2011, FRS 1957), Thomas (Tommy) Gold (1920-2004, FRS 1964), Hermann Bondi (1919-2005, FRS 1959), Cyril Domb (1920-2012, FRS 1977), Jerry Pumphrey (1906-1967, FRS 1950), M.H.L. Pryce (1913-2003, FRS 1951), J.F. Coales (1907-1999, FRS 1970).

⁴ Interestingly Pumphrey was a zoologist whose role in the Witley group was in some senses peripheral and yet in other ways vital as an excerpt from his Biographical Memoir shows -

"In October 1939, Pumphrey left Cambridge and joined the Admiralty Surface Weapons Research Establishment at Portsdown; he was transferred to the Admiralty Signal Establishment at Witley in 1941. Professor T. Gold, with whom he worked both during and after the war, writes: 'Scientific honesty is a quality of great importance in research. Few possess it to the degree that R. J. Pumphrey demonstrated in his varied career as a research scientist. During the war he was transposed into a field that was not primarily his own—electronics and radar development. He quickly became a most important contributor there, largely by forcing his colleagues, myself included, to a regime of a more careful evaluation of the understanding and knowledge that we had. Decisions often became obvious when his questions had to be answered; inventions can often be attributed more to the clarity of his questioning than to the originality of the inventor.' Professor H. Bondi writes in the same vein: 'His outstanding characteristic was his tremendous honesty, which made him say "I do not understand" when the rest were allowing ourselves to be talked into a course of action by the radio engineers. Through this simple intervention he made outstandingly valuable contributions on a number of occasions . . . Throughout it was his honesty and perseverance and modesty that made a very deep impression on us all.' At Witley, Pumphrey became for a time Scientific Assistant (secretary) to the Chief Scientist". Professor H. E. Hogben writes: 'Later he was deputy head of the division responsible for the development of radar for surveillance and fighter direction, and played his part in planning with Hoyle (Professor Fred Hoyle, F.R.S.), Bondi and others the series of trials with radar on the top of Snowdon which influenced so greatly the development for airborne early warning. His keen intelligence, capacity for hard work, ingenuity as an experimenter and ability to get on well with many colleagues of diverse temperaments made him a most valued colleague.'

Another insight into the structure and working of the Witley Group comes from Domb's recollection in the Hoyle Festschrift (*Astrophysics and Space Science* **285**: 289–292, 2003).

"Hermann Bondi joined our hut in April 1942. He came with prestigious backing from headquarters at Eastney, and, when we were later formally constituted into a Theoretical Group, he served as Deputy Head. One of his first important achievements was to persuade the authorities to let Tommy Gold join ASE. Tommy and he had been close friends at Cambridge, but Tommy had only a 4th class engineering degree to back his case. As a student he found the engineering courses boring, and he devoted his time and energy to climbing King's College Chapel. Hermann demonstrated his ingenuity and organizational ability in overcoming this handicap, and Tommy became the fourth occupant of our hut in November 1942. Needless to say Tommy soon exploited his rare combination of experimental versatility with wide theoretical understanding, and his reputation grew rapidly. Fred, Hermann, Tommy and I formed the core of the theoretical group. We were later supplemented by Charles (E.T.) Goodwin, a Cambridge friend of Fred's whom he rescued from an unhappy situation in ballistics research, John Gillams, a young Oxford graduate, and S. Rosseland, a Norwegian astronomer, who made no contribution to radar research, but whose membership of our group made the free Norwegian government happy. Three members of other groups were closely associated with us. Maurice (M.H.L.) Pryce, whom Fred knew well from Cambridge; Pryce was 2 years senior to Fred, and enjoyed a fabulous reputation as a theoretical physicist; he had recently been appointed Reader in Theoretical Physics at Liverpool University, and was much higher in the ASE hierarchy. Otto Bohm, a highly talented electrical engineer who had been Research Director of Telefunken in Germany before he had to leave because of Hitler; he designed the wave-guide fed 'cheese' aerials for the new generation of 10 cm wavelength radar sets. R.J. Pumphrey, a capable biologist with a good grasp of general scientific ideas was quite high up in the administration. Fred served as a benevolent Head of the group, allowing everyone to follow his own path, and providing administrative help to the best of his ability".

In 1993 I (JG) was arranging a meeting, under the auspices of the Challenger Society for Marine Science, to celebrate "50 years of science at Wormley" and I invited Sir Hermann Bondi to take part in the event. His reply to my invitation gave a further insight.

Thank you for your letter of 2nd February. Your programme for 50 years of science at Wormley certainly sounds very good. As regards my participation I appreciate my dual qualification as a former chairman of NERC and as one of the radar scientists at Witley (as we used to call it) but nonetheless I wonder whether I am the right person. I was so very lowly-placed (and so wrapped up in my corner of the work) that I did not have a good view of what was going on in the establishment as a whole. There are people from those days with far better knowledge. I am thinking in particular of Professor JF Coales FRS. He has arranged for the writing and publication in late February of a book on the development of naval radar in the war, and so his knowledge of what went on at Witley is excellent. A possible alternative would be the then head of my section Sir Fred Hoyle FRS who now lives in Bournemouth.

Professor Coales gave a talk entitled "The role of Witley in the Development of Radar". Sadly, I missed the meeting through being at sea at the time. A report was written and published in the Challenger Society Journal *Ocean Challenge* Vol 4(1) page 22.

Roger Wilson pointed out that [Ralph Benjamin](#) another refugee from Nazi Germany worked at Witley during the war. In his oral history he comments

"We were very fortunate to mix fairly intimately with so-called Naval Applications Officers, primarily operational ones, to make us understand the navy's operational problems, but also technical ones to make us understand the problems of operating and maintaining equipment at sea.

.....We were all working very hard, and I got very involved in my work. Therefore, as often as not, I forgot to collect my pay, but they kept it for me until later weeks. There was not a lot of spare time, but I did help to run a local scout group, the First Milford. On one occasion, cycling to the scout group, I got run into by a military vehicle of the Canadian Army, which was driving fast on the wrong side of the road – the right side by Canadian standards – and I finished up in hospital with concussion and a broken jaw. However, as far as I am aware, no permanent damage was done.



Visit of King George VI (Centre) to ASE, Witley. March. 1943.

Royal visit. Mostly navy uniforms but the group of civilians probably includes Bondi, Hoyle and Co. Sadly resolution is not good enough to identify them (Courtesy KES archives)

John Moorey also remembers L.H. Bainbridge Bell :-

"I worked with Bainbridge Bell, accredited as being one of the three British scientists who developed British RADAR.. He came into the lab. one day with a spinning top that he had bought. He spun it and it slowly turned through 180 degrees and continued to spin, from the other end. .He was fascinated. He was a bachelor. To the surprise of the ASE police, he would turn up for work as usual on Christmas day."

Interestingly there is evidence that the interactions between the scientists in this group were wide ranging. Post-war there were papers published jointly by Pumphrey and Tommy Gold on audiology.

What went on in the old NIO building?

Piecing together a picture of what research was carried out in the labs and workshops will be a lengthy task but some information is in the open literature.

The organisational structure of ASE (Annex 1) shows Pryce as head of RC1 (Aerials, Cables, Waveguides) Ratsey (RC2, Transmitters, Modulators, Monitors), Hoyle (RC8, Theory) and Coales (RE2, Gunnery). Pumphrey is identified as Liaison (RL1, Lythe Hill, Leydene)

The Biographical memoir of John Coales, CBE FRS (1907-1999) sheds some light on the development of radar systems at Witley as follows

John headed a large division, of which Fred (later Sir Fred) Hoyle (FRS 1957) was head of the theory section, with Hermann (later Sir Hermann) Bondi (FRS 1959) as his deputy. One memory of Coales in these difficult days is that 'he was invariably smiling and in a good mood. His optimism irritated many people, but it made him drive through to completion projects that others had despaired of' (Sir Hermann Bondi, personal communication).

In addition to these developments of gunnery control systems, the group became involved in some initial explorations of the use of radar systems for the control and guidance of anti-aircraft missiles. This was a responsibility of the Admiralty Signals Establishment (ASE) at Witley, the home of the Experimental Department of HM Signal School. A complete, automatically stabilized radar system for this purpose was developed and trials were successfully carried out at Witley in 1946. After the war had ended, in late 1945, the Admiralty decided to put the procurement of its research and development in the radar and electronics field onto a longer-range peacetime footing. They set out to persuade some appropriate industrial organization to set up a research laboratory, and to work, with the help and support of the Admiralty on the development of completely automatic fire-control systems for medium-range AA, including the radar. After many discussions, Elliot Brothers, based in London, was given this contract. In

early 1946 the Admiralty agreed with the directors of Elliott Brothers that Coales should take charge of the project.⁵

Ralph Benjamin tells us a little more of the work at Witley

My initial work was helping with the development of [radar](#) for detecting submarine snorts or periscopes, which was a very pressing problem. I then moved on to its counterpart, i.e. [radar](#) mounted in the periscope of our own submarines. I moved on from that to working on Mark-5 IFF: Interrogation Friend of Foe.”

Benjamin claims that in 1946 he invented the [tracker ball](#), the predecessor of the computer mouse, 20 years before the Americans claimed to have done so. It was part of the Comprehensive Display System (CDS). (It is not clear whether he was still at Witley then or had moved to Portsdown)

A fairly comprehensive summary of the research is contained in a paper by Lythall, (1990). He refers in some detail to the work of Hoyle’s group which he refers to as XRC8 and particularly their work on radio propagation, atmospheric effects and cosmic background noise. An experiment was carried out involving simultaneous measurements over 25-4 hrs from Nutbourne and Witley of the cosmic noise level at 40, 90 and 200MHz – early radio astronomy. There was also work on seaclutter. (Ten years later surface wave research was a main focus of NIO). There was also research on reducing the radar signature of ships – an early pre-cursor of the stealth concept.

We also have an insight into work at Witley from our former colleague, Pam Draper (Edwards).

I joined the Royal Naval Scientific Service as an Assistant Scientific Officer in about September 1950 and was allocated to Watson-Watt’s guided missile section. Most of us commuted by train – there weren’t many cars there then. We didn’t see much of WW – I think he was at Lythe Hill with most of the other senior scientists. My bosses were Charlie Pout and Mr Bruce. They were developing the guidance system for the guided missile Sea Slug⁶. Every few weeks an aircraft from Farnborough flew on a designated course near Wormley and the accuracy of following it was recorded on film. My job was reading the distances on the plots (to the nearest tenth of a millimetre) and doing the calculations of correlations etc by hand, using hand-wound mechanical calculators like FACIT and BRUNSVIGA - in other words, I was a computer. A few months of that caused eye strain and I was transferred to the Standards Section, where two Polish scientists and their mechanic colleague patiently taught me the secrets of calibration of various wave guides and attenuators, mainly X band. The admin. staff were mostly at Pinewood, as was our table-tennis table!

In the summer of 1952 the last of us were transferred to Portsdown, to the new ASWE lab there, and we commuted, six days a week – we worked Saturday mornings then. But an emissary of NIO, in the person of Laurence Baxter, had been visiting Wormley frequently to set in train the move to there, and he arranged an interview with Sir George for me and my transfer was secured – it was about a year before it actually happened, though a few people like Dick Privett were there early in 1953, I think. I started at NIO on 24 May 1953.

She also commented

I didn’t come across the senior scientists mentioned – it was a large and secretive body.

⁵ It seems likely that this was the Type 901

⁶ There is a detailed description by H.W. Pout of the Type 901 radar in the Monograph “Weapon Control in the Royal Navy 1935-45” in “The Applications of Radar and other Electronic Systems in the Royal Navy during World War 2”, F.A. Kingsley (Ed).

Domestic arrangements

With many people moved into this rural location, accommodation was an issue. The railway line mentioned earlier was a vital artery as the following extract from *Conflict in the Cosmos: Fred Hoyle's Life in Science* shows.

"By the autumn of 1942 Fred and Barbara Hoyle had a young son, Geoffrey, to look after, and at the time of the relocation to Witley, they had finally found a suitable house to rent not far from Nutbourne, at Funtington. Fred could not face house hunting all over again in Witley. So, for several months, he cycled 4 miles to the nearest train station and then took a 20 mile trip to Witley on a slow train, in winter time the reverse trip was entirely in darkness. Hermann Bondi, meanwhile, stayed at his billet with the Palmer family. Tommy Gold, whose first contribution to the war effort had been working on a farm in the Lake District, also lodged with the Palmers initially. Tommy however was a strongly practical man, with an independent streak, and he did not want to camp out in a gracious house run by extremely polite people. Early in 1943, he found a little farmhouse with three bedrooms to rent. It was unoccupied because it was under the flight path of a nearby bomber station, where aircraft would sometimes crash on takeoff, blowing all the windows out of the cottage. Tommy and Herman moved in and on weekdays Hoyle stayed overnight in the third bedroom. This was the start of a highly productive friendship.

About this time the trio organised themselves with private cars. Tommy got one first, an old Hillman, followed, followed by Fred, who bought a 1928 Singer for £5. Thereafter, he motored over to Witley on Monday mornings, returning to Barbara on Saturdays. Gold got extra petrol rationing coupons for them by arguing that they could not get to Witley before 9:25 am using public transport. However, once they had secured the essential petrol rationing allowance, in practice they rarely got started before 10 am! Food rationing was less easy to manipulate. A few special food items, such as chickens, stayed off rationing and, being in a rural area, they managed to get a chicken to roast most weekends".

And from Bondi's biographical memoir

"In early 1943 Tommy and Hermann rented a small house in the village of Dunsfold near Witley. Fred Hoyle and his family had rented a house near Nutbourne close to where he had been working before the move to Witley, and so commuted weekly, staying with Hermann and Tommy in their cottage during the week. The three spent almost all their time in the evenings discussing scientific questions, with Fred firing them with enthusiasm about problems in astronomy; as Hermann recalled, this gave him an outstanding scientific education".

A more "other ranks" perspective on accommodation comes from Winifred Sillotoe's web site:-

"The only thing I remember about that autumn day when Betty and I arrived in Haslemere is a conversation with the billeting officer; discussing the difficulties of arranging accommodation for newcomers to the Admiralty Signals Establishment, he told us about a brilliant mathematician who kept bicycle parts in the wardrobe and clothes under the bed.

My billet turned out to be a very small bedroom in a small house in Shottermill, the western suburb of the town. The rent for bed, breakfast and evening meal was £1 per week, half my salary as a Temporary Experimental Assistant, Grade III. The following day a 'ferry' would collect me and other ASE employees for transport to work. A Temporary Experimental Officer, Peter Flowerday, was billeted in the same house. His bicycle caused no problems.

It was a tandem, and one Saturday afternoon he invited me to accompany him to collect sweet chestnuts from a wood a few miles out on the Liphook road. Never wear a pleated skirt on a tandem! It blows over your face when you get up speed but you just have to keep on pedalling. The chestnuts were worth it, though".

Arthur Fisher remembers the part that Witley played in his family's life when he was a schoolboy and then when he had his first job at NIO

My father, Edward Jack Fisher, made a career of administration in The Admiralty having served the Royal Naval Air Service/ Royal Air Force in WW1. In the late 1920's he was employed at ASE which then occupied part of the Ellams Building in Commercial Road, Portsmouth. The Establishment was evacuated during the war to Haslemere and Witley. My father travelled daily to Witley by rail returning his wife and family at home in Portsmouth each night.

In December 1944 (I was 8 years old) a Christmas party was organised at Witley for the children of staff employed at ASE Witley, King Edward School. Transport was provided and I believe Walter Denyer drove the vehicle. The party took place in the school gymnasium and Santa's Grotto was under the floor in what I now realise was the school swimming pool (empty!). I even remember the present I received. I later discovered that Sylvia Harvey and John Cherriman also attended that day. Before leaving Witley to return home that day my father showed me his office; the Head Master's study.

*I joined NIO in 1954, believing I was going into the unknown, only to find my name meant something to a lot of the local staff employed there: Henry Funge, Bert Bradbury, George Rowlands, Charles Capp, Ernie Newman, Kathy North, Miss Stiven, Capt O'Hagan and Eric Cooper. Ernie Newman would come to see me regularly to remind me that my father had promised him three weeks work in 1941 and that he was **still** at Wormley fifteen, twenty, thirty years later! When he received his BEM presented by the Lord Lieutenant of Surrey in the Director's Office, he asked if he could invite me to the presentation. I attended and felt honoured: a memorable occasion.*

The Admiralty also took over a number of other properties in the area: "Pinewood" across the Brook Road was also part of the Establishment. My sister Betty was employed there for a short time as a shorthand typist, eventually returning to Haslemere at Lythe Hill House and Whitwell Hatch: also commandeered by the Admiralty. She later returned to ASRE/ASWE Portsmouth to become secretary to the Captain Superintendent.

The NIO Building

Construction of the building took place in 1942/3. The building is described in the 1952/3 Annual Report of the NIO as follows :-

"The building selected as the headquarters of the Institute was erected in 1943 for the Admiralty as an extension of the Signal and Radar Research Establishment at Haslemere. It is a four storey rectangular construction measuring approximately 180 ft x 40ft. All the weight of the structure is taken on the outer walls so that it has been possible to clear or partition each floor as required to suit the needs of the Institute. During the time of Admiralty tenure the greater part of the site was covered by brick outbuildings and hutments. A few of these have been retained as stores, battery room and sand-blasting plant and paint-spraying shops. The remainder of the site has been cleared and will be planted with grass and shrubs".

Detailed evidence of its layout and contents may be contained in a report dated 1948 "Guide to ASRE Workshops at Witley, giving brief overview of activities".

The building had a number of features to fit it for its purpose. The large black roller doors on the east-facing aspect (seen in the photograph on page one) allowed large pieces of equipment to be moved in and out of the building and permitted access to a large cargo lift (from my memory about 20'x10' by 8'high) running the full height of the building and with access to all floors including the roof. On the roof rail lines were embedded to allow equipment to be moved around. Foot access to the upper floors was via a concrete stairway on the west side of the building. The toilets (with no heating!) opened off the stairwell.

From the roof there was clear line of sight to the south and south east as far as the South Downs near Shoreham (30 miles) and to the north to the nearer Hogs Back near Guildford (7 miles).

When asked about the rails on the roof Pam Draper said

Yes there were rails and flat-bed trolleys on the roof but I don't remember them being used, except by staff like me who sat on the trolleys to eat our sandwiches at lunchtime.

I think the tracking was done from a rotatable tower in the north-east? corner of the grounds, past the large gantry on rails – I'm pretty hazy about that. Nobody told the workers anything and we didn't ask!

Of the “hutments” the largest was a Nissen hut along the western boundary of the site known as “The Black Hut” that was used as a store until it was demolished to make way for the wave tank, administration block and “White House” store that opened in 1966.

More details of the building may be in

<http://discovery.nationalarchives.gov.uk/details/r/C11260405>

This source is yet to be accessed and explored.

A few last thoughts

It is clear that proximity to the Portsmouth London railway line was vital to the viability of the Witley site in wartime, just as it was a key factor in choosing Witley/Wormley as the location for NIO.

One has the feeling that it is likely that the “brains” (Hoyle, Bondi etc.) did not work in the “NIO” but more likely in the school or in one of the huts. (shades of Bletchley Park).

Hermann Bondi was Chairman and Chief Executive of NERC from 1980-84. His visits to the IOS during that tenure must have had a certain poignancy.

Over the 50 or so years 1942/3 to 1995 when IOS moved to Southampton KES/Admiralty/NIO/IOS may have been one of the most academically productive non - University sites. 16 Fellows of the Royal Society worked there at various times or were closely associated with it. In order of election they were :-

1944	Deacon G.E.R (1906-1984)	Marine chemist
1950	Pumphrey, R.J. (1906-1967)	Biologist
1951	Pryce, M.H.L. (1913-2003)	Physicist
1957	Hoyle, F (1915-2001)	Cosmologist
1959	Bondi, H.(1919-2005)	Cosmologist
1963	Longuet-Higgins, M.S. (1925- 2016)	Hydrodynamics and waves
1964	Gold, T. (1920-2004)	Cosmology
1968	Swallow, J.C. (1923-1994)	Ocean circulation
1970	Coales, J.F. (1907-1999)	Radar and electronics
1976	Charnock, H. (1920-1997)	Air sea interaction
1977	Domb, C (1920-2012)	Mathematician
1980	Laughton, A.S. (1927-)	Geophysics
1981	Clarke, M.R. (1930-2013)	Squid and whale biologist
1984	Cartwright, D.E. (1926 -2015)	Waves and tides
1991	Thorpe, S.A. (????-)	Fluid dynamics
2000	Fasham, M.J.R. (1942 -2008)	Ocean modeller

Annex 1

The groups making up the Radar Department at Witley in October 1942.

Code	Name	Head
R	Radar Department	
RC1	Aerials, Cables, Waveguides	Maurice H.L. Pryce
RC2	Transmitters, Modulators, Monitors	O.L Ratsey
RC3	Receivers	Leslie Moxon
RC4	Displays, Teachers	D.S. Watson
RC5	Measurements, Wavemeters, Test equipment	H.M. Bristow
RC6	Auto Following and Scanning	H.C. Calpine
RC7	Experimental Engineering	F.N. Scaife
RC8	Theory	Fred Hoyle
RC9	Anti-Jamming, New Devices, Research	A.W. Ross
RE1	Tactical, Anti-Submarine, Fighter Intercept, Shore Stations	S.E.A. Lansdale
RE2	Gunnery, L.A., H.T. and Close Range	J.F. Coales
RE3	Recognition, Navigation, Miscellaneous	H.E. Hogben
RD1	Deputy and Officer-in-Charge	J.D.S Rawlinson
	Liaison with others	
RL1	Lythe Hill, Leydene	R.J. Pumphrey
RL2	Handbooks	L. Bainbridge-Bell
RL3	Test Department	<i>no name provided</i>
RL4	Fitting out, ship-fitting, Power Supplies	W.H. Pritchard
RL5	USA and Canada	B.G.H. Rowley
RL6	Valves	B. Hodgson
RL7	Operational Research	<i>no name provided</i>
RL8	DNO (<i>possibly Director of Naval Ordnance</i>)	<i>no name provided</i>
RL9	TRE (Telecommunications Research Establishment) and ADRE (Air Defence Research and Development Establishment)	W.T. Davies

Table based on information in J.F. Coales's Monograph "The Origins and Development of Radar in the Royal Navy, 1939-45 with Particular Reference to Decimetric Gunnery Equipments" in "The Applications of Radar and other Electronic Systems in the Royal Navy during World War 2", F.A. Kingsley (Ed).

References and sources

- Biographical Memoirs of ASE Witley Scientists
 - Bondi <https://royalsocietypublishing.org/doi/pdf/10.1098/rsbm.2007.0008>
 - Coales <https://royalsocietypublishing.org/doi/10.1098/rsbm.2003.0007>
 - Domb Biography is still being prepared
 - Gold <https://royalsocietypublishing.org/doi/10.1098/rsbm.2006.0009>
 - Hoyle <https://royalsocietypublishing.org/doi/10.1098/rsbm.2003.0013>
 - Pumphrey <https://royalsocietypublishing.org/doi/pdf/10.1098/rsbm.1968.0018>
 - Pryce <https://royalsocietypublishing.org/doi/pdf/10.1098/rsbm.2005.0023>

- Books and printed documents
 - Bondi. H. and Lord Carrington, 1990, *Science, Churchill and Me: The Autobiography of Hermann Bondi*. Elsevier. 151pp
 - Kingsley, (F.A. Ed). 1995. *The Development of Radar Equipments for the Royal Navy, 1935–45* Particularly Monograph 2 Basic Science and Research for Naval Radar, 1935-45 by B.W. Lythall. Palgrave Macmillan, 520pp.
 - Lythall, B.W (1990). History of Naval Radar 1935-1945 BasicScience and Research. *Journal of Naval Science*, 16(4) 190-206.
 - Milton, S. 2005. Conflict in the Cosmos: Fred Hoyle’s Life in Science. National Academy Press. 428pp. National Institute of Oceanography, Annual Report 1952/3. Available online at https://viewer.soton.ac.uk/nol/image/24063/1/LOG_0003/
 - Ratsey, O.L. Date not known *As We Were-Fifty Years of ASWE History*. Manuscript held by HMS Collingwood Heritage Collection. <http://www.rnmuseumradarandcommunications2006.org.uk/>
- Pumphrey’s papers on audiology
 - 1947. **(With T. Gold.)** Transient reception and the degree of resonance of the human ear. *Nature, Lond.* **160**, 124-125.
 - 1948. (With T. **Gold.**) Phase memory of the ear: a proof of the resonance hypothesis. *Nature, Lond.* **161**, 640.
 - 1948. (With T. **Gold.**) Hearing. I. The cochlea as a frequency analyzer. *Proc. Roy. Soc. B*, 135,462-491.
- Web Sources
 - The archive of the Naval Radar Trust held by Churchill College Cambridge <https://janus.lib.cam.ac.uk/db/node.xsp?id=EAD/GBR/0014/NVRT>
 - HMS Collingwood Heritage Collection <http://www.rnmuseumradarandcommunications2006.org.uk/>
 - Archives of Dick and Winifred Sillitto <http://www.sillittopages.co.uk/landladies.shtml>
 - Information about Ralph Benjamin <https://www.telegraph.co.uk/technology/news/10174366/Briton-I-invented-the-computer-mouse-20-years-before-the-Americans.html>
[https://ethw.org/Oral-History:Ralph Benjamin](https://ethw.org/Oral-History:Ralph_Benjamin)