

# Memoir of an English Lighthouse Engineer

## AN AUTOBIOGRAPHY BY KENNETH SUTTON-JONES

### PART III

This autobiography by Kenneth Sutton-Jones was published originally as *Grandpa's Lighthouse & Light Housework* by Peter Williams Associates, Milford Haven, Pembrokeshire, SA73 3AK United Kingdom. Copyright © 2005. It will be presented in *The Keeper's Log* as a series of articles.

#### CHAPTER IV

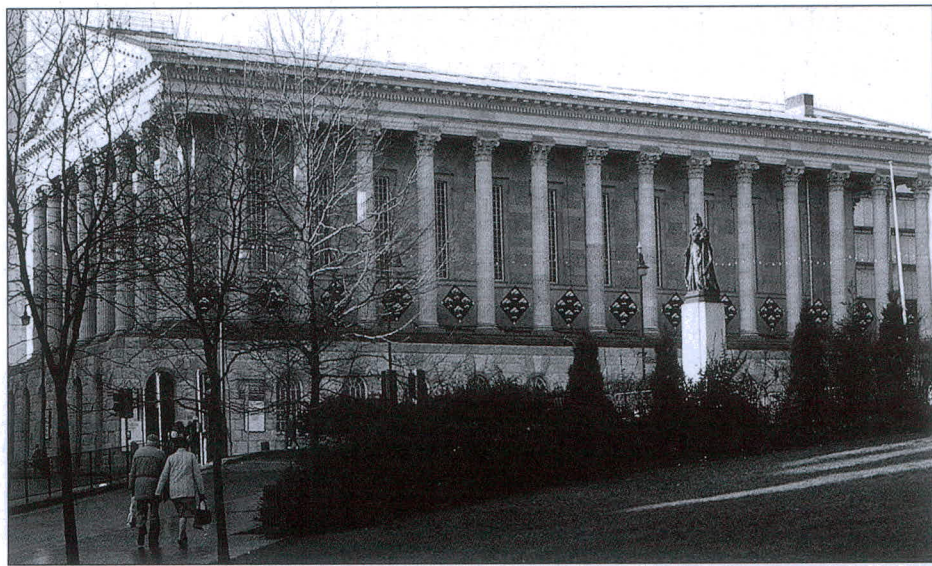
##### On The Brink

##### 'A Time for Jitters, Joy and Peace'

**I**n 1940 Britain was truly on the brink. Germany had failed to annihilate our beleaguered force on the Dunquerque beaches thanks to a brave armada of small boats and ships. It became obvious that the tactics of the First World War were no match for the Luftwaffe and a horrible foreboding prevailed, lest we should be invaded, as the rest of Europe and Norway had been.

People began to listen for church bells to ring. (They had been silenced pending becoming the means of alerting us to the invasion.) Daytime air raids intensified, but soon there was hope that the enemy aircraft would be trounced by the bravery of young pilots with their new superior fighter aircraft. The Hawker Hurricane and the Supermarine Spitfire had been made available in the nick of time. The Spitfire's designer, R.J. Mitchell, dying early in life through sheer overwork and exhaustion. The sky over southern Britain was well filled with hundreds of large balloons adjusted to optimum height by their ground crews (mainly of women of the WAAF) to form an obstructing screen for enemy aircraft.

An ominous calm set in and our King George VI urged all people to pray, and indeed we did, and many maintain that events proved that God was listening and acting. It was providential that we now had a government able to cope, with Churchill at the helm. Then the incredible news that Hitler had invaded Russia reduced the threat to us for a while. This enabled us to rearm, regroup under new field commanders and increase our air capability. We still suffered reversals in most of our ground battles until Field Marshal Montgomery turned round the African incursions by Rommel at El Alamein. The tide turned



Birmingham Town Hall.

and the Allied Forces, including American and Canadian troops, were able to re-enter Europe at D-Day in June 1944—an action that led to the final toppling of the Nazi regime in Germany.

Living in the flat next to Pulteney Bridge in the centre of Bath, my parents and grandfather enjoyed the wonderful views and generally pleasant life in the very beautiful city. In August 1941 Phyllis and I travelled by train and had a weekend with them. We walked the hilly country overlooking the architectural beauty of the city. We were so happy; it was my 21st birthday and we became engaged. Our "bottom drawer" was started when we purchased some table napkins. We were able to have another short break the following April (1942) and my friend, Wilfrid Dickinson, travelled from Bristol to celebrate his 21st birthday with us. It was a happy day but the sirens sounded during the night and soon we were assailed by a destructive air raid. The wardens demanded that we retreat to the below ground shelter across the road. Whilst crossing the road, a bomb fell very near and part of the roof of our parents' home was destroyed. The destruction in Bath,

resulting from the aerial attack known as the Baedeker Raids, was a most tragic sight, but we were all grateful to be alive.

However, I soon discovered that I could hear with my left ear only, the damage diagnosed by a leading ENT surgeon as merely a split drum. It should have healed satisfactorily, but it was revealed later that he had not taken note that the stapes within my ear had been dislodged. They have since grown into a mass, destroying the linkage to the drum. I have been almost totally deaf in my right ear since then. Around that time I recall the sinking of Britain's finest battleships, the fall of Singapore to the Japanese, and the virtual destruction of the U.S. base at Pearl Harbour in Hawaii. Thousands of British expatriates were to spend the remainder of the war in brutal Japanese camps. The construction of the Burma Railway across northern Thailand caused many to die from jungle fevers, privation and exhaustion. Japan deservedly had alienated itself from the world and its militaristic objectives only stopped by the dropping of two atomic bombs on their cities at Hiroshima and Nagasaki, followed by swift retribution in their homelands.

An 'invasion' of Britain did take place as thousands of drafted United States and Canadian personnel joined with us in training for the invading and reoccupying of Europe. Our girls loved it all and received so many gifts of nylons, not hitherto obtainable items. Many of the relationships with those servicemen became permanent. The eyes of the Americans widened to observe 'unbelievable destruction to our cities', and ours widened at their obvious standard of clothing and general living conditions, unknown to us war-weary souls. Meanwhile, southern England suffered a new Nazi weapon. A flying bomb, the V1, came in large numbers launched from pads in northern France. When reaching their targets over England their engines stopped, and they dived to explode and cause indiscriminate carnage.

A second even more destructive and super-sonic flying bomb, the V2, dived to the target even before its approach was heard. The Allied military machine was well prepared and it retaliated night after night with raids of as many as a thousand bombers assaulting Germany's cities, factories, and power dams. The retribution raids made us all feel better, but in reality, it was a very dangerous time to civilian and military personnel alike.

The North African Campaign was going well only to be frustrated at Monte Cassino in Italy, which took time to surmount. Preparations for the 'second front', so much insisted upon by Stalin to relieve Russians so nobly thwarting the German forces and their advance, were obviously taking shape under surprisingly effective secrecy. Daily we expected something to happen. Phyllis worked

along with her fine colleagues in the hospital wards, some of which had taken in the overflow of soldiers maimed in conflict. She would come home tired out after a night's duty and would have a little sleep, then go to her sewing machine and do a little more to her wedding dresses (bride plus four bridesmaids), using material she had purchased at the beginning of the war.

My cousins, Rosemary and Barbara (buddies of mine from the 1920s), were in the Land Army toiling on farms in Surrey and another cousin, Alison, was in the women's forces elsewhere.

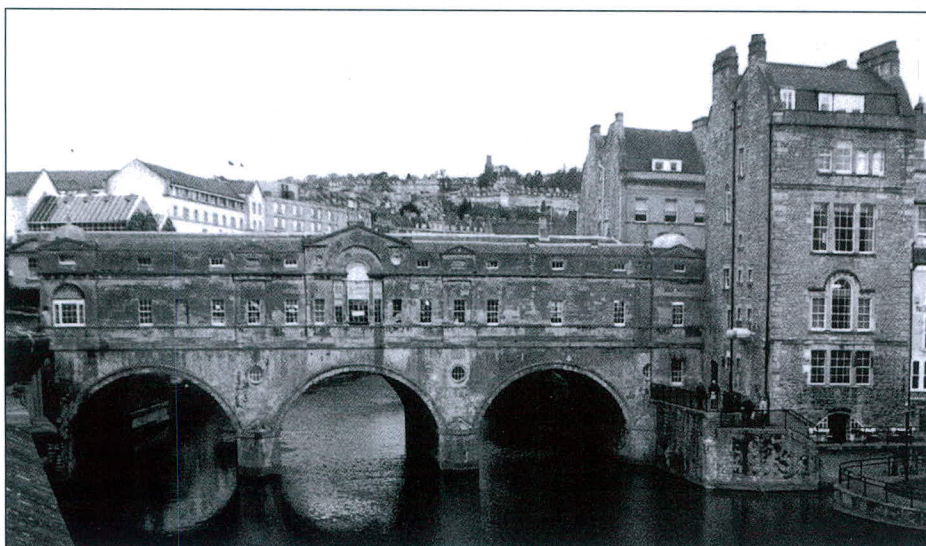
I had expected to join the Navy when my call up papers arrived but the deafness sustained in the air raid on the city of Bath thwarted my acceptance on medical grounds. The work I was doing at Chance Brothers was totally connected with the needs of the Forces and, upon consideration, I could not have played a more effective part. Certainly, the hours of work were very long indeed, and on one occasion, we did a stint of twenty-seven consecutive days' work in four weeks and were exposed heavily to air raids in the middle part of the war. My main contribution was to come in the years immediately following the end of hostilities in 1945.

Phyllis and I decided it was time to marry, although prospects were as yet unseen. We both felt God's intention was for us to be married and so plans were laid. Phyllis was expected to be married in her own Chapel (and this would have been ideal). In those days, Anglicans and Baptists were less close than now but our faith in God and the Redemption of Our Lord Jesus, followed by the promise of

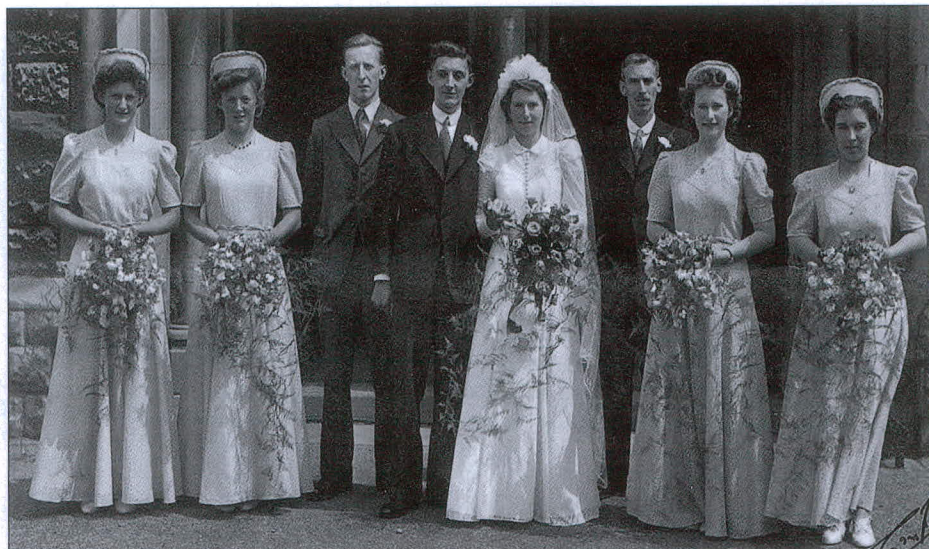
God's dwelling Spirit was a uniting factor, so we were not violently opposed to my own parents' desire for us to be married in their local place of worship, St. Mary's, Addington, Surrey. I had had a double dose of Baptism, i.e., in August 1920 in Croydon and, following my own conversion to the faith, by immersion at Carters Lane Church. I had already been confirmed at Croydon Parish Church in the days of Bishop Woods in 1936 and it was decided that Phyllis would be confirmed in Birmingham. So it could be said that we had both become 'well and truly done'. Also, that we could both be described as 'Baplicans'. A 'shuttle' service of necessities for the wedding was to follow between Quinton and Shirley in Croydon. These featured the wedding dresses, cake, presents, etc., to be preserved against air raid damage within the brick shelter behind the garage at number 20 Shirley Church Road. Bans were read in both locations and all seemed set for the day, 24th June 1944.

Then, came a frantic phone call from Minnie (my mother), "We have suffered roof damage in an air raid. The wedding cannot possibly take place, oh dear, oh dear" etc. Since Phyllis was living in at the hospital, the Bans had been read at the local Church (St. Augustine, Edgbaston) and Rev. Roberts, Chaplain at the hospital, pointed out that the wedding could be re-arranged to take place at St. Augustine's and he undertook to make all arrangements and would be happy to conduct the marriage himself. (What a friend indeed.) So those who had been invited and said that they could not attend to be with me in the south, were re-invited and turned up, together with so many of the nursing staff. The 'shuttle' was reversed to deliver all necessities in time for the Edgbaston wedding. My best man, Colin Hill, had to return to his unit, so my choice was for Crusader and great friend, David Bulman. We visited the notable caterer Kunzles of Five Ways in Edgbaston, who most helpfully turned on a delightful wedding breakfast in their restaurant, restricted to twenty guests because of the difficulties due to very strict government rationing regulations.

I stayed at the Bulman residence in Harborne and, with David, strode the five miles on foot the following day to find that the bridal car was already in the vicinity ahead of us. We took our places in the packed Church with the most glorious organ playing of Handel's *Water Music* with Mr. North as organist, and my dear friend Wilfrid Dickinson assisting Rev. Rob-



Poulney Bridge in the centre of Bath, home to Kenneth's parents.



**Kenneth and Phyllis on their wedding day along with the wedding party.**

erts in conducting the marriage. Phyllis looked stunning as she passed to my side on the arm of her dear father. There were four bridesmaids, namely, Phyllis's sister Hazel, her friend Edna Roach, and my two cousins Rosemary and Barbara. The first hymn was *Praise My Soul the King of Heaven*, during which the Rev. Roberts turned us to face each other to say our vows. It really was a truly wonderful occasion.

The signing took place and more superb music followed as we went out to the front of the Church where the photographer took our photographs. Then we were greeted by our relatives and friends. We 'sailed away' to Kunzles, then to New Street Station and off by train, standing all the way to Cheltenham. Here we walked to the bus for Winchcombe and our honeymoon venue. Our honeymoon was under conditions limited by war restrictions.

It rained every day, and apart for a visit by bus (only one a week) to Gloucester, where our raving appetites were so wonderfully restored by Phyllis's auntie's catering, we had a rather Spartan, though joyous, week. Our first and temporary home was in Phyllis's parents' home in

Compton Road, Quinton, and we found them so welcoming and kind in every way. One cannot escape feeling that there was an element of spite to note that, for our first three months as man and wife, the hospital matron placed Phyllis on night duty! I had disappeared to work before Phyllis arrived home and she left for night duty just half an hour after I returned from work.

The D-Day assault by the Allied Forces had taken place some days before our wedding. The roar of the air armada overhead with the paratroops and gliders full of men making for their dropping zones, and the revelation of what had happened across the Channel itself, truly amazed us all—the beach head on the coast of Northern France with its floating concrete harbour, and craft landing thousands of men onto Normandy beaches.

Pure exhilaration prevailed, but certainly,

there was no 'push-over', only a constant hard slog for many weeks. The ebb and flow of battle was mostly flow until the reverse at Arnhem, which threatened to be a very serious setback, but eventually, after eleven months, victory in Europe was secured. The war against Japan intensified and it submitted only after two atom bombs were dropped on Hiroshima and Nagasaki.

What was revealed in the slave camps in Europe and in the Far East utterly horrified the world—to think that humankind could ever be so brutal and indifferent to suffering. Much penal retribution followed and it took a long time for normal relationships with our former enemies to be restored. Reflecting upon the years of anguish, one can feel immensely proud of the steadfast, compassionate loyalty of the British in the general conduct of themselves. Defiant under fire, magnanimous in victory and extremely brave in adversity with almost invariable honesty one to another.



**Europa Point, Gibraltar. The lighthouse was built by the Royal Engineers in 1841.**

The edge of defeat had passed and we were now on the brink of the world, by no means as we knew it before Hitler. The periphery we were now approaching was of a changing world...still changing at an alarming rate as I write in the twenty-first century.

There emerged the brink for the British Empire and the end of colonialism. Then came the inception of nationalism worldwide. Europe had learned its lessons in World War II and sought a united Europe (still in its throes in 2002). But we had further wars ahead in Korea, Suez, Spain, East and West Pakistan (now Bangladesh) involving India, Vietnam (much rued since by the U.S.A.), Israel with Egypt, Nigeria (Biafra), the Falklands, Iraq, and now, the world's need to contain terrorism: mercifully the Cold War of East versus West 'kept its cool' and communism collapsed. What a world!

But in 1945 we were on other 'brinks' at Chance Brothers. As the war in Europe closed, we had half-completed the lighting apparatus for Trinity House Lighthouse Service destined for Europa Point, Gibraltar. It was the most complicated optic to manufacture, having panels of white and red condensing beams all rotating as an assembly.

A vital piece of special prism fractured in transit to Gibraltar. The prism had been drawn from the stock of finished glass and could be replaced only with the investment of an expensive mould that cost the company dearly. We were busy completing contracts for military equipment. The electrical department had already blossomed into a major supplier of the specialized power plant, so necessary for light-houses in the post-war period modernisation programmes, but also for telephones and other purposes additional to the core business of providing lighted aids to marine navigation.

This seeking for alternative trading outlets for new products warped the company ambitions. For example, submersible pump manufacture occurred when a truly charming Austrian refugee arrived, bringing his expertise and designs. This dominated the resources of the 'lightus', much to the disgust and anguish of many. The 'glassus' suffered also from an over-zealous endeavour to enter the domestic glass market with pressed tableware. This was at odds with Chance Brothers' niche, which was essentially for high quality scientific and technical glass manufacture. The whole company seemed to be going into error (which eventually

proved to be the case). Meanwhile, the needs of the post-war maritime world led into expanding of aids to marine navigation.

My own future was also 'on the brink' but I still had very much to learn both technologically and in business wisdom. At the time

when the nations were feeling 'on the brink' of peace and facing the needs of rehabilitation, Chance Brothers lighthouse works was admirably equipped to cope with all requirements of the major attended lighthouse, most of which had been supplied with oil wick or mantle illu-



Above – Winchcombe High Street in 1944.

Below – Our first home on Compton Road, Quinton, Birmingham.



minants. Most damaged lighthouses could be repaired, but many needed replacement (some in total) and updating to the new electrical luminants. Chances' electrical department had all the know-how to manufacture the new type of equipment with the essential reliability and serviceability needed to sustain service over periods of several months.

I was sent to a number of lights requiring recommissioning—firstly, to Withernsea, near Hull, with installer Ernie Barratt to service and recommission the turntable and pedestal. This necessitated dismantling and emptying the mercury trough, cleaning and painting the parts with shellac varnish, and reassembling and setting the rotation equipment in motion (we worked in sub-zero conditions of deep snow and intense cold). Then I was sent to Staithes Harbour, a very sweet Cornish-like village on the east coast to the south of Middlesborough. Here we recommissioned the acetylene gas-operated beacon on the north breakwater. On to the Menai Strait [Wales] to plan new lighted aids, including the examination of the light set beneath the centre of the Menai Suspension Bridge, and recommissioning of Llanddwyn and Mountfield Beacons. The Harbour Master was, I remember, very efficient and lyrically Welsh in his 'explosive' way of relating his local problems with 'principal port lights'.

At this point in the post-war stage I received a request to meet a Mr. Bert Charman from the Basrah Port Authority [Iraq], then based in Fao at the entrance to the Shat-al-Arab. He was on leave at Llandudno, North Wales, and was keen to see if I would join him as assistant engineer. This would entail living aboard a servicing vessel to service two manned lighthouses, and numerous beacons and buoys within the whole of the Persian Gulf. Following careful advice I decided this would cramp my development, for I had much technical study and business experience to gain. I considered such an offer just too premature. Thank God I did decline service in such a despicable 'hot as hell' in summer Fao (as it was then). This service developed later into the Persian Gulf Lights Service, Bahrain, and is now the well-respected Middle East Navigation Aids Service.

Similarly, a Mr. H.J. Cooper visited Chance Brothers to purchase new major lighthouse equipment, and a sound signal for Cape Columbine Lighthouse, South Africa. He had undertaken the construction of many of their lighthouses and offered me an assistant engineer's job in South Africa. Indeed, this was very

tempting and I prayed over it and felt again, "No, not for me yet".

So far I had studied mechanical engineering, electrical science, optical science and navigation, as well as the equipment at many lighthouses that Chance Brothers supplied worldwide. Allied to these disciplines I read civil engineering and became a student member of the Institution of Civil Engineers. I gained much more knowledge on the design of buoys, loading of vessels, moorings, and a host of other fringe subjects, such as estimating, purchasing, packing, consignment, shipping, installation, and warranty writing. All was required knowledge to cope with the highly variant conditions of operation and servicing that was necessary in so many different parts of the world.

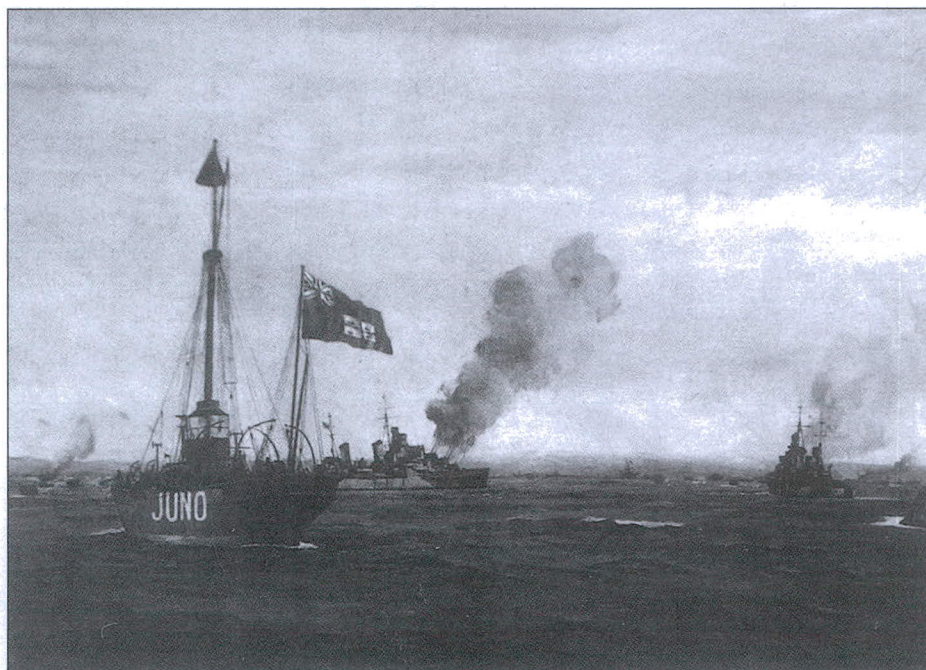
The company decided to move me into the department that undertakes the planning, estimating, and drawing-up of technical specifications. Immediately I was in daily contact with experts as well as some intensely interesting people (understatement). For years I had been dealing with the 'finished-product end' and I was now at the 'technical-planning end' making proposals and dealing with numerous calls for assistance from many lighthouse services—most of these following the ravages of war that had affected the light stations under their control.

The offices at the 'lightus' were located at



**H.J. Hipkins at the organ of Pedmore Church, Stourbridge.**

a small block fronting on to the main high workshops. This compact set of administrative and design offices was open-plan upon the upper floor; the lower floor contained separate offices for the estimator and for the service manager. J.W. Dodds, Works Manager, had an office overlooking the main high workshop and I was located in a larger area of separate desk-bound personnel. The managing director's office was at the front of the block overlooking the adjacent 'glassus' department. Behind were the large washrooms, whilst in the centre of the block was the general administrative office where the general office manager, Mr. James Lord, sat in regal state behind his table facing



**Trinity House placed light vessels and laid over three hundred radar-controlled buoys to mark the main shipping channels off the D-Day beaches at Juno and Kansas. This painting by Roland Langmaid hangs in Trinity House's London Headquarters to commemorate the work carried out by Trinity House vessels and tenders for the D-Day landings in June 1944.**

the large wall clock and surrounded by clerks and typists. He was rather austere, an ageing man of medium height, with rectitude and order written clearly in every one of his precise movements. When one got to know him he was kind, reasonable, and a man of God. Another man of God was the 'Pickwickian' H.J. Hipkins, Chief Estimator, who occupied his office below stairs. Entirely different from James Lord, he was a born humorist, yet looked splendid in his stiff collar, dark suit, watch-chain and serious countenance. He was surrounded by over fifty old-style copying books containing estimates 'of yore' reaching back into pharological antiquity. H.J. Hipkins was also a Churchman and known widely for his love of music, a firm exponent of his beloved Elgar's musical genius. H.J.H. was organist and master of the choristers at Pedmore Church near Stourbridge, a few miles away. He was known rather mischievously throughout the 'lightus' as His-Hippiness the Lord Provost of Pedmore. But he was enormous fun to be with and a great tease.

A lighthouse authority that operated a lighthouse exhibiting a light signal in white and red sectors of light requested us to submit a price for replacing the broken red glass 'shades' that had given noble service since 1890. So I repaired to the office of the 'Oracle' H.J.H. and requested his help to arrive at a current estimate of cost. "Shades, Kenneth my boy", and he lapsed into song, "The shades of night were falling fast." Pointing to three very large tomes, requesting me to raise them from the dust... *Hymns Ancient and Modern Volume III*, which I opened and saw an incredible array of indexed sections, one of which I opened at the thumb index, 'Shades'. "Did I know the focus of the lens apparatus at the lighthouse in question? Was it third or second order? Did it have catadioptric prisms and presumably it was a fixed lens?" Having studied the drawings I stated that it was a fixed dioptric second order light. He reached over my shoulder and ran his finger down the details under sub-section 'second order fixed: shades for'. "Oh, yes Kenneth, we've struck gold. Look in copybook eleven on page 130 to reveal the last estimate done for shades of the type required." Employing his own special factors, stating also, "Oh, yes Gaffer's new car plus the price of fish on Fridays" gave me a figure strictly 'ex works' written in his neat hand.

"Kenneth, do you know *The Dead March in Saul*?" He stood up, extracted a small pitch

pipe from his waistcoat pocket and blowing the refrain he struck the wall of the metal filing cabinet adding the percussion. What a character! "Mind you, Kenneth, I wouldn't do this for anyone else, but I'll always be happy to help you." We ascended the stairs to the upper floor and he entered Jimmy Lord's sanctum, noting workers about to leave. Mr. Lord tapped his table with his pencil, admonishing those seeking to leave a minute before time. They returned to their desks reluctantly. Jimmy intensified his gaze at the clock face, then tapped his tabletop again, uttering, "Fifty-three, you can go", whereupon Hipkins burst into scripture simultaneously intoning "The Lord dismisseth us."

On beyond the general office one entered a large open area where the technical 'brains' and draughtsmen pored over their tables and desks. The chief draughtsman, George Nicol, guarded entry and was always very brisk and to the point with us all. He was responsible to see that everyone kept to a prescribed schedule of performance. Lengthy progress meetings would

review and reveal laxity of performance. Each item of work was discussed in turn and George Nicol would hold forth at length on the problems of achievement. The 'chair' would enquire about number 'XYZ' and George would enlarge verbally on the problems with a, "My dear Sir, I assure you...." or the terse statement of "No movement", and after a group of "No movements" someone would have the irreverence to retort, "You need more powerful pills." He eventually went to live near Johannesburg and we missed his 'brisk' manner.

Alongside him sat our most venerated master and chief engineer, W.F.A. Richey, at that time, well into his eighties, and a fund of knowledge surrounded by his memorabilia and enveloped in pipe smoke. He was so kind, so full of methods of achievement, having been involved in the design and making of the mammoth biform hyper-radial optical apparatus in 1892 for Bishop Rock Lighthouse, south west of the Isles of Scilly. If one stuck to an opinion on "how it was done before", his retort could dispel your clouded vision as to how best to do



An early woodcut of Bishop Rock during a storm.

it now. He kept himself so up to date, did 'our Uncle Bill'.

Next in line along the long office sat Harold Gough and Wally Cooper, optical apparatus, mechanical experts and fog signal experts. Harold Gough amazed us all by his mathematical and glass technology aptitudes: Wally as a very sound mechanics brain. We looked up to these supermen who had proved their capability in my own mind by what I had seen produced in the workshops. They were assisted by the next row of draughtsmen and assistants.

Bill Dimmock did the detailed 'set out' on paper for patterns to be made and glass to be fitted within the lens framework. Len Neenan, similarly, dealt with the details of rotating machinery, pedestal castings and assemblies, lantern enclosures, and fog signal instruments. He became a wonderful friend and colleague and had been born virtually at the rear-wall of Chance Brothers' mighty factory and attended the Church of The Good Shepherd in the adjoining Spon Lane, West Smethwick. He was small and dapper, had a lovely tenor voice singing in the choir, and became one of the star turns on winter choir evenings and on special occasions when we had a celebration.

Then came two rows of tracers, drawing office printing, general staff members, and lastly a mountain of long record cabinets beyond which one almost fell down a flight of stairs into the works yard.

At the end of the row of factory workshops was the modern electrical department, which was a self-contained unit complete with its own offices, for the foreman, Phil Robinson, and an open-plan section for engineers and design personnel (many of whom had formerly operated in Banbury before the acquisition of the Austin Lighting Company).

Originally there was a farm to the rear of the factory. Following Chance Brothers' participation in developing and manufacturing powerful sound signals (fog horns), it was found that the cattle took alarm when signals were on test. They had to be brought under cover by the farmer who had to be given warning of the intention to sound the super 'bull's bellow' which the cows found too stimulating! The cows objected to the enormous blasts from the fog horn which frightened the horses too, and while local residents had little choice but to accept, "Oh, it's only Chance's fog horn, tek no notice and carry on", one could hear echoes rebounding from the hills six miles to the west. It became imperative to acquire the

farm, which eventually became the company's sports and social club with an attractive centre for socials, football, cricket and bowls. I took a fancy to trying my luck at bowls but was surprised to realize that 'it wore flat' like those in the south playing, which was 'mere child's play' compared with 'the crown greens of the midlands and north'. Additional skills were demanded in dealing with the complications of bias inherent in the dome-shaped green. There were some super bowlers in the 'lightus' workshops.

Across from the main entrance gate of the 'glassus' were the headquarters of the glass technologists in a laboratory where standards of glass manufacturing in its many forms were established. These were maintained under the highly respected Dr. Hampton as Director, and Drs. Bastick and Woolart, and John Holmes, who was the specialist on colour and illumination. All participated in the delicate questions of design and manufacture undertaken in the 'lightus', along with our own Harold Gough, so the company gained immense talent. Chance Brothers contributed so much internationally, including the provision of the British Standard publications BS942 and BS1546 relating to the computation of performance in lighthouse illuminating apparatus adopted worldwide. All were so very helpful to me in pursuit of the knowledge I needed.

There were occasions when I had to visit units within the 'glassus', always fascinating and bearing semblance to an imagined Dante's *Inferno*. There was the 'Swanee River', a wide river of glass about 25 mm thick that emerged through rollers to receive a wire netting that settled into the glass as it cooled. This was so much in demand to replace panes lost in air raids that it kept going for years. The broad river passed through its cooling stage, and about 50 metres after leaving the machine, it was cut into required panes, stacked, and taken away in trucks to the packing unit. During the war when daytime air raids started and the sirens sounded, the team would rush into the shelters provided, but in their absence the river of glass rolled on piling up in the end of the workshop, much to the embarrassment and fury of the management.

A visit to the coloured glass department could have inspired a writer like Homer. A blob of red glass was drawn from the pot on the end of a punty, or long pipe, which the blower then swung into a 'sausage' shape. The other end of the 'sausage' was then attached to a separate

tube with air supply and placed horizontally on a machine above a pit, which caused it to rotate, whilst air extended the 'sausage' into a cylinder about 20 cm in diameter, and perhaps a metre in length. It was then taken from the machine and laid in an oven where it was cut along its length, and with the use of oar-like handling tools, was carefully laid flat in the oven. Following annealing it became a large red pane completely transparent and homogeneous in thickness. No wonder H.J. Hipkins's red glass shade seemed so high in price!

One of the sights to arrest the attention of the visitor entering the great glass factory was to see the elevated stage of blowers. They were getting the molten mass on the end of their punty tubes from the gaping cauldron of the pot, then, lifting it high, swinging it for elongation, then plunging it within the jaws of the mould. Then, with cheeks expelling the breath into the bulb of glass, forced it to take up the final form of a bowl or petrol pump globe. Raising it finally high towards the light it was examined for its conformity and then broken off to cool in triumph.

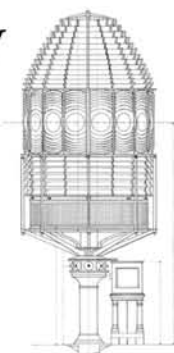
It was with fascination that one watched the rows of machines dropping glass automatically into spinning moulds, only to expel their conformed product, and be severed by an applied flame to pass it on to a moving conveyor belt, on through a yawning door and out of sight.

Surely, I thought, the optical department would display something very special (for one thought of finished glistening lenses) but no, only rows of moulded blanks, no doubt very special in precision of technological conformity and chemical mix, but still only dull looking 'blanks'—what a disappointment! Utilizing the heat and many chemicals and additives by the exceptional skills and knowledge of a very expert staff, it was amazing what was produced in the form of technical glassware.

Once outside, amidst the smells of sulphur and effluent from kilns and stacks, one wondered how well the lungs could survive. Chance Brothers was only one large local factory, for in the near vicinity, were a tar distillery, a glue factory, and a large and important phosphor works. In the light of the rigours of World War II, people complained of a massive smell of 'tom cat' (as one opened the office door or out of the wind in the yard). So pronounced was the nuisance that the cry went out to "find the cat and throttle it". In time it was traced to the phosphor works and a suitable filter was introduced to alleviate the problem.



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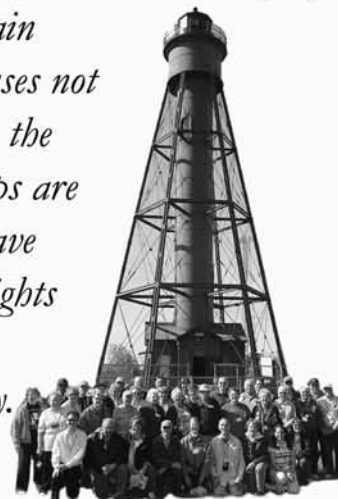
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