Memories of the Thomas Seager Foundries

by E A Harrison

Imagine a cold, damp day in late February 1930, at 7.30 a.m. and hardly light. This is how my first day at Thomas Seager's started: met at the door by Tom himself, I was ushered into a large, corrugated iron shed which was dark, dirty - and very cold. I was rather shocked to find that I was walking on a black, earth-like floor, which was very uneven. Introduced to the then Foreman, Jack England, a small balding man with ginger hair (later to find out he was called 'Bloodnut' - not to his face, of course) and taken under his wing to be taught the intricate methods of learning to be a Moulder. His first words were "What's your name, lad?" I answered "Ted". "Oh, dear, he said "we already have one of those, you will have to be 'Younger' - nothing to do with light ale production. "Well, let's get started - we are now going to make some trolley wheels for the gold mines in South Africa, (ordered by Seamarks for their machining). "So, let's get the sand ready." This meant mixing the sand on the floor by digging into the damp sand beneath the dry on top, then turning and sifting it through a half inch mesh sieve, to remove and separate any pieces of iron and nails left from a previous cast.

That over, I was asked to fetch some 6 'hooks' (1), (see Diagram A). Not knowing whether this was a leg pull, like a 'left-handed spanner', I asked and was shown, by another Moulder, what was required (in some parts of the country known as 'Lifters' or 'Gaggers'). The next item was the pattern (4). In this case, it was made of wood, segmented to prevent distortion, and varnished to a smooth finish, to allow an easy withdrawal from the sand. Then came the moulding box, in two parts, top and bottom or Cope (2) and Drag (3), which fit together on location pins (3a) to ensure the mould goes together in exactly the same place. The procedure was then as follows:-

The Cope was laid lugs uppermost on the floor and filled with sand, rammed in lightly with a flat rammer (5) and scraped off level. The pattern was then laid on a flat surface in the centre of the box area. The Drag was fitted on to copy by location pins, then the pattern was covered by 'fat' (facing sand), a mixture of loam (new sand), old sand and coal dust, then the bore was filled with floor sand and gently rammed around the pattern (without hitting it) with a pig rammer (6) around the pattern to finish and scraped level. With a vent wire (7), holes are made in the sand to allow the gas made from the coal dust to escape.

The next thing is to make the 'bed', a level area of the floor covered up and soft to roll the mould on. The now top half is removed and emptied and a trowel used to flatten around the pattern at a point where any tapers opposing meet. This is called 'making the joint.' Next, a coating of parting powder is shaken over it (through a bag), the top box replaced, fat sifted over the pattern and hooks placed in any part that is below the joint line, filled with floor sand, runner sticks in position, rammed flattened and scraped off. The top box is then lifted off and over and prepared for finishing. Next, ingates have to be cut into the sand to allow metal to pass from the hole made by the runner stick into the mould cavity. The pattern is then loosened in the mould by knocking a spike into the top and tapping it with a hammer or an iron bar. Then, with a screw eye it is gently withdrawn from the mould, keeping very steady so not to disturb any sand. Next, any 'cores' (8) are put in (sand shapes to make holes in castings and made of sand rammed into a core box (9) and the whole mould is dusted with plumbago to stop too much sand burning onto the casting. Top box now replaced, clamped together - and it's ready.

This was repeated throughout the week by each of the moulders, with different patterns of course, until the floor area was covered in moulds. On Friday, a fire was lit in the cupola and a breast plate backed with sand on one side and a tapping hole formed on the other.

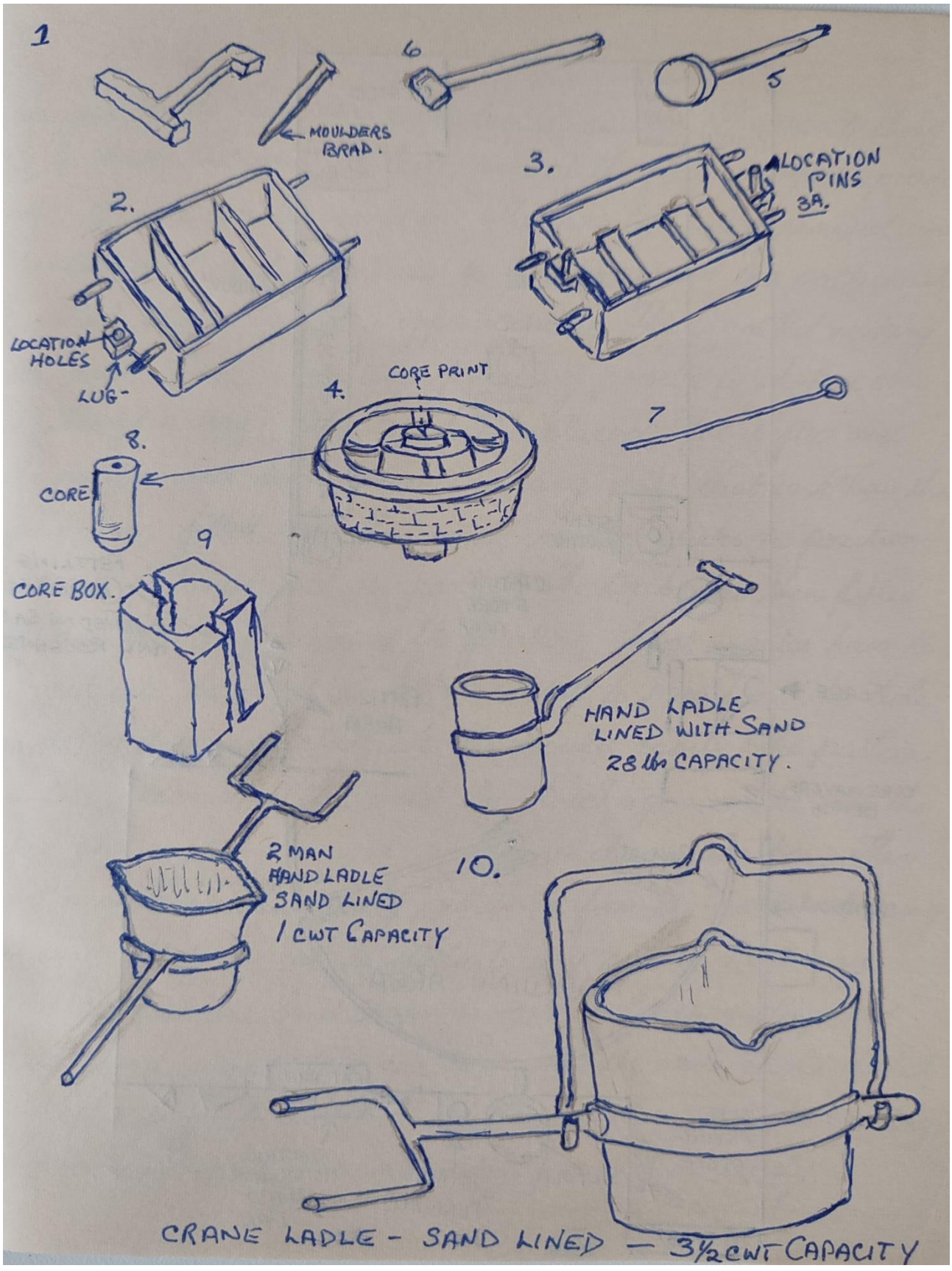

Diagram A: Foundry Equipment

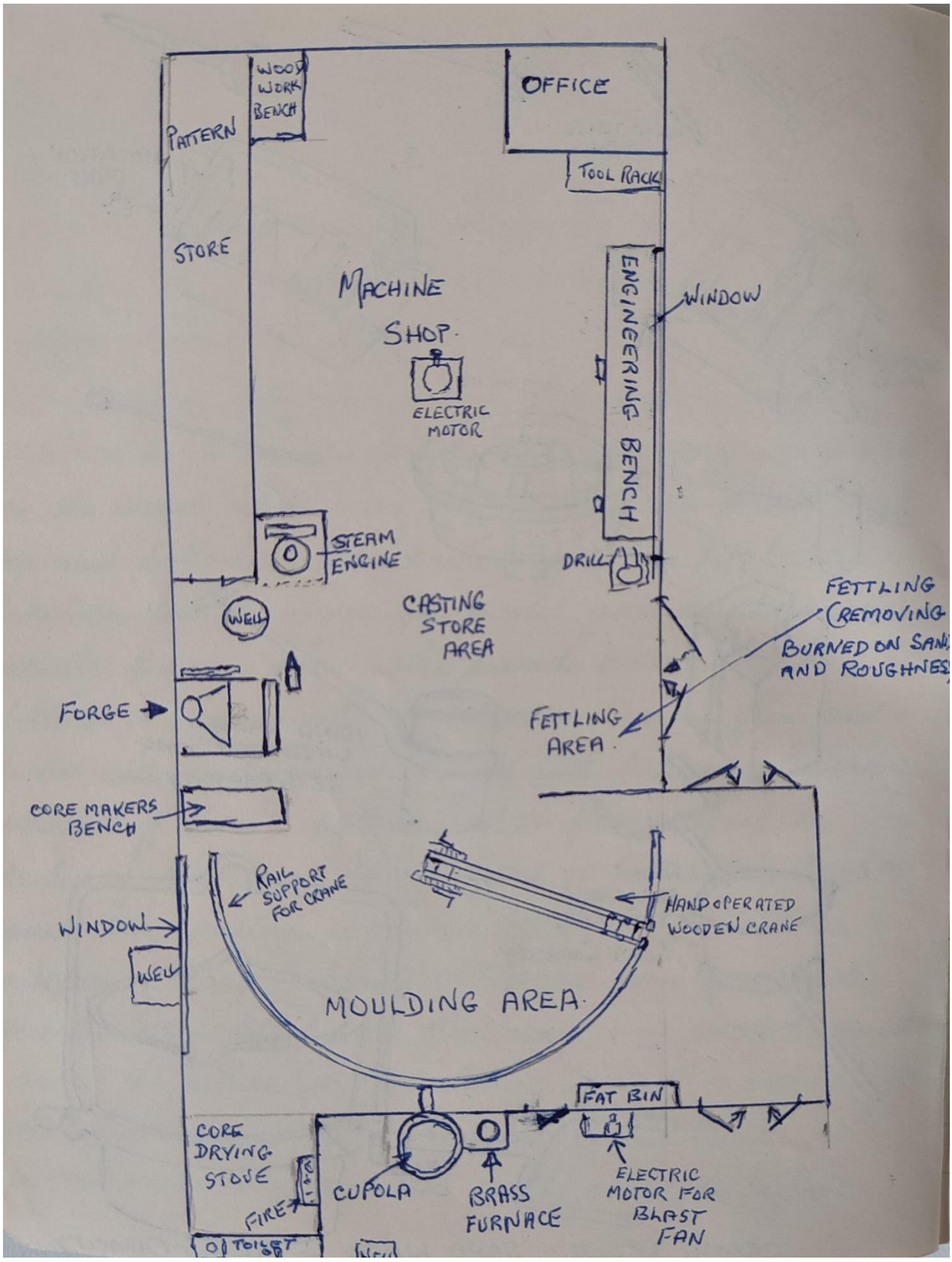

Diagram B: Plan view of the Foundry

The special coke was then put in to the cupola to a depth of around 40 inches, followed by a layer of pig iron and scrap, more coke (around 28 lb), iron coke, iron coke, until full.
Forced draught was then turned on and after about 25 minutes, drips of molten metal could be seen dropping between the white-hot coke. After a time, this collected in the well of the cupola and was then tapped out and caught in one of the ladles (10) appropriate for the job. All moulds cast, the blast shut off, the cupola had now to be emptied of slag and coke, so the breast plate was knocked away and with very long rakes, the white-hot coke was removed (This was still around 1500 degrees C.)

Water from an improvised well - soaking from the creek was then bucketed over the coke until extinguished. Saturday morning - all moulds knocked out and sand re-mixed - then at 12 o'clock - pay day 12 shillings - 60p now, all in shillings and sixpences.

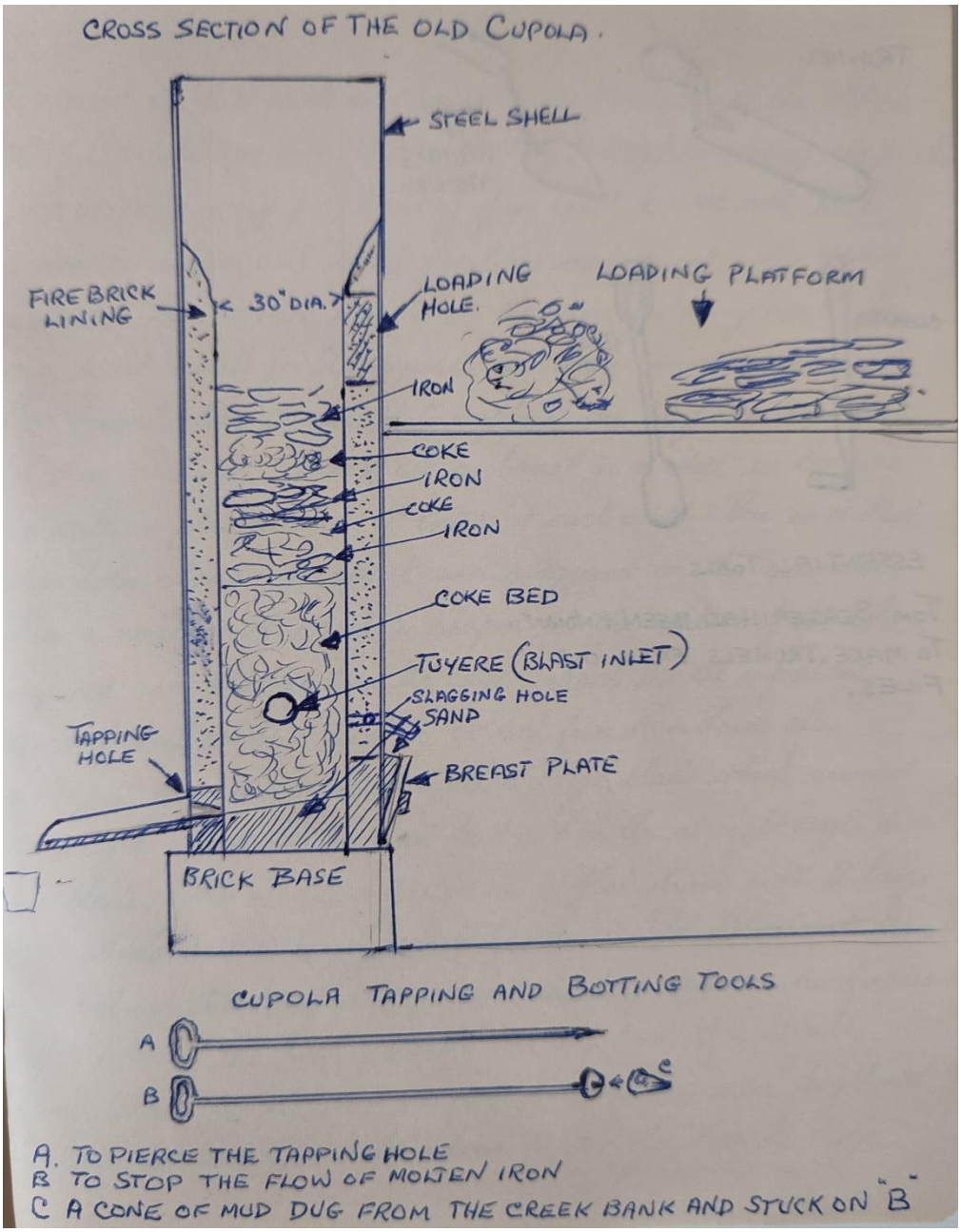

Diagram C: Cross section of the Old Cupola

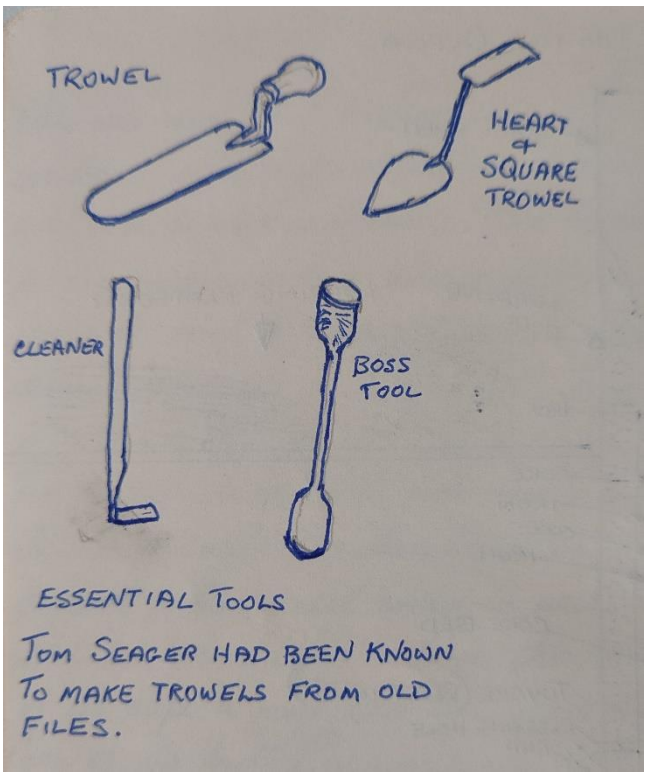

Diagram D: Essential tools

Thus ended the first week in what was very similar to the Black Hole of Calcutta, for there was no heating (except on casting days, then it was too hot), very poor lighting from about 6x100 watt bulbs, no running water and toilet facilities were practically nonexistent.

This routine was to be the same for many months to come, until orders for lamp posts and barge pumps came it (Diagram E.) Here, I would attempt to explain the was cores are made for these costings. First of all, a barrel is needed, as long at the pattern, plus around 9 inches extra at the end. This is drilled with holes about 6 inches apart and staggered on the diameter. Then, a core board which is shaped at the entrance of the hole required and clamped at the edge. Next, the all important truss of hay, which I had to collect from Ham Farm, after cutting it from the haystack with a large blade, which seemed to weigh about 28 lbs. and had a handle at right angles to the blade. This was transported on a flat truck with 2 large cartwheels and a heavy steel handle. “Old Bloodnut” then sat behind this truss and passed the hay between his fingers after hooking the first strands over the hook of a wimble - being turned by me - and moving back as the ‘rope’ lengthened. In very hot weather, it had been known for him to doze while still passed the hay through, so I found a novel way to rouse him :- watch for a nice large thistle to appear, speed up the revs on the wimble and lo and behold, fingers caught in the thistle and he is wide awake and with it. Having made ‘miles’ of hay bands, we now proceed with the cores. First barrel is placed in 2 trestles with semi-circular holes of different sizes and the coreboard placed at the correct distance from it, to give the same (unreadable)then a handle placed in the end of the barrel and wedged to be able to turn it. The hayband is then wound on to the barrel in layers until the distance between it and the core board measures about 1”. It is then smeared with a coat of floor sand and water and put into the stove to dry. In the case of the lamp post, core the distance in one spot is so small that coir yarn (coconut string) has to be used instead of hayband. Next day, the dried part core is rubbed over to remove all charred hay bristle and coated with a mixture of loam (new sand), horse dung and cow hair or ‘bull’s wool’, as was used in the old plaster for ceilings, etc. This is done by piling the mixture on the core board and sweeping it onto the core as it is revolved, thus using the coreboard as a stickle. Then back into the store for another drying. Removed from the stove again, the diameters of the cores are checked and reduced by rubbing, if necessary, coated with a mixture of plumbago slurry and water by brushing it, it goes back into the store again until required. Old Bloodnut had acquired the habit of chewing tobacco and often spit filthy juice into the mixtures

to enhance the setting property of it (Bunkum!) and often some of the sifted dung found its way into his Porpoise mixture (4 1\2d per 1\2 ounce) as it was the same colour. This habit, I was told, came about because smoking was forbidden by both the Thomas Seager's, their philosophy being; "You have 8 hours to work in and 16 hours to smoke in", and we were told this.

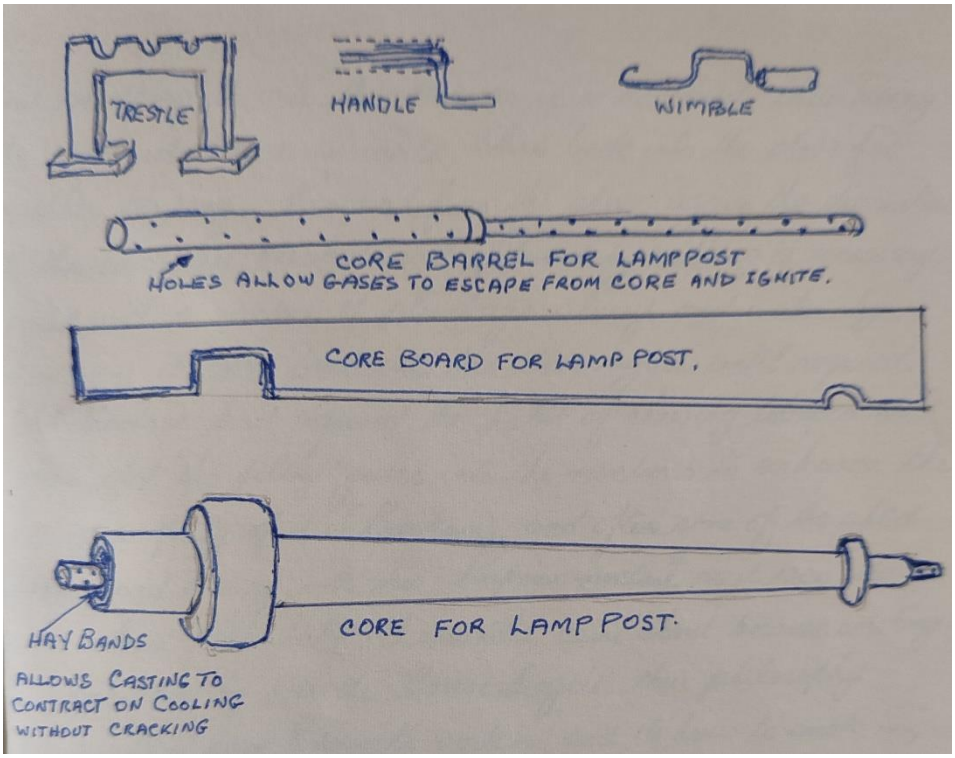

Diagram E: Lamppost manufacturing equipment

After casting, the core barrel is removed by tapping and pulling, bringing with it the charred remains of the hay. This leads me to the tale of an old man who visited the Brents once a year. He looked round the foundry and said to Tom - "I see you make Oller Toobs (hollow tubes) here", to which he replied "Have you ever seen a solid one?"

In the case of the barge pumps, they were often stood on end in the storing area and a tap with a hammer would produce a different note, not a good sign for the quality of the iron used. Steering gears for barges were a specialty about this time, there being a small amount of castings in each, namely a square rudder head and a steering wheel in cast iron and two large brass nuts, the rest being steel work, which Tom machined on the lathes and drill. Scrap brass and gunmetal was bought in from the local rag and bone men and stored in a large bin outside the office. It was from this scrap that came in one particularly large consignment that a set of bells was rescued, strung up in the cavity between the top of the office and the roof, and we were thus able to have our own peal of bells. To mould a bell and cast it was something I always wished I could do, but having no pattern, it was impossible. So much for the regular work. The next part is the jobbing bits that were brought in by local residents, builders and some farmers, even.

Mrs. Woman brings in a broken top plate of a kitchen:- 'Mr. Seager, can you make me a new top like this? Tom replies :- "What in two (or three pieces) like that?" Response: "No, all in one?", Mr. Seager: "Well, yes, but how did you break it?" Mrs. Woman "Straightening the red hot poker, with a hammer - and it is iron, isn't it?" Next we see the fire grate bent and broken through the bars, conversation with another woman which was very similar.

The worst people to deal with in this respect were the local farmers, a few days before the commencement of hop picking. Their requirements were usually fine bars for the oast houses, which - due to a lack of space left at the ends of the firebox, the bars had swelled under the intense heat and not being able to swell lengthways, buckled up in the middle. This is where the real skill of the moulder is needed, especially with broken patterns, because the finished mould has to be made to allow for contraction, so the pieces have to be moulded with slight gaps between them, allowing 1/8th to the foot for cast iron, 3/16th to the foot for brass and 5/32th to the foot for aluminium. Of course when new patterns are being made, all this reckoning is unnecessary, as special rules have been made to encompass the shrinkage allowance throughout the whole of its divisions, and for the wooden pattern being made as a master for metal reproduction - double contraction.

The metal used by the foundry in those days was quite good enough for that kind of work. It had been known for some of the locals to take some of these scrap metals, by lifting it over the low fence and bring it back a few days later for Tom to buy from them. Until the thought came up of marking it. The grey paint that was used to coat all the barge equipment - and known to all in the foundry as ‘crab fat’, was thinned with paraffin and splashed over the scrap heap, not too noticeably, but enough to make it recognisable the second time around. It worked a treat. Coke was another victim of pilfering, but that soon died out as it was found not to burn on kitchen stoves and was often returned over the fence!

Moving on through the years to January 1938, we arrived one morning to find the place had been flooded and everything was soaked, coated with oil paint. Anything that had previously been in drums had floated and tipped over. The whole floor had to be dug out and dried over fires lit in moulding boxes, covered with a sheet of corrugated iron, then piled up with sand.

Unfortunately, we were all affected personally, as our only supply of drinking water, which was from a spring at the rear of the Willow Tap public house was also under water for some time. This did not make any difference to old Bloodnut, because he brought his drink from home, (bottled cabbage water,),as our can was always hidden, due to his filthy habit.

Bloodnut and his family were well know as dancing instructors, his wife and daughter gave private lessons and he taught at local hops. He was also noted for leaving his ‘trademark’, (he used to mix the plumbago, slurry, muddy water and sometimes wine with his hands). Consequently, the pores of his skin became clogged with the blacking and when perspiring whilst dancing, a hand mark was often left on a girl’s dress. Another filthy habit.

He was also the proud possessor of a ‘Yellow Beaver’ trilby, which always took pride of place, out of harm’s way, on top of a large 8ft square moulding box standing on its side against the brick wall. It was in this position one very hot day, when unfortunately, one of the rafters at the apex to the roof was ignited by sparks from the cupola. I was detailed to take buckets of water and walk along the top of the wall and put out the fire. Mission accomplished, but the hat was under the spot and was well soaked in sooty water. His reaction: ‘B****y Norah, she’ll kill me, she has just had it cleaned.’

Eventually, we were back to normal, still producing about one and a half tones per cast. Then came the War (WW2) and because of blacking out (complying with the Blackout Regulations) was impossible. The timing of finishing the cast had to be brought forward to get the furnace emptied and put out before darkness set in. During the early part of the war, the foundry was an ideal spot from which to watch the bombers following the Thames towards London. On one such occasion, the bombers were being chased from London when one released three bombs which, apparently, landed beyond the canning factory without exploding. By this time, a large amount of equipment was being made to furnish the lighters being built at the J. Pollock shipyard: namely pumps, bollards, windlass bits and rope cleats. It was during the time when I was taken away to serve in a torpedo factory and, incidentally, learning new skills. Then Pollocks took over and old Tom retired at around 73 years of age.

On my return in 1944, a different class of work was undertaken in that winches and hoists, which were manual and used toothed wheels and pinions. They were replaced by power driven ones using friction rollers. The old cupola was replaced by a smaller, homemade one, too small to be much good and very trying for the man who had to get inside it to trim the slag from the face of the bricks and patch the lining where it was burned away, with gannister (fire clay). Incidentally, the aforementioned lighters were used as store houses on the Thames, as many buildings were demolished. Things went on as usual, until the great freeze-up in 1947, when all factories were closed due to the fuel crisis. When work was resumed on 10th March, the foundry had been taken over by C.F. Doyle Ltd. From then on, major changes took place.

Under the management of Mr. H Bullock, much of the old machinery was moved out and more moulding floor space was obtained. The introduction of an older-type moulding machine helped to boost the output - making a mould that would normally have taken at least an hour - in a matter of minutes. This meant more patterns to be stored for use, so part of the building had to be altered to accommodate this. The second machine was added later, which was able to produce even bigger moulds, thus making it necessary to cast more often. One amusing incident happened around this time, Mr. Mumford-Cooke from the Ship Hotel was a keen movie photographer and was to make a film of mould production. Unfortunately, every time the mould was being carried from the machine to the space on the floor, the middle of the mould dropped out, but it was alright in the eventually, and the film was completed.

A number of foreign trainee foundry operators/managers were introduced and were able to learn both old and new production methods. Another blessing was the introduction of a sand mill, which mixed and mulled the sand far quicker than by hand. At this time, we were using sand from the loam pits at Erith. It had quite a high clay content and therefore good binding quality. This is called ‘natural sand’ and in its damp state is called Green sand, although the colour is black. Later, we were introduced to ‘synthetic’ sand. This is a fine silica sand with little or no clay content, to which artificial binders are added during mixing and mulling. This gives a better surface finish on the castings and easier mould breakdown after casting. There were also great steps forward in the actual casting methods, for when I used to require a tight iron for a pressure casting, a small piece of aluminium was put into the ladle before the iron was tapped into it. This had the effect of reducing the size of the flakes of iron and this could be seen on the surface of the molten metal. Well, now we used a product called calcium silicide, which was more refined and had other additives, including silicon, and was more controlled in quantity. The number of employees also increased from the original 5 to 12. Eventually, the old cupola gave up the ghost in 1955 and we moved into new premises at Doyles - a brand new building well lit, heated and with a concrete floor, the concrete floor put an end to bed making, for all the moulds were laid on aluminium plates and then on to roller conveyers - a real treat after all the years in the black hole. Floods again caused havoc in 1949 and 1953.

It may be interesting to note that up until we moved to the new site, there were only two bad accidents, both to members of the same family. The father had stepped into the pigged metal, while walking past to too closely and the son put his hand on the semi-circular cradle bar on a cement mixer, whilst it was still running - and slipped between the barrel arm and base. The father burnt away the flesh of the heel and the son removed the skin in the mid-forearm to the knuckles. Fortunately, my first aid training with the Civil Defence came in extremely useful. (Name of injured - Seager - no relation to Tom.)

Note: Pigged iron in what is left after all moulds are filled and pound into a ‘V’ shaped trough dug in the floor.

Now with a new cupola, I made my first attempt at the specialist job of fitting hundreds of firebricks into the steel tube, more changes took place, as steel was introduced into the mix, according to the grade of iron required, (ranging from grade 4 to grade 26). Grades were determined by using a test

bar, machined to a certain size and then pulled between 2 points and the number of tons pull required to break it is the grade. (Diagram F)

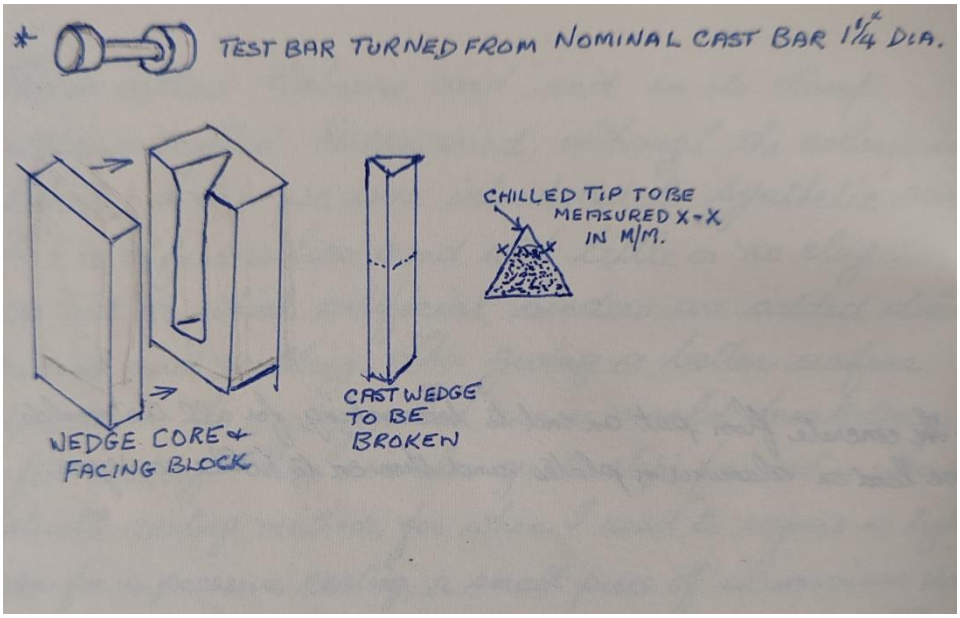

Diagram F: Test bar and Wedge test equipment

Also, every ladle of metal was now tested with a wedge test - metal from the spout poured into a wedge-shaped core, set and plunged red hot into cold water until cool, then broken and the chilled tip measured for size according to the grade required. The higher the grade, the wider the chill. If the wedge chill is found to be too wide, ferro-silicone is added to the molten metal and plunged in, and a further sample take quickly. All this takes place at a temperature of around 1500 degrees C or 2553 degrees F. The number of patterns in use also increased by leaps and bounds and at this point. John Doyle decided that every pattern an internal number and be recorded together with all particulars and a sketch of the finished casting. This was done as follows: on a flimsy paper which was printed and squared off in places for relevant particulars were entered, customer's name and number of patterns on plates, number of cones required, bin number, in which core boxes are stored, plate number and bin number for patterns, type of sand to be used and size of moulding required and the amount of holding-down weight required for each mould. Then, the harder point of sketching what the cast will look like so that anyone - even of little experience - was able to sort out the requirements to produce castings. This flimsy was then used as a 'master' card and copies issued with every order. This being passed from operation to operation until finished castings leave the fettling shop. (Diagram G)

It was in one of the new buildings that an oil fire furnace for melting non-ferrous metals was installed and was where the aluminium signs that adorn the entrances to Faversham were made. We also dabbled in parts for outboard motors (gear cases and propellors) for the boat trade at Whitstable. Elliott's of Rochester were noted for their pressure valve production connected with the oil industry and on one occasion had a number of scrapped castings which had failed the pressure test - and probably as a last resort - asked if I could make a valve. Well! One could but try. (Diagram H) It turned out to be a good one, so the order came for a further 13. More and more valve patterns followed in the next few years.

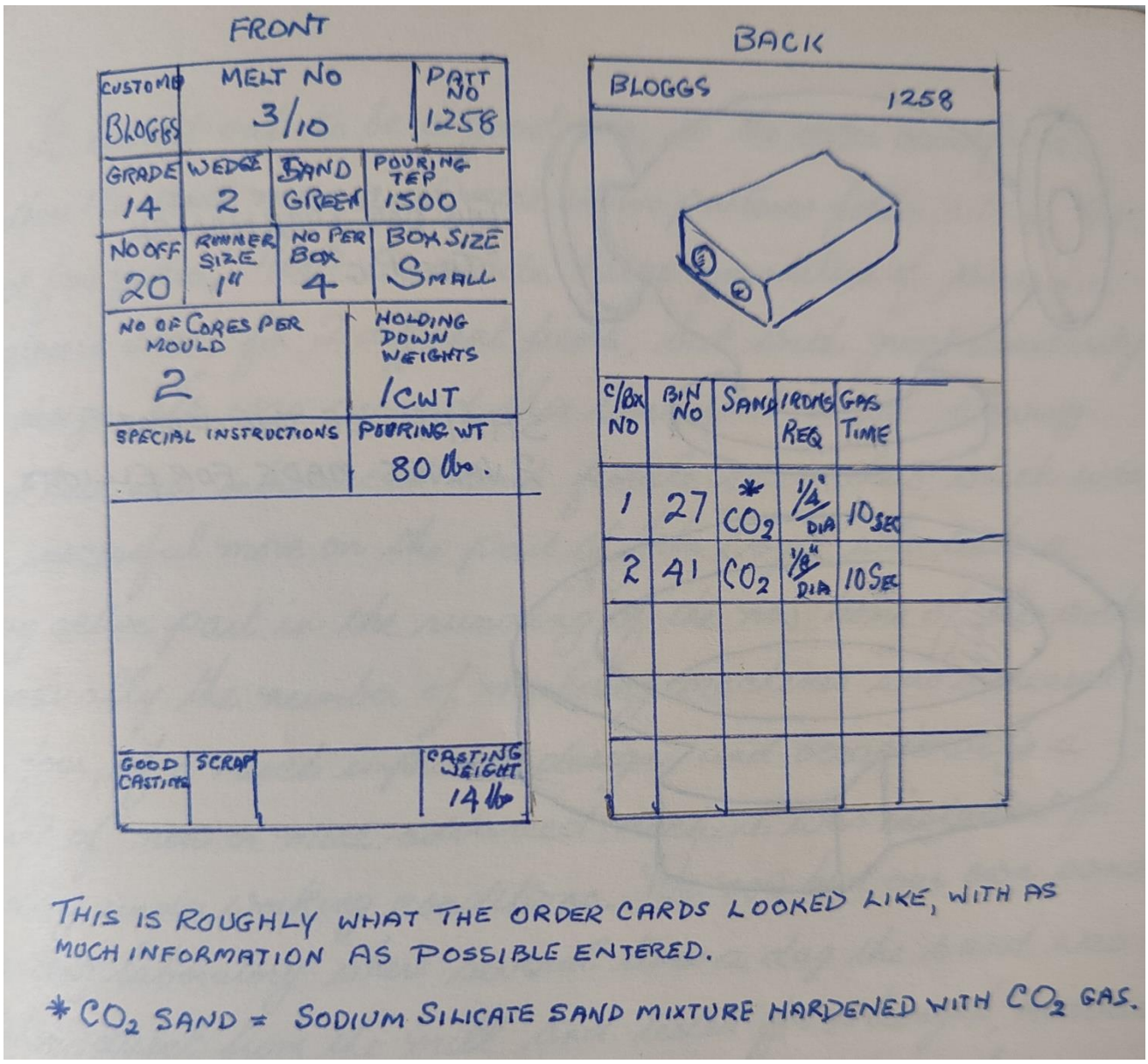

Diagram G: Customer Order Cards

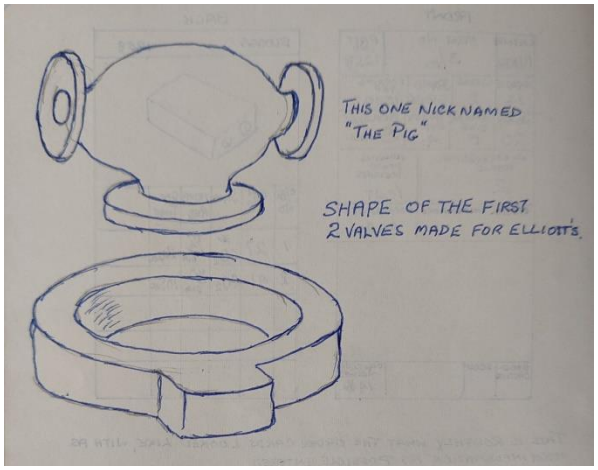

Diagram H: Valves made for Elliot’s of Rochester

Next, we made large quantities of parts for engineer's vices, for two different firms, but with great similarity of design. It was around this time that a core-blowing machine was introduced and female core-makers, which was a successful move on the part of John Doyle. He took a very active part in the running of the new home of the works. Gradually, the number of moulding machines was increased to four - of a much improved design - and occasionally a trial of new or more advanced machine was installed for testing under working conditions.

We now had our own sand testing laboratory, where several times a day the sand was taken directly from the mill and tested for strength, moisture, permeability and clay content, each of which play a part in producing good castings:- strength to withstand the wash of the metal, moisture enough to hold it together, but not enough to cause the mould to blow, permeability to allow any gasses formed to pass through the sand and not be contained in the metal, and the clay content to make sure the strength was correct to enable the sand to be rammed to a correct density and hardness. The testing of the metal had to be undertake by a specialist firm in Keighley, to whom test bars were sent weekly. It was hoped that eventually, this would be possible on the premises.

With more and more work - and customers - we were soon casting every day and, in 1964, another new building was ready, in Oare Road, with another cupola to brick up. It was not quite such a headache this time and after completion, a fire was in it for a week before giving it blast, and at Easter time came the first melt to christen it. A pattern making shop had been opened on this site some time before, and was then known as Davington Patterns and Plastics. Gradually, all the equipment was moved from the C J Doyle site and production started in earnest. At this stage, the offices consisted of an old prefab converted into four offices, with some staff still at CFD. There followed a further buildup of machinery, particularly in the fettling shop, all to make the work easier and to improve efficiency.

The grinders and cutting wheels, as well as small handheld pneumatic and electric tools were a far cry from the original hammer and chisel, carborundum brick and file of the early days. A rotary oven was bought, for the drying of oil bonded cores and some moulds. This took the trays up and over and down and under very slowly (about an hour per circuit), the fire being in the centre. Next, there was the hot box method, whereby the corpora was of metal and fixed between two heated plates on a blowing machine. A silica sand mixed with resin was then blown into the box cavity and left for a few seconds, then parted pneumatically and the core removed with gloved hands. These cores had an easy breakdown and left a much more accurate hole in the castings. The next innovation was 'No Bake' sand moulding, for which a machine mixer was installed. This mixed fine silica sand and various binding agents. It poured the mixture into the moulding-box, covering the pattern, shaken down and levelled at the top. In a few minutes, it is set and ready for the pattern to be removed. During one summer holiday period a second cupola was installed and both raised from their normal height to accommodate a hot metal receiver, which was gas fired and able to maintain the temperature of the melted metal for longer than being held with a ladle and thus the cupola had to be tapped but once and the metal continued to flow into the receiver until it was all melted. To keep pace with this, an electric magnet and hoist skip was installed to keep up the feeding of the cupolas. This took one man to operate wit and one to weigh and load the coke into the skip.

Vast improvements were also made at the offices, new ones build at the lakeside. Eventually, we had a laboratory and a metallurgist, able to test the metal daily and adjust the mixture as necessary, to maintain a specific grade. A computer was installed to assist in the tabulation of all the production and relevant data concerning each casting, like stocks, scrap expectation and production times. Also in this laboratory, a cast iron marking-out table and some very accurate measuring tools were housed. This meant learning yet another skill, of which I had no previous experience, but as it is said, it is 'never too late to learn'. I felt my way through the process of making the machining lines on each sample casting, which was then submitted to the customer for approval, before normal product started. All this together with weekly visits to some of the customers made life very interesting for the rest of my days in the foundry, finally finishing in February 1980, just fifty years later.