Number 89 Spring 2011

Ashpan 89

Ickenham and District Society of Model Engineers

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Contents:

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Cover Story

The major project of the winter is the replacement of the station roof. January and February saw the A-Team dismantle the old roof and clear the station area. The first stage was to remove the track from the station as a precaution against damage if something heavy fell on it. (As it turned out, the A-Team didn't quite remove enough track. [right]) Work then moved onto dismantling the roof which was done over three Tuesdays. The first saw the roof cladding removed [cover], while the second saw the superstructure demolished, with the roof columns being removed on the third Tuesday. Over the next few pages there are some more photos of the station demolition.


CROSSING
NO GATES

Top: 11th January 2011, Middle: 1st February 2011, Bottom: 15th February 2011

Ashpan Notebook

A note from the Treasurer: Subscriptions

Subscriptions for the year 1st April 2011 to 31st March 2012 are now due. Rates are unchanged from last year, i.e. adults £25.00 and juniors £6.00. Payments to be made to the treasurer, Vic Barton, in person, in coin of the realm, Bank of England promissory notes or personal cheque payable to IDSME.

Alternatively cheque payments can be made by post to:-

V.G.Barton
4 Princes Park Parade
Hayes, Middlesex
UB3 1LA

Dates For Your Diary

There are planned to be two Family Running Days at IDSME during the summer: Saturday 23rd July and Saturday 17th September. Don't forget also, our regular public running days on the first Saturday of each month.

Ashpan 89 & 90

Thank you to those who have submitted contributions for inclusion in this issue of Ashpan. The next issue of Ashpan is due to be published in time for the July Running Day and so any contributions should be with the editor by early June at the latest. The editor's contact details can be found on the inside front cover. On that very subject…

New Editorial Email Address

The eagle eyed amongst you may have spotted that the editorial email address shown inside the front cover has changed. The new address is Ashpan@idsme.co.uk While on the subject of matters electronic, this might be an appropriate place to remind readers that this, and all previous issues of Ashpan can be downloaded from http://www.idsme.co.uk/IDSME/IDSMEAshpanOnline.shtml

Chairman's Chat

As I write spring seems to have sprung, daffodils and crocuses are in bloom, the birds are singing, members are smiling (it could be wind) and a new Running Season approaches.

Several of the station columns were bolted in position today and 'The Gate Gang' was excavating some very deep holes. The track work was being replaced in the station area.

It is most unlikely that the station will have a roof over it for the start of the season and arrangements are being made for a temporary platform that will be safe for passengers to use. Better to do this than rush to try and finish things in time for the season and muck something up. Visitors may find it interesting to see the work in progress. We are about £540 under the theoretical spend and about £1000 below the estimated spend based on the programme. There will be a further wood order soon.

The 'Station Buffet' is now under new management and Bob has been busy stocking up the cupboards. June and Jean will still help us out from time to time but can now have the odd Saturday for themselves. Bob and Mrs Bob are manning the counter during the April Run but would welcome the assistance of members in giving them a break from time to time.

So, after what seems to have been a long gloomy winter, we can look forward to another enjoyable summer.

Mel Fuller

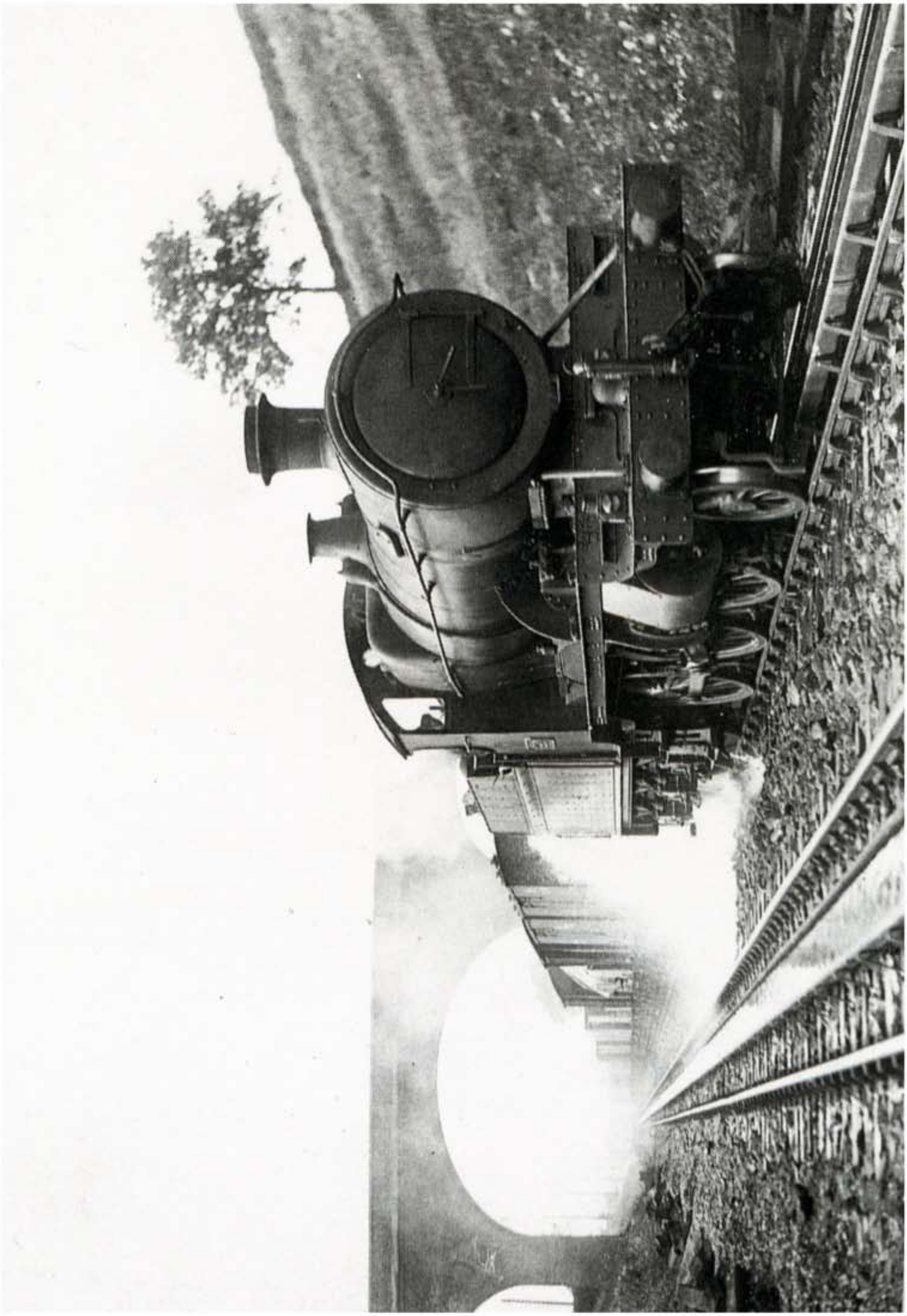
Secretary's Notes

I'm pleased to report we agreed at the Club Night on 11th March that we would fund, as a society, a slate roof on the main apex of the new station roof. The estimated cost of £1,250 (plus whatever inflation since last year) for the slates, lead and fittings, has largely been covered thanks to some very generous donations from members who have decided to remain anonymous. Thank you, whoever you are. The plan is to obtain new Welsh slates of the same size as the booking office. The ridge will be leaded rather than tiled, as obtaining suitable ridge tiles of the correct shallow angle would be difficult and grey lead will match the slate well.

Following concerns raised by members in October and November about the extra car parking and changes in the road layout making access to our site difficult, I've been in touch with the Council. This hasn't been easy – they 'lost' the first letter and didn't really answer the points in the second letter – but they have recognised there is a problem and have proposed further parking restrictions around the village pump and pond to discourage thoughtless car parking. The solution as shown at our meeting on 11th March isn't quite right; their detailed plans of the area are out of date, so I will be writing to them again suggesting modifications.
Regrettably the Council don't seem concerned about the safety issues we have raised with the new light-controlled crossing that has replaced the zebra crossing. Our reports of the increase in 'near misses' have been met by a '*it's to a design by Transport for London and it was installed to ensure the right hand turn into Swakeleys Road doesn't block up during the rush hour as pedestrians using the new light-controlled crossing will break up the main flow of traffic*'. Not quite the answer I was expecting so I shall continue to pursue this one and remind them of the importance of road safety.

Thank you to everyone who contributed to this season's winter programme. Once again we have enjoyed some excellent talks, well researched and presented, with most of the items coming from our fellow members. Attendance has been down this year although there is no obvious reason why this should be and is no reflection of the content of the evenings.
I appreciate Michael Proudfoot's efforts as Programme Secretary. Thank you, Michael. He has yet to decide if he will carry on for next season, as his new job as a steam fitter at Southall Engine Shed is consuming much of his time. Whatever the outcome, please can you think whether you can contribute an evening or part of an evening to next season's programme. If you are unsure of how to go about it, read Peter Reynold's excellent article in Ashpan 87.

David Sexton



Even Scotsmen Drink Water

In February, the secretary was contacted by a family in Ruislip who were clearing the house of a late relative, and they were offering the society a number of items of railway interest. Among them was the above photograph, which is believed to show Flying Scotsman passing over the water troughs at Ruislip. This photograph was the inspiration for this article about water troughs.

Coal and water are the two consumables that steam locomotives require to carry out their work. The more that can be carried with you, the greater the distance that can be covered without having to stop. Conversely the more you carry with you, the greater the penalty in weight, which limits the maximum speed that can be achieved. Clearly a compromise has to be reached. Water troughs however provide the opportunity to have the best of both worlds, by providing the ability to replenish at least some of the supplies on the move, thus increasing range without the full weight penalty at the beginning of the journey.

In 1860 the London & North Western Railway, wished to accelerate the 'Irish Mail' by running non-stop over the eighty-five miles from Chester to Holyhead. Given the loads involved this was beyond the range of the locomotives to be used. The locomotive superintendent, John Ramsbottom was tasked with finding a suitable way for locomotives to take on water without stopping. While not the first person to consider this problem, he was the first with a workable solution. This consisted of an extended water-filled trough laid between the rails on a level section of track, and a hinged scoop beneath the locomotive tender, connected by a vertical pipe with the water tank above. The first set of water troughs on this pattern were installed near Mochdre & Pabo, some forty-three miles from Chester. The system proved successful and was widely adopted by the L&NWR. Other companies also installed water troughs of the same pattern at various locations to permit service accelerations. Water troughs were also used in continental Europe and in the USA where they were known as track pans.

In 1921 there were fifty-seven sets of water troughs in the UK. The L&NWR had the most, with seventeen examples on its own lines and a further two sets on joint lines, of which the L&NWR was a partner. In second place was the Great Western Railway, which had twelve on its own lines, and again two on joint lines. Interestingly the GWR was a relative latecomer to the world of water troughs, not installing its first set (at Goring) until 1895. The delay was allegedly due to the Refreshment Rooms at Swindon. Many of you will no doubt be aware that the terms of the lease granted to the tenants of the Refreshment Rooms required the GWR to stop all passenger trains at Swindon for ten minutes. With this enforced stop there was little scope to accelerate services by means extended non stop running and certainly no need to provide water troughs as water could easily be taken while stopped at Swindon. The GWR finally bought out the lease in late 1895.

With this impediment to train services removed, the GWR embarked on a programme of water trough installation and this project was given further impetus by the new cut-off lines that the GWR was constructing at the time. All the water troughs on the GWR opened between 1895 and 1907, many of the later ones in conjunction with the new cut-off lines.

In choosing a location to install a set of water troughs there are a number of requirements that need to be met. Firstly there is consideration as to whether a set of water troughs in the locality is even desirable. This will depend on a number of factors including distance from major stations where trains are likely to stop anyway, and perhaps distance from other sets of water troughs; on the L&NWR troughs were typically thirty miles apart while on the GWR they were between forty and fifty miles apart.

The next requirement was dead level track for the length of the water troughs. Furthermore the line should be well clear of sharp curves, junctions and signals which might slow or stop a train, and thus prevent it travelling fast enough to pick up water satisfactorily. The location also had to be a reasonable distance from fixed obstacles between the rails, such as point work and level crossings, as the tender scoop, when lowered was below rail level, and this would have struck any such fixed obstruction if lowered too soon or raised too late.

Another consideration was the availability of a plentiful water supply and finally the site needed to have good drainage. A significant proportion of the water in the toughs would be sprayed around the countryside and the track bed would always be saturated. One of the GWR's early sets of water troughs, at Fox's Wood near Bristol, had to be relocated after only two years use because defects were found in the arches of a short masonry viaduct at this location. These defects were attributed to constant water seepage resulting from splashing as passing locomotives picked up water. In practice the presence of the water troughs probably aggravated a pre-existing condition and the same defects would most likely have eventually occurred simply due to natural percolation of rainwater. Nevertheless it was felt desirable to find a new location for the water troughs.

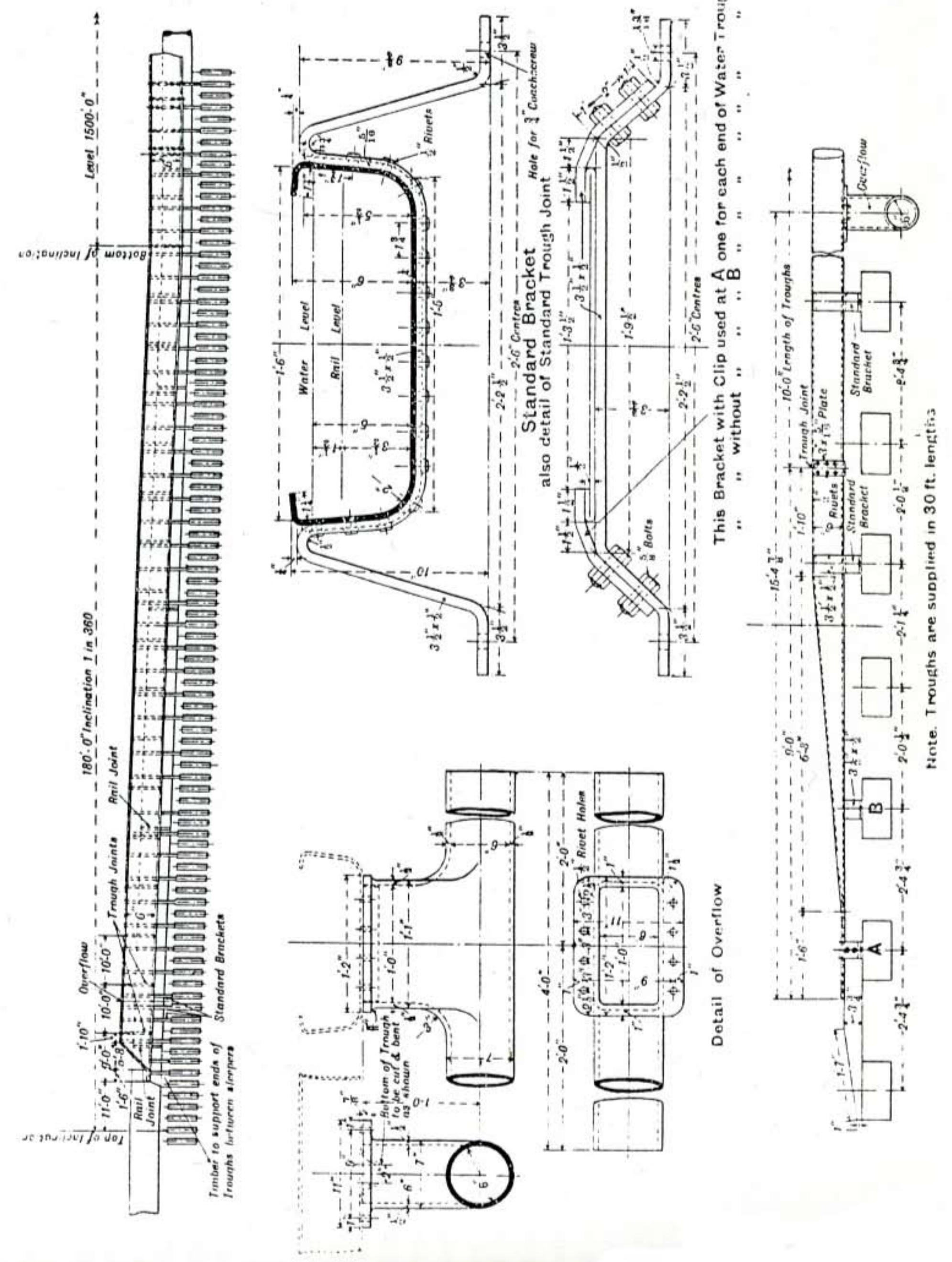
The Design of Water Troughs

What follows is a description based on the GWR's design for water troughs. Other companies installations will have differed in the details.

The troughs were made from galvanised steel plate in ten foot lengths, eighteen inches wide and six inches deep. The total length of the troughs on the GWR varied between 500 and 620 yards, with a length of 560 yards being the most common. By 1905 a modification to the shape of the trough had been made by providing an in-turned lip along the top edge of each side in an effort to reduce splashing. The bottom of the trough was mounted four inches above the sleepers throughout the length of the troughs. Early installations used baulks of timber bolted to the sleeper to support the trough, but these were quickly changed to steel brackets, which were easier to install and maintain.

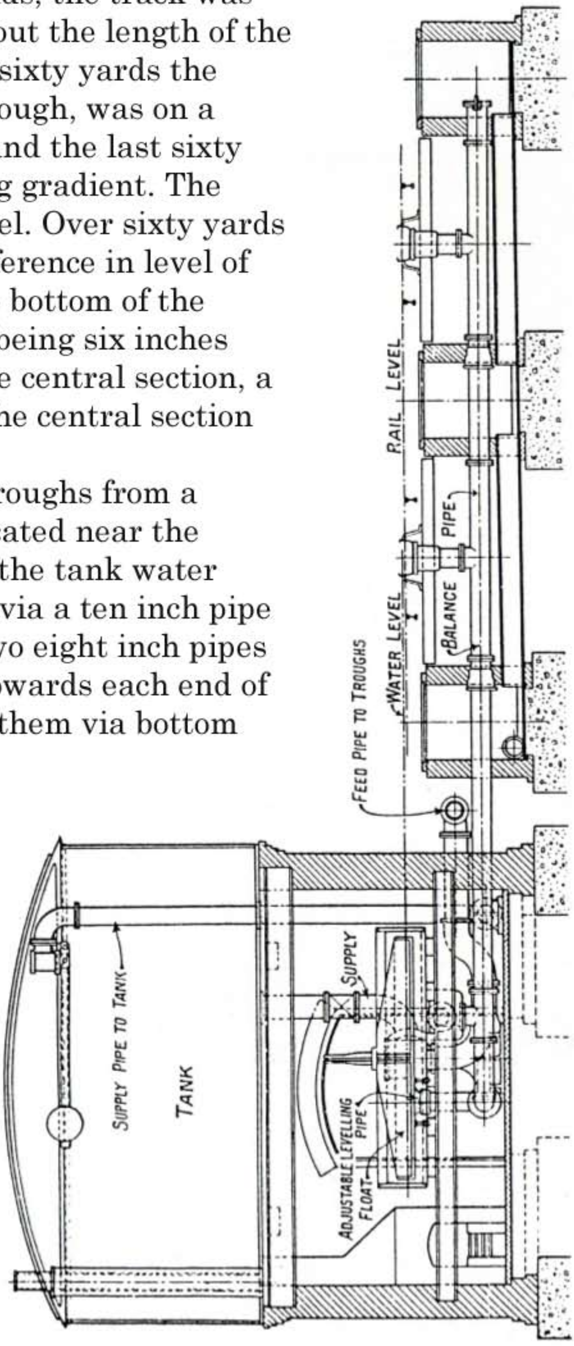
The normal maximum water depth within the trough was five inches and in this state the water level was 1½ inches above rail level. Where the location of the troughs was on curved track, the cant of the track was limited to 1½ inches so that the water depths on the high and low sides of the trough were not significantly different from the ideal five inches. In normal service the water scoop on the locomotive, when lowered would be one inch below rail level and thus 2½ inch below water level and 2½ inches above the bottom of the trough.

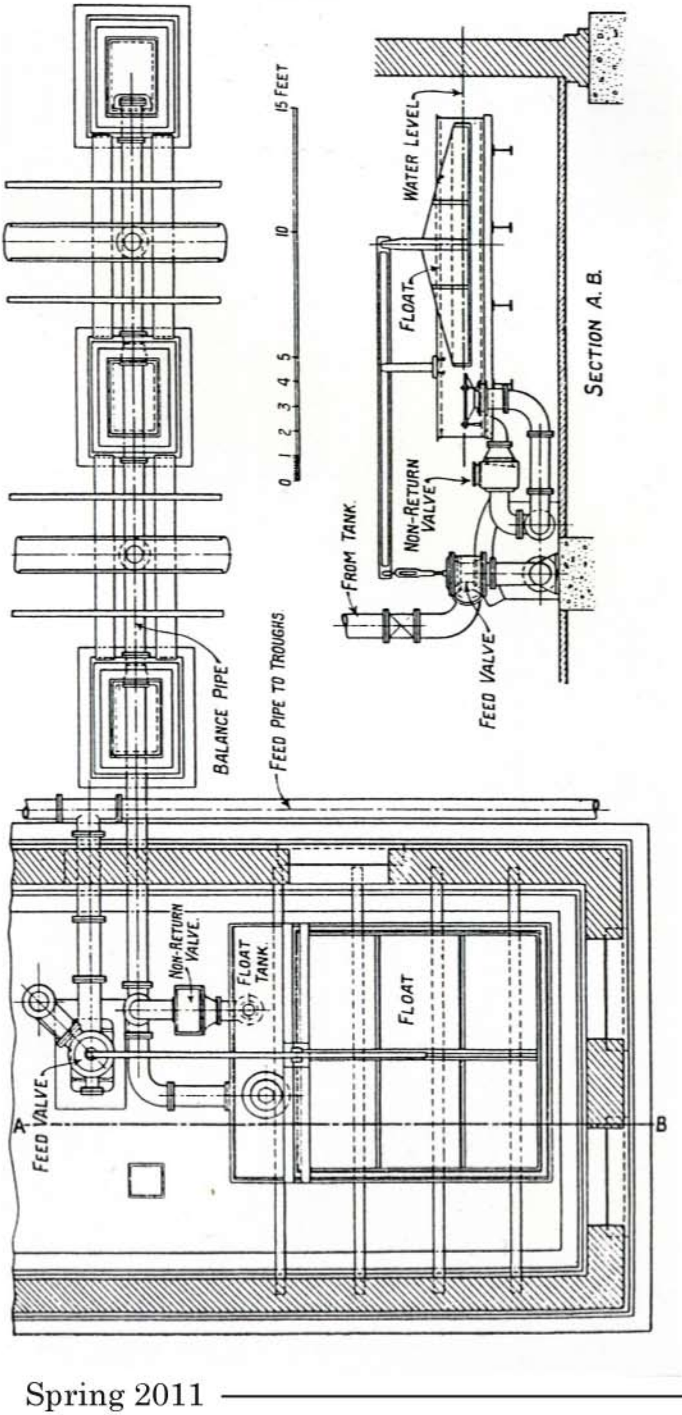
The troughs were open ended so that there would be no obstruction that would impede the passage of the water scoop if it were lowered before the troughs were reached, or was not raised before the end of the troughs. In order to retain the water in the


Level 1500'-0"
180'-0" Inclination 1 in 360
Bottom of Inclination
Top of Inclination
Rail Joint
Trough Joints
Overflow
Standard Brackets
Timber to support ends of troughs between sleepers
Standard Bracket
also detail of Standard Trough Joint
Water Level
Rail Level
Hole for 3/4" Coachscrew
1/2" Rivets
5/8" Bolts
2'-6" Centres
This Bracket with Clip used at A one for each end of Water Trough
" " without " B " " " " "
Detail of Overflow
Bottom of Trough to be cut & bent as shown
1/2" Rivet Holes
10'-0" Length of Troughs
Trough Joint
Standard Bracket
Note. Troughs are supplied in 30 ft. lengths

troughs, despite the open ends, the track was not uniformly level throughout the length of the troughs. In fact for the first sixty yards the track, and thus the water trough, was on a falling gradient of 1 in 360 and the last sixty yards was on a similar rising gradient. The central section was dead level. Over sixty yards this gradient produces a difference in level of six inches and thus with the bottom of the trough at the extreme ends being six inches higher that the bottom of the central section, a five inch depth of water in the central section was easily maintained.

Water was supplied to the troughs from a 40,000 gallon water tank located near the centre of the troughs. From the tank water flowed through a feed valve via a ten inch pipe to a tee piece, from where two eight inch pipes carried the water 374 feet towards each end of the troughs before entering them via bottom inlets. Providing two inlet points speeded up replenishment of the troughs and also helped reduce the wave height of the inrushing water. Typically it took about three minutes to refill the trough after the passage of a train. Speed of replenishment was important as subsequent trains passing in quick succession would have had trouble picking up sufficient water if the





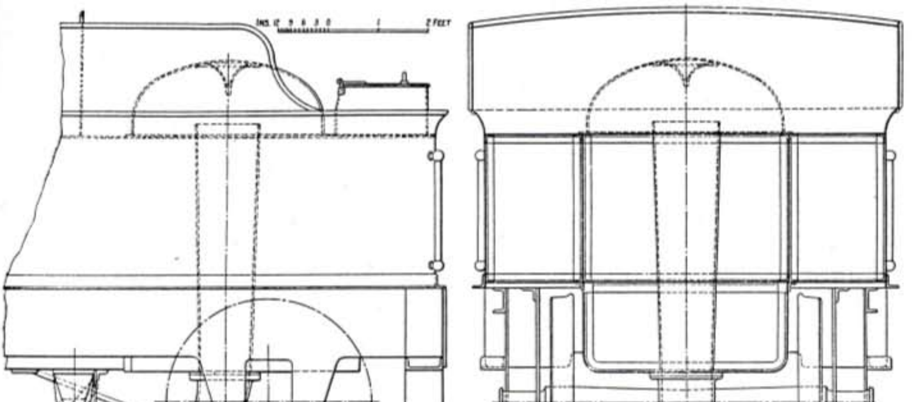
troughs could not be quickly refilled. The feed valve was controlled by a float located in its own tank below the main tank. This float tank was at the same level as the water troughs and was connected to them by a balance pipe. Thus when the water level in the troughs fell as a result of a locomotive picking up water, the level in the float tank also fell, opening the feed valve. In fact the balance pipe split into an inlet pipe and an outlet pipe just before connecting to the float tank. The top of the outlet pipe was flush with the bottom of the float tank and this pipe also had a non-return valve fitted. As the water level in the troughs fell water drained out of the float tank via this outlet pipe and the non-return valve. As the water level in the troughs rose again, the non-return valve prevented the float tank from filling via the outlet pipe. The top of the inlet pipe was above the bottom of the float tank and was in fact set at the desired water level when the troughs were full. The effect of this arrangement was that as the water level in the troughs rose, the level in the float tank remained unchanged until the troughs were full, at which point the water began to spill out over the top of the inlet pipe, refilling the float tank and closing the feed valve. The inlet pipe had an adjustable collar at the top to permit small adjustments to be made to the final water level. The advantage of this arrangement is that the feed valve remained fully open until the last moment; without it the rising water level would gradually close the feed valve, restricting the flow of water and thus extending the refilling time.

Water Pick Up

The water scoop fitted to locomotives or tenders was hinged so that when not in use it was well above rail level. It was lowered by a screw mechanism, usually manually operated by the fireman, but there were examples of steam operated water scoops. When lowered, the scoop lined up with a vertical pipe which passed through the water space in the tender or water tank. The top of this pipe was above the normal water level in the tank and this provided the non-return feature of the system. The forward motion of the train caused some of the water in the trough to be forced up the scoop and vertical pipe to spill over into the water tank. Experience showed that a speed of at least 20mph was required to pick up water satisfactorily and that the best results were obtained when the speed was not more than 50mph. On the L&NWR trains were regularly recorded as picking up water at 80mph, but with water troughs at frequent intervals obtaining a full tank wasn’t a necessity. By contrast, for many years on the GNR, after a fast run down Stoke bank, drivers would slow their trains to between 35 and 40 mph to pick up as much water as possible at Werrington Troughs, to see them safely over the final eighty miles to Kings Cross. This situation was alleviated after the first world war, by the provision of troughs at Langley, south of Stevenage.

Another important feature of the equipment required on a locomotive was adequate venting of the water tank. When picking up water a considerable quantity of air has to be expelled from the tank very quickly, as the GWR found out to their cost when they first tried to apply water pick up equipment to a tank locomotive. When No 11, the prototype of their 36XX class 2-4-2T locomotives, was tested at speed over Rowington Troughs, the tanks are reported to have burst because the vent pipes were too small to dissipate the excessive air pressure caused by the rapidly rising water level. Much larger vents, under mushroom shaped covers were fitted, and no further trouble was experienced.

In the 1930s the LMS developed a refinement of the water scoop whereby it was preceded by two vertical plates dipping in the water and converging towards the centre of the trough. This



funnelling effect reduced sideways wastage and increased the effectiveness of water pick up at high speeds.
It might surprise you to learn that some diesel locomotives were fitted with water scoops. When the diesels were first introduced, much of the coaching stock in this country was heated by steam, and diesels had to carry an auxiliary boiler to provide this. Thus the scoops were used to replenish the tanks for the steam train heating boiler. In practice it was found that the locomotive's traction motors did not take kindly to the drenching they received each time water was taken and the practice was not perpetuated for long.
Of course the water troughs themselves were not without their problems. Mention has already been made of the effects of water spillage, but the other big problem was frozen water in the winter months. It was the responsibility of the permanent way ganger to keep any ice broken and cleared from the trough. If the thickness of ice exceeded 1/8 inch the troughs were to be closed, as was also the case if the ice formed faster than it could be cleared. Likewise the troughs were to be taken out of use if the accumulated ice on the track bed, formed from the spillage of water, exceeded one inch in depth. Naturally if the troughs were out of use alternative arrangements had to be made which may well have required trains to make extended or additional stops to take on water. On the GWR alone, during the first three weeks of February 1917, the water troughs at Aldermaston, Fairwood, Goring, Keynsham, Magor, Ferryside, Ludlow, Ruislip, King's Sutton and Rowington were all out of use for periods varying between five and twenty days. Similar problems were experienced whenever there was a severe winter.

Ruislip Water Troughs

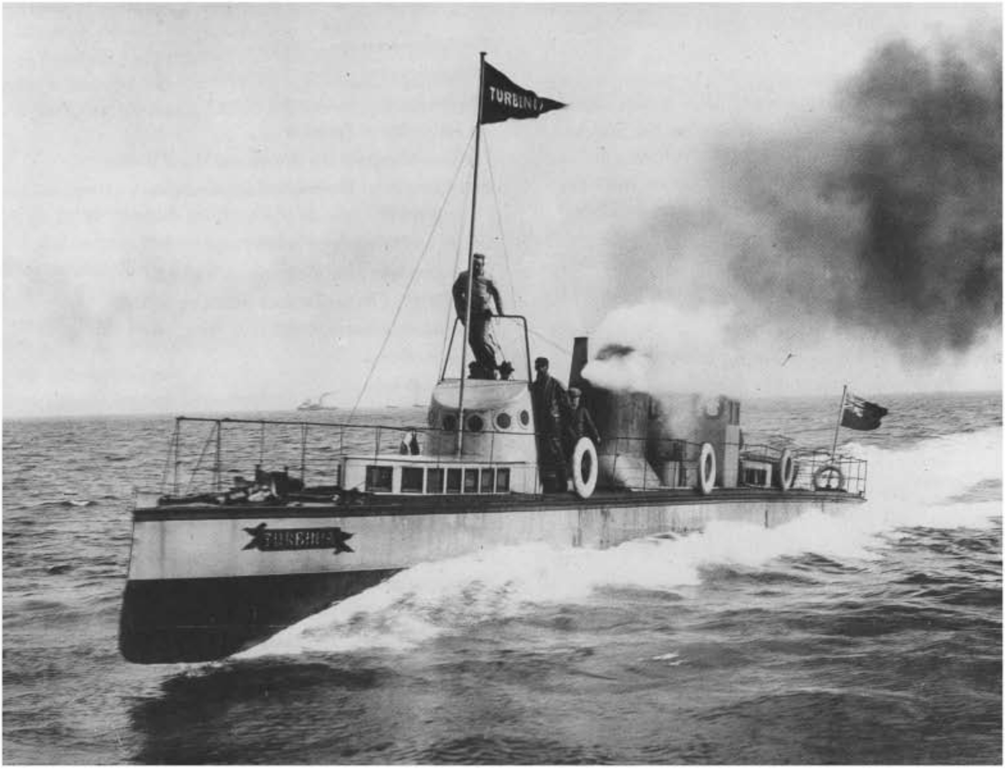
Ruislip water troughs were located west of West Ruislip station on the Great Western & Great Central Joint Railway. They opened in 1906 and were 560 yards long. Their eastern end was 2 miles 18¼ chains from Northolt Junction, while their western end was

2 miles 43¼ chains from Northolt Junction. Although on a joint line, the troughs were built to the GWR design, and to this end a trial had been carried out, in late 1904, of a Great Central locomotive on the GWR's water troughs at Aldermaston, in order to check scoop clearances. The results were perfectly satisfactory, and the Great Central's Chief Mechanical Engineer, J.G. Robinson, agreed to the use of the standard GWR trough design on the joint line.

Ruislip water troughs can just about claim to have been the closest set of water troughs to London. Their only serious rival was the Bushey troughs on the line from Euston. Ruislip troughs were about thirteen miles from Paddington and fourteen miles from Marylebone, while the Bushey troughs were fifteen miles from Euston. Interestingly though when measured, as the crow flies, from the Charing Cross (the traditional point for measuring distances from London) both sets of troughs turn out to be a little over fourteen miles away, the difference being less than the length of the water troughs themselves.

THE 'TURBINIA' TRIUMPHANT

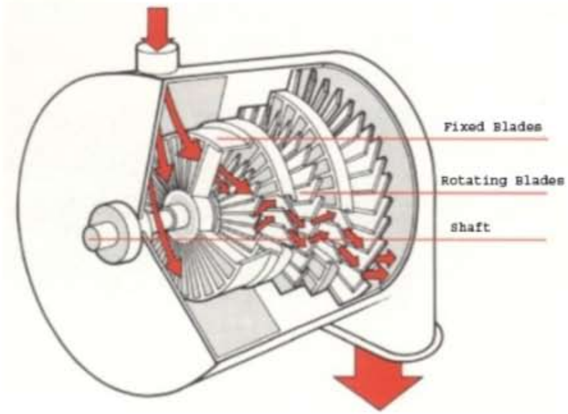
By Paracaramel



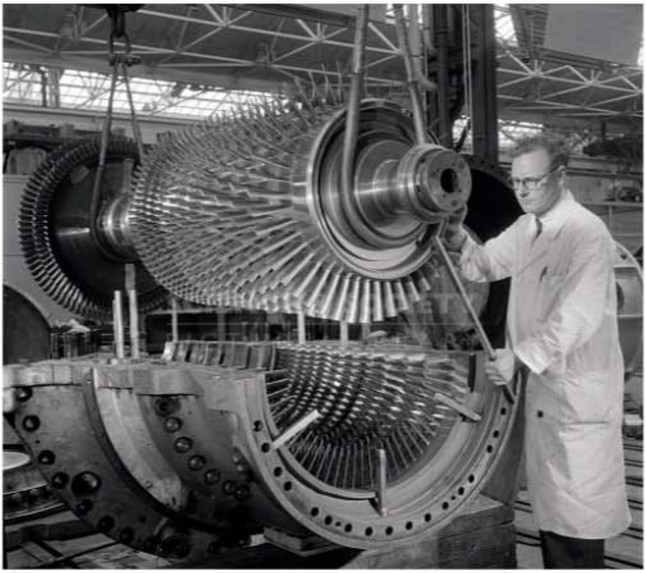
A year ago my contribution to Ashpan 85 was an appreciation of Charles Parsons and some of his lesser known interests. In this article I will attempt to describe the invention for which he is most famous and for which the world owes him the very highest praise. I am of course referring to the axial flow reaction turbine, which today is used in generating 80% of the entire global supply of electricity.

The concept of simple turbines, in one form or another, had been known for centuries but the practical applications for them were slow to advance beyond that of the windmill. The industrial revolution was mainly powered by reciprocating steam engines, but engineers and inventors were only too well aware of their shortcomings. Many attempts were made to design rotary engines which could give a continuous power output. Most of these used the swash-plate or variations of it such as the Dakeyne disc engine.

The concept of turbines in general had been known since the 18th century and in 1791 John Barber patented the gas turbine. Whilst this was before the days that patents had to be shown to work, the principle of a reaction turbine driving a compressor had been established. Much greater success was achieved when Pelton invented his impulse water turbine in the 1870's and also when de Laval invented his impulse steam turbine in the following decade. The impulse principle utilises the kinetic energy derived from high velocity fluids emerging from converging/diverging cones.

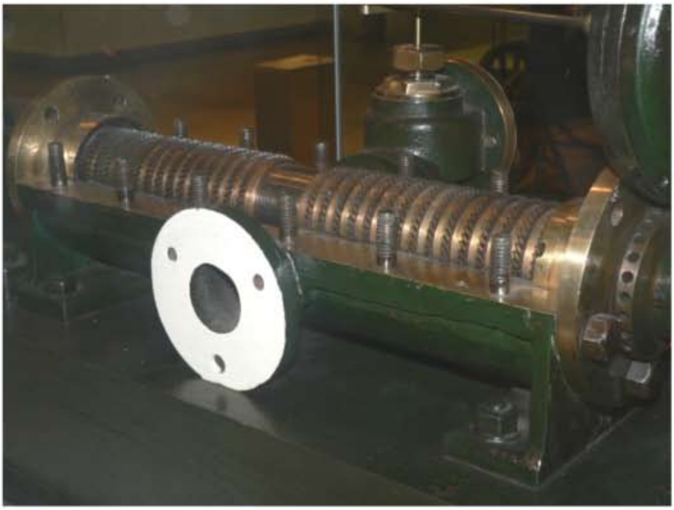


It was from these beginnings that Parsons began to think about the ways in which steam could be used in a reaction mode to drive a turbine at a lower speed and in a more economical manner by using its expansive properties. His solution to these problems was to arrange for the steam to be expanded in a series of multiple stages. This he achieved by arranging a number of turbines in series such that the velocity of the steam remained notionally constant as it passed from one set of blades to the next with only a small drop in pressure. In a practical system the steam passing at an angle over the blades of the first turbine is ejected at an opposing angle which needs to be reversed to its original angle before being passed to the second turbine. This was achieved by interspersing a set of fixed blades between each pair of adjacent turbines. This formed a set of turbine blades running on a rotating shaft within a casing to which were attached the stator blades. As the number of stages increased, the diameters of the turbine and stator blades were increased to cope with the expansion of the steam thereby maintaining a steady flow. This proved to be an excellent



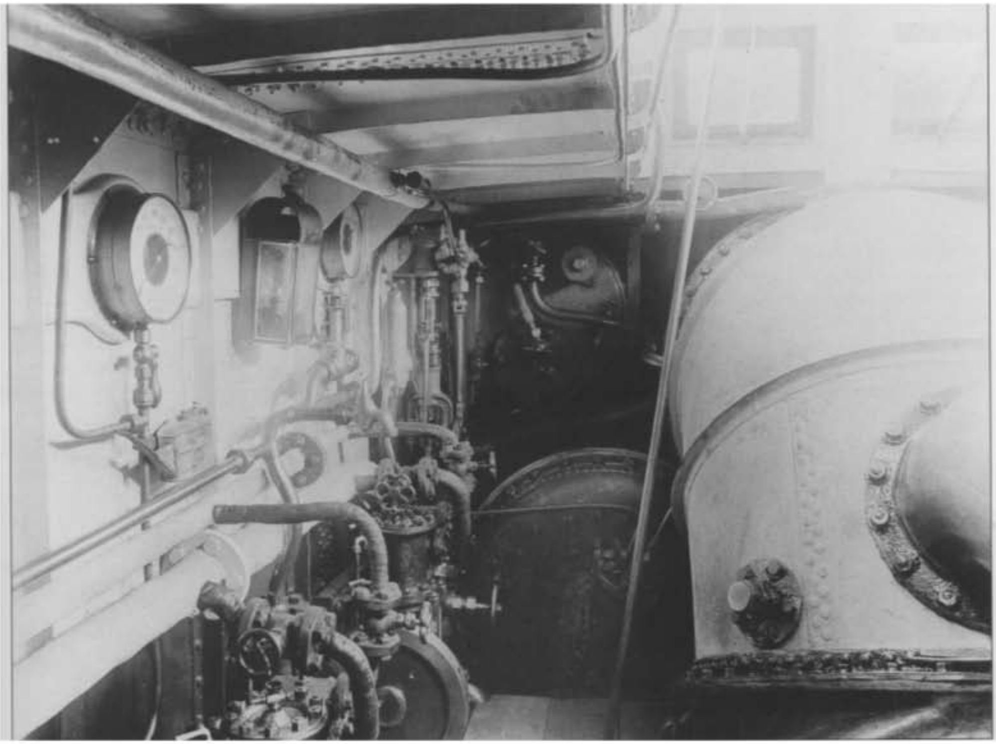
arrangement provided the working tolerances were kept low although Parsons was somewhat disappointed with the high rotational speed of 18,000 rpm required to achieve maximum economy.

It was whilst Parsons was working for Clark-Chapman in Gateshead as chief electrical engineer that he built his first commercial turbine/generator. Using turbines with a constant 4"diameter these small units worked in pairs on the same shaft with the steam being admitted at their centre to cancel out the end thrusts. Despite their low overall efficiency (1½%) they were compact and free from vibration.



Some 300 units were made and these formed the basis of his patent for the axial flow reaction turbine. In 1889 Parsons left Clark-Chapman along with some twelve other employees to set up his own business, at Heaton in Newcastle, with a view to further exploiting his patent. In the event the patent was not available to him since it formed part of his working agreement with Clark-Chapman to whom it had been assigned. Providentially, the patent made no mention of the radial flow configuration which Parsons was then able to develop into a commercial success. He managed to recover his axial flow patent in 1894 after a costly legal battle and immediately took out his classic patent for the use of steam turbines for marine propulsion. At the same time he formed the Marine Steam Turbine Company. Even before Parsons had recovered his axial flow patent, his thoughts had been to apply turbines to ship propulsion. It was clear to him that turbines could pack more power into a smaller space and at the same time reduce vibration. With further developments on blade design, turbines might also yield a considerable benefit in fuel economy. In 1893 Parsons began to design a boat which could test these ideas. A year later work started on the construction of 'The Boat' which was subsequently named 'Turbinia'. Her hull was mostly built from 16 gauge sheet steel by the Brown and Hood Works and secrecy was the order of the day. Notwithstanding this, the director of construction at the Admiralty, (Sir William White) was invited to observe the progress and there is no doubt that certain members of the Admiralty were well aware of what might be coming. 'The Boat' was launched into the Tyne on 2nd August 1894. She was very sleek being just over 100ft long with a 9ft beam and a design draft of only 3ft with 4ft freeboard. Her displacement was 44 tons. She was fitted with a double ended water-tube boiler working at 210 psi and her machinery was made at the Heaton works and comprised a radial flow turbine, developing 1650 hp at 1700 rpm when coupled to a single shaft with a single propeller. Initial trials were disappointing and the lack of speed was attributed to either the turbine or the propeller. Further trials were made with a variety of different propellers but to no avail. Attention then turned to the power output from the turbine. This is critical since the power requirement is proportional to the cube of the speed. Torque measurements on the drive shaft indicated enough power to achieve the designed speed of 30 knots whilst the boat could only manage a bare 20 knots. The hunt was on to find where the loss of power was occurring. Attention was refocused on the propeller which was now thought to have been suffering from the newly discovered phenomenon of cavitation. In order to study this, Parsons built a glass tank illuminated by a flashing light, created by a rotating mirror whose rotation could be matched to the speed of the propeller. (In today's parlance this was a stroboscope.) Sure enough the propeller was rotating so fast that the surfaces of its blades were breaking away from the water and rotating in an envelope of attenuated water vapour. Reduction of the shaft speed was not an option since turbines have a very critical speed to achieve maximum efficiency and reduction gearing at that time was not capable of coping with this speed. The only alternative was to study propeller design which might reduce the cavitation problem. Using his observation tank Parsons found that small diameter propellers with large area blades gave the best results. Coincidentally it was found that if the tank was used under reduced pressure then cavitation occurred at significantly lower speeds. The shaft was then fitted with three smaller propellers in line.

By this time Parsons had recovered his axial flow patent (which was his preferred option) and the decision was made to refit the boat with an improved propulsion unit. This took the form of a three stage axial flow turbine working as a combined triple expansion unit driving three separate shafts each having three 18" propellers with 24" pitches. With steam at 200 psi the central shaft ran at 2000 rpm whilst the outer shafts ran at 2,230 rpm.



The improved performance was magnificent, reaching over 32 knots and rising further to 34 knots after a redesigned funnel had been fitted to improve the rate of steaming. Proving trials continued and minor adjustments were made. With its two stokeholds, conditions on board were cramped and it was found that four stokers working two to each short shift were required to fire the three drum double ended water tube boiler boiler. This had 1,100 sq ft heating surface with an evaporation rate of 27,000lb/hr. At maximum speed a flare from the fire could be seen rising to a considerable height from the funnel. After each high speed run the stokers would repaint the funnel a bright yellow. Parsons' determination had paid off and the stage had been set for a spectacular demonstration to be given in 1897 which would change the face of marine propulsion beyond all recognition.

1897 saw Queen Victoria's Diamond Jubilee. She had reigned for sixty years over an Empire whose undisputed Naval might was maintained to be greater than any two other fleets combined. As part of the celebrations a grand Naval Review was to be held on the last Saturday in June.

On Saturday 26th June 1897 the dawn broke grey with a heavy mist hanging over the Solent. As the sun rose the outlines of ships at anchor could just be seen. By eight-o-clock the fleet had become visible and, on a signal from the flagship, each vessel was transformed into outlines of coloured bunting rising from the bows, over the tops of the masts and down to the stern. This spectacle was repeated on one hundred and sixty five warships anchored in five lines occupying a total of thirty miles. They carried among them forty thousand sailors and three thousand naval guns. It was the most powerful fleet assembled in the history of the world. The Admiralty had summoned the ships from the Home Fleet without feeling the necessity of summoning any from the Mediterranean, Far Eastern, Southern Atlantic or Pacific Fleets. Fourteen foreign navies had sent representative ships and there was to be one further uninvited small craft later in the day.

As part of the Diamond Jubilee celebrations, on the previous Tuesday, the Queen had driven through huge crowds in London to attend a service of thanksgiving at St Paul's Cathedral. By the time of the Naval Review on the Saturday the Queen had not recovered enough composure to attend and she was represented by Albert Edward, the Prince of Wales.

During the morning of the review, packed trains left Waterloo at five minute intervals for Portsmouth, where the passengers joined the crowds who had arrived the previous day. At 12:20 the first of the royal trains arrived. Forty minutes later a second

royal train arrived carrying the Prince of Wales, adorned in the dark blue and gold uniform of an Admiral of the Fleet. He was escorted directly to the Royal Yacht where he joined his sister Victoria, Empress Frederick of Germany and mother of the future Kaiser Wilhelm II, for lunch. The cannons of Nelsons 'Victory' fired the Royal Salute whilst the Royal Standard of Great Britain was raised at the main mast to fly alongside the gold and black German Imperial Standard. At two-o-clock the Royal Yacht cast off and was joined by a procession of other vessels containing invited guests, before commencing its approach to the fleet. At the sound of another salvo from HMS Victory the order was given to 'Man Ships'. In the days of sail the result was the most dramatic of naval spectacles, with sailors (known as top-men) racing to beat the clock to climb the masts and line the rigging and yard arms. This was invariably done with bare feet as was demonstrated on the eighteen wooden men-o-war still in commission with the Home Fleet at the time of the review. On the steel ships the rigging and yard arms had been removed and sailors lined the edges of every deck, the gun turrets and along their barrels. As the Royal Yacht drew level with each warship the crew 'removed caps' and shouted three cheers. Capital ships with bands struck up the National Anthem and the German ship 'König Wilhelm', presumably with tongue in cheek, played Rule Britannia. (Within a week Rear Admiral Alfred von Tirpitz had been appointed State Secretary for the German navy to start his programme of German rearmament.)
As the review was coming to its end an uninvited small ship bearing a red pennant with the name 'Turbinia' clearly visible made its appearance and began to race up and down the lines of ships at anchor. Weaving and darting between ships with astonishing speed and manoeuvrability and with flame belching from its funnel there were no other craft capable of catching it. Parsons had launched the 'Turbinia' onto the world stage before an audience of immensely powerful and influential people. History does not record the extent to which the Admiralty had connived at the exploit but at least three members are known to

have been appreciative. As the Royal Yacht steamed back to Portsmouth Harbour the 'Turbinia' made another surprise appearance alongside to make its own Royal Salute. Parsons' timing was perfect: coinciding as it did with the Prince of Wales' welcome signal to 'Splice the Main Brace'.

As the Royal Yacht was entering the harbour the sky had become dark green and black with thunderclouds. Thunder and lightning preceded rain that became torrential and gave rise to the worst storm ever recorded on the South coast. For a time it seemed as if the illuminations from the fleet would have to be cancelled, but the storm passed as quickly as it had arrived and at nine fifteen, on the signal from a cannon, myriads of electric lights outlined every ship. At eleven thirty there was a final rendering of the National Anthem and all the warships in the anchorage fired coordinated salvos which could be heard as far away as London. The review was at an end but the events had made a marked impression on the navies of the world. Within a decade one quarter of all Royal Naval warships had been fitted with turbine propulsion manufactured by Parsons or his licensees and the Admiralty had ordered that all future warships should be designed to take advantage of the power and economy derived from turbine propulsion. These decisions were to influence the political map of the world for ever as will be described in a future article about the design and launch of HMS Dreadnought in 1906.

As a postscript, the 1897 Naval Review was not to be the largest ever. This was to occur on June 5th 1944 when a part of the invasion fleet comprising over eight hundred ships was reviewed. However there were certain other differences. Neither Royalty nor the public were invited. The Germans and Japanese were persona non grata, the Italian fleet had been sunk at Taranto, the French fleet sunk at Oran, the American fleet depleted at Pearl Harbour and the Turbinia had been cut in half in 1926. The stern part, complete with engines and propellers, had been sent to the Science Museum in London and the bow section remained in store at Wallsend. The two parts were reunited in 1994 using a new twelve foot centre section, and on the centenary of her launch, she was moved to the Discovery Museum in Newcastle.

Don't Forget Members Running Days Saturday 23rd July & Saturday 17th September

IDSME
Then & Now

Left: 1981, erecting the middle of the three station roof columns

Below: 2011, demolishing the middle of the three station roof columns