Club Magazine

AUTUMN EDITION 2021

Luton & District MBC

.... a club NOT just for boats ....

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EDITORIAL

Despite the latest sad news that the St Albans MES and The International Model Boat Shows have been cancelled there is still plenty of activity going on to keep us all amused. All lined up for September is Brambleton Outdoor railway (Harpenden), Black Park Open Day and Deans Marine Open Day plus the Bushmead Hall monthly meetings with talks being given on many subjects of interest by people who know.

Included in this quarterly issue are reports on Northampton MBC open day, Wings and Wheels. Fenny Stratford Canal Day and Hemel Hempstead Club sailing days and Brambleton Model Railway open day, so there is lots of interesting reading and pictures to browse through.

Finally my thanks goes out to Pete Carmen for the reports on the activities that the club has attended, as I have not been in a position to attend any of these events.

Ed.

A QUIET WORD

Since the last edition, we have been busy with landscaping and flower beds revival. Although not in our remit, it makes our area nicer with plants. To that end, several members have been helping out digging, planting, laying paving slabs and litter picking on a regular basis. It has not gone unnoticed by the public. I would ask all club members, please help out where possible. Even if it's just picking up the cans in the compound. Also, when finished sailing, I would like everyone to continue to clean the tables down and where possible, help put them away.

On a sadder note, one of the Hemel members, James Heselwood lost his battle with cancer. The club sent flowers and condolences to the family. James was a fount of knowledge on many subjects, and on a personal note, always made me laugh with some of his stories from work or personal life.

Going forward, with the evenings drawing in, the club will organise a few Saturday afternoon sails so we can put the lights on the boats. We will also be going over to our club nights at Bushmead Hub, please see the diary dates on the club website. I have put the talks up till December. We hope to do our usual fish and chip night in December plus our Christmas Moat House meal between Christmas and New Year, date to follow!

Pete Carmen - Club Secretary

TERRY'S NEW WHEEL BARROW

Innovator of the Year Award!

BUILDING A TRUMPETER 1/350 SCALE LIBERTY SHIP KIT FOR RC

For a long time I've really fancied owning an RC model of a three island, engines amidships merchant ship. So far the right ship hasn't come along but, after successfully motorising a Lindberg plastic kit of a shrimp boat, as a challenge I thought I'd try my hand at something I *could* easily get my hands on, a Trumpeter 1:350 scale Liberty ship. Admittedly my dream had been of something just a bit bigger but, on the plus side, it would be much easier for a man of advancing years to carry to the lake.

The Trumpeter kit seemed a good basis for mini RC as it's got a one piece hull and the fore and aft decks are separate mouldings which, if left removable, would make gaining access to the innards easier. I already had a spare Viper Marine 10 ESC so would need at least 4.8 volts to power whatever motor I chose. From experience with the shrimp boat I knew a twelve volt slot car motor fed by something under six volts would produce more than ample power for a vessel the size of the Liberty. (I've been playing with slot cars since I was at school – and yes, they had been invented then - so had a few spare motors lying around.) I decided to use four separate AAA NiMH cells with tags which would enable me to solder them in series with short lengths of wire so I could move them around the hull to get my ballast in the right place. Add to those a receiver, micro servo for the rudder, the motor from an old HO slot car, prop shaft from a short length of brass tube and shaft a length of steel wire; I thought I'd try the kit propeller as it looked as if it would be reasonably efficient. (Re the prop, rather than try to drill a central hole in it for the shaft - having first removed the moulded on 'pin' that on a static model cements into a hole in the stern - and then decide how to fix it accurately to the shaft, I took the easy way out and joined the 'pin' to the end of the shaft with a short piece of aluminium tubing.)

Before going any further I piled that lot and as much deck and upper works from the kit contents I could manage onto the hull and headed for the kitchen sink: you don't need a bath when testing little ships (which is not to say you shouldn't have at least a wash first) and there was no point in going on if it floated too low in, or under, the water. Hooray! It bobbed up and down with freeboard to spare so I *could* afford to add the extra wiring, an on/off switch, motor coupling and a rudder.

Some of the following might be a bit inaccurate as I did make the model a couple of years ago and my ageing memory, which never was brilliant, isn't even what it used to be. Anyway, first I cut a hole at the back end for the prop shaft and drilled a vertical hole under the counter stern to take a 1.8mm o/d (1mm i/d) brass tube for the rudder shaft. The rudder is a rectangular piece of thin brass soldered to a 1mm diameter length of brass wire which is held inside the hull end of the tube by a very short lever arm (not much room in a tapering counter stern) made of a lump of soft plastic off cut from something I don't remember. The advantage of the softness is that it grips the wire nicely without gluing and allows for easy adjustments.

After that I made a mounting for the motor out of plasticard which, together with the prop shaft, I secured to the hull with Plastic Padding Super steel after I'd lined up motor and prop shaft, joined by a piece of wire insulation. I like Super steel as it sets in a satisfyingly smooth way.

With the motor and shaft firmly positioned the next sink test involved positioning the RSC, rudder servo and batteries to roughly balance the ship after which the former two were hot glued to the base of the hull and the servo linked to the rudder arm with thin wire.

Before deciding on where the batteries would finally go there remained the little job of completing the kit and painting it. I decided on a post war 'civilian' finish to represent one of the Ellerman '*City of...'* Liberty's. They were all slightly different in the alterations to superstructure and fittings after the gun platforms, life rafts and other warlike

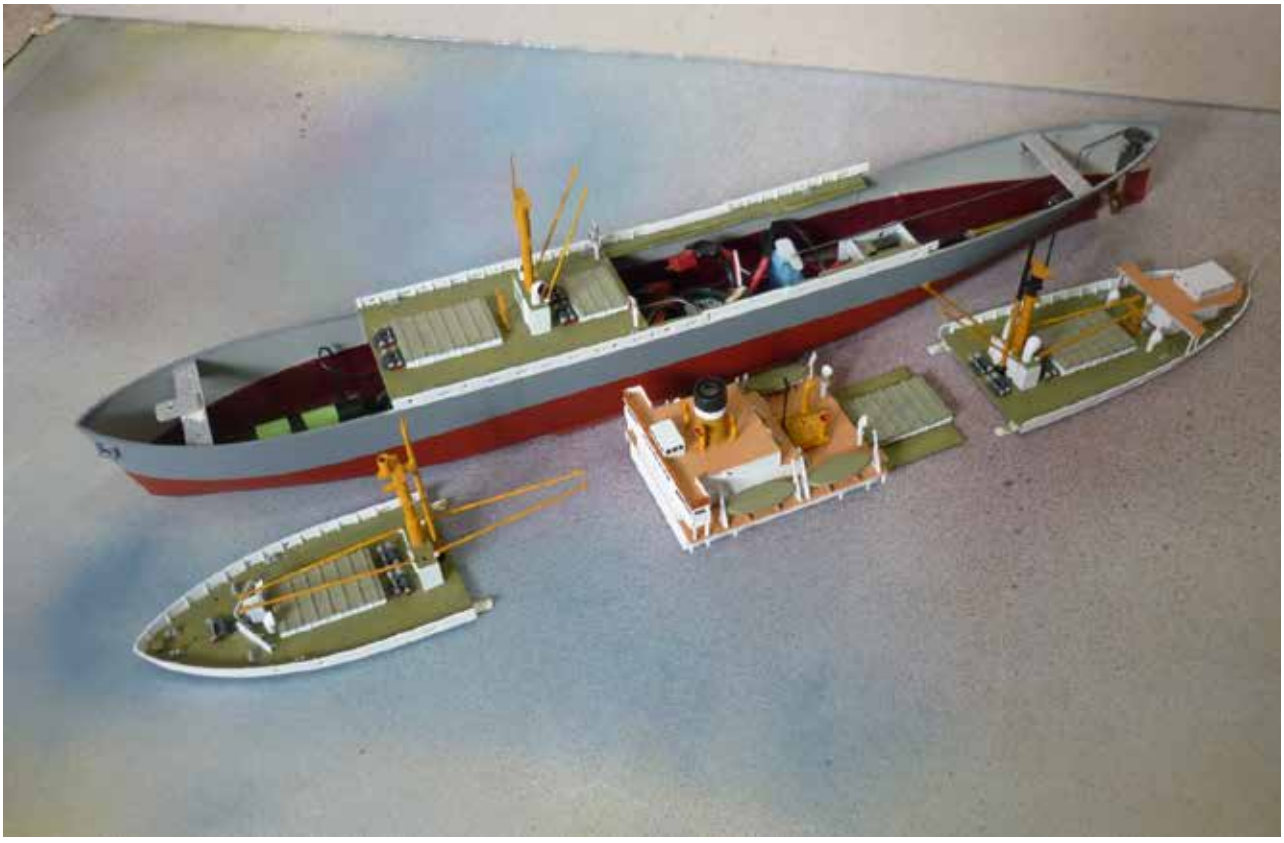
appurtenances were removed, but mine is loosely based on the *City of Chelmsford*. I altered the bridge, made a new funnel and made covers for the lifeboats (out of Supersteel of course) as the kit's wartime ones were open, ready for instantly abandoning ship. I left any rigging off as it would make taking off the removable parts very difficult and I knew I'd have enough trouble in not knocking off the derricks and other fittings with my sausage fingers.

As well as making the fore and after decks removable, I cut round the central part of the deck under and just aft of the superstructure so that too comes off easily to get to the main works: that bit just slots in whereas the fore and aft decks are held in by self tapping screws.

All painted and loosely assembled it was back to the sink where it proved surprisingly easy to shuffle the batteries and get the ship to float correctly trimmed: beginner's luck!

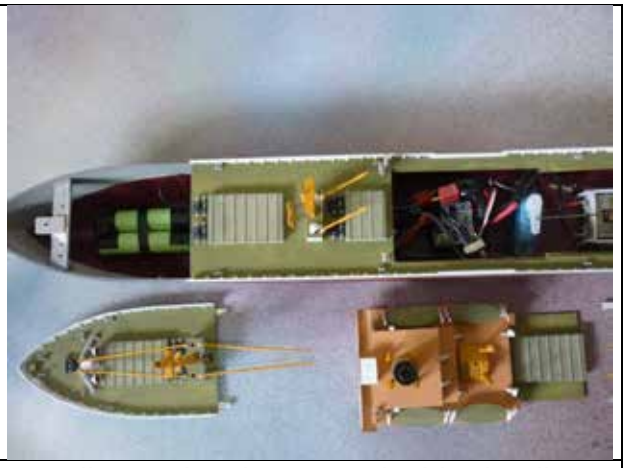
At sea *City of Chelmsford* behaves very well and can ride out frightening large scale waves; the kit propeller provides more than ample thrust and the rudder is in truth too effective and can stall progress if too much lock is applied. Anyway, Tony Martin had a go and approved, so it *must* be OK... A few photos follow.

Bill Grigg



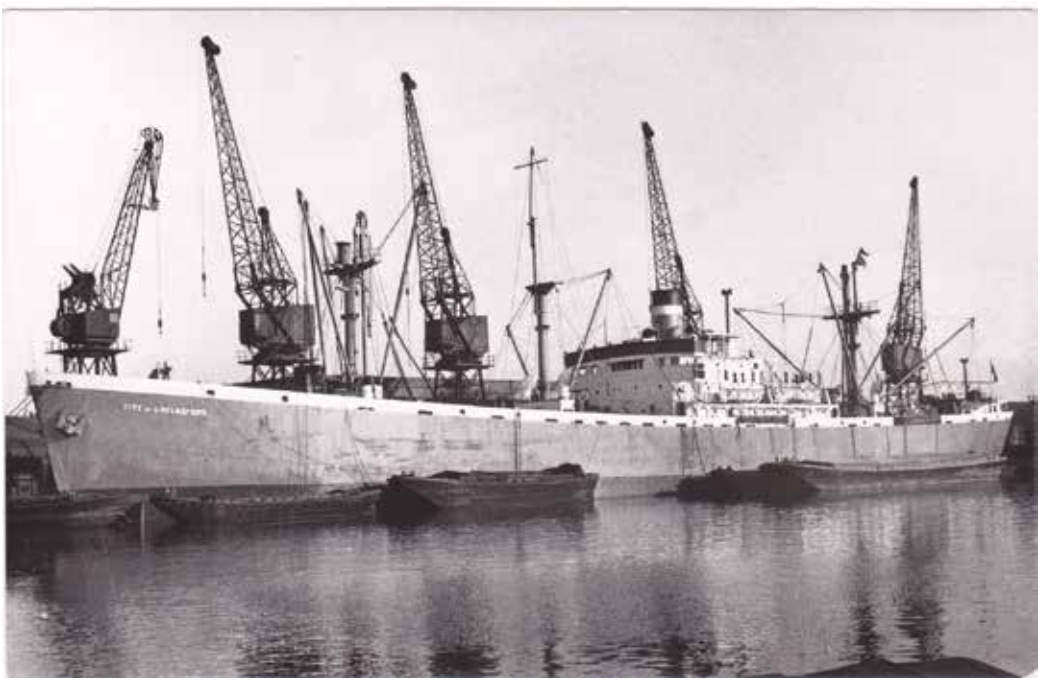
Liberty with decks removed exposing the inner workings

Aft end showing the Motor and Shaft



Liberty showing some inside detail

Fore and Aft views of the completed model



Completed Model on the water

AN UNUSUAL REQUEST

A few weeks back, I received an email from a lady asking if we could do a talk for a group of young adults with mental health issues. Not one to turn anyone away, we agreed a date and time. As part of due process, I checked out the group and its management and found that they were an organisation www.transitionsuk.org and a registered charity, set up to support the lives and futures of disadvantaged young people across the UK to ensure they transition to healthy, happy and fulfilled adult lives.

I asked several members if they would help by bringing boats along to display. The format was to be a 15 minute chat then a demo of boats on the water. On the day, not as many club members turned up as I had hoped, but hey ho! There were about 15 boats. The group turned up and introduced themselves. All were between 16 and 22. The talk went ok, but having mental health issues, they had a short attention span. So we started to put boats on the water. We were demonstrating different boats with different speeds from tugs to fast patrol craft. A couple asked if they could have ago. Why not. It wasn't in the plan but what the hell. A couple of the lads were up for it so we had a quick demo and let them loose. They were surprisingly good. We let them play for a few minutes each. This bought the group to life and several club members were being engaged by the youngsters. What was supposed to be a 30 minute demo turned into over an hour? The team leader Nicole was particularly happy as one of the group never engages with anyone, but today he was asking questions and totally enthralled. It was an eye opener for everyone involved, and hopefully we can do this again at some point a couple of photographs attached.

The Group of Visitors

Pete Carmen Describing the Boats

Some Boats on Display

Pete Carmen.

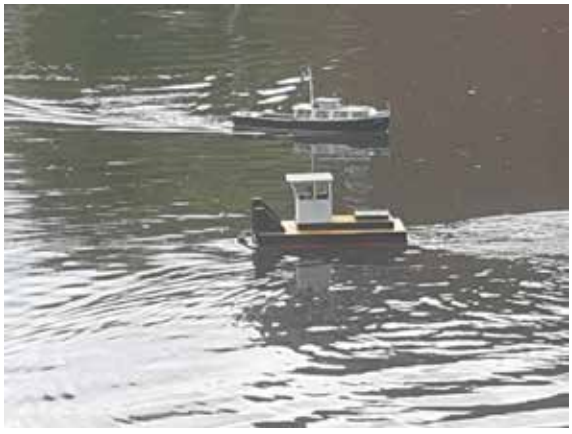
HEMEL HEMPSTEAD SAILING DAYS

Due to covid we were curtailed from sailing for nearly 18 months. But we did go on 2021!! We held 2 sailing dates, both of which were well attended. Great to see old faces, and to see them sailing. A special mention to Roger Warrington, who arrived on his invalid scooter with a boat!!

The second meeting was just as good, people turning up for a Sunday morning. I used this as a test sail for 2 recently refurbished boats. A Cervia tug which belongs to Reem, which had a new motor and coupling with prop shaft and rudder regrease, plus a split in the hull repaired and a repaint. This sailed remarkably well and was also reballasted.

The second was an oil rig supply vessel. At 4ft long and a deep purple colour, she had the electric wiring overhauled, prop shaft regreased and kortz nozzle repaired. This has been in the club for a year awaiting these actions so she could be sold. I did not think she would sail well, as she should be twin prop and twin rudder. She also only has a 6v decaperm motor in her. The original motor and esc (hitec gold) were kept. A 6v 4.5amp battery with separate supply for the receiver was installed and she was put on the water. I could not have got it more wrong! She was powerful, turned in her own length and was a delight to sail! In fact she rescued 3 boats in quick succession. I was doing a sales pitch to 2 club members, who shall we say we're not ready to part with cash, body parts when the wife found out, or just did not have room. Then Neal Robinson piped up that he would buy her. He had a sail, liked it.....bought it. As I sit here a week later, I am still annoyed I did not buy it!! The photo's that follow show some of the boats and those who sailed them.

P Carmen.



AN AFTERNOON SALE

We had an afternoon compound sale for the summer. Mainly due to having too much stuff in the hut that we needed one. We duly put out tables then filled them with all types of ~~crap~~ boats etc. Other clubs were invited, and members from Wicksteed and Northampton did attend. The club raised about £170. This will go towards paying for Bushmead hall for the coming winter meetings.

P Carmen.

NORTHAMPTON MBC OPEN DAY

Sunday 18th July.....Saturday was bad enough for how hot it was, but at least if you were at home you could escape. The Sunday promised to be even hotter! After collecting the table's midweek, I set to on the Saturday to clear the car. This gets full with junk over a few weeks with personal and club bits, paperwork, batteries, bits of boats that have broken off that I didn't realise etc. So, after discovering 4 servos, 6 batteries, several pieces of plastic and 1 unidentifiable piece which looked like a golf tee, the car was clear. Now the reason for doing this was because I was taking a recently swapped Robbe Topaz with me. Standing at 5ft she needed room in the boot. With the car sorted, I looked at the map, yes, a real map, to look at routes to the Northampton club's lake. Due to Silverstone bring on, I did not relish driving up the motorway or up the A6. So, I went up the country way. Set out at 7.50. At about 8.15 first message from someone saying they were already there. They thought it was a 9am start! So, I'm trundling along country roads, when I came across a lady on a horse. I was then stuck on a single-track lane with no passing places. I eventually turned up at 9.40. There were already gazebos and tables up for us, so set up was quick. By 10.15 we had boats on the water. The event was limited to 30 peeps due to covid restrictions, but that never stopped us having fun!

While others were settling down, I had a quick gander at all the boats on show, an impressive range, also some bargain boats for sale! As usual there was a raffle going on with a scratch-built Clyde Puffer up for grabs. Tickets were duly purloined! I retired to the tables to get the Topaz set up. I had bought a Shaun the Sheep figure to put on it for a bit of fun.....I realised its leg was missing, this was the golf tee I found earlier! To get to the electrics (this became relevant later), I had to undo 4 rigging sheets, unhook and lay to one side, undo 2 bolts at the back, loosen a screw at the front, slide the cockpit back and up then I can get to the electrics. Connected the battery and put back together. Brian got his square rigger up and running as well. My Topaz went very well, until I lost sail control, motor control (yes it does have a motor but that will be taken out), but the rudder still worked! 2 minutes later, Brian had the same thing. When I retrieved the boat, the receiver had fallen into the bottom of the hull, possibly blocking the signal. Not too sure on that. I left my boat with the cockpit area on but none of the mast attached. Then, we had a surprise visitor. Ron Dean of Deans Marine turned up in his Triumph Stag. Nice to see the Stag now finished, as it needed the motor totally refurbishing, which has now been done. I pointed out to Harvey who Ron was and that he had 2 Dean's boats here. Ron duly came over and was very pleased to see HMS Javelin and HMS Pegasus. Ron had bought HMS Kelly for a shakedown run after a refurbishing, so Harvey was roped in to sail with him with myself being nominated cameraman!

Much merriment was had, as Harvey was new to formation sailing, not as easy as it looks, and to Director Ron wanting me to lie on the red-hot decking! As the day progressed, the heat rose. To be honest, it was way too hot to stand outside sailing. We had some tea...and cake, then some more, sailing in between. Bob had several admirers of his steam boats, and Mark, Brian and Harvey had quite a few as well. My Topaz had none!!! By 1pm most sailing had stopped for cold drinks and some food, and because it was too hot! A while later, the Committee came around.....and prizes were announced. Not to my surprise, Bob Vaughan won best in show with his steam boats. John from Peterborough club came second with his Pibber (which he sold at the show), and to everyone's surprise, I came 3rd in show, with what Brian described as "my broken pile of junk". Indeed, in the photo of me with the yacht, I'm actually holding the rear mast on! I didn't stop there with nearly everyone joining in asking "how much was the Bribe".

The truth is a Robbe Topaz is a rare beast. Again, it naturally draws attention due to its unusual shape. And that's the only reason it won third prize. Mark won a highly commended for the boats he bought along. Personally, I was disappointed Harvey did not win anything as his display was quite impressive. With the temperature not letting up, we started to pack away, but the raffle was being drawn. Anne won 3 bottles of booze, Mark won a Clyde puffer, Harvey won some bits but I never saw what. Lots of prizes, too many prizes as usual. With everything packed away, and the prospect of the Silverstone Race emptying onto the motorway, we all made a farewell and left for the hot journey home. A few photographs of the event are shown below.

Pete Carmen

Mark with Boats

Bob with Trophy - Best in Show

Pete with Trophy – Pile of Junk???


Tug Towing Competition

THE LITTLE REPAIR SHOP

Having completed the conversion of two plastic models I was building namely the 1/350 scale Russian Battleship Tsesarevich and RNLI 1/72 scale Severn Class Life Boat (both articles with Model Boats awaiting publication). I decided to pay attention to some sorely needed repair work of my older models. The lists of vessels awaiting attention were:

a) **HMS DARING**: Small RC deck guns not traversing correctly.
b) **QUEEN MARY 2**: One of the 'PODS' motors not working correctly.
c) **PERKASA PT BOAT**: (originally owned by the Late Brian Thomson) needed some attention to the propulsion system.
d) **MS WORK BOAT**: The old escapement (Bang Bang) control system running hot.

HMS DARING

First to enter dry dock was HMS Daring (Small RC deck guns not traversing correctly). There are two pairs of small guns, Oerlikon 30mm Guns and Phalanx 20mm CIWS guns. The traversing is obtained using two servos' to drive pulleys connected by rubber belts. I had assumed that the base bearings were dirty and needed cleaning thus they were stripped down and cleaned. **Photo 01.**

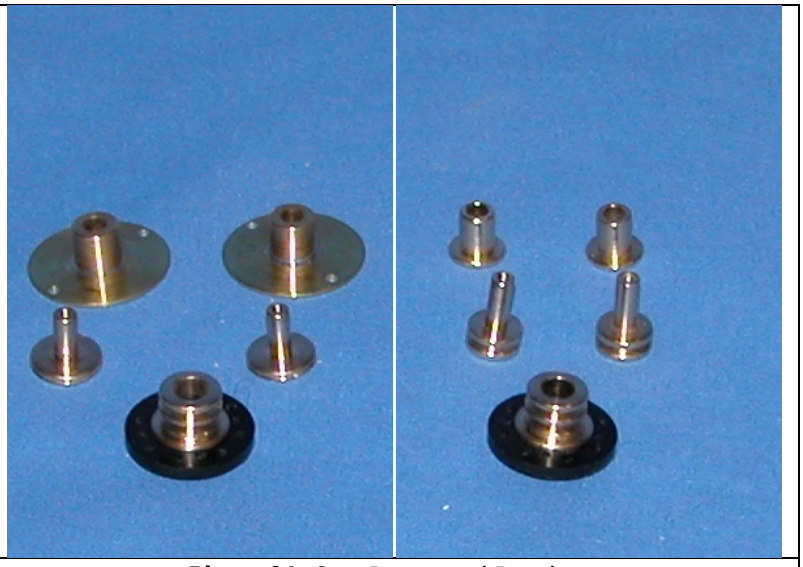


Photo 01: Gun Bases and Bearings

Following re-assembly the gun functions were tested to find that the Oerlikon guns were still not working. On closer inspection it was found that the drive servo was the problem **Photo 02.**

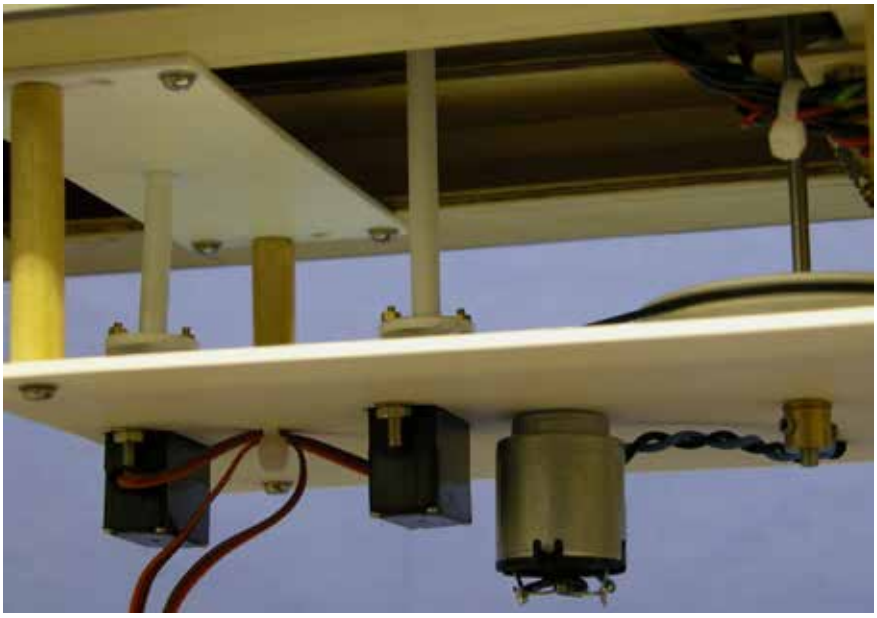


Photo 02: The Gun Servo's

The faulty servo was replaced, and after some difficulty getting the new one back into position, all the guns were now working correctly.

Having disconnected everything, it was time to reconnect all the cables. After a bit of head scratching this was accomplished allowing the entire superstructure to be replaced thus completing the necessary rework of HMS Daring **Photo 03** that is apart from its sea trials down on Wardown Lake.

Photo 03: Completed Model

QUEEN MARY 2

The only problems that I encounter with Queen Mary 2 is with the propulsion pods as from time to time water seems to creep into one or the other of the four pods rendering them inoperative as was the case on this occasion but only with **POD 2**.

The first task was to remove the entire superstructure from the hull, as shown in **Photo 01.** This was to allow access to the pod wiring and the two retaining screws shown in **Photo 02**. Pod two is in the top right hand corner of the photo

Photo 01: Main Superstructure Removed

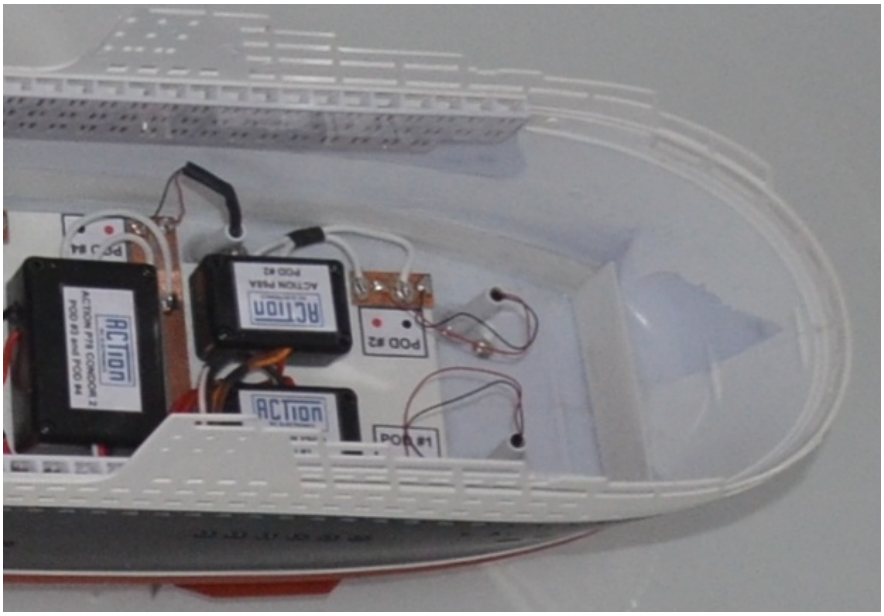


Photo 02: View Inside Hull of Pod Wiring

Photo 03 shows a drawing of a POD. In order to extract the motor from its housing, first the propeller and locking nut are removed from the propeller shaft, and then the rear blanking plug is machined away at the back of the pod to allow it to be removed. By pushing on the short propeller shaft and easing the connecting wires through the down tube the motor can be extracted.

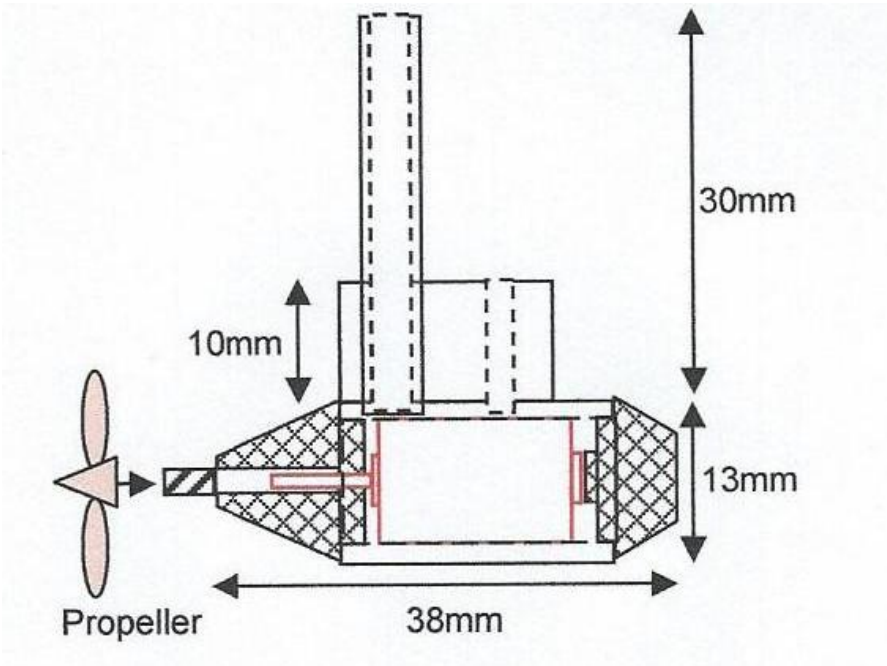


Photo 03: POD Construction Diagram

With the motor removed it is now possible to detach the propeller shaft from the motor and as this is bonded in place using Cyano it is only necessary to heat the shaft with a soldering iron to break down the glue and remove the shaft. Lastly, clean out all the old grease from the housing and replace it with some fresh, ready to accept the new motor assembly.

It is always a problem obtaining new motors, although the new motors may look the same and have the similar dimensions, there is never any information regarding its torque which is an important aspect of its requirements. After scanning the internet I found a suitable candidate which gave information about current verses voltage and after consideration I placed an order for six (a few spares) After waiting about four weeks the motors arrived and I quickly put one to the test and to my surprise they had a good amount of torque.

Re-assembly is the reverse of taking it apart. Bond the propeller shaft onto the motor shaft, add new connecting wires to the motor, thread the connecting wire in through the motor housing and up through the down tube then insert the motor into its housing making sure not to trap the supply wire in the process. Test the function of the motor to ensure it is working satisfactory prior to sealing it up.

Machine a new back plug, trial fit it, then bond it into position and when the adhesive is cured mask the assembly and give the whole assembly a coat of paint. When the paint is dry, fit the Pod back into the vessel, applying a small amount of silicon sealant between the mating surfaces before screwing the pod into position. Connect the two supply wires to the electronic speed controller and it is ready for testing **Photo 04.**

Photo 04: The POD installed

The long awaited bench test was carried out and found to be satisfactory only thing left to do is its sea trials down on Wardown Lake. **Photo 05** shows the completed model.

Photo 05 Completed Model

PERKASA MTB

A while ago Derek Thompson gave me a 1/72 scale model of a Vosper-Thornycroft Perkasa MTB that had been owned by his late brother Brian and was in need of some TLC. Thus when time permitted I set about the renovation. The original story of the renovation may be found in the Club Magazine Autumn 2019.

The sea trials were reasonably successful although the model really lacked oomph probably due to the selection of the type of motor. The new challenge now was to select a motor that would give the vessel some decent speed in the water. Hunting through the selection of possible motors I selected one I thought would do the job and proceeded to extract the old motor complete with mounting bracket. **Photo 01** shows the original motor installation.

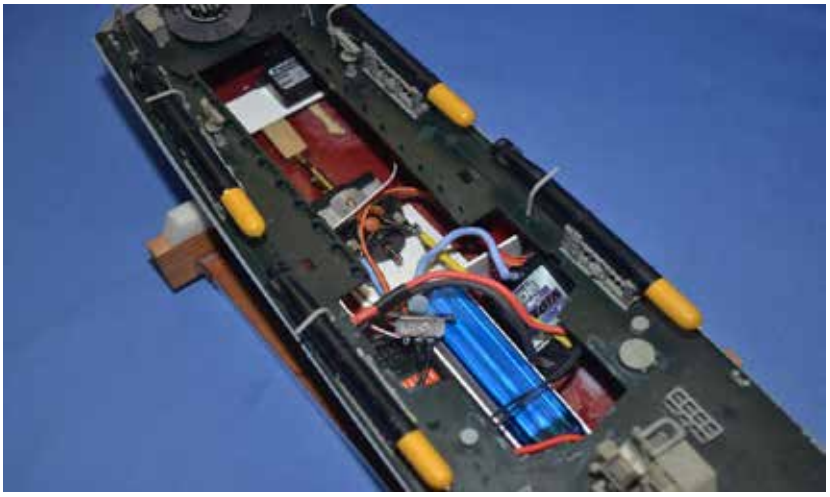


Photo 01: Original Motor Installation

Having removed the Radio, Battery, ESC and coupling/shaft from the hull the motor mount was unscrewed allowing the motor and its mount to be extracted. The motor was removed from its mount and the new motor with the mount trial fitted back into the boat. The good news is that with a small amount of packing the new motor came into alignment. Once the packing piece was glued to the old motor mount the complete assembly was re-installed back into the vessel with its propeller shaft and coupling.

The battery, ESC and Radio were fitted back into the hull and the wiring re-connected this then allowed the motor, coupling, shaft and Rudder to be tested which all worked to my satisfaction **Photo 02**. Only thing to do now is to try the vessel out on the lake in Wardown Park.

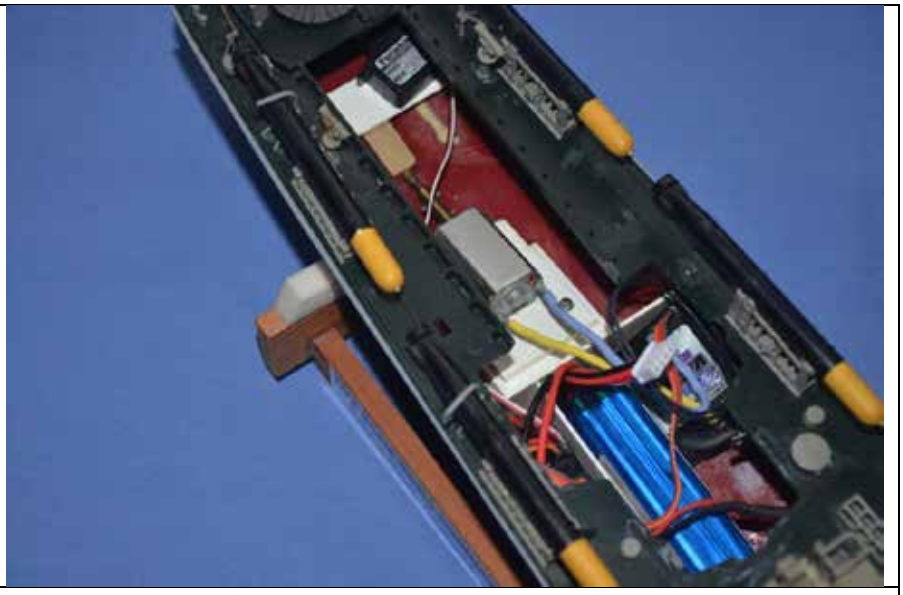


Photo 02 New Motor Installation

MS WORK BOAT

The original article on this particular model was published in the Model Boat Magazine November 2019 so if you are looking for the full information on building this model you now know where to look.

After modifying the control system electronics a couple of times I had noticed that the escapement drive unit was getting hot. After extracting the module during this re-fit I discovered that the plastic box housing the electronics had got so hot it had become deformed.

On investigating the problem I discovered that the pulse drive to the escapement motor was not actually switching off during its rest periods remaining at about 3 volts, which is enough to make the pulse drive output transistor very hot.

The answer to this problem was to modify the output drive circuit by using a different type of drive transistor. This modification was carried out and the system re-connected and tested. The pulse drive circuit was now working and switching off completely during its

rest periods (and not getting very hot) now allowing the complete system to be operated from 7.2 volts. The control system diagram is shown in **Photo 01.**

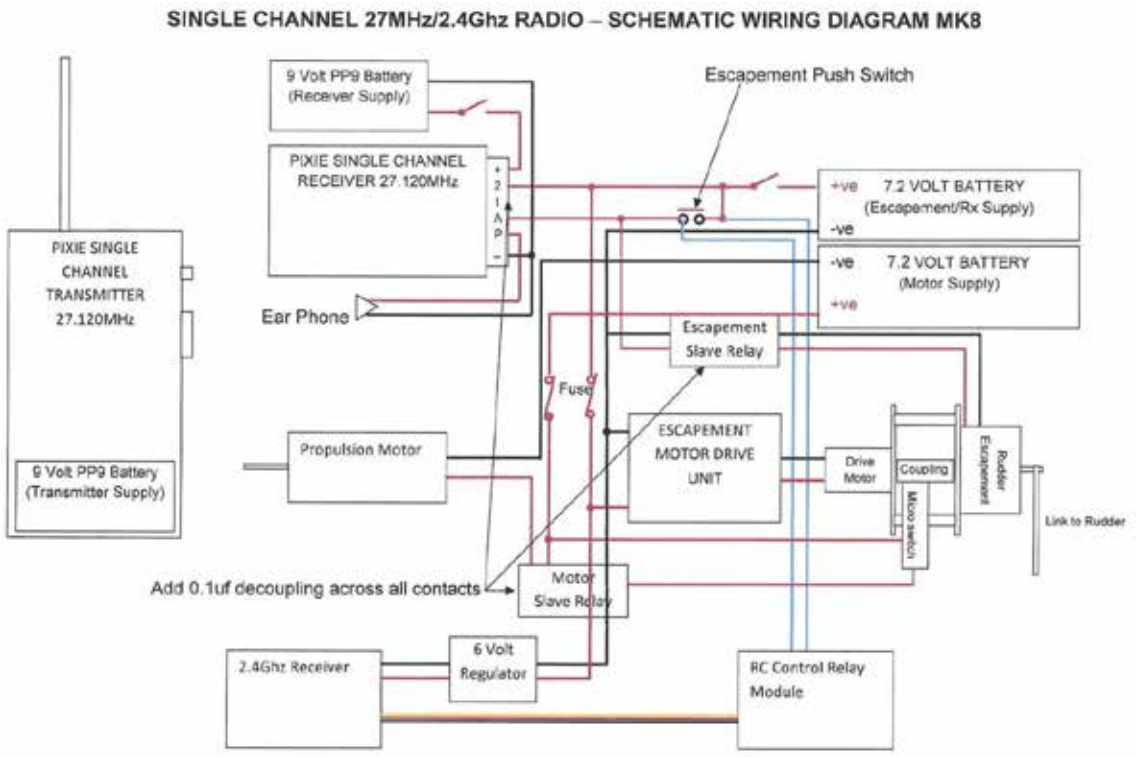


Photo 01: MK8 Control System Diagram

Having cured one problem I came across another, in that the RC electronic switch (which controls the escapement), for some unknown reason would not operate from the 7.2 volts supply. The simple answer to this problem was to insert a 6 volt regulator between the battery and the radio receiver, and yes, this did correct the problem.

Testing the system once again it was noted that the motor occasionally failed to self start thus yet more investigation was required, this entailed removing the motor and a partial strip down which led to the discovery that one of the simple copper strip type brushes had worn away resulting in the intermittent operation.

The brush was repaired by using a thin strip of copper to replace the worn part of the brush and bending it to the correct profile. With the brush repaired the motor was put back together and tested to find that it was no longer intermittent. The motor was fitted back into the boat and rewired into the system. This time the system tests were satisfactory with no apparent problems.

The last and final action was to re-arrange the position of the Land Rover and Horse Box on the fore-deck. It had been pointed out after initially completing the model, the Horse Box would be better positioned on the other side of the deck as the steering position was completely blindsided by it. The two vehicles were repositioned and secured into their new positions **Photo 02.**

Once again the only action left to carry out was the sailing of the vessel on the lake in Wardown Park – maybe I will see you there one day when I am trying all these repaired vessels out?

Photo 02: Final Rebuilt/Repaired Work Boat

Do hope you have found these short anorak type stories of some interest. If you, the readers of this magazine have any similar stories of repairing damage models etc why not put pen to paper and share your trials and tribulations with our readers.

Sinker Dalton

WINGS AND WHEELS

With covid going on, and a lot of shows being cancelled, I thought about the club doing this show. In my younger years, I attended this show when I flew aeroplanes and helicopters for a hobby. I talked it through with David from the Stevenage club, as they were also interested in attending for the first time. We decided to do a joint venture, mainly because we had no idea how many members would or could attend! We contacted the organisers and we were all set. A few questions needed to be asked as we went along of the organisers, all of which were answered promptly. To that end, when I eventually met up when we attended, a nice bottle of wine was handed over! Much to the others who all took the Michael!

It was decided from the beginning, that I was going to camp over, and Brian, Anne and Mark joined me with their caravan. It did not take much convincing for me to stay in the caravan either!!

We set out Friday morning for North Weald, a Second World War aerodrome. The route was supposed to be M1, M25 then the M11. Reality was a bit different. A slip road closure on the M25 made us divert to a lovely country route….. but we eventually arrived. We were escorted to the area where we were to display, straight opposite the boating

pond! The campsite was another 50ft beyond that. First order of business should normally be tea, but Brian insisted we sort the caravan out first! Then we had tea!!!! We then put up the gazebo (in its lowered position for the night). We got chatting…. Well, I did to some other groups there. I never did get the second cup of tea!! For the life of me, I cannot remember what we ate that first night! The Stevenage group turned up and we helped them set up next to us!

Saturday was a beautiful day, against what we were told it was going to be! Breakfast and tea was made by Brian and Anne. The gazebo was fully erected, and tables and boats put out. Other members turned up, Pete James, Harvey, Reem and Hubby…..Harvey decided to buy another boat, and lots of nick-nak's off the Stevenage stand! It was quiet to start, but soon picked up. I had, on Friday evening, put my pond yacht on the pool, where it sailed all weekend! We had a good look around, although there were many vendors, there was not a lot of boat bits for sale. There were some, but not many. There is also a bring and buy here, and again, although there were quite a few boats for sale, not many were of interest. The pond was quite large at 30ft square. There were boats on it all day from the 10 clubs that attended. Later in the day, we had the idiots from the aeroclubs coming along with small fast boats, racing around with no regard to other users, this resulted in several boats damaged and 1 boat sunk. Lake bank Model Boat Club ran the have a go boats for kids on a blow up pond, and were supposed to be running the main pool.

Saturday night, we all went into Harlow to go for a meal. Parking was a bit of a problem, but we found somewhere. We went to a Weatherspoon's in the town centre. Having been to Harlow on 2 previous occasions, I remembered why I do not go there. It's a total dump, and that coming from someone who lives in Luton! The meal was ok, nothing special. We then retired back to the caravan, and through the evening, watched the night flying followed by the fireworks display, all the while accompanied by the live music playing. It was quite spectacular!

Sunday was much the same, lots of chatting to peeps about boats, sailing and generally enjoying ourselves!

On the whole, I think the show was quite good. I would think we will attend again, if club members are willing to attend and help.

P Carmen

FENNY STRATFORD 2021

It's been 2 years since we last visited the Canal Festival. And I was really looking forward to it this year. As the date got nearer, I was still worried it could be cancelled!

As usual, I met Terry up in MK on the Friday. We put the gazebo up in the lowered position. We both met the new show organiser Diane. Saturday I was up early to get to Fenny to set up. Mike was there, and soon after many peeps turned up. The gazebo was put to full height, sides added, tables put out sand filled with boats and last, but not least the tea table was put out with cakes on!

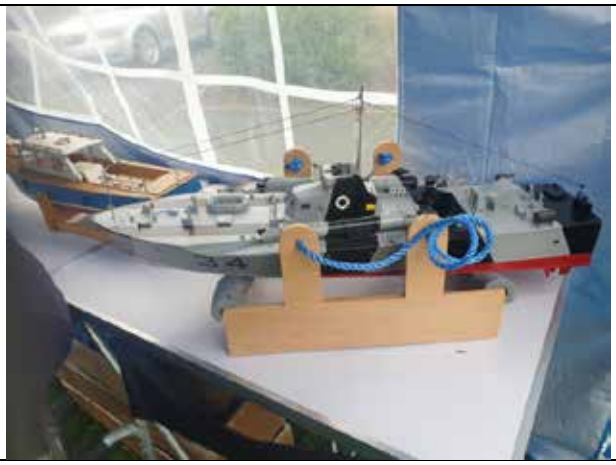
The weather forecast was not good, showers but warm. As it turned out, we had 2 light showers Saturday and 5 on Sunday. Seats out, we sat down and watched the world go by. One of the canal boat owners did ice cream, and said if we wanted a free ice cream,

to just come over, several of our members did! There was not as many traders there this year, mainly because during the summer, the canal traders move along a set route each weekend doing canal markets. This year, many were out of place due to covid. This event never appears to be busy, but at a rough guess, the footfall was probably over 1500 for the weekend. One of the bonuses of a canal festival, is the towpath attracts lots of dog walkers, so Terry and I were well happy! We happily sailed on the canal, intervened was tea and cake, plus we found a pasty stand down the tow path. Terry even had chips!

The canal was very busy. In the past, we were lucky if 5 canal boats went past all weekend……..we were having that an hour at certain times of the day. The aim f the festival is to raise money for local charities and the canal and river trust.

We sailed by launching from a launch cradle due to the banks being high from the water. Many of the public seemed surprised that RC boats were on the water. Many of the canal boat owners were impressed with the scale and variety of boats we had with us. Also, it was great to see some new faces from the club at the show!

P Carmen










BRAMBLETON MODEL RAILWAY 2021

A short one. Saturday 4th September was Brambleton Model Railway Clubs show. We have been attending this event for 4 years now, so we decided to go again. It's an outdoor event, with no boat pool, so it's just an exhibit show for us. Due to a previous commitment, I could only setup as I had to leave at 3pm. Many thanks to Dave Seath, Mike Skuse, Pete James and John Lamkin for helping out. I will just show a few pictures.






P Carmen

ORIGINS OF UNDERWATER WARFARE

Since the beginning of time, humans have searched for a means to operate underwater to gain the advantage in warfare, resulting in the development of the submarine.

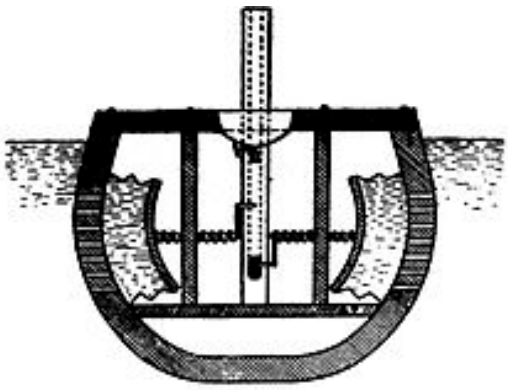
The concept of underwater combat has roots deep in antiquity. There are images of men using hollow sticks to breathe underwater for hunting, but the first known military use occurred during the siege of Syracuse (415–413 BC), according to the History of the Peloponnesian War.

Alexander the Great being lowered in a glass submersible.

At the siege of Tyre (332 BC), Alexander the Great used divers, according to Aristotle. Later legends from Alexandria, Egypt from the 12th century AD, suggested that Alexander conducted reconnaissance, using a primitive submersible in the form of a diving bell, as depicted in a 16th-century Islamic painting above.

According to a report attributed to Tahbir al-Tayseer in Opusculum Taisnieri published in 1562: two Greeks submerged and surfaced in the river Tagus near the City of Toledo several times in the presence of The Holy Roman Emperor Charles V, without getting wet and with the flame they carried in their hands still alight.

Although there were various plans for submersibles or submarines during the middle ages, the Englishman William Bourne designed one of the first prototype submarines in 1578. This was to be a completely enclosed boat that could be submerged and rowed beneath the surface. Comprising a completely enclosed wooden vessel sheathed in waterproofed leather, it was to be submerged by using hand-operated wooden screw thread adjustable plungers pressing against flexible leather bags located at the sides in order to increase or decrease the volume of water to adjust the buoyancy of the craft.



A submarine by William Bourne, in Inventions or devices, 1578.

The sketch above suggests that the depth adjustment was by means of a crank set projecting above the surface. There is no obvious accommodation for crew. In 1596 the Scottish mathematician and theologian John Napier wrote in his Secret Inventions the following: "These inventions besides devises of sayling under water with divers, other devises and strategems for harming of the enemyes by the Grace of God and worke of expert Craftsmen I hope to perform." It is unclear whether or not Napier ever carried out his plans. Henry Briggs, who was professor of mathematics at Gresham College, London, and later at Oxford, was a friend of Napier, whom he visited in 1615 and 1616, and was also an acquaintance of Cornelius Van Drebbel, a Dutchman in the service of James I of England, who designed and built the first successful submarine in 1620. Hence, it is not impossible that it was because of the interest taken by Napier in the submarine that Briggs came in touch with Drebbel.

Submarine of Cornelius Jacobszoon Drebbel, 1620 and 1624.

Drebbel's submarine was propelled by oars. The precise nature of this submarine is unclear; it may be possible that it resembled a bell towed by a boat. Two improved types were tested in the River Thames between 1620 and 1624. Of one of these tests Constantijn Huygens reports in his autobiography of 1651 the following:

Worth all the rest put together is the little ship, in which he calmly dived under the water, while he kept the king and several thousand Londoners in the greatest suspense. The great majority of these already thought that the man who had very cleverly remained invisible to them – for three hours, as rumour has it – had perished, when he suddenly

rose to the surface a considerable distance from where he had dived down, bringing with him the several companions of his dangerous adventure to witness to the fact that they had experienced no trouble or fear under the water, but had sat on the bottom, when they so desired, and had ascended when they wished to do so; that they had sailed whithersoever they had a mind, rising as much nearer the surface or again diving as much deeper as it pleased them to do, without even being deprived of light; yea, even that they had done in the belly of that whale all the things people are used to do in the air, and this without any trouble. From all this it is not hard to imagine what would be the usefulness of this bold invention in time of war, if in this manner (a thing which I have repeatedly heard Drebbel assert) enemy ships lying safely at anchor could be secretly attacked and sunk unexpectedly by means of a battering ram — an instrument of which hideous use is made now- a-days in the capturing of the gates and bridges of towns.

On 18 October 1690, his son Constantijn Huygens, Jr. commented in his diary on how Drebbel was able to measure the depth to which his boat had descended (which was necessary to prevent the boat from sinking) by means of a quicksilver barometer:

Old Mistress Kuffler came to see me in the morning. She was still talking about a place at court or elsewhere; I said I could not help her. She said that her father Cornelis Drebbel had a long tube of quicksilver in the boat in which he dived be under water.

In order to solve the problem of the absence of oxygen, Drebbel was able to create oxygen out of saltpetre to refresh the air in his submarine. An indication of this can be found in Drebbel's own work: On the Nature of the Elements (1604), in the fifth chapter:

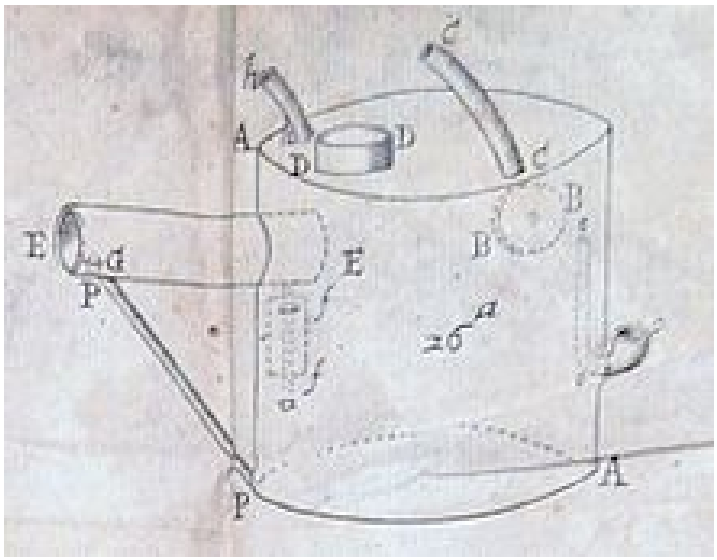
Very dry, subtle or warm air, which then very quickly penetrates the coarse, heavy clouds, expands them, makes them subtle and thin, and again changes them into the nature of air, whereby its volume is increased an hundredfold in a moment, which brings forth the terrific motion which, cracking and bursting, sets the air alight and moves it, until volume and density are equal, when there is rest. Thus is the body of the saltpetre broken up and decomposed by the power of the fire and so changed in the nature of the air, or as when a wet hand or cloth is waved about on a hot iron, or molten lead, which by expansion or enlargement due to heat cracks and bursts with a noise like thunder.

The introduction of Drebbel's submarine concept seemed beyond conventional expectations of what science was thought to have been capable of at the time. Commenting on the scientific basis of Drebbel's claims, renowned German astronomer Johannes Kepler was said to have remarked in 1607: "If Drebbel can create a new spirit, by means of which he can move and keep in motion his instrument without weights or propelling power, he will be Apollo in my opinion."

Although the first submersible vehicles were tools for exploring under water, it did not take long for inventors to recognize their military potential. The strategic advantages of submarines were first set out by Bishop John Wilkins of Chester in Mathematical Magick in 1648:

1. Tis private: a man may thus go to any coast in the world invisibly, without discovery or prevented in his journey.
2. Tis safe, from the uncertainty of Tides, and the violence of Tempests, which do never move the sea above five or six paces deep. From Pirates and Robbers which do so infest other voyages; from ice and great frost, which do so much endanger the passages towards the Poles.

3. It may be of great advantages against a Navy of enemies, who by this may be undermined in the water and blown up.
4. It may be of special use for the relief of any place besieged by water, to convey unto them invisible supplies; and so likewise for the surprisal of any place that is accessible by water.
5. It may be of unspeakable benefit for submarine experiments.



Denis Papin's submarine, second design, 1690.

Between 1690 and 1692, the French physicist Denis Papin designed and built two submarines. The first design (1690) was a strong and heavy metallic square box, equipped with an efficient pump that pumped air into the hull to raise the inner pressure. When the air pressure reached the required level, holes were opened to let in some water. This first machine was destroyed by accident. The second design (1692) had an oval shape and worked on similar principles. A water pump controlled the buoyancy of the machine. According to some sources, a spy of German mathematician Gottfried Wilhelm Leibniz called Haes reported that Papin had met with some success with his second design on the River Lahn.

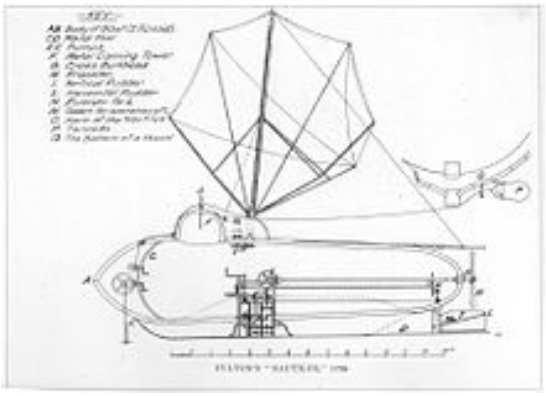
By the mid 18th century, over a dozen patents for submarines/submersible boats had been granted in England. In 1747, Nathaniel Symons patented and built the first known working example of the use of a ballast tank for submersion. His design used leather bags that could fill with water to submerge the craft. A mechanism was used to twist the water out of the bags and cause the boat to resurface. In 1749, the Gentlemen's Magazine reported that a similar design had been proposed by Giovanni Borelli in 1680. By this point of development, further improvement in design stagnated for over a century, until new industrial technologies for propulsion and stability could be applied.

The carpenter Yefim Nikonov built the first military submarine in 1720 by order of Tsar Peter the Great in Russia. Nikonov armed his submarine with "fire tubes", weapons akin to flame-throwers. The submarine was designed to approach an enemy vessel, put the ends of the "tubes" out of the water, and blow up the ship with a combustible mixture. In addition, Nikonov designed an airlock for aquanauts to come out of the submarine and to destroy the bilge of the ship. With the death of Peter I in January 1725, Nikonov lost his principal patron and the Admiralty withdrew support for the project.

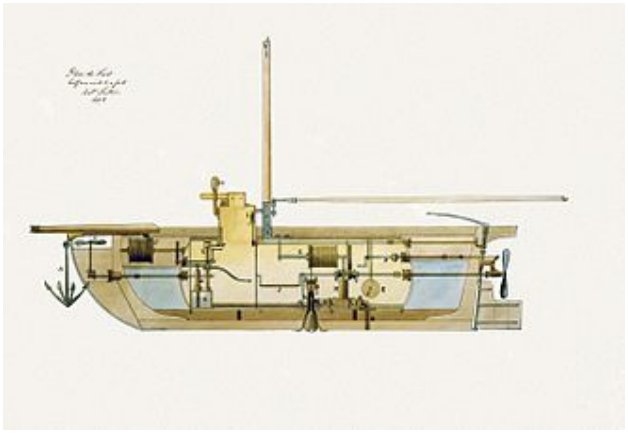
The first American military submarine was Turtle in 1776, a hand-powered egg-shaped (or acorn-shaped) device designed by the American David Bushnell, to accommodate a single man. It was the first submarine capable of independent underwater operation and movement, and the first to use screws for propulsion.

A cutaway depiction of David Bushnell's Turtle, 1776.

According to British naval historian Richard Compton-Hall, the problems of achieving neutral buoyancy would have rendered the vertical propeller of the Turtle useless. The route that Turtle had to take to attack its intended target, HMS Eagle, was slightly across the tidal stream which would, in all probability, have resulted in Ezra Lee becoming exhausted. There are also no British records of an attack by a submarine during the war. In the face of these and other problems, Compton-Hall suggests that the entire story around the Turtle was fabricated as disinformation and morale-boosting propaganda, and that if Ezra Lee did carry out an attack, it was in a covered rowing boat rather than in Turtle. Replicas of Turtle have been built to test the design. One replica (Acorn), constructed by Duke Riley and Jesse Bushnell (claiming to be a descendant of David Bushnell), used the tide to get within 200 feet of the RMS Queen Mary 2 in New York City (a police boat stopped Acorn for violating a security zone). Displays of replicas of Turtle which acknowledge its place in history appear in the Connecticut River Museum, the U.S. Navy's Submarine Force Library and Museum, Britain's Royal Navy Submarine Museum and Monaco's Oceanographic Museum.



The Nautilus (1800), built in France by Robert Fulton.



An 1806 submarine design by Robert Fulton.

In 1800, the French Navy built a human-powered submarine designed by Robert Fulton, the Nautilus. It also had a sail for use on the surface and so exhibited the first known use of dual propulsion on a submarine. It proved capable of using mines to destroy two warships during demonstrations. The French eventually gave up on the experiment in 1804, as did the British, when Fulton later offered them the submarine design.

In 1834 the Russian Army General Karl Andreevich Shilder demonstrated the first rocket-equipped submarine to Emperor Nicholas I.

The Submarino Hipopótamo, the first submarine built in South America, underwent testing in Ecuador on September 18, 1837. Its designer, Jose Rodriguez Lavandera, successfully crossed the Guayas River in Guayaquil accompanied by Jose Quevedo. Rodriguez Lavandera had enrolled in the Ecuadorian Navy in 1823, becoming a Lieutenant by 1830. The Hipopotamo crossed the Guayas on two more occasions, but it was abandoned because of lack of funding and interest from the government.

In 1851 a Bavarian artillery corporal, Wilhelm Bauer, took a submarine designed by him called the Brandtaucher (fire-diver) to sea in Kiel Harbour. Built by August Howaldt and powered by a tread wheel, Brandtaucher sank, but the crew of three managed to escape.

During the American Civil War both sides made use of submarines. Examples were the Alligator, for the Union, and the Hunley, for the Confederacy. The Hunley was the first submarine to successfully attack and sink an opposing warship.

In 1863 the Submarine Explorer was built by the German American engineer Julius H. Kroehl, and featured a pressurized work chamber for the crew to exit and enter underwater.

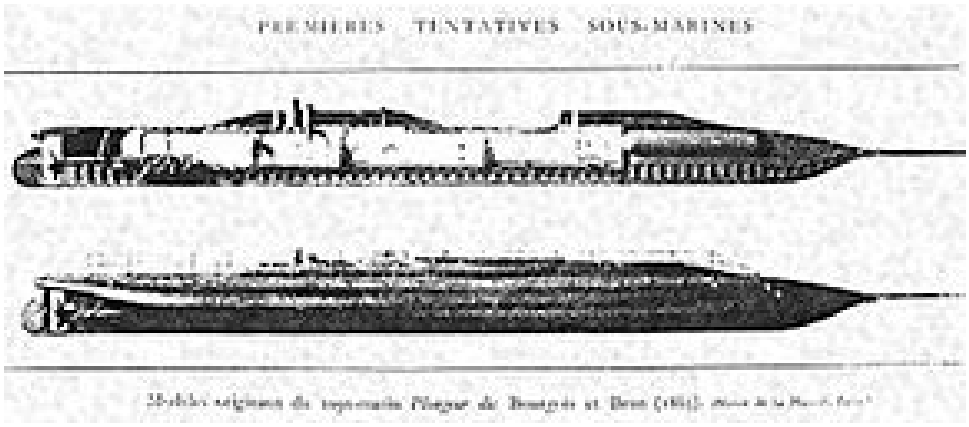
Submarine Explorer 2007.

This pre-figured modern diving arrangements such as the lock-out dive chamber, though the problems of decompression sickness were not well understood at the time. After its public maiden dive in 1866, the Sub Marine Explorer was used for pearl diving off the coast of Panama. It was capable of diving deeper than 31 meters (103 feet), deeper than any other submarine built before.

The Chilean government commissioned the Flach in 1865, during the Chincha Islands War (1864–1866) when Chile and Peru fought against Spain. Built by the German engineer Karl Flach, the submarine sank during tests in Valparaiso Bay on May 3, 1866, with the entire eleven-man crew.

During the War of the Pacific in 1879, the Peruvian government commissioned and built a submarine, the Toro Submarino. It never saw military action and was scuttled after Peru's defeat to prevent its capture by the enemy.

The first submarine that did not rely on human power for propulsion was the French Navy submarine Plongeur, launched in 1863, and equipped with a reciprocating engine using compressed air from 23 tanks at 180 psi. In practice, the submarine was virtually unmanageable underwater, with very poor speed and manoeuvrability



Plongeur, the first submarine that did not rely on human power for propulsion.

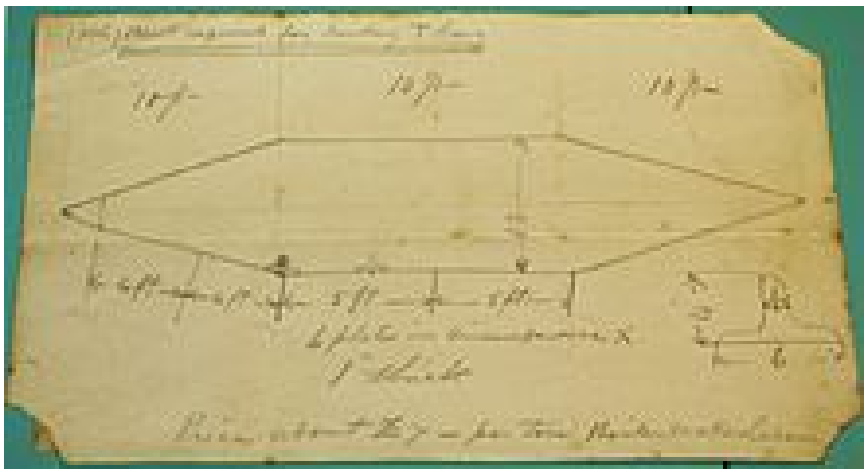
The first air independent and combustion powered submarine was the Spanish Ictineo II, designed by the Spanish engineer from Narciso Monturiol. Originally launched in 1864 as a human-powered vessel, propelled by 16 men, it was converted to peroxide propulsion and steam in 1867.

A replica of Monturiol's wooden Ictineo II stands near Barcelona harbor.

The 14 meters (46 feet) craft was designed for a crew of two, could dive to 30 metres (98 feet), and demonstrated dives of two hours. On the surface, it ran on a steam engine, but underwater such an engine would quickly consume the submarine's oxygen. To solve this problem, Monturiol invented an air-independent propulsion system. As the air-independent power system drove the screw, the chemical process driving it also released oxygen into the hull for the crew and an auxiliary steam engine. Apart from being mechanically powered, Monturiol's pioneering double-hulled vessels also solved pressure, buoyancy, stability, diving and ascending problems that earlier designs had encountered.

The submarine became a potentially viable weapon with the development of the first practical self-propelled torpedoes. The Whitehead torpedo was the first such weapon, and was designed in 1866 by British engineer Robert Whitehead. His 'mine ship' was an 11-foot long; 14-inch diameter torpedo propelled by compressed air and carried an explosive warhead. The device had a speed of 7 knots (13 km/h) and could hit a target 700 yards (640 m) away. Many naval services procured the Whitehead torpedo during the 1870s and it first proved itself in combat during the Russo-Turkish War when, on 16 January 1878, the Turkish ship Intibah was sunk by Russian torpedo boats carrying Whiteheads.

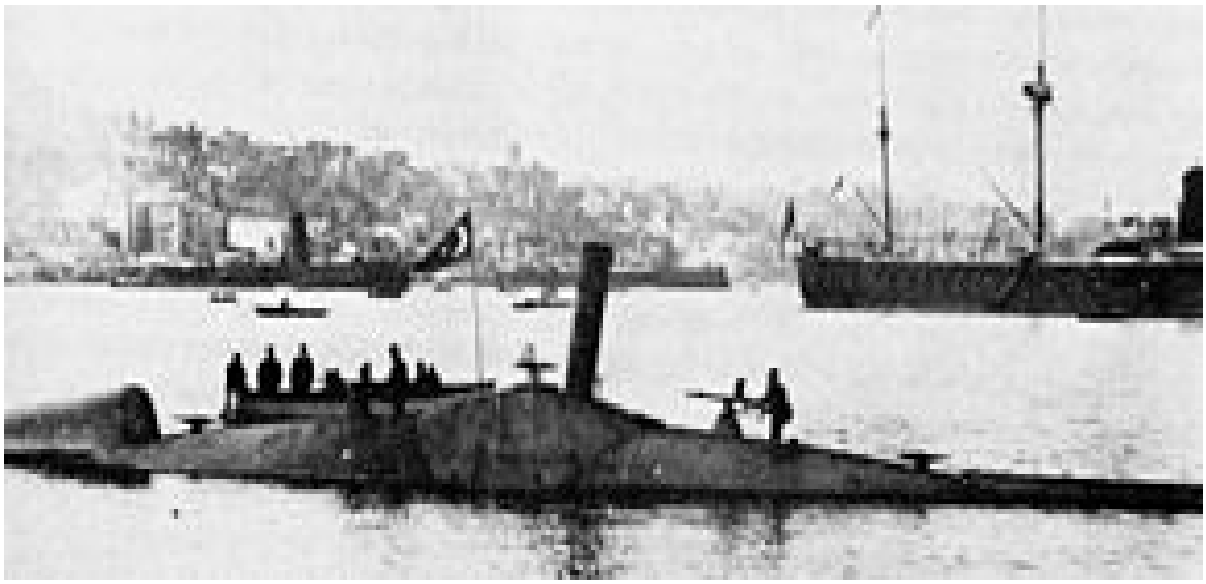
During the 1870s and 1880s, the basic contours of the modern submarine began to emerge, through the inventions of the English inventor and curate, George Garrett, and his industrialist financier Thorsten Nordenfelt, and the Irish inventor John Philip Holland.



Sketch of the design of Resurgam II by George Garrett.

In 1878, Garrett built a 14-foot (4.3 m) long hand-cranked submarine of about 4.5 tons, which he named the Resurgam. This was followed by the second (and more famous) Resurgam of 1879, built by Cochran & Co. at Birkenhead, England. The construction was of iron plates fastened to iron frames, with the central section of the vessel clad with wood secured by iron straps. As built, it was 45 feet (14 m) long by 10 feet (3.0 m) in diameter, weighed 30 long tons (30 t), and had a crew of 3. Resurgam was powered by a closed cycle steam engine, which provided enough steam to turn the single propeller for up to 4 hours. It was designed to have positive buoyancy, and diving was controlled by a pair of hydroplanes amidships. At the time it cost £1,538.

Although his design was not very practical – the steam boiler generated intense heat in the cramped confines of the vessel, and it lacked longitudinal stability – it caught the attention of the Swedish industrialist Thorsten Nordenfelt. Discussions between the two led to the first practical steam-powered submarines, armed with torpedoes and ready for military use.



The Nordenfelt-designed, Ottoman submarine Abdül Hamid

The first such boat was the Nordenfelt I, a 56 tonne, 19.5 metres (64 feet) vessel similar to Garret's ill-fated Resurgam, with a range of 240 kilometres (150 miles; 130 nautical miles), armed with a single torpedo, in 1885. Like Resurgam, Nordenfelt I operated on the surface by steam, then shut down its engine to dive. While submerged, the

submarine released pressure generated when the engine was running on the surface to provide propulsion for some distance underwater. Greece, fearful of the return of the Ottomans, purchased it. Nordenfelt commissioned the Barrow Shipyard in England in 1886 to build Nordenfelt II (Abdül Hamid) and Nordenfelt III (Abdül Mecid) in 1887. They were powered by a coal-fired 250 hp Lamm steam engine turning a single screw, and carried two 356mm torpedo tubes and two 35mm machine guns. They were loaded with a total of 8 tons of coal as fuel and could dive to a depth of 160 feet. It was 30.5m long and 6m wide, and weighed 100 tons. It carried a normal crew of 7. It had a maximum surface speed of 6 knots, and a maximum speed of 4 knots while submerged. Abdülhamid became the first submarine in history to fire a torpedo submerged.

Nordenfelt's efforts culminated in 1887 with Nordenfelt IV, which had twin motors and twin torpedoes. It was sold to the Russians, but soon ran aground and was scrapped. Garrett and Nordenfelt made significant advances in constructing the first modern, militarily capable submarines and fired up military and popular interest around the world for this new technology. However, the solution to fundamental technical problems, such as propulsion, quick submergence, and the maintenance of balance underwater was still lacking, and would only be solved in the 1890s.

A reliable means of propulsion for submerged vessels was only made possible in the 1880s with the advent of the necessary electric battery technology. The first electrically powered submarines were built by the Polish engineer Stefan Drzewiecki in Russia, James Franklin Waddington and the team of James Ash and Andrew Campbell in England, Dupuy de Lôme and Gustave Zédé in France and Isaac Peral in Spain.

In 1884, Drzewiecki converted 2 mechanical submarines, installing in each a 1 hp engine with a new, at the time, source of energy – batteries. In tests, the submarines travelled under the water against the flow of the Neva River at a rate of 4 knots. They were the first submarines in the world with electric propulsion. Ash and Campbell constructed their craft, the Nautilus, in 1886. It was 60 feet (18 m) long with a 9.7 kW (13 hp) engine powered by 52 batteries. It was an advanced design for the time, but became stuck in the mud during trials and was discontinued. Waddington's Porpoise vessel showed more promise. Waddington had formerly worked in the shipyard in which Garrett had been active. Waddington's vessel was similar in size to the Resurgam and its propulsion system used 45 accumulator cells with a capacity of 660 ampere hours each. These were coupled in series to a motor driving a propeller at about 750 rpm, giving the ship a sustained speed of 13 km/h (8 mph) for at least 8 hours. The boat was armed with two externally mounted torpedoes as well as a mine torpedo that could be detonated electronically. Although the boat performed well in trials, Waddington was unable to attract further contracts and went bankrupt.

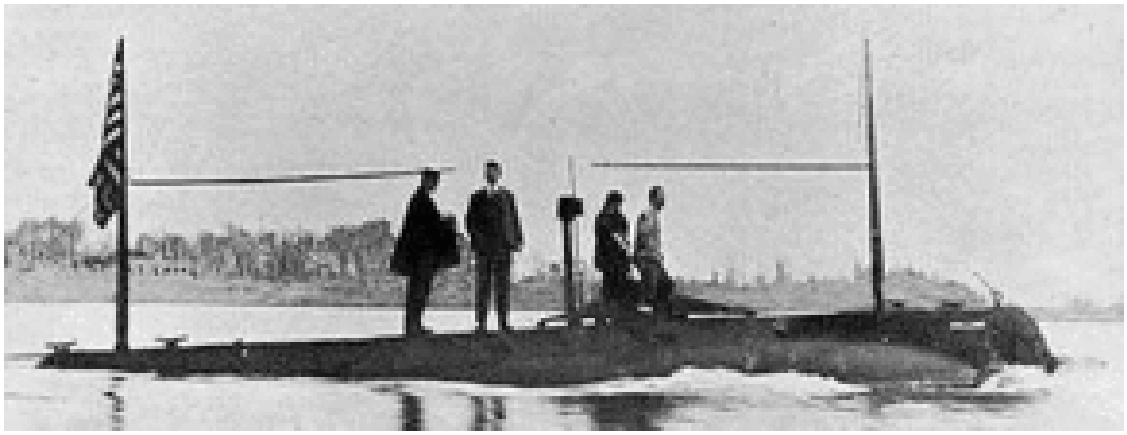
The Peral Submarine, one of the first electrical powered submarines. Built in 1888, now preserved and restored in 2013 in Cartagena Naval Museum.

In France, the early electric submarines Goubet I and Goubet II were built by the civil engineer, Claude Goubet. These boats were also unsuccessful, but they inspired the renowned naval architect Dupuy de Lôme to begin work on his submarine – an advanced electric-powered submarine almost 20 metres long. He didn't live to see his design constructed, but the craft was completed by Gustave Zédé in 1888 and named the Gymnote. It was one of the first truly successful electrically powered submarines, and was equipped with an early periscope and an electric gyrocompass for navigation. It completed over 2,000 successful dives using a 204-cell battery. Although the Gymnote was scrapped for its limited range, its side hydroplanes became the standard for future submarine designs.

The Peral Submarine, constructed by Isaac Peral, was launched by the Spanish Navy in the same year, 1888. It had three Schwartzkopff torpedoes 14 in (360 mm) and one torpedo tube in the bow, new air systems, hull shape, propeller, and cruciform external controls anticipating much later designs. Peral was an all-electrical powered submarine with an underwater speed of 3 kn (5.6 km/h; 3.5 mph). After two years of trials the project was scrapped by naval officialdom that cited, among other reasons, concerns over the range permitted by its batteries.

Many more designs were built at this time by various inventors, but submarines were not put into service by navies until the turn of the 20th century.

The turn of the 20th century marked a pivotal time in the development of submarines, with a number of important technologies making their debut, as well as the widespread adoption and fielding of submarines by a number of nations. Diesel electric propulsion would become the dominant power system and instruments such as the periscope would become standardized. Batteries were used for running underwater and gasoline (petrol) or diesel engines were used on the surface and to recharge the batteries. Early boats used gasoline, but quickly gave way to kerosene, then diesel, because of reduced flammability. Effective tactics and weaponry were refined in the early part of the century, and the submarine would have a large impact on 20th century warfare.



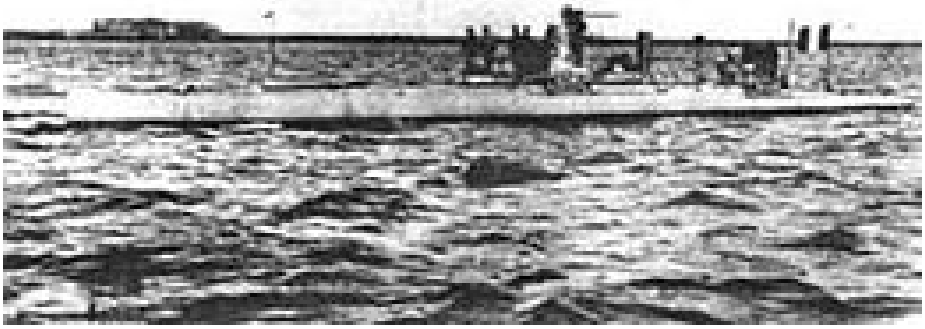
USS Holland was commissioned into the U.S. Navy in 1900.

The Irish inventor John Philip Holland built a model submarine in 1876 and a full scale one in 1878, followed by a number of unsuccessful ones. In 1896, he designed the Holland Type VI submarine. This vessel made use of internal combustion engine power on the surface and electric battery power for submerged operations. Launched on 17 May 1897 at Navy Lt. Lewis Nixon's Crescent Shipyard in Elizabeth, New Jersey, the Holland VI was purchased by the United States Navy on 11 April 1900, becoming the United States Navy's first commissioned submarine and renamed USS Holland.

A prototype version of the A-class submarine (Fulton) was developed at Crescent Shipyard under the supervision of naval architect and shipbuilder from the United Kingdom, Arthur Leopold Busch, for the newly reorganized Electric Boat Company in 1900. The Fulton was never commissioned by the United States Navy and was sold to the Imperial Russian Navy in 1905. The submarines were built at two different shipyards on both coasts of the United States. In 1902, Holland received U.S. Patent 708,553 for his relentless pursuit to perfect the modern submarine craft. Many countries became interested in Holland's (weapons) product and purchased the rights to build them during this time.

The Royal Navy commissioned the Holland-class submarine from Vickers, Barrow-in-Furness, under licence from the Holland Torpedo Boat Company during the years 1901 to 1903. Construction of the boats took longer than anticipated, with the first only ready for a diving trial at sea on 6 April 1902. Although the design had been purchased entirely from the US company, the actual design used was an untested improved version of the original Holland design using a new 180 hp petrol engine.

Meanwhile, the French steam and electric Narval was commissioned in June 1900 and introduced the classic double-hull design, with a pressure hull inside the outer shell. These 200-ton ships had a range of over 100 miles (160 km) underwater. The French submarine Aigrette in 1904 further improved the concept by using a diesel rather than a gasoline engine for surface power. Large numbers of these submarines were built, with seventy-six completed before 1914.



The 1900 French submarine Narval.

By 1914, all the main powers had submarine fleets, though the development of a strategy for their use lay in the future.

At the start of World War One, the Royal Navy had the world's largest submarine service by a considerable margin, with 74 boats of the B, C and D classes, of which 15 were oceangoing, with the rest capable of coastal patrols. The D-class, built 1907–1910, were designed to be propelled by diesel motors on the surface to avoid the problems with petrol engines experienced with the A class. These boats were designed for foreign service with an endurance of 2,500 nmi at 10 knots on the surface and much-improved living conditions for a larger crew. They were fitted with twin screws for greater manoeuvrability and with innovative saddle tanks. They were also the first submarines to be equipped with deck guns forward of the conning tower. Armament also included three 18-inch torpedo tubes (two vertically in the bow and one in the stern). D-class was also the first class of submarine to be equipped with standard wireless transmitters. The aerial was attached to the mast of the conning tower that was lowered before diving. With their enlarged bridge structure, the boat profile was recognisably that of the modern submarine. The D-class submarines were considered to be so innovative that the prototype D1 was built in utmost secrecy in a securely guarded building shed.

The U-1 became the Kaiserliche Marine's first commissioned submarine in 1906.

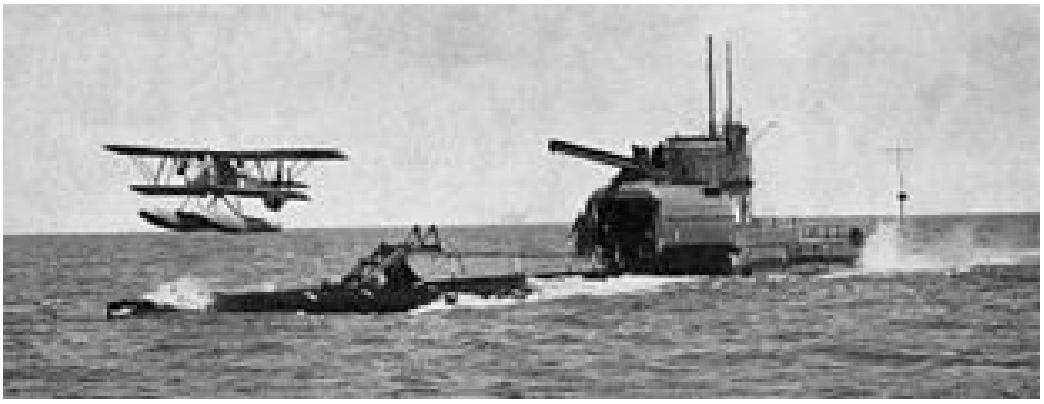
The British also experimented with other power sources. Oil-fired steam turbines powered the British "K" class submarines built during the First World War and in following years, but these were not very successful. The aim was to give them the necessary surface speed to keep up with the British battle fleet.

The Germans were slower to recognize the importance of this new weapon. A submersible was initially ordered by the Imperial Russian Navy from the Kiel shipyard in 1904, but cancelled after the Russo-Japanese War ended. One example was modified and improved, then commissioned into the Imperial German Navy in 1906 as its first U-boat, U-1. It had a double hull, was powered by a Körting kerosene engine and was armed with a single torpedo tube. The fifty percent larger SM U-2 had two torpedo tubes. A diesel engine was not installed in a German navy boat until the U-19 class of 1912–13. At the start of World War I, Germany had 20 submarines of 13 classes in service with more under construction.

Diesel submarines needed air to run their engines, and so carried very large batteries for submerged travel. These limited the speed and range of the submarines while submerged.

An early submarine snorkel was designed by James Richardson, an assistant manager at Scotts Shipbuilding and Engineering Company, Greenock, Scotland, as early as 1916. The snorkel allowed the submarine to avoid detection for long periods by travelling under the water using non-electric powered propulsion. Although the company received a British Patent for the design, no further use was made of it—the British Admiralty did not accept it for use in Royal Navy submarines.

The first German U-boat to be fitted with a snorkel was U-58, which experimented with the equipment in the Baltic Sea during the summer of 1943. The technology was based on pre-war Dutch experiments with a device named a snuiver (sniffer). As early as 1938, a simple pipe system was installed on the submarines O-19 and O-20 that enabled them to travel at periscope depth operating on its diesels with almost unlimited underwater range while charging the propulsion batteries. U-boats began to use it operationally in early 1944. By June 1944, about half of the boats stationed in the French bases were fitted with snorkels.



HMS M2 launches a specially designed Parnall Peto seaplane.
It sank accidentally in 1932.

Various new submarine designs were developed during the interwar years. Among the most notable were submarine aircraft carriers, equipped with a waterproof hangar and steam catapult to launch and recover one or more small seaplanes. The submarine and

its plane could then act as a reconnaissance unit ahead of the fleet, an essential role at a time when radar was not available. The first example was the British HMS M2, followed by the French Surcouf, and numerous aircraft-carrying submarines in the Imperial Japanese Navy.

Early submarine designs put the diesel engine and the electric motor on the same shaft, which also drove a propeller with clutches between each of them. This allowed the engine to drive the electric motor as a generator to recharge the batteries and also propel the submarine as required. The clutch between the motor and the engine would be disengaged when the boat dived so that the motor could be used to turn the propeller. The motor could have more than one armature on the shaft – these would be electrically coupled in series for slow speed and parallel for high speed (known as "group down" and "group up" respectively).

Thus the development of the modern day submarine had arrived and continued until today when we have very large underwater vessels with nuclear propulsion.

This article was extracted from information published by Wikipedia

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