In 1938, when Iowa was being designed, her shape was a major change from previous battleships. In addition to armament, speed was now a major factor in what was seen for future naval operations. Iowa’s length and her tapering bow was found to increase her speed significantly. This was proven in hydrodynamic tank testing at David Taylor Research and Development. But this was only possible due to the efforts of one man, who changed naval architecture forever.

The years 1871-1872 saw the turning point in the history of ship model research. For it was at Torquay that a Victorian civil engineer named William Froude began a chain of events in his native Devon which would put Britain in the forefront of technological innovation of the time and lead in due course to the development of the world’s leading ship model research establishment in a quiet backwater of Portsmouth Harbor.

Froude was born in Devon in 1810 and although a scion of literary and academic family - his brother was the distinguished historian James Anthony Froude - William went to work with Isambard Kingdom Brunel on the Great Western Railway project after Oxford University. But the sea and ships had always exercised a special fascination for him and he soon began conducting resistance experiments with small model boats in the River Dart. The first of these was carried out on scale models of the screw gunboats ‘Swan’ and ‘Raven’. For the purpose of these experiments, Froude devised the most delicate recording apparatus fashioned out of tin and solder. This is now preserved in the Science Museum at Kensington.

Before long, Froude became fired with the determination to build his own testing tank where he could work undisturbed by both the elements and the remarks of uncomprehending spectators. Sometime during the 1860s he had acquired some ground at Torquay and built himself a house known as Chelston Cross. Froude now drew his work on models to the attention of Sir Edward Reed, Chief Constructor to the Navy, and through the latter’s support was given an Admiralty grant of £2000 to cover the cost of building the model testing tank adjacent to Chelston Cross, the day-to-day running costs of the installation and a small salary to his third son and chief assistant, Robert Edmund Froude. William Froude himself refused a salary. The loss in August 1871 of the ‘Captain’, a large twin screw ironclad with many design faults, caused him much distress. The ship turned turtle in the Bay of Biscay with the loss of almost the entire crew of 500. This major tragedy spurred Froude on in his determination to resolve the recurring problem of faulty design.

From time immemorial the hull design of English ships had been largely a matter of rule of thumb, allied to the accumulated experience of the master shipwright. In an earlier period, the Age of Enlightenment had produced some amateur experimenters equally concerned as William Froude to try to resolve this problem. They were as diverse as Benjamin Franklin, the Abbe’ Bossut and one Colonel Mark Beaufoy who founded the Society for the Improvement of Naval Architecture in 1791. But it was the father and son partnership of the Froudes that was able to apply the knowledge gained from their empirical research at Chelston Cross. The result - the virtual elimination of...
design faults by the simple expedient of submitting accurate scale models to rigorous tests and in the process heralding the end of the appalling and needless loss of life at sea. The world’s first model experiment using the Froude techniques was with a miniature version of HMS Greyhound in 1871. Her sea trials took place a year later in the Solent.

By 1885 the Torquay tank had exhausted its capacity and the lease had also run out on the land occupied by the tank. A new and much larger site capable of expansion was an urgent requirement. In 1886 Robert Edmund Froude, who had succeeded his father on the latter’s death in Cape Town in 1879, supervised the transfer of the Admiralty Experiment Works to Haslar adjacent to Gunboat Yard. He chose the Haslar site in preference to three others at Chiswick, Deptford and Portsmouth Dockyards. Its relative isolation may have advanced its appeal - Haslar a hundred years ago was remote and inaccessible and in spite of modern transport and motorways, remains largely so today. Interested persons wishing to inspect the 475 feet long, 20 feet wide and 9 feet deep tank and its half million gallons of fresh water had first to negotiate Portsmouth Harbor and the vagaries of waterborne transport. ‘There are no ferry or watermen’s boats nor any other means of crossing to Southsea nearer than Fort Blockhouse except by special arrangements. It would not be difficult to get into or from a boat along the sea wall near the fort and from there you could, I should say, easily hire a boat from Southsea beach, but the safest and surest place to land from or embark in a boat is Haslar Jetty which is accessible all tides in any weather,’ wrote Froude in a vein calculated to repulse all but the keenest visitors.

The move to Haslar coincided with the country’s huge increase in the Naval shipbuilding program. The statistics for the first two decades of Haslar model tests are impressive. By 1918 some 500 different warships models had been subjected to a rigorous program. This tally, which includes the famous ‘Dreadnought’ laid down in Portsmouth Dockyard in 1906, was made up of 33 battleships, 46 cruisers, 61 destroyers, 14 submarines and 20 miscellaneous vessels.

The eminence of William Froude as an innovative engineer had been universally acknowledged in his lifetime. After his father’s death, R.E. Froude received worldwide requests for advice on the building of tanks similar in every respect to the Haslar one. Italy and Russia had ship testing tanks at Spezia and St. Petersburg which were fully operational well before the end of the last century. The first commercial tank in the United Kingdom was that of Sir William Denny of Denny Bros. at Dumbarton.

The apparatus first devised by William and R.E. Froude over a century ago has changed very little in principle. A carriage runs over and along the sides of the tank on rails which have been specially aligned to take into account the curvature of the earth’s surface. This mobile carriage is equipped with a dynamometer beneath which is suspended the scale model. The whole purpose of this ingenious device is to record the speed, performance and resistance of the ship’s model in still water as well as its motion in waves, which can be artificially induced with a wave making machine. The models are molded from paraffin wax, although nowadays fiberglass is increasingly used. Each model measures up to 20 feet in length, is 2 feet wide and of about one inch thickness. In 1885 R.E. Froude explained how the sleek shape of the hull is achieved: “Finishing off the outer surface of our paraffin model, we use flexible steel shapes. As it is important that the models should have a perfectly smooth surface, the scrapes ought to have a keen, unbroken edge. The scrapes we use are rather softer than sawplate, consequently their edges soon become dull and
break away if they meet any grit.”

Early on in the life of the tank, the water became cloudy with algae growths. R.E. Froude solved this problem in a typically practical fashion. He imported a quantity of fresh water eels from Gilkicker Lake and these creatures obligingly munched their way through the weed growth until they themselves were made redundant by the introduction of chemical clearing agents. R.E. Froude finally left Haslar in 1919 having been in complete charge of the test program since 1886. His Alverstoke home is now a popular village inn - the Old Lodge.

On the 27th May, 1879, the Lords Commissioners of the Admiralty wrote to Robert Edmund Froude on the death of his father: ‘My Lords desire to convey to you and all members of your family their most sincere sympathy at the irreparable loss you have sustained - a loss which cannot be looked upon as other than a national one. They feel that Mr. Froude rendered great service to the Navy and the country in making his great abilities, knowledge and powers of observation available for the improvement of the designs of ships, without reward or any other acknowledgement other than the grateful thanks of successive Boards of the Admiralty’.

It is a resounding epitaph equally applicable to his son Robert Edmund Froude, while the complex of buildings which comprise Haslar’s Admiralty Research Establishment is a working memorial to them both. The maritime heritage of the Portsmouth Harbor area and the supremacy of Britain as a sea power during the late Victorian period owes a considerable debt to the work of the pioneering Froudes. Yet few people other than those with an interest in naval architecture have ever heard of them or have an inkling of the significance of their work. Their published papers are still used by today’s naval architects as standard works of reference on the basic problems of ship model research. William Froude was a pioneer in the use of ship models for hydrodynamic research. This was particularly relevant at the time because the steam engine was replacing sail as the prime mover and a more scientific approach to hull and propeller design was essential to harness this power to best advantage. Quite simply, the scientifically designed hull led to a safer and more cost-effective navy.
The Bulbous Bow

For those who have seen USS Iowa in a drydock, you would have noticed that she does not have a straight stem. Her clipper bow curves down, then bulges out to form a “bulb” at the bottom. It is an integral part of her design and helps her obtain higher speeds with less engine power.

A bulbous bow is a protruding bulb at the bow (or front) of a ship just below the waterline. The bulb modifies the way the water flows around the hull, reducing drag and thus increasing speed, range, fuel efficiency, and stability. Large ships with bulbous bows generally have a twelve to fifteen percent better fuel efficiency than similar vessels without them. A bulbous bow also increases the buoyancy of the forward part and hence reduces the pitching of the ship to a small degree.

Bulbous bows have been found to be most effective when used on vessels that meet the following conditions:
- the waterline length is longer than about 15 metres (49.2 ft)
- the vessel will operate most of the time at or near its maximum speed.

Thus, large vessels that cross large bodies of water near their best speed will benefit from a bulbous bow. This would include naval vessels, cargo ships, passenger ships, tankers and supertankers. All of these ships tend to be large and usually operate within a small range of speeds close to their top speed. Bulbous bows are less beneficial in smaller craft and may actually be detrimental to their performance and economy. Thus, they are rarely used on recreational craft like powerboats, sailing vessels, tug boats and yachts.

In a conventionally shaped bow, a bow wave forms immediately before the bow. When a bulb is placed below the water ahead of this wave, water is forced to flow up and over the bulb. If the trough formed by water flowing off the bulb coincides with the bow wave, the two partially cancel out and reduce the vessel’s wake. While inducing another wave stream saps energy from the ship, canceling out the second wave stream at the bow changes the pressure distribution along the hull, thereby reducing wave resistance. The effect that pressure distribution has on a surface is known as the form effect.

Some explanations note that water flowing over the bulb depresses the ship’s bow and keeps it trimmed better. Since many of the bulbous bows are symmetrical or even angled upwards which would tend to raise the bow further, the improved trim is likely a by-product of the reduced wave action as the vessel approaches hull speed, rather than direct action of water flow over the bulb.

A sharp bow on a conventional hull form would pro-
duce waves and low drag like a bulbous bow, but waves coming from the side would strike it harder. The blunt bulbous bow also produces higher pressure in a large region in front, making the bow wave start earlier.

The addition of a bulb to a ship's hull increases its overall wetted area. As wetted area increases, so does drag. At greater speeds and in larger vessels it is the bow wave that is the greatest force impeding the vessel's forward motion through the water. For a vessel that is small or spends a great deal of its time at a slow speed, the increase in drag will not be offset by the benefit in damping bow wave generation. As the wave counter effects are only significant at the vessel's higher range of speed, bulbous bows are not energy efficient when the vessel cruises outside of these ranges, specifically at lower speeds.

Although the bulbous bow concept is credited to David W. Taylor, a naval architect who served as Chief Constructor of the United States Navy during the First World War and who used the concept (known as a bulbous forefoot) in his design of the USS Delaware, which entered service in 1910, there are earlier examples. Models in the Discovery museum, Newcastle upon Tyne, England of several warships built in Newcastle during the last decade of the 19th century (notably in the yards of William Armstrong) show bulbous bows. An illustration of the cruiser USS Albany (launched 1899) which appears in the biography of Armstrong by Henrietta Heald appears to show a bulbous bow. It may be of relevance that Armstrong was a hydraulics engineer. The bow design did not initially enjoy wide acceptance, although it was used in the Lexington-class battlecruiser to great success after the two ships of that class which survived the Washington Naval Treaty were converted to aircraft carriers. This lack of acceptance changed in the 1920s, with Germany's launching of Bremen and Europa. They were referred to as Germany's North Atlantic greyhounds, two large commercial ocean liners that competed for the trans-Atlantic passenger trade. Both ships won the coveted Blue Riband, Bremen in 1929 with a crossing speed of 27.9 knots, and Europa surpassing her in 1930 with a crossing speed of 27.91 knots.

The design began to be incorporated elsewhere, as seen in the U.S. built SS Malolo, SS President Hoover and SS President Coolidge passenger liners launched in the late 1920s and early 1930s. Still the idea was largely viewed as experimental by many ship builders and owners.

In 1935 the French superliner Normandie coupled a bulbous forefoot with massive size and a redesigned hull shape. She was able to achieve speeds in excess of 30 knots. Normandie was famous for many things, including her clean entry into the water and markedly reduced bow wave. Normandie's great rival, the British liner Queen Mary, achieved equivalent speeds using traditional stem and hull design. However, a crucial difference was that Normandie achieved these speeds with approximately thirty percent less engine power than Queen Mary and a corresponding reduction in fuel use.

Bulbous bow designs were also developed and used by the Imperial Japanese Navy. A modest bulbous bow was used in a number of their ship designs, including the light cruiser Ōyodo and the carriers Shōkaku and Taihō. A far more radical bulbous bow design solution was incorporated into their massively large Yamato-class battleship, including Yamato, Musashi and the aircraft carrier Shinano.

The modern bulbous bow was developed by Dr. Takao...
Inui at the University of Tokyo during the 1950s and 1960s, independently of Japanese naval research. Inui based his research on earlier findings by scientists made after Taylor discovered that ships fitted with a bulbous forefoot exhibited substantially lower drag characteristics than predicted. The bulbous bow concept was first definitively studied by Thomas Havelock, Cyril Wigley and Georg Weinblum, including Wigley’s 1936 work “The Theory of the Bulbous Bow and its Practical Application” which examined the issues of wave production and damping. Inui’s initial scientific papers on the effect of bulbous bow on wavemaking resistance were collected into a report published by the University of Michigan in 1960. His work came to widespread attention with his paper “Wavemaking Resistance of Ships” published by the Society of Naval Architects and Marine Engineers in 1962. It was eventually found that drag could be reduced by about five percent. Experimentation and refinement slowly improved the geometry of bulbous bows, but they were not widely exploited until computer modelling techniques enabled researchers at the University of British Columbia to increase their performance to a practical level in the 1980s.

Some warships specialized for anti-submarine warfare use a specifically shaped bulb as a hydrodynamic housing for a sonar transducer, which resembles a bulbous bow but the hydrodynamic effects are only incidental. The transducer is a large cylinder or sphere composed of a phased array of acoustic transducers. The entire compartment is flooded with water and the acoustic window of the bulb is made of fiber-reinforced plastic or another material (such as rubber) transparent to underwater sounds as they are transmitted and received. The transducer bulb places the sonar equipment at the greatest possible distance from the ship’s own noise-generating propulsion system.
Note: A while back I sat down and wrote about some of my experiences in the service. I have also documented some of the sea stories others told me. In all, it takes me back to those glorious days I spent at sea with my shipmates. I hope that these will take you back to those times at sea when anything could happen - and usually did. I will add a chapter or two in each edition.

There has never been, nor ever shall be, a creature as inventive, daring, clever, daunting or dedicated to a cause as the American sailor. During over 20 years of work in and around the United States Navy, I have never failed to be impressed by the sheer inspiration and sometimes gall our sailors have in getting things done. They will try anything. They will examine anything, and they will say anything while doing it.

Much of this is due to the nature of the job they have. The average person can’t fathom what it is like to go to sea for days, weeks or months at a time, and live in a world that is extremely crowded, colorless, boring, difficult and in general inhospitable. The Navy tries its best to make life better, but there are limits. Today’s sailors live in what they lovingly describe as “coffin lockers.” These are a steel bunk with walls on all but one side and a foam mattress only about 3” thick. The open side has a curtain for privacy. It measures 7’ x 3’ x 3’. Under the mattress is a locker that is about 8” deep which holds your belongings, including all your clothes, toiletries, and other personal gear. You are also allowed one stand up locker that is large enough to hang up maybe 6 shirts. It only stands about 3’ tall. You can imagine why they call them “coffin lockers.”

But things aren’t all that bad. There is a light in it. There are even places to hang your wet towel, a blanket, pillow and sheets. In some ships, there is even an air conditioning vent and a place to plug in some headsets to listen to music. The floor, or “deck,” is tiled and constantly waxed, stripped and waxed again. Lighting is from fluorescent lights on the ceiling or “overhead.” At night, other fluorescents come on that are red shaded. This is so people can see to get around without tripping over things. With a steel deck, going bump in the night can cause severe trauma.

Sleeping is fun because there is constant noise from the ventilation system and about 50 other guys snoring. Since a ship never really goes to sleep, there are always people going in and out to check voids, measure the depth of fluids in tanks or just making sure things are okay. This is done because there is a great attempt to make sure that the water on the outside, doesn’t get inside. As a result, people are going through your sleeping compartments every hour. The watches change every four hours, so at those times, people are either getting up to go to watch, or coming off watch and going to their “rack,” (another name for “coffin locker”) to get some sleep.

The term “rack” goes to an older navy where you slept on a steel tube frame with a wire mesh or piece of canvas on the bottom. Then the space between you and the next man up depended on the other person’s weight and how far it sagged. Often you couldn’t turn over. They used to be at least three deep, often four. During the day all of these were joined with hooks and triced up, or lifted on one side and secured so that they stood flat on the side. At night they came back down for sleeping.

At sea, add one other minor annoyance. The whole
ship is moving in different directions while traveling through water. The smaller the ship, the more the movement. If the ship is unfortunate enough to hit some rough seas, which happens quite often, you also stand the chance that you can go to sleep in your “rack” and wake up out of it because a wave tossed the ship, and you, being a movable object, took a brief attempt at unconscious flight. It is almost never successful and results in a nice pile on the deck, sometimes from multiple “fliers.” To solve this dilemma, the Navy issued an adjustable strap with hooks on either end. One end hooks to one side of the tube, it goes over the occupant and hooks again on the other side. It was only good when you slept on your back.

Now look at the work schedule. Everyone is up at 6 a.m. to get ready for the day. If you are lucky, the ship has plenty of fresh water so you can take a “Navy shower.” You step into your flip flops, or shower shoes, grab your soap dish and towel and head down the passageway to the “head.” The “head” is where you get rid of body wastes, and perform normal bathing rituals. It was originally named the “head” because it was at the head of the ship. If you ever take a good look at some of the old wooden ship models of sailing warships, look up front where the jib meets the hull. There, in a small platform are places for men to sit and do their duty. The salt water that is splashed up from the bow wave constantly cleans the “head” for you. If you sit long enough, you can be cleaned the same way, sometimes you could get cleaned all the way from your seat up and over the side.

Back to your shower. After waiting your turn (there is always a line since there are probably only 20 showers for 350 people), step into the stall and pull the curtain. You then take the shower nozzle in hand. The nozzle is on the end of a hose and has a push button. Pressing the button lets the water run. You hope that the person before you has it adjusted right (there is a handle to adjust the temperature), and you quickly wet yourself by moving the nozzle all round you. Aim carefully since the pressure can sting.

Now for the fun part. You take your soap, and lather all up from head to toe. This includes shampoo. Now that you are all white and bubbly, you grope for the shower nozzle and pray. The prayer is that the engineers didn't turn off the fresh water pump leaving you in a lathered condition. If the water comes on, you quickly rinse off all the soap and then towel dry outside the shower. By now the next guy is in performing the same ritual. Draped in the towel (or sometimes not) you slide back to the compartment you sleep in and get dressed. The wet shower shoes work really well on the waxed deck. Ice skating is easier.

Getting dressed is another chore. The space between the coffin lockers is only 3 feet or less (usually less). With 6 guys sharing the cubicle in these kinds of tight spaces, imagination is required to find everything and get it on in the proper sequence. Then you must make your rack and stow all your stuff. By the way, if you shave there are a few more sinks than showers, but you still have to hold the valve open to get water. Mixing the hot and cold requires two hands. No one counted on holding a razor as well.

Now for breakfast. You head for the mess decks. Nice name, huh. Really appetizing. Grab a metal tray and get in line. It's cafeteria style. Always eggs, hash browns or grits, toast, some kind of meat (you never are really sure what it is) and beans. Yes, I said beans. A standard Navy staple. Guaranteed to stick with you and later to help you pass the time more interestingly.

You take your food to a table and sit on a swiveling stool next to 4 or 6 other guys. Elbow room is at a premium. You eat with one hand and hold the tray with the other. Remember, the ship is still moving, so you eat fast and then go to quarters at 7:30. On the way out you drop your tray at the scullery. There, the seediest looking man you ever saw, wearing a dingy white apron with every imaginable stain (and some you could never guess) takes Sailors go through a chow line. (USN)
the tray and slams it over the trash can and passes it to the cleaning crew who clean and sanitize it to exacting standards.

At quarters, the Chief Petty Officer passes the word on what is going on, gives out work assignments and then patiently waits for the officer to say, “Go to work.” Then it’s off to 8 hours of fun in a machinery or electronics compartment no bigger than the inside of a small van. If you have military duties, such as standing a watch, you must dress for watch, stand it, and then change back to work clothes and continue your work. Watches are usually stood in addition to your 8 hour work day. Most smaller ships are on a 3 section rotation. That means 4 hours on watch, with 8 hours off. From 4 p.m. till 8 p.m. the watches are “dogged.” This means the watches are only 2 hours each so that it fits around the evening meal time. No matter, it still means long days.

Relaxation is a nice break if you can get it. On most ships now, you can watch prerecorded tapes of regular television shows on the ship’s TV system. That means you get to see what was already on TV about one month before. There are also movies. They used to be real honest-to-god 16mm films of near first run movies shown on the mess decks. Now there is a DVD player and a video projector. The galley (kitchen) makes popcorn and everything. By 10 p.m. taps goes and everyone goes to their own racks. You may even get a couple of hours of sleep before a very large bos’n’s mate wakes you up at about 11:30 p.m. to tell you that you have the next watch.

Sundays are rest days. You still have watches to stand, (those never go away) but you can sleep till 7 a.m. and nothing is planned while you are off watch. On large ships, the chaplain gets time to hold services (rarely attended), and the galley serves a brunch menu. Some guys sleep, or go outside, or sleep, or watch movies, or sleep, or read, or sleep. It’s a time to catch up.

This goes on for days at a time with the extra added attractions of training, exercises and other assorted war gaming to keep the average sailor exhausted. Somewhere in that time frame, a sailor’s brain starts looking for things to do to break that monotony. Then when you least expect it, some new outrage is pulled to let off steam. Sometime it happens at sea, sometimes in port. Even when ashore, events happen to sailors that completely shape their lives - both the serious and the not so serious. But whenever it happens it begins the start of an amazing process which results in what we call a sea story. It is a story that usually begins with, “This is a no shitter,” or ends with “no shit.”

This is a no shitter....

Chapter 1  
Seasickness

It never fails. Place people in the middle of the ocean in a vessel of some type and you will have people who get sick. It’s not so bad except it seems that everyone is laughing at you when it happens. Sailors being sailors, they often go out of their way to get you to be sick. So it happened when I got to my first ship, an LST. An LST gets its letters from what it is, a Landing Ship, Tank. The sailor’s version is not as nice.

The LST has a shape only a mother would love with a huge nose in front which helps it to stick out its tongue. The nose is a derrick and the tongue a ramp which is stored on the main deck behind the derrick. When the ship offloads its cargo, the bow doors are opened and the tongue lifted up and forward, then lowered so it makes a ramp from the main deck down to the beach. Tanks and jeeps and such can then drive from a below decks storage area, over the tongue and onto a beach. Yes, this is one of the few ships in the navy that you can run aground on purpose. It runs on diesel engines and has one unique quality... it has a flat bottom. This makes sure that the ship rolls even on a dead calm sea. Usually this would provide...
plenty of excitement for a crew, but the longer at sea, the more excitement is needed.

I knew my day would come. I had maintained a good set of sea legs the whole summer and thought I would make it all the way. Nature changed that. We hit a hurricane on the way back from Portsmouth, England, that sent almost everyone to their racks. Standing at the front of the tank deck (the storage spaces that holds the tanks and jeeps, etc.) you could look towards the rear of the ship and watch the whole ship twist and turn. The front of the ship was actually doing things different from the back! I remembered some of the movies I had seen where ships broke apart in hurricanes and just knew this one was next.

Now the sailor games began. Since I was still standing, I was sent with one other guy to get the water out of the bow thruster room. The bow thruster room was almost all the way at the front of the ship (forward) and on the bottom. I’ll swear we were weightless a few times with that big bow rising and falling in the seas. The room was small, about 4’ x 4’ x 5’, humid, and smelled of electricity and oil. There was only one overhead light in the space and it turned on in the compartment above. When I got there I knew that this was one space on the ship that was not supposed to be inhabited by man. The water was from condensation off the bulkheads so the smell added something to write home about.

There was just about 2 gallons of water sloshing in a corner of the room. Taking a plastic cup, I began scooping the water and placing it in a bucket. Once the levels got down so far we used sponges. I was almost done when I heard a muffled gurgle. There was a reason for just one light in the space. It kept you from seeing how sick the other guy was. The torrent that came from his face was almost captivating. It filled the bucket and continued to flow back into the corner I occupied on my hands and knees. It was like somebody had turned on a fire hose. The fluids just kept coming. It was amazing to see what this guy had eaten for breakfast (so much for the beans). Now add to this that the ship gave a big lurch and the bucket turned over. Mr. Sea Legs began to feel it coming. I couldn’t climb out of that room fast enough. Initially I made my way to one of the heads, but to my dismay there was a line out the door. Hurricane or not, I became determined to make it to the main deck. In the midst of thundering waves and whipping spray I began to hurl cookies.

There's one thing you have to learn if you get sick. Always check the wind direction. I hadn't learned that yet. The wind (obviously in on the joke) blew everything right back on me. Several bo'sn's mates stood nearby and laughed (they were eating baloney at the time). One of them was the one who sent us down there. I really tried to get over there so I could soil his shoes, but alas, the sickness was temporarily gone. The last I saw of the guy with me in the space was when I looked back while going up the ladder. He was calmly refilling the bucket. The ship was decommissioned a few years back. I think he's still down there.

It's something about being seasick. Once you blow tubes you feel much better - at least for a while. I made it back to my rack and tore the clothes off. They went in the trash. Climbing in, I noticed that most of the other racks were filled too. About 10 minutes later someone came in and tried to get us up to do another job. The first man he got out of his rack promptly redecorated the front of his uniform. No one else came in after that.

This was not the last time I was the brunt of a seasick joke. I had reported aboard a guided missile destroyer as the electronic warfare officer and the man I was to relieve (take over from) decided on the first day out at sea to take me to the highest compartment on the ship that was filled with electronic equipment. We were there to inventory and sign for all classified materials.

You have to understand that an Adams Class DDG has never been known for the smoothest of rides. 447 feet
long and 47 feet wide, she is fast and agile, but can plunge and buck in a rough sea. Today, the seas were about 20 to 25 feet from top to bottom. The bow was kicking water all the way over the signal bridge just in front of us. Once again, I was holding my own. Into the compartment we went.

You know, the smell of vacuum tubes and other electronics is just perfect to give you a headache at the very least. It wasn’t long before my head started swimming. Then there was the second joke. Nearly all of these manuals had been placed inside a Plexiglas covering. Place that Plexiglas into a tightly confined space for long periods, like in a filing cabinet, and the smell is just like that of someone who just threw up in your bucket. Add to that the fact that this joker had about 45 different books and catalogs for me to visually check, verify completeness and that it is up to date, and then sign for in two places. It was like trying to read in a car going around sharp curves up a mountain. I excused myself and walked outside.

The best thing you can do to calm down is look at the horizon and breathe in the fresh air. After a few minutes I was feeling much better and went back inside. The SOB had lit up a cigar. The first class had joined him and between puffs, asked if I was feeling OK. I was just pissed off enough to say yes and go back to work. Five minutes later I could feel it coming. I rushed out on deck, checked the wind (see, you do learn from experience) and leaned over the rail. I then blew cookies all over a first class petty officer standing on the deck below. I never will forget the look of horror on his face as the multicolored stream hit him mid-chest. He was saying something, but I was in an automatic mode and too busy to carry on a conversation. At best I was able to gargle out “sorry” before my eyes finally opened. The petty officer was gone. That was when I heard the door open behind me and these two walked out carrying a bucket asking if I could use it. I had the great satisfaction of being there when the bow lifted a great sheet of water over the rail and drenched them both. Luckily it also cleaned the deck for me. From that point on, I didn’t get sick again. The Doc gave me pills.

I often had the opportunity to see the tricks played on others. We had one poor soul who turned green after the last line was brought aboard and stayed green the entire time we were out. They painted him a personal puke bucket. It was pink. They welded a mesh over the top and cut a hole in the center which would help keep the thing from spilling so much. He was the brunt of many jokes and finally got out after being labeled terminally seasick.

Our navigator even got into the act sometimes. We would be on the bridge in some rough weather and he would always come in to look at his charts smoking the biggest, greenest cigar that a nickel could buy. One night he came in puffing away telling the bridge watch to “suck it up.” About that time the helmsman gave a lurch backwards trying to get to the trash can on the back bulkhead. Unfortunately he was letting go with a heavy spray at the same time and coated the entire watch. It took a moment before we realized there was no one driving the ship. The rest of us made a mad dash to get control of the wheel before the ship started going somewhere we didn’t want it to.

The mess cooks were also good players. Being a military organization, they stuck to the plan. In this case, the menu never changed except in dire emergencies. It could be a howling gale with 50 foot seas outside and they would serve the greasy pork chops. Once you had firm sea legs this was OK, but for the newer guys, it was torture. Better yet, the smell of those things would drift throughout the ventilation system. As I said before, on some ships there was a line into the head just to be sick. And when the engineers got into the act and closed the valves to the toilets, even the meekest individual began to use language not often found in a Webster’s Dictionary.

Chapter 2
Cussin’

Sailors cuss. I believe they invented cussing. I know they make up new words and phrases every day. I met
some new sailors as they went into the boot camp in Orlando. Nice guys, clean cut (mostly) with an eager look of someone ready for an adventure. Just eight weeks later, these same men are cynical, sometimes lethargic and spouting verbal skills never sanctioned in their grade school experience. What makes it worse is that nearly every other word is in some way or shape profane. It is to the point that they do not respond the same way to decent language. I once tried to have a group of men begin a task of refurbishment on the ship’s missile launcher. Four hours later and there was very little accomplished. I tried raising my voice. Again, little happened. Then the Chief showed up. Explaining the situation in ways only a sailor would love, he informed them that they had better pick up those g__d ___ned chippers and needle guns and move their (a term for a portion of their bodies) or he would personally pinch their head off and (physical act of personal off loading) down their wind pipes. (Use your imagination on what was really said, it’s more fun that way.) The job was completed in a record two hours. A very valuable lesson.

Although I did not try to use the phrases all the time, I did become more effective. It even initiated a sort of bonding between all of us. But what is strange is that the use of these colorful metaphors seems to have really caught on primarily in the American Navy. The Brits seem to be more into practical jokes (although the Americans are not far behind). I saw one once in a video shot on a Royal Navy ship. In it, visiting Americans were in a lounge of sorts. Remember, the British still have alcohol on their ships. They were busy consuming their ration. Then one asks our sailor if he would like to try a little trick. The trick consisted of unrolling a condom and sniffing the enclosed end up their nose, through their sinus and into the back of the throat. They then grabbed both ends and moved it back and forth a few times and the entire condom was pulled through the nose and out the mouth. The Brits did this in the most pleasant of language. But when the American did it, more than the condom came out. The air was thick with numerous references to parentage, clothing styles, sexual preferences and an occasional bit about physical acrobatics of a sexual nature. Even the sailors who watched the tape cringed and spouted. To my knowledge, no one else tried it, but the effect was long lasting.

The best reaction to sailor talk came from a German officer. The ship pulled into Kiel, Germany, for a special event. The ship was USS IOWA, a battleship, and definitely an attention getter. When we approached the German coast a small German Navy contingent came aboard which included two officers. The first one was the equivalent of a Lieutenant Commander, and he was the stereotype German officer. He walked around like he had a corn cob inserted. He even clicked his heels. The almost universal expression when our greeting group saw him was “sh__t, where did he come from?” We expected the guy to start goose stepping around our teak decks. Fortunately, he didn’t stay around long. The second guy, named Michael, was about a lieutenant in rank and turned out to be a neat guy. Very quiet at first, he went aft to the stern of the ship to watch our entrance into the harbor.

Here were all the U. S. sailors lined up at quarters around the deck. Everyone was watching Greenpeace boats motor around and around the ship as we moved ahead, with little banners saying, in German, “atomic bombs onboard.” I told you we got attention. In the middle of this, our ship was trying to anchor. At a signal, everyone was to break ranks and begin readying the accommodation ladder for us to embark and de-bark the crew. Inevitably, something went wrong. Standing close to Michael was our Chief Warrant Officer Bo’sn’s Mate. A Chief Warrant Officer is a commissioned rank from the Secretary of the Navy as an expert in their chosen field. Boats was an expert with a capital “E.” One look at what was going on and he began shouting orders heavily laced with color. The air around the fantail turned a shade of blue. It was then that Michael turned to me with a curious look on his face, and asked, “Is he saying what I think he’s saying?”

I said it was and the guy actually pulled out a small notebook and began taking notes on American profanity. He even mumbled, “This is some good stuff,” as he wrote furiously. The guys around me almost fell out laughing at this guy, hanging on Boat’s every word. I told Boats later about it and he said, “Sh-t, if I’d known that I could have
given the f---ker some real good stuff.”

The next day Michael even tried to use some of it. It was pretty good. Some young German sailor had really messed something up and Michael had him braced up against the Turret Two barbette really laying it on thick in German. I could tell he was coming across because of the look of sheer terror on the kid’s face. Then, with a curt, Teutonic order, the kid turned and ran off. Michael was still mad and came over where we were. The ship’s navigator was with me. Michael said that he was really upset with the little “head of sh-t.”

Gator, (nickname for the ship’s navigator) being a former enlisted man, jumps up and says “hey look partner, if you are going to talk like us, you gotta do it right. He ain’t no head of sh-t. He’s a sh-t head, a phlegm wad, a f--khead, a di-k weed, a scum bag......” You get the picture. Out came the notebook again and the two spent the afternoon trading the proper sequence and quality of profanity. Michael was great. He took us to all the great places around town. This included one out of the way beer hall where we proceeded to try and get everyone swilled. Since I don’t drink, I was the man selected to get everyone home. The rest of the group began to get royally sloshed on some really good, fresh brewed German beer. He even taught them some neat German songs and we all went home that evening singing in the streets like all good Germans can do. I only hoped we weren’t singing Panzerlied or Bombers Over England.

Michael was so good that he was invited to stay with the ship during some exercises with the local navies. We shared a lot of information and everyone really liked his talent and personality. There was one man he couldn’t seem to get near, our Main Propulsion Assistant. Danny was a quiet sort of guy with a very dry sense of humor. It was so dry he had to dust it every day. But once you knew him, he was a friend for life. But because of his quiet dry humor, Michael was afraid to go near him. At lunch one day we decided to change the situation. Gator was eating with us and just before we sat down for lunch, Gator turned to Michael and told him that he would never get in with Danny till he broke the ice. He then told Michael to go over to him, slap him on the back and say, “How’s it going, you f--king d--k weed.” Michael turned pale saying that he could get court-martialed. We insisted and urged him on. The guy finally gathered the courage to go over to him.

Danny slowly turned to Michael and a small smile appeared on his face. He put his arm around him and said “Somethin’ tells me I’m gonna like you. Sit down next to me.” I’ll swear, from then on they were the best of friends. Gator is still laughing, the XO is still wondering what Michael said and I still have trouble eating lunch. Michael has continued to climb in rank and status. He’ll be an admiral some day. It just shows you what a little cussin’ can do.

The Author;

Hunter Goforth has written three books about USS Iowa. The first is called Tempered Steel - about a future war with North Korea. The second is called Sending Messages - where Iowa is called upon to help when a Venezuelan dictator kidnaps several American mayors. The third is Arctic Wind - when the world becomes embroiled in a war started by Russia.

These books are available on Amazon Kindle for $3.99 each.

Goforth has also written two works of science fiction and a detective novel about uncovering a Nazi plot in 1962. They are also available at Amazon.
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Editor’s note:  While the Iowa class were the epitome of battleship design, it took a long time to get there. One of the first ships to begin to carry armament and firepower of what we would call a battleship was HMS Inflexible. It gives a good insight into naval thinking in the 19th Century.

The year of 1876 was one of great importance. Samuel Plimsoll MP, after eight years, finally established his shipping safety measures, namely the famous plimsoll mark on the water line of ships. Queen Victoria became Empress of India, and the British fleet was ordered to the Dardanelles in a war crisis with Turkey. Egypt was declared bankrupt, causing France and Britain to set up dual control over Egypt’s finances.

W.G. Grace scored 1209 runs during the month of August, including three centuries, and greyhound racing with an artificial hare was staged experimentally at Hendon. In Portsmouth, that year saw the return of HMS Challenger from a voyage of exploration around the world. She had been away since December 1872. The two survey ships Alert and Discovery had returned from the Polar Regions, having travelled further north than had yet been possible. In July a boiler explosion on board HMS Thunderer at Spithead killed nearly 30 men. It was one of the worst boiler-room accidents to occur in the Royal Navy and over £5000 was raised in the town for the sufferers. However, the greatest of the year’s events were in the Dockyard.

On 27 April 1876, Princess Louise opened the great Dockyard extension, this event coinciding with the launch of HMS Inflexible. She was perhaps the most graceless ship ever to be launched at Portsmouth. It was said that, the day before the launch, the town was filled with visitors and it was impossible to obtain accommodation. Many complained of the extravagant prices demanded for lodgings. The next morning, excursions by rail and water brought in hundreds more, who, when alighting, headed straight for the Dockyard. So great was the crowd that the Main Gate had to be opened early to ease the congestion at the Hard. Soon every foot of vantage ground was filled around the slipway, while the harbor scene was filled with ships dressed overall and a multitude of smaller craft dotted around the north corner of the yard, waiting for the great ship to leave No.5 slipway, the cradle of her creation. The crowd was further swelled when, at half past eleven, Dockyard employees were allowed to leave work and join the assembly. The tedium of waiting for the VIPs to arrive was alleviated by the band of the 52 Regiment and that of the Royal Marine Artillery, who played popular selections. Just after twelve noon the guns of the Duke of Wellington, the St. Vincent and the Garrison Battery boomed out in a 21-gun royal salute announcing the arrival of Princess Louise, who had travelled from London by special train. The royal stand was packed with senior dignitaries, but it was the Mayor of Portsmouth, Mr. William Pink, and the chief constructor, Mr. W. B. Robinson, who had the honor of being presented to Princess Louise. Mr. Robinson had the duty of explaining the mechanism for the launch to the Princess.

The Inflexible was the first ship to be launched by electricity. The mechanism for the launch was a simple touch button. When the Princess touched the button a charge was set up between two carbon rods that fused the wire holding a bottle of wine, which, when released, crashed against the bows of the mighty vessel. The Princess then touched the button again to release two 8cwt weights suspended loft above the dogshores that were holding the ship on the slipway. When the button was pressed, the galvanic circuit...
that activated the two magnets holding the weights was cut and the two weights crashed down onto the dogshores, releasing the ship. There was a silence upon the assembly, for the ship did not move. An intense silence prevailed as a dozen men threw themselves onto the hydraulic rams and, with bulging muscles, heaved at the levers of the rams. But still she did not move. With bated breath the crowd stood and then she quivered, just the slightest movement. But she moved, slowly at first, every second gaining speed. “She’s off” was the cry as hundreds of voices filled the air and 4000 tons of British iron and expectation slid majestically towards her native element, the sea. Hundreds of hats were flying in the air as the bands struck up ‘Hearts of Oak Are Our Men’ and the cheering filled the building shed that covered the slipways, on which the pride of the British fleets were created. At the end of the slipway the bluish-green waters of the harbor frothed into a milky white mixture as the stern of the Inflexible tore a pathway into the harbor, coming to rest as the wind gently caught her, slightly swinging her bow to point to the harbor mouth, as if like an excited child wanting to be away on her exploration of her new-found element. But she was restrained by the older and wiser tugs that gently pulled her to the jetty, where she would have to wait a few hours for the Princess to officially open the complex of docks and basins known as the Great Extension.

At the steps of the North Wall jetty waited the Royal Yacht, Alberta, and it was here that the Princess and other dignitaries embarked for the trip across the tidal basin and into the North Lock, known today as B Lock. They then travelled across the repairing basin to the eastern side, where the royal party disembarked and boarded a train pulling five carriages which took them to the head of No. 13 dry dock. Here the Princess inspected the structure of the dock in which the Inflexible would soon be safely secured out of her new-found element. With this simple ceremony the great complex was opened. The party then boarded the train to complete the journey through a series of triumphal arches to the Iron Foundry, where they then disembarked and boarded carriages that took them past Long Row to Admiralty House where a luncheon had been spread for 80 guests. The leading men who had built the Inflexible were suitably dined in a separate hall tastefully decorated with palms and evergreens, where the speeches and festivities lasted into the late afternoon. In the town a hundred Metropolitan Policemen were on duty to assist with the huge traffic of people caused by the day’s events, which the papers were to report “will long be remembered”. There was much to be done to the Inflexible before she would face the waters of the Channel. It would not be until 18 October 1881 that she was finally completed.

The Hampshire Telegraph described the ship as the most formidable engine of war afloat. She was a remarkable vessel and one that stood out as a milestone in the development of the battleship. The story of her conception shows an obsession that dominated naval thinking of that period. With the introduction of armor into the world’s fighting ships, the maritime nations set themselves a game that could have no winner, the game of armor versus the big gun. During the 1870s a dream developed in naval thinking, the dream of single knock-out blows by a monster gun, the impossible dream, and one which has never been attained against an armored ship in Naval warfare. Knock-out blows could be achieved from well-controlled salvos but not from a monster gun firing spasmodic shots.

During this period Armstrong and Whitworth announced they were prepared to supply guns far bigger than any previously built. This was made possible by the introduction of the built-up gun barrel. Up until the introduction of this type of construction, cannon had been cast in iron or bronze. The largest service canon was the 68 pdr of 112 cwt introduced by Dundas in 1841. The Armstrong system of construction was one of wrought iron rings and tubes shrunk onto the main tube that became the bore of the gun and in theory there was no limit to the size of gun that could be made. The Admiralty, who were content to maintain the status quo, saw no need for bigger guns which would hasten the obsolescence of our fleets. The Board of Ordnance had developed the 12 inch gun, which suited the British needs as the largest gun that sea warfare demanded.

It was the Italians who broke the lull of the coming storm. They saw their long vulnerable coastline at the mercy of a growing French maritime power in the Mediterranean, a threat that, like the British a few years before,
they were to take very seriously. Their great constructor, Benedetto Brin, introduced a naval policy of a limited number of the largest ships afloat with the biggest guns, rather than a large number of less powerful ships. These new monsters were to be armed with the latest Armstrong 15 inch guns weighing 50 tons each, and far exceeding the British 12 inch supplied by the Board of Ordnance.

The very thought of these new monsters sailing the Mediterranean, where the British were the predominant Naval power, prompted the Admiralty into responding with the building of the Inflexible. She was laid down at Portsmouth on 24 February 1874 and was to be one of the milestones in British battleship design. One key element was a central armored citadel and she was the first capital ship to have an armored deck below the waterline in place of vertical armor along the waterline, a feature that was to be the standard component of battleship design throughout the world. The Inflexible was a complete departure from previous designs, in armor layout and thickness, gun power and the disposition of armament, and the introduction of electricity. She was the ultimate fighting machine, initiating a string of new military values.

If the Italians were going to have 50 ton guns, the British Navy would have 60 ton guns. But the 60 ton guns were never put into production. In 1875, a year after the keel of the Inflexible had been laid, the first 80 ton guns were ready for trial with a caliber of 14.5 inches. After a series of experiments, the bore was opened to 15 inches and, having been well-tested, the gun was bored out again to 16 inches, which became the final caliber. So, in accordance with the biggest gun possible policy, they were ordered for the Inflexible. Happily for the ship, there was sufficient margin in her design to accommodate the new guns, but it increased her displacement by 800 tons, which made her 12 inches deeper in the water. The Italians, not to be trumped by the Admiralty, ordered Armstrong’s to deliver the new 17.7 inch guns of 100 tons. Unfortunately there was not sufficient reserve stability in the Italian design to accommodate the new guns and so the precious armor had to be reduced and, in some places of the new ship’s design, had to be abandoned altogether. To maintain the status quo in the Mediterranean, in 1878 the Board of Ordnance ordered four of the monster 100 ton guns from Elswick for emplacement in shore batteries in Malta and Gibraltar.

To understand the complexity of Inflexible’s design, one should imagine the hull as three separate parts.

1. The central citadel measuring 110 ft x 75 ft and rising to 9.5 ft above the waterline and 6 ft below, with the turrets at opposite corners of the citadel, each containing the hydraulic loading gear, magazines etc. The citadel was protected by armor of two thicknesses, 20 inch iron armor backed by 24 inches of teak above the waterline, 24 inches of iron armor backed by 17 inches of teak at the waterline and 16 inches of iron armor backed by 25 inches of teak below the waterline.

2. The rise of the underwater portion of the hull was limited to the 3 inch armored deck which ran from the
forward ram to the stern. Below the armored deck were the engines and boilers with other compartments being divided up into watertight sections.

3. The hull above the 3 inch armored deck served only to maintain stability and provide accommodation. It was designed for this unarmored portion of the ship to be severely damaged and waterlogged without affecting the ship's stability.

Above the armored deck and outside of the citadel were the coal bunkers and 400 tons of coal were kept below the armored deck for use in action. The space between the coal bunkers and ship's side was made up of compartments 4 ft wide filled with cork and internal to this were coffer dams, 2 ft wide, packed with canvas and oakum, which also extended across the ship at the ends of the coal bunkers. Experiments had been carried out on iron boxes filled with cork soaked in calcium chloride, which, when perforated by 68 pdr cannon shot had not caught fire and had stopped flooding, while those filled with canvas and oakum tended to help plug the hole when the shot was driven in.

In 1875 the Chief Constructor, E J Reed, had the opportunity to visit the Italian shipyards building the Duillo and Danolo, the new Italian super-ships. On returning home he published a report declaring them unsafe and unfit for battle. This threw the whole question of the design of the Inflexible once again into the debating chambers. In order to settle the controversy, the Admiralty appointed a board of senior naval architects, engineers and naval officers to investigate the charges made against the ship's design. Work stopped on the construction of the ship at Portsmouth for a year and did not resume until after 4 December 1877, when the committee delivered its findings. They declared the ship was of sound stability but made several recommendations that were adopted in future classes of armored ships.

The whole balance of her stability had been worked out to keep the ship in a fighting state with many of her compartments above the armored deck in a damaged and flooded condition. The increase in her main armament from 60 tons to 80 tons had previously reduced this reserve of stability. When completed, there was speculation in the press as to her ability to stay the right way up. Many said that she would roll excessively and be useless as a gun platform, so to counter these fears she was fitted with anti-rolling tanks forward and aft. These were tanks at each side of the ship connected by pipes through which the water flow from one tank into the other when the ship was rolling, although it is reported that these were in the end used for stores. The ship proved all the doubters wrong and was found to be steadier at sea than anticipated.

The two great turrets were at that time the largest mounted in the Royal Navy, being 33 ft 10 inches in diameter. The armor was in layers of 9 inches outer skin and a 7 inch inner skin backed and separated by a total of 18 inches of teak. When complete they each weighed 750 tons. To rotate the turret, Rendel's hydraulic system was used in preference to steam. A complete rotation could be achieved in just one minute. The guns were muzzle-loading, which had to be done outside of the turrets. The armored deck was raised in one position to form a glacis. When the barrel was depressed, it came below the level of the glacis and, from here, the hydraulic rammers rammed the charge and the giant 16 inch projectile. The projectile weighed 1684 lb and had a muzzle velocity of 1590 ft/sec. With full charge the projectile was capable of piercing 23 inches of iron at 1000 yards and the rate of fire per gun was one round every two minutes.

Steam was generated by twelve boilers that worked to a maximum pressure of 60 lbs/sq in, feeding two three-cylinder inverted compound engines, which in turn drove two twin-bladed 20 ft diameter propellers of 65 revolutions per minute to give her a top speed of 14.75 knots. On her first speed trials over the Stokes Bay measured mile, she was fitted with four-bladed propellers, but these were judged to be overmatched for her engines and consequently changed for two-bladed propellers. The engine
room became unbearable during the speed trials due to inadequate ventilation and additional air supplies had to be installed, which necessitated the Dockyard cutting through the armored deck. When built, the Inflexible was fitted with a brig sailing rig, although it was not intended that she should use the rig to fight, merely as a training aid for the crew to participate in evolutions aloft with the rest of the fleet. By 1885 her yards and masts had given way to pole masts with circular fighting tops and light yards for signaling.

The Inflexible was commissioned at Portsmouth on 5 July 1881 and completed in October, before joining the Mediterranean Fleet. She was at Alexandria, where her broadsides made impressive viewing, firing some 88 of her 16 inch shells against Ras-el-Tin, Mex, Ada and Pharos forts, although accurate firing did not produce the destruction anticipated. She sustained the most damage of all the British ships present. One hit, a 10 inch shell, struck below the waterline outside of the armor and glanced upwards, perforating the deck and killing two of the crew in the superstructure. It is said that most of the damage to the superstructure and boats was caused by the blast from her own broadsides. She returned to Portsmouth in 1885 and, after a refit, was placed in reserve. She was commissioned for the fleet review of 1887 and for fleet maneuvers in 1888 and 1889. In July 1890 she went to the Gibraltar Straits, where she remained until November 1893, and returned to Portsmouth to become the Port Guard ship for four years. She was reduced to fleet reserve in 1897 and to Dockyard reserve in November 1901, being sold out of service for £20,100 in September 1903.

When the Inflexible was finally commissioned her size and gun power caught the public imagination, causing as much fanciful speculation as the Dreadnought did some thirty years later. The question remains would she have been any good in a battle and would she have stood up to the damage as her designers claimed? In Dr. Oscar Parks’s British Battleships, he claimed that a comparison can be made with the Chinese turret ships, Chen Yuen and Ting Yuen. These were central citadel ships with soft ends, similar to the Inflexible and in fact they were modified Inflexible designs. At the Battle of Yalu in 1894, both ships were exposed to the full concentrated fire of the Japanese ships.

The Ting Yen was hit 200 times and the former nearly as many, but in neither case were the unarmored ends of the ship blown to pieces. The 1877 committee claimed the Inflexible would take 300 hits and survive, and based on the example of the Chinese ships, which were sitting and helpless targets, it is most probable that the Inflexible would have withstood a similar barrage and proved worthy of her designers’ claims; a true credit to the Royal Navy.

The ship had other innovations which set her apart. She was also the first Royal Navy ship to be completely lit by electricity, and the first to have underwater torpedo tubes. The electrical installation provided 800 volts DC to power arc lamps in the engine and boiler rooms and Swan incandescent bulbs in other parts of the ship. The circuitry was complicated because the lighting consisted of sets of 18 Swan lamps and an arc lamp arranged in series. Each incandescent bulb was fitted with an automatic mechanism to switch in a resistor to maintain continuity should it fail, so that the set of 19 lights would not be extinguished if one failed. The arrangement also led to the first fatal electrocution on a Royal Navy ship, in 1882, after which the Navy adopted an 80 volt standard for its ships.

The ship was equipped with many other novelties, including water tanks to dampen the roll, which turned out to be useless. Much of the ship was without natural illumination, and Fisher had different deck levels painted in contrasting colours to make it easier for crew members to find their way around the ship.

She was also equipped with a ram – ramming was considered a practical means of sinking an enemy battleship at that time. The Italian Re d’Italia had been rammed and sunk by the Austrian flagship, Ferdinand Max, at the Battle of Lissa in 1866. This had started a vogue for ramming (which persisted until the 1890s), and many naval experts even believed this was the most effective weapon a ship could have. For example Gerard Noel won the 1874 Royal United Services Institute essay contest with an article that asserted that “[i]n a general action I do not hold that the guns will be the principal weapon”.

This was less surprising than it might seem to modern eyes, because it was expected that naval battles would be fought at a range of only a couple of thousand metres. The
advent of steam power meant that ships were no longer restricted in manoeuvring by wind direction and had led to a belief that it would be possible to steer into enemy ships. Rams turned out to be a handicap in retrospect, as several warships were accidentally sunk by them – for example HMS Vanguard by HMS Iron Duke in 1875, and HMS Victoria by HMS Camperdown in 1893. Whilst this showed the considerable potency of a ram, it also demonstrated the inadequate manoeuvring characteristics of many of the ships equipped with them. The ram was designed to be removable to avoid damage during accidental collisions, but although other ships customarily carried theirs detached, Inflexible seems to have kept hers in place. The ram was a solid iron forging supported by an extension of the 3-inch (76 mm) armored deck which turned downwards behind it.

On completion the ship was sent to join the Mediterranean squadron. She took part in the bombardment of Alexandria on 11 July 1882 during the Urabi Revolt, firing 88 shells[10] and was struck herself twice; one 10-inch (254mm) shell killed the ship's carpenter, mortally wounded an officer directing the fire of a 20-pounder breech-loader, and injured a seaman. The blast from Inflexible's own 16-inch (406 mm) guns did considerable damage to upperworks and boats.

She was refitted in Portsmouth in 1885, when the full sailing rig was removed. She was in the Fleet Reserve until 1890, except for brief service in the 1887 review and the manoeuvres of 1889 and 1890. She was re-commissioned for the Mediterranean Fleet from 1890 to 1893, serving thereafter as Portsmouth guard ship until 1897. From there she went to Fleet Reserve, and in April 1902 to Dockyard Reserve, until sold at Chatham in 1903 for scrap.

The earliest photograph in the Portsmouth Royal Dockyard Historical Trust records of a Portsmouth built ship being launched is the Battleship TRAFALGAR, launched on the 20th September 1887. During the birth of these ships the torpedo was allowed to dominate the thinking of Naval warfare to such an extent that the battleships were being looked on as little more than a helpless target waiting to be sunk by the new mosquito with its lethal sting.

Mr. Hibbert (Financial Secretary to the Admiralty) in his description of the TRAFALGAR, when moving the Naval estimates for 1886 said to the House. “I may safely say these two large ironclads will probably be the last of this type that will ever be built in this or any other country”.

In March 1889 the First Lord explained: “I had hoped some two years ago that the NILE and
TRAFALGAR would be the last battleships laid down in this country. It then appeared as if there was to be a general cessation of ironclad building owing to the appearance of the torpedo boats. But the powers of these torpedo boats had been greatly exaggerated by naval officers. France suspended her battleship building and other nations followed her example; but since then, owing in part to the invention of the quick-firing guns, there has been a return to the building of battleships. What a persistent beast the battleship is! Yes is, for how ironical that 102 years after that speech was made and 31 years after Britain's last battleship went to the breakers, the Royal Navy should find itself riding shotgun (escorting) American battleships on operational patrols in the Gulf War.

The TRAFALGAR was laid down on No 5 Slipway on 18th January 1886 followed in April of that year by her sister ship the NILE at Pembroke Dockyard. She was launched by Lady Hood on 20th September 1887, although it was one of the yard's highlights of the year it was clouded by 1,000 men, mostly Shipwrights being made redundant. The ship was completed in March 1890 at a cost of £859,070. Although officially stated to have been completed in the unprecedented time, for that period, of three and a quarter years, she was kept waiting for her guns and was not commissioned until April 1890. At sea she performed well, achieving her designed speed of 17.5 knots. The very low freeboard forward did have its drawbacks as in wind states of 3-4 and insufficient sea to lift the ship, the forecastle was always awash with clouds of spray breaking over the turret.

Her first commission was as Flagship Mediterranean where she remained for seven years, paying off at Portsmouth in October 1897 and remained as port guard ship until August 1902 when she was derated to the Fleet Reserve Class A. In September 1903 she was derated further to the Dockyard Reserve. In April 1905 she was transferred to Reserve Fleet Devonport, and in March two years later to Sheerness, where she became turret and submerged torpedo tube drill ship until replaced by the VENGEANCE in April 1909 when she reverted to the 4th Division Home Fleet at Nore. The end of the line came in March 1911 when she was sold for the princely sum of £29,500 and scrapped.

Her armor plating, by any standard, is breathtaking, 20 inch thick sides and 18 inch thick bulkheads, we can only now marvel at how they transported and erected it on the slipway. Like so many things now, what was bread and butter to them appears as the eighth wonder of the world to us.

Installing the Trafalgar's guns. (RN)

Trafalgar being scrapped after 14 years of service. (RN)
Ships That Never Were

Often in our history, ships were designed and plans made for construction, but either the funds were never appropriated or events caused the needs of the Navy to change. Here are some examples of ships that never were.

A carrier based on the hull of an Omaha Class Scout cruiser. There were plans to use the cruiser Omaha hull for a carrier but few details.

Based on a Battlecruiser hull, the Bunker Hill removes the aft guns in favor of a flight deck and hanger. She would be able to carry approximately 75 planes when built. Note the off-center forward turret to counter the weight of the island.

Based on official plans for using the hull of an Iowa Class Battleship for a carrier conversion.
A truly bizarre 1912 design for a battlecruiser. 1250 feet long, armed with 8 12” guns.

A fast battleship design, part of the Lexington Class design process.

Design 165 10x16”

Design 166 10x16”
Four designs for a 10 gun, 16” Tennessee. The 8 gun Maryland was built instead.

A variant of the Tillman design with sextuple 16” turrets. Certainly doesn’t look too practical!

A later “Maximum Battleship” design.
Letter from the Editor

I hope you all are enjoying the stories from this issue. I am now doing both this newsletter and the Iowa Veterans Association newsletter. I may occasionally share some of the stories of interest.

I hope you will consider sending more personal experiences to share with the crew. The next issue will include some more of my own experiences and “sea stories.”

If you have anything you would like to share with our shipmates and friends, please send it in. It may take some time to get it in the newsletter, but we’ll get it in for all to see.

Send your works to:
Brad Goforth, 1200 Somersby Lane, Matthews, NC  28105
or email it to:  bgoforth@thesamaritanhouse.org

Brad Goforth

Disclaimer:

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2017 Reunion of the Iowa Veterans Association

Here is the latest information on the dates and place of the reunion:

Location:  NASHVILLE AIRPORT HOTEL, 2200 Elm Hill Pike, Nashville, TN  37214

Dates:  Saturday 12 August 2017 - Wednesday, 16 August 2017

Room Rate:  $125

Tour Days:  Sunday, Monday and Tuesday

Crews Meeting:  Wednesday

Banquet:  Wednesday

Checkout:  Thursday

$125 room rate will be available on nights of 11 August and 17 August depending on room availability.

Website:  hinashville.com

Set in Historic Mud Tavern and just down the road from Opryland, the hotel is minutes from popular local restaurants, famous concert venues, shopping malls, golf courses, lush city parks and family-friendly attractions.

King bedroom, Hilton Nashville Airport.

Downtown Nashville.

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