Family Sailing Adventures

in a

Self made GRP Sloop

Maxmillian Cottrell

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Family Acknowledgements.

The understanding and support of the Captains mate, my wife and lifelong companion Joyce, has been inspirational in providing me with thoughts and events during our sailing adventures. Keeping the Captain and crew on an even keel when events demand it leaves me eternally grateful.

First of the crew, our son Stephen became a great help in providing the agility of jumping the gap between boat and dock with line in hand to secure us fast before we should pass the dock by.

Second of our crew, daughter Beverly was always on hand to provide help when needed and to maintain a wary eye on the mischief maker, the third of our crew Melinda.

Each of the crew have now shipped out to become experts in their own fields including Television Broadcasting, Art Media and Natural Art subjects.

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Contents

Sandgrounder is the name given to second generation inhabitants of Southport, Lancashire, England.

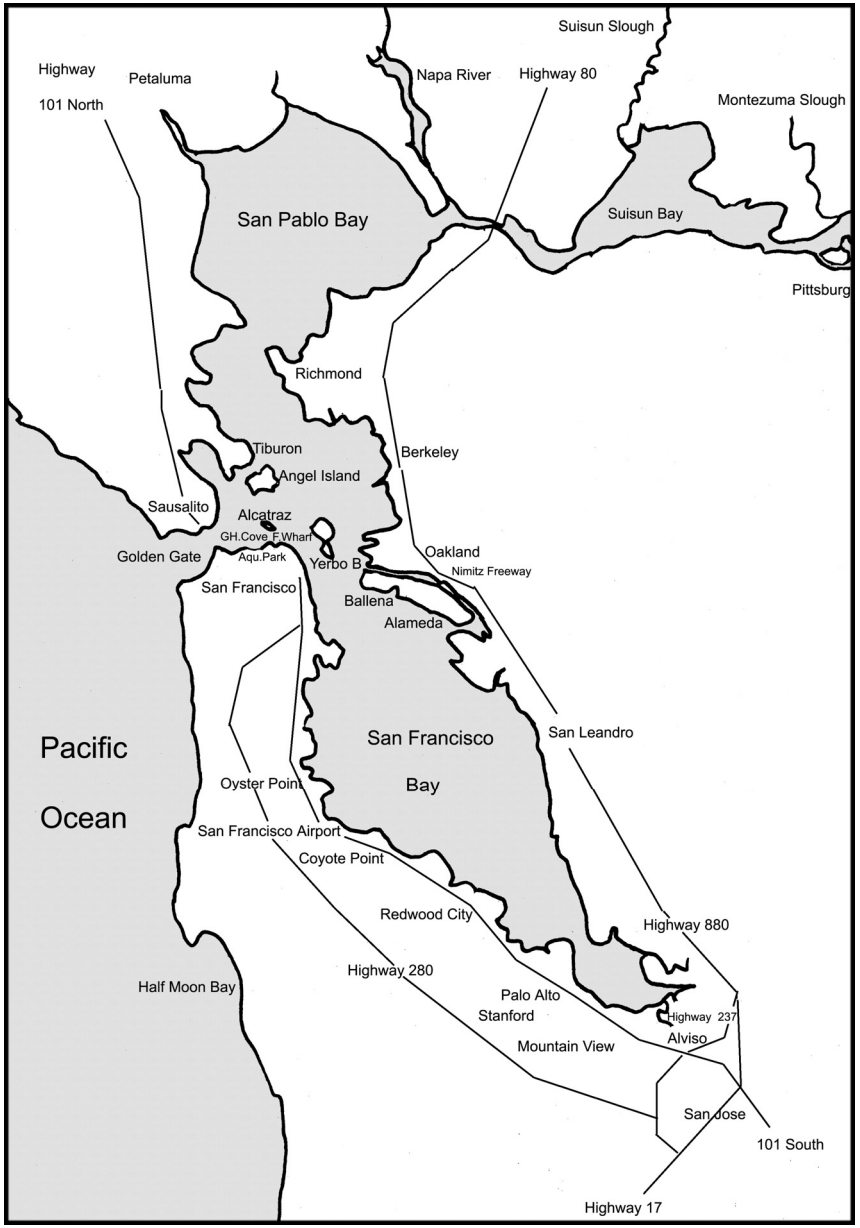
Introduction.

This book includes an account of how to go about building a 24 foot GRP sailing Sloop suitable for coastal sailing on a tight budget. The account also includes many sailing experiences in areas from rivers, lakes and sea.

The craft was built and sailed within the San Francisco Bay area, California and later sailed on the Irish Sea around North Wales. It deals with some thoughts about the craft and what is desirable for family based leisure cruising with a limited budget. Although built in 1972, a long time ago for today's youngsters, the materials used and techniques applied are still valid and in use to day. It was completed in less than a year giving 30 years of family sailing pleasure. Now having a new owner, it is still in service on Loch Lomond, Scotland, a testament to its durability.

I have tried to be consistent with all the measurements which are mostly in feet and inches with the odd metric measurement thrown in for good measure. This is mainly because the drawings I have were in 'English' measure although 'roods' and 'perches' were disallowed. Sketches should not be used for navigation purposes and photo's shown are not necessarily up to date. The use of sailing jargon, which to a complete novice tends to be like a different language, need not deter a person with practical capabilities from joining in this unique pastime. These terms soon become second nature as they are learnt and used, in fact as the boat is being constructed many names are needed to describe the individual parts of a sailing boat.

There is nothing quite like experiencing forward motion on a sail driven boat with fluttering sails and occasional waves lapping at the hull. On the other hand, if you enjoy more excitement, this is also available when more sail is plied on with a stiff breeze to set the boat surfing. Having a relatively small boat also provides further sailing experiences by being able to manoeuvre and explore into small creeks and rivers. One does not have to be on salt water to enjoy this past time. If I tend to wander a little don't despair, it comes to most of us as we look back at the happy times we had under sail.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San Pablo Bay
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Pittsburg
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Tiburon
Berkeley
Angel Island
Sausalito
Alcatraz
GH.Cove F.Wharf
Aqu.Park
Golden Gate
Yerbo B
Oakland
Nimitz Freeway
San Francisco
Ballena
Alameda
Pacific
Ocean
San Francisco
Bay
San Leandro
Oyster Point
San Francisco Airport
Coyote Point
Redwood City
Highway 880
Highway 280
Half Moon Bay
Palo Alto
Stanford
Highway 237
Alviso
Mountain View
San Jose
101 South
Highway 17

Chapter 1

San Francisco Bay Area Marinas.

It has to be said that once you build a boat for yourself you never really quite finish it. That was certainly my experience for after spending the first year building a twenty two foot swing keel fibre glass re enforced sailboat, in the following thirty years it grew to 24 feet long with the addition of an extension. There are still some small changes I can envisage.

That said, it does not detract anything from the enjoyment of sailing in a craft made from your own efforts and knowing every detail and nuance of its construction. Sailing on the waters of San Francisco Bay on the American west coast and then later in English west coast waters is an experience I would wish to share with anyone.

In the years of the space race the place to be was in Silicon Valley, specifically in Santa Clara county just south of the beautiful city of San Francisco. This is where most of the major semiconductor companies we know of today were starting up including Intel who's microprocessors are fitted in probably the majority of personal computers. At that time Fairchild Semiconductor had made use of the planar fabrication process and were busy making some of the very first digital circuits. I had been working in Canada when an opportunity arose to escape the freezing winters of Montreal and to bring my family to the amenable climate of Mountain View in California. As a new employee of the Fairchild Semiconductor Corporation in Mountain View, it was exciting new technology to be involved with and not to be missed if at all possible.

The headquarters of Fairchild Semiconductor faced on to the service road of the Bay shore freeway namely highway 101.

Across the other side of the freeway is Moffett airfield, the home of the submarine hunter P3 Orion propeller driven aircraft. These aircraft protect the Pacific coast from would be invaders by monitoring the seas on a continuous and routine basis. The airfields claim to fame though was in it's earlier history, when it was used to house the huge six and a half million cubic feet airship 'USS Macon'. This was the airship constructed in the 1930's for use as a flying aircraft carrier. It had a somewhat chequered career managing several flights in its two years of active service only to end up with weather damage sinking into the Pacific ocean off Point Sur. Today, it's massive hanger still stands as a monument to this previous age but now there is some talk of demolishing it. The annual Moffett air show presenting the Blue Angels and F16 Thunderbirds is an eagerly anticipated event which draws large crowds from all over the bay area. Group formation flying skills need to be seen to be believed especially the manoeuvres where by high speed jets converge to a single point crossing over with just a few feet to spare!

About six miles from Mountain View, further along the Bay shore freeway and heading north towards San Francisco is the town of Palo Alto. This is the home of the world famous Stanford University which draws in the great and talented students from many countries. In 1967 Andrew Stephen Grove was employed by Fairchild Semiconductor Research & Development Laboratories in Palo Alto. His knowledge of science and physics made him an expert in the manufacture of semiconductors and as a result he gave classes on the subject. This curriculum became the basis of his book 'Physics & Technology of Semiconductor Devices' and he taught this to all the Fairchild employees who wished to take the course. As a Hungarian emigrant, Andy Grove ultimately became Chief Executive Officer of the Intel Corporation managing to make it the worlds most powerful highest market value company during his tenure.

Halfway between Mountain View and San Francisco is the port of Redwood City. This town derived its name from the Redwood Creek which enabled logging companies to ship timber from the redwood forests by way of the Bay to San Francisco. Although the creek is now silted up, small craft are still able to go almost as far as the Bay shore freeway. The small tidal range of the South Bay just about allows boats to get down the creek and back within a three hour time span depending on there draft. Redwood Marina is here which also has space to launch boats from trailers and plenty of storage area.

Further along the Bay shore freeway north of Redwood City are the towns of Burlingame and Hillsborough in San Mateo County where nearby lies the Marina of Coyote Point. Coyote Point has a recreation area which is a favoured spot to view the trans America and trans Pacific aeroplanes gliding down to meet the southern runway of San Francisco airport. At least that was the general consensus until one day in November 1968, a Japan airlines DC-8 flight decided against convention and landed in the shallow water surrounding the point. According to reports the captain was using an automatic landing system in a non standard operating procedure and made a perfect landing in the water about a mile short of the runway. Fortunately, nobody was hurt in

the incident and passengers and crew exited down chutes to life craft which had been deployed.

The JAL DC-8 was later lifted onto barges and transported to the United maintenance base at the airport (United Air Lines then being the biggest DC-8 airline). There it was repaired and flown back to Japan where it was returned to service. The grand view of the occasion has not been equalled since that time and no reports were ever heard of whatever happened to the captain. Sailors in the area now keep extra vigilance when passing around the point.

In the late 1800s a pier was built at the point for timber loading and transportation. About that time Eucalyptus, Cypress and Pine trees were planted on the knoll which are still present in the recreation area. Very high winds can be experienced here due to a gap in the coastal mountain range allowing summer cooling air to rush inland.

After the Bay shore freeway passes San Francisco International airport it reaches the town of South San Francisco and its marina at Oyster Point. This is now a 600 berth marina and the last one before the coast line becomes cluttered with the industrial wharves and piers which surround the city of San Francisco. Around San Bruno Mountain is Daly City, home of the Cow Palace. Originally known as the California State Livestock Pavilion built in 1941, it became known as the Cow Palace due to its association with the livestock & rodeo history. The Cow Palace is an indoor arena for shows and expositions including the annual boat show.

Onwards towards the city and passing the Oakland Bay bridge, San Francisco itself has a varied history which has made it one of the most exciting and beautiful cities in the world. Most of its visitors flock down to the waterfront to enjoy the ambience of Fisherman's Wharf and the converted Pier 39. This area is now totally engulfed in tourism attributes with trips round the bay or trips to the infamous Alcatraz island.

Around from Fisherman's Wharf and close to Ghirardelli square is the Aquatic Park which is a sheltered anchorage suitable for small craft. This is a good staging post before taking on the bay proper with a grand view of the Golden Gate bridge.

The St. Francis and Golden Gate yacht clubs have their headquarters in the San Francisco Marina West basin. The East basin called Gashouse Cove, is a mile or so on from the Aquatic Park anchorage. As you would expect this is a large marina having all the facilities for the serious boating enthusiast including a fuel dock in Gashouse Cove.

Across the Golden Gate, the Bay shore Freeway starts to leave the bay area becoming more familiarly known as highway 101 as it extends into the wine growing area further North. Just after the bridge is the town of Sausalito in Marin County. This houses a large sailing community and faces San Francisco over the Bay. Sausalito has been the back drop of several movie films including 'The lady from Shanghai' directed by Orson Wells and is the home of the writers and actors. There are many floating properties moored in the community as well as a collection of local marinas and restaurants to be visited. It is well protected from the high afternoon winds entering through the Golden Gate and is a favoured eating area of the city dwellers across the bay having a frequent ferry service.

Adjacent to Sausalito is the Tiburon peninsula which in the past was the terminus of the North West Pacific Railroad. Freight and timber were off loaded from the trains to be transported to San Francisco by barges using the port facilities. In the past, Tiburon was an important area with fully equipped rail yards able to repair trains as well as build freight cars and locomotives. In addition to the yards, Alaskan codfish processing plants and ship building activities were a mainstay of employment in the area.

To day the area has been redeveloped being given over to nature trails and expensive housing. The harbour area has many fine restaurants for the visitors and is a popular place to visit. It is also served by ferries from San Francisco.

Just 1 mile across the Racoon straight is Angel Island which is now a most popular weekend anchorage for cruising sailors. Racoon straight is named after H.M.S. Racoon which was beached in the cove in the 1800's. One of Angel Island's past uses was as an immigrant station between 1910 and 1940 when it became a staging post handling many thousands of Chinese immigrants. World War II saw the island being used to house both Japanese and German prisoners of war and as a staging post for returning U.S. soldiers from the Pacific. Angel Island became a state park in 1954 with a small craft anchorage which lies within Ayala Cove previously named Hospital Cove.

Heading in an easterly direction across the San Francisco Bay brings you to Berkley on the inner eastern bay, famous for its university and academic facilities. Berkeley yacht harbour is useful for trailed craft since it has launching ramp with enclosed protection. From here it is possible to sail into San Pablo Bay by way of Richmond.

Access to the marina can be made from the East Coast highway known as Interstate 80. This is an extension from the Nimitz Freeway is now named the Interstate highway 880 or the old highway 17, which routes southwards along the eastern side San Francisco bay. At San Jose, the 880 freeway returns to become the original highway 17 after crossing highway 101.

Moving on southwards towards the Alameda, past Emeryville the Oakland Bay Bridge is seen linking Oakland to San Francisco using Yerbo Buena Island as a land bridge. Adjacent to this is Treasure Island which is a man made island built from dredging the bay. This was constructed for use in the 1939 Exposition and was intended for use as a Pan American flying boat service station. These days it has recreation facilities with a raised walkway around the island and has been used frequently for movie film sets.

The Alameda is an island separated from Oakland by a narrow channel which leads to Oakland inner harbour. The island has been home to the Naval Air Station Alameda established during world war two and was closed in 1997. During the years

after the war it was a common site to see Nimitz class aircraft carriers at the Alameda naval station, hence the name recognised now as the Nimitz Freeway. The city of Alameda itself resides on the main island area with the former Naval Air station at the western end.

The port of Oakland lies within the channel which divides the Alameda from the mainland. This used to be the second largest containership port in the world until surpassed by Los Angeles. It remains an important port serving the Pacific with a dredged channel to 33 feet depth being about 800 feet wide. Small craft can pass around the Alameda but there are a number of low road bridges which require to be opened for sailing craft not having the ability to lower masts during transit. These are opened at pre determined times other wise the road traffic would become more chaotic than it already is. Just past Jack London Square there are several marinas and yacht basins which are convenient for overnight stops.

On the San Francisco bay side of Alameda island is Ballena bay where the Ballena Bay Yacht Club is located. This spot is handy for an hour sail from San Leandro Yacht marina as a sunday lunch stop.

The Nimitz freeway continues southwards past Oakland International Airport towards San Leandro. The city is rather unspectacular but does have a useful marina which serves the centre of the eastern side of San Francisco Bay. Access to the marina by road is a little convoluted being a mile or so from the main freeway. The Marina was dredged in the 1970's allowing small craft to enter at all states of the tide. The marina includes the usual sailing facilities and overnight berths. A man made lagoon is connected to the marina for the use of younger sailing novices and visitors from the adjacent recreation park. There is a two mile marked channel to get into San Francisco Bay as the surrounding area is quite shallow. San Leandro Marina marks the last useful sailing facilities available on the south eastern side of the Bay.

As the Nimitz freeway threads its way towards San Jose passing the San Mateo and Dumbarton Bridges, the bay gradually narrows becoming shallow and silted with creeks and slough's entering the bay at various intervals. The small town of Alviso is served by one such slough along which the odd small power boat can be seen pulled up on the banks. There is a launching ramp available for local power boaters in what might be called the marina. This is a collection of nondescript buildings which, nevertheless, is the only place in the southern most Bay where there is still access to salt water.

Finally, highway 237 or the Mountain View - Alviso road, or Milpitus- Alviso road depending on your entry point, links back to highway 101 the bay shore freeway. This is just a stones throw away from the Sunnyvale Baylands County Park and Moffet Airfield where the tour of the Bay Area started.

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Chapter 2

Before Building, Points to Consider.

Certainly, the San Francisco Bay Area attracted all kinds to its shores and with the influx of people from all walks of life, the bay was just waiting to be sailed on. Many new marinas were already being prepared and upgraded waiting for their new occupants to take over. Marina's like San Leandro , Redwood city and Coyote Point just a few miles from Silicon Valley were becoming my favourite haunts where it was possible just to imagine sailing off to places yet to be discovered.

However, it soon became apparent that as a newcomer I would not be able to afford the cost of any of the gleaming new sailboats which were on offer at the marina's. The annual boat show at the Cow Palace in South San Francisco left one salivating at the myriad of craft on sale but unless you were well established or able to take on a huge financial burden this was for me out of the question. After a demonstration sail over the bay in Oakland I decided that this is going to have to be a DIY job.

I had been talking with new found friends at Fairchild and in particular one guy with a practical knowledge of processes such as the relatively recent innovations using polyester and fibre glass as a boat making medium. Most of the new small craft manufacturers were using polyester combined with chopped strand fibreglass applied within an external mold to form the hull. This allowed the materials to be ejected from a gun almost like heavy paint together with its catalyst which caused the material to cure and become rigid. Creating a hull this way was too impractical for a home project so alternate ideas were on offer requiring the use of a interior mold sometimes called a plug.

Boats hulls were also being constructed by impregnating twisted & welded wire mesh networks with a fine concrete mix, but because of the thickness of the hull this method was reserved for hulls of perhaps fifty feet or more. These are massive projects taking several years for one person to complete but result in grand ocean going vessels to sail the world in. I was looking for a method which could end in a family friendly sail boat to be ready in about a year.

To form the boat hull required the use of flexible fibre glass cloth and chopped strand mat to be laid over the complex curves of an easily constructed interior mold. The fibreglass layers would then be soaked in polyester mixed with its catalyst and squeezed free of air bubbles plus any surplus polyester. An excess of polyester in the fibre glass layer results in a more brittle construction with less strength and so is to be avoided.

Making a suitable interior mold from timber or steel was almost as much work and expense as building a hull ready to fit out in itself and since the idea was to limit the budget this would be again impractical. In addition, forming a complex hull shape with curves in every which way required a lot of skill and patience using steel or timber.

One other solution was possible which used inexpensive sheets of polystyrene foam to make an interior mold. The problem with this is that polyester will dissolve polystyrene like honey in hot tea so that any contact between the two plastics would be a disaster. The two materials had to be isolated, at least for the initial layers which required a separation layer impervious to both polyester and polystyrene, and which could also be applied over the interior forming mold like paint.

A suitable material available to do this was water based white glue or to give its technical name of Polyvinyl Acetate (PVA). This would make it possible to paint over and cover the polystyrene interior mold and thus isolate the polyester when applied as the first layer. An added bonus was that the polystyrene sheet mold could remain inside the hull and provide thermal insulation preventing any possible condensation from forming. That was the

process to be followed. Some major planning was now needed and a final hull size and form determined along with a costing exercise for the materials needed.

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Surveying the boats on water and on trailers provides a bewildering array of shapes and sizes. There seems to be hull profiles for every occasion, deep keel, shallow keel, twin keel, swing keel, separate rudder, swing rudder, rudder as an extension of the keel, you name it and its there.

There is an advantage with a swing keel boat since with the keel up the draft is greatly reduced allowing the craft to enter shallow waters without becoming grounded, or if accidentally grounding being easily able to extricate from a difficult situation. In addition, having a retractable keel makes the boat easy to launch & retrieve from a towed trailer. Also, by making it easy to be quickly transported to new areas, different sailing experiences can be enjoyed. As a family sailboat, this rates highly as one is not confined to one Marina and weekend sailing routine. In addition, by trailing the boat to home for winter the cost of storage can be avoided.

One potential disadvantage is the need for the additional mechanism and space taken within the hull for the raised keel. The fact that the keel is not part of the hull can also mean that some directional stability is also lost which makes the craft more responsive to large waves & sea state. With this type of sail boat the rudder design is important since that controls the forward stability. All in all, so long as the craft will only be used in relatively sheltered waters these disadvantages are not that much of a problem. That is not to say in Force 5 or 6 plus winds it cannot be controlled but depending on wave state it might be a bumpy ride.

If the sailboat is to be easily transportable this also means that the mast will need to have an easy method for raising and lowering without a large effort. The favoured method is to use the

tabernacle at the base of the mast as a hinge and by releasing either the back stay or the fore stay allow the mast to be lowered so that it is supported over the pulpit or cockpit guard rail.

The dimensions of the hull were chosen to be based on what was thought reasonable to be transportable on a car towed trailer. In other considerations, an open cockpit with minimum length to be long enough for sitting on in comfort and sleeping on warm nights. Also, berths for sleeping under the fore deck, in the cabin and aft under the cockpit seats would be very useful. The interior space of the cabin also needed to be sufficient for a galley and dining area when weather was inclement.

Having a swing keel sailing boat means that there has to be somewhere for the keel to go whenever the keel is raised. This requires an internal box structure which protrudes into the cabin sufficiently to take in most of the keel plate when raised horizontal. To limit the size of the structure, a small amount of keel also runs parallel under and along the hull length.

The draft of the boat is of course based on its final weight and the surface volume of the submerged part of the hull. An estimated draft of a little above a foot to the hull bottom was estimated based on the hull shape. Determining an internal hull dimension height of about 36 inches would be acceptable, this would allow an above water freeboard dimension of about two feet before any cabin extension and combing above the gunwales. Also, assuming the boat was ever in a capsize position on its side with the keel raised, there has to be a positive self righting moment such that the centre of gravity will cause the boat to recover. If the cabin entrance were open, then the cabin doorway should constructed as to be always above the waterline in a capsize situation. Because the hull was to be of resin and fibre glass it would have the ability to be constructed with soft chines and smooth complex curves except at the transom.

Having reviewed the various options, it seemed that cost wise very little expense was needed to create the polystyrene interior mold so with the aid of some french curves and other drawing instruments the basic hull outline with properly scaled

measurements was drawn up. The interior frames and formers were drawn on to paper templates ready for transferring to the polystyrene sheets. In fact the frame dimensions could be easily scaled up to be drawn straight on to the polystyrene sheets using a standard marker pen. Creating the polystyrene mold took about four weeks at the end of which it was possible to imagine what a finished hull would look like. The cost thus far was basically insignificant in expense and was an interesting project to construct.

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Converting the polystyrene mold into a real hull is the tipping point where a full commitment to future expense and time must be made. Abandoning such a project after the hull is complete is not the thing to contemplate unless you have a need for a very large garden bath tub. You also will need to complete the superstructure and decking as well as fitting out the necessary hardware and this is the most time consuming part although it is not on a forced schedule.

Choosing the right grade of polyester resin is essential and cost should not enter into this. Some resins will absorb moisture which would undermine the hull integrity and even could cause de lamination of the fibre glass bonding. The dreaded boat pox or osmosis will allow water under external pressure to pass into the hull and might become a real problem in the future where the least expensive resins have been used. For the hull the only choice should be a good grade of Isophthalic lay up resin since there would be considerable pressure on the finished hull when afloat. Surfacing resin has a wax additive mixed in and you must not use surfacing resin as a substitute for lay up resin. This would prevent each layer from amalgamating causing separation of each layer.

The final surface layers will have a suitable resin based colour pigment mixed in with the resin to give the hull some glamour. In addition, a dissolved wax surfacing agent is added in the very last coat to prevent surface tackiness remaining after the lay up resin has cured.

If you opt to paint the hull instead of using resin pigment, the paint used must have the same characteristics as the resin otherwise the expansion and contraction of the hull will cause the paint to craze and flake off.

It goes without saying that the internal fitting out of the decking and cabin requires a reasonable and practical knowledge of carpentry. One thing to be aware of is that the decking needs to be strong enough to support the weight of an adult perhaps holding a mast end of 40lbs or so. The use of 3/8 "(10mm) ply and a layer of chopped strand mat topped of with a light skin of 1/8" (3mm) surfaced ply will be adequate for the outer surfaces. Water, being the way it is, always seems to want to flow uphill so the outside surfaces should be inclined to drain of any surplus water. A suitable sheer at the bow will allow any deck water to run off.

Under the centre mast area a sturdy timber stud is fitted between the keel box and cabin roof. This is needed since the mast is mounted on the top of the cabin and the compressive loads are to be transferred down to the hull via the keel box. A load spreading plate directly under the mast will stop the mast from punching through the deck if sailing conditions were ever to become more exciting than one would wish for. In such conditions, a fore hatch positioned within arms length of the mast base is extremely useful in providing access to enable the sails to be released and tamed, without needing to go out on an unstable deck.

Salt water environments can play havoc with metal fittings so these just have to be impervious to corrosion. Stainless steel fittings are the most successful but where aluminium fittings have to be used these must be anodised properly. Cleats for securing lines come in all sizes and differing materials, in a fresh water environment it may be possible to get away with aluminium but using these in a salt water atmosphere could spell trouble when you least expect it. Do not mix metals such as putting a brass cleat on an aluminium mast without first electrically isolating the contact area. Dissimilar metals will generate a small voltage in a

salt water based environment and this voltage will cause a small electric current to flow. This current will cause the corrosion of the materials and will eventually cause a failure of the fitting or its mounting bolts, that is to say perhaps where steel bolts were used to secure aluminium cleats. Neither should use brass split pins be used to secure stainless steel shackles.

If you are feeling really safety conscious, the area under the fore deck sleeping berth and the two areas below the under-cockpit berths can be filled with waste polystyrene foam to become totally sealed floatation tanks. Originally this was incorporated but later a use was found for the space under the fore deck for building in a sea toilet. The rear floatation tanks were always kept for that purpose but thankfully never had to be tested. A small rear hatch is built into the cockpit providing access to space for miscellaneous gear such as anchor, outboard motor fuel and lines.

The Johnson 6 hp yacht twin outboard motor, a recommended minimum size, which attached to an oak bracket on the transom was later enclosed by the addition of a transom extension bringing the overall length up to 24 feet. This space had the advantage of being isolated from the main cabin which fuel wise was a safety issue, and since LPG was used for the galley it provided an escape route for any potential gas leakage's. LPG of course is heavier than air so you do not want any gas to leak inside the hull which would spell disaster. An isolation valve should be fitted separate to the LPG tank for safety purposes.

The original rudder was constructed as a lift up weighted swing rudder being attached with gudgeons and pintles on the transom, the idea being to be able to swing up the rudder when grounding or in shallow rivers. It was found that due to the flexibility of the rudder swivel under the enormous stresses put on it, this was impractical on this size of craft and the rudder converted to a single piece construction. When the transom extension was added, the rudder and shaft sleeve were enclosed in a rectangular box which allowed the rudder and its sleeve block to be withdrawn upwards when beaching the boat. This worked extremely satisfactorily as the boat could be motored for

beaching with the keel raised and rudder up avoiding any damage to the rudder.

It would now be more appropriate to incorporate the extension as part of the hull during any future hull construction and lay up process. The choice of plywood for the original transom was taken to provide extra rigidity and strength in order to support the outboard motor and rudder. This would still need to be taken into account with an enclosed outboard motor attached to a suitable internal aft bulkhead. However, the addition of the rudder enclosure box provides significant strength reducing the need for a 1 inch thickness of plywood bulkhead.

Later additions included small two bilge keels to keep the hull from being sand papered down when the boat was anchored on a gravel base in the tidal waters experienced around the Irish sea. The outboard motor was a long shaft version with the propeller just clear when grounded and the motor could be swivelled for steering. Using the motor only, the boat could be turned through 360 degrees within its own length.

Thus far, I hope I have explained some of the practicalities of a small family based cruising sailboat and my thoughts about its construction requirements. The expenses are incurred in four sections, the hull build, the cabin fitting out, the mast + rigging then the sails. I have included all the drawings where possible along side the descriptive details within the book and there are several pictures included. All measurements are approximate and may need minor adjustments to suit the circumstances. In the next chapter I will outline the actual methods used to bring about the desired result.

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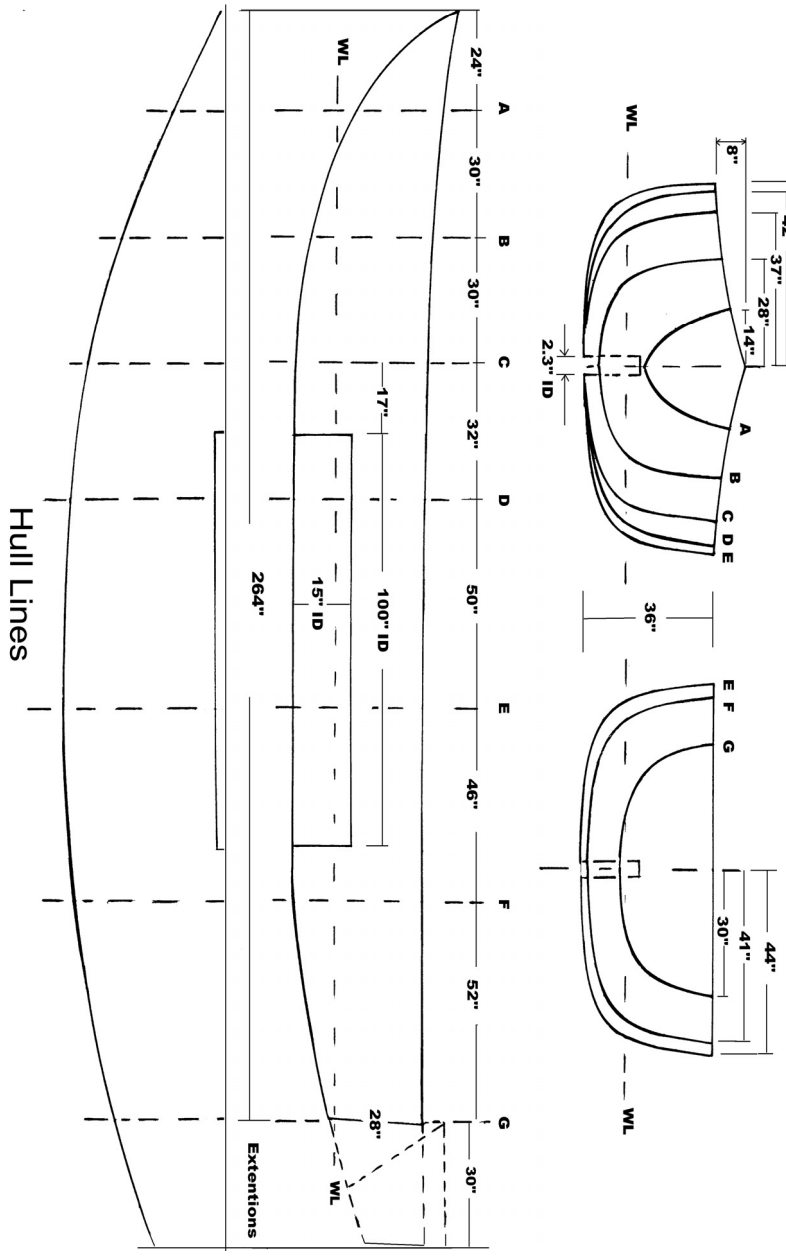
Chapter 3

Details of the boat construction.

It will now be necessary to draught the hull shape out on squared graph paper to scale. Take the gunwale dimensions and make a plan view of the outline. Next , take the hull profile from the side and lay this out showing the hull outline and include the waterline for reference. As there is a keel box to be fitted, show this as well since this will be a flat area at the lowest point on the hull. Include any sheer above the gunwale level, this will be needed when the mold frames are made. Finally, draught the hull cross section shape at each frame making each side a mirror image for correct symmetry. Do two views from the broadest section, one forward & one aft with the hull section between the keel box limits converging at the outside edge of the keel box, not the centre line.

For the hull, the only choice should be a good grade of Isophthalic polyester resin for the lay-up and for a 24 foot hull, a full 40 gallon barrel of this is needed plus catalyst. Also needed is fibre glass chopped strand mat of about 300 gm/square metre and fibreglass cloth about 150gm/square metre, a full roll of each in moisture proof sealed polythene wrapping and 20 metres of fibre glass tissue to start and finish off the lay-up. Some talcum powder for thickening the resin may also be useful.

In addition, a pair of large scissors, several disposable 1 inch to 3 inch paint brushes for applying the polyester resin, Disposable plastic gloves, acetone for cleaning brushes, a strong rubber squeegee such as used by silk screen printers, a face mask and all your saved empty plastic household milk cartons or wax covered milk cartons for holding mixed resin. A large covered well ventilated garage or workshop should be available with plenty of space to walk all around the mold. Be prepared to


Hull Lines
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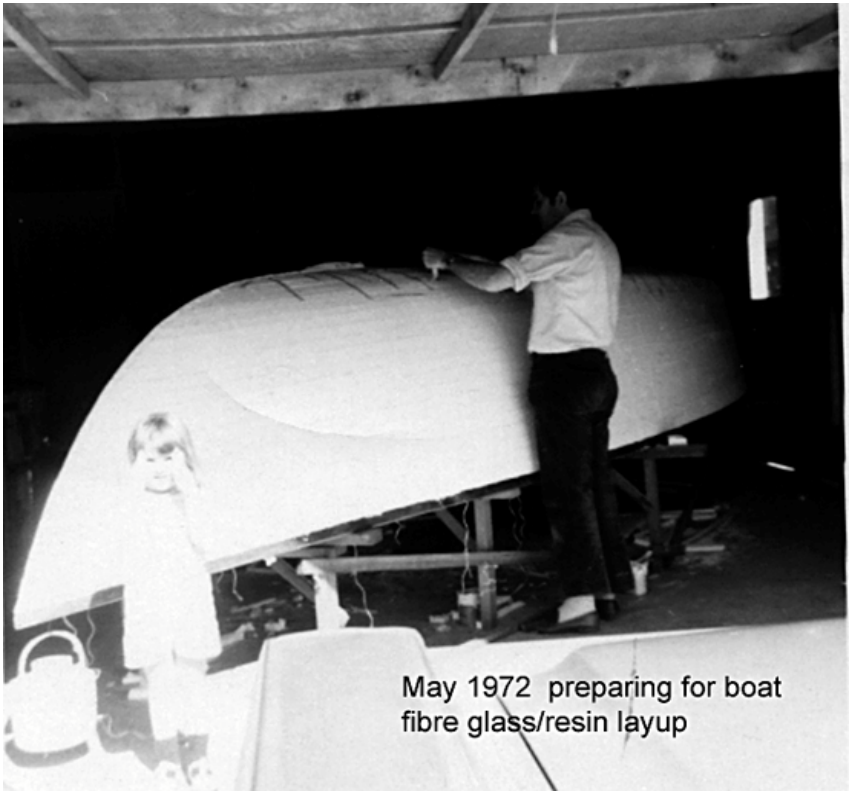
30"
WL

do at least one layer every 24 hours in order to maintain a homogenous lay-up whereby each layer will bond with the preceding one. Allow for two weeks of continuous operation requiring up to 4 hours per day once the main lay-up stage commences.

A word of advice here, do not leave surplus mixed polyester in a container as it will rise in temperature due to exothermic catalytic reaction. A local company subcontractor mixed a large quantity of epoxy and catalyst at one time before knocking off for lunch. After lunch they returned to a raging fire which burnt out a factory building costing several million pounds to re build. The weather was cold so I guess they assumed a little delay was acceptable to allow the mix to warm up, not very smart.

The Mold.



May 1972 preparing for boat fibre glass/resin layup

The upside down interior mold was constructed from about 40mm wide strips cut from sheets of polystyrene using a hot wire cutter. The cutter is made from single strand stainless steel wire of perhaps 1 mm diameter and arranged over a wooden C shaped frame such that six or so strips of polystyrene could be cut at one go. The current needed to raise the wire temperature sufficiently to cut the foam was obtained from a low voltage source and required one or two amps from a car battery or low voltage transformer. Since some of the curves are relatively sharp around the mold chines, the angle of the active hot wires should be made adjustable so that these cut strips have sloping sides and will form a curve when fitted together.

Suitable timber was purchased to construct the gunwales and then lap joints were used to create the required outline. This timber would eventually be used to wrap the fibre glass around it and so did not need to be of high grade in strength. Supports to raise the gunwales from the floor to a working height of about two feet were made, and dimensions to allow for the sheer was anticipated.

A one inch marine grade plywood transom was installed in position so that the later fibre glass lay up will wrap around the outside of the transom. Full length longitudinal stringers will be fitted in position during the glass fibre lay up process. In addition, two 16 inch deep x 0.5 inch thick bulkheads are fitted later when the hull is completed. By fibre glassing the bulkheads to the hull inside surface, it would still be possible to reposition these if wanted. The bulkheads will be level with the stringers so that the inside berth's top plywood layer can be supported on the both the stringers and bulkhead.

It was found that there was enough flex in the gunwale timber allowing for a temporary suspended weight added at the bow to form the desired sheer. All that was now needed was for the polystyrene frames to be positioned at intervals along the hull length so that the hull mold could be formed to plan.

The magic ingredients used to fix the polystyrene foam planks together and to the frame formers was latex glue and tooth picks.

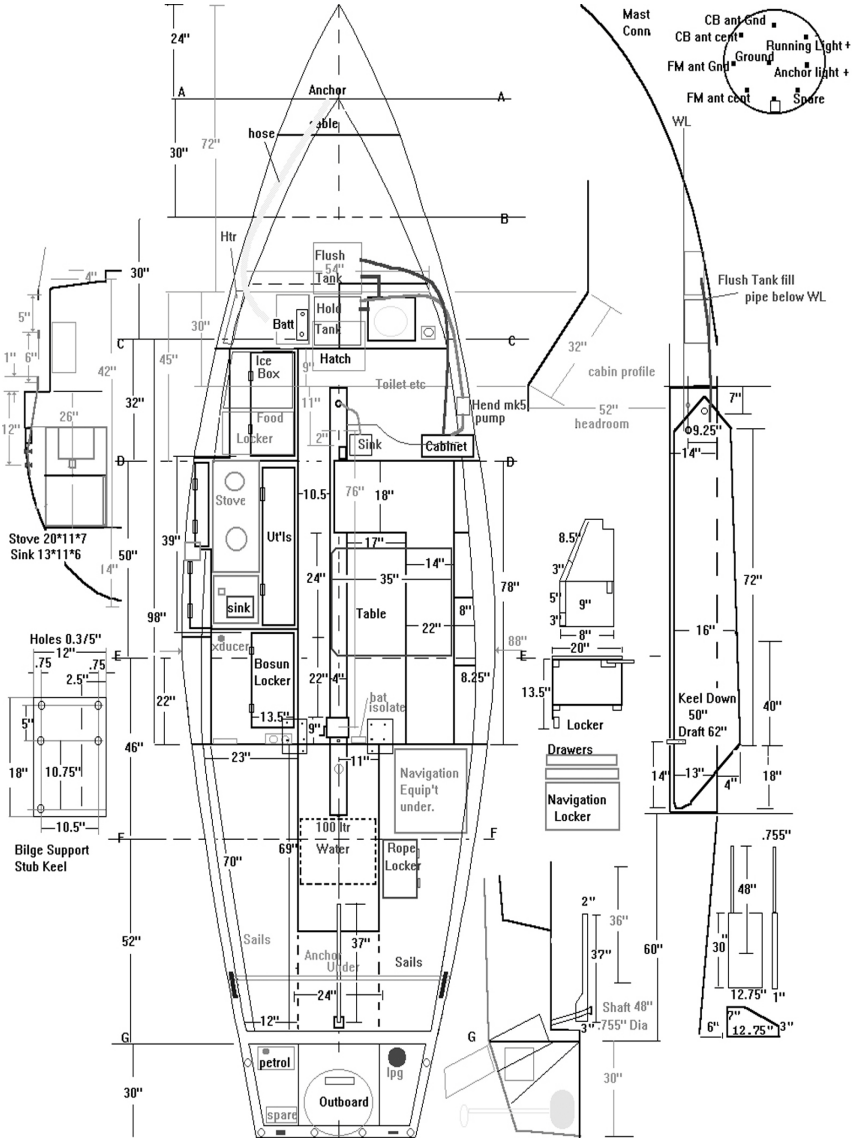
This turned out to be very easy and did not require a continuous effort. In all, working in spare time this took about four weeks. Finishing the surface with a woodworking coarse file together with sandpaper completed the job and gave a real feel for how the hull would eventually look like.

Having created and sealed the polystyrene mold with PVA white glue and without pin holes of any kind (it ought to be possible to use household wall emulsion paint instead but test first), paint the mold with a resin mixture only and allow to cure. Next, spread a layer of fibreglass tissue over one side of the mold, a little tackiness on the resin just painted mold will help hold the tissue in place. This first layer is needed to stiffen the mold and provide a barrier to any resin leakage into the mold if perchance any pinholes have been missed.

If unsure of the resin to catalyst mix ratio then do a time test on a small sample noting the temperature of the work place. It is not critical but this is not a job where workshop temperatures are below 15 degrees centigrade as the curing of the resin will be prolonged. Start with about a quarter litre or so and gently brush the resin into the tissue wetting it through. Cover one side making freshly mixed resin quantities and then repeat for the other side.

At this point it does not matter if the coating is a bit uneven and should not be subjected to stress or be squeegeed at this time. Clean the brush in acetone and cover the used acetone in its container to prevent evaporation. Do not leave large amounts of surplus mixed resin in a container as it will generate its own heat and depending on the catalyst mix strength can easily reach combustible temperatures. Make sure it is all used or pour it into a proper waste container for later disposal.

If a layer does not fully cure this can be corrected by mixing extra catalyst in a 'hot' resin mix on the successive layer. Lay-up resin does not cure perfectly dry on the surface but has tackiness caused by air moisture which can be a help in holding successive fibre glass layers. After this has cured, inspect for resin leaks and repeat the process but with one cloth layer only to add more strength.



General Layout

Allow the cloth to overlap where it can, generally over the keel area and pull the cloth in position at the bow. At the stern, allow a foot or so to overlap the transom and use masking tape or a staples sparingly to hold the cloth in position. Wrap the cloth around under at the gunwales and tape or staple the cloth in position. At the bow, overlap to the other side by a foot or so to give greater strength. Use the resin brush to manoeuvre the cloth while applying the resin; gentle use of the squeegee can be tried to smooth out the surplus resin although it shouldn't really be needed until chopped strand mat is used on the main lay-up.

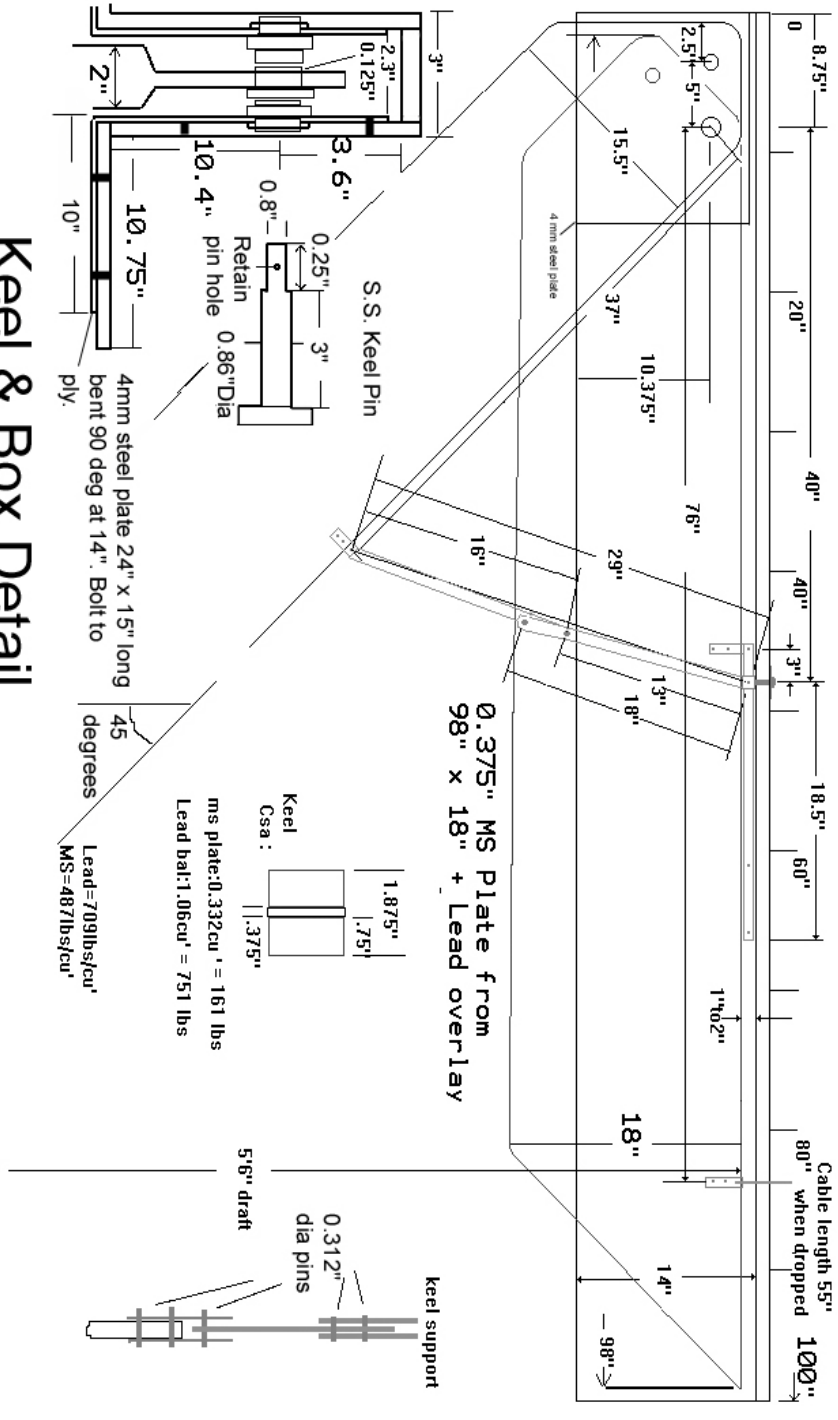
Once the first two layers are fully cured, the space for the keel box can be cut from the mold using a sharp knife then the keel box can be inserted in position using a spirit level to keep it vertically aligned. The keel box is bulky and heavy so it will need supporting properly when being glassed in position.

The Keel Box.

The keel box is constructed from 3/8" marine grade water proof glued plywood with completed internal dimensions of 2.5 x 14 x 100 inches. Cut a 10 foot sheet into two 15 inch and two 10 inch wide strips 9 feet long to form two right angles sides. Cut lengths of 3 x1 inch wide planed timber to provide the top and ends of the box. Coat each inside piece in resin and a layer of cloth and bond the top and two ends to one of the right angled sides.

Temporarily bolt two right angle steel 3/16 inch thick plates complete with brass bushes fitted and reamed to the diameter of the stainless steel keel pin to be fitted; place under the right angled timber sides at the bow end and cut clearance holes in the timber for the brass bush fittings. These will receive the swing keel support stainless steel pin and when fully assembled must be accurately aligned using the pin. Unbolt the steel plates, coat any bare metal with epoxy based resin and reassemble.

Apply a layer of chopped strand mat to the inside and underside area of each right angled side then carefully attach the


Keel & Box Detail
8.75"
0
20"
40"
40"
3"
18.5"
60"
2.5"
5"
15.5"
4 mm steel plate
37"
10.375"
76"
16"
29"
13"
18"
1"&2"
18"
14"
98"
100"
Cable length 55"
80" when dropped
0.375" MS Plate from
98" x 18" + Lead overlay
3"
2.3"
0.125"
2"
3.6"
10.4"
0.8"
0.25"
3"
Retain
pin hole
0.86"Dia
S.S. Keel Pin
10.75"
10"
4mm steel plate 24" x 15" long
bent 90 deg at 14". Bolt to
ply.
45
degrees
Keel
Csa :
1.875"
.75"
.375"
ms plate:0.332cu ' = 161 lbs
Lead bal:1.06cu' = 751 lbs
Lead=709lbs/cu'
MS=487lbs/cu'
5'6" draft
0.312"
dia pins
keel support

second side, preferably while the chopped strand mat is not yet cured such that it completes a watertight box assembly. Make sure the swivel pin holes are aligned using the keel pin and complete the outside of the box assembly with a layer of mat & cloth. The box insides must be parallel and flat with a minimum two inch gap.

Mark and cut out the space for the box to fit within the polystyrene foam mold and include a suitable slots cut into the hull frame/formers. A sharp knife will cut through the mold's polyester skin and then position the keel box in situ using a spirit level to keep vertical. The keel box should be flush with the hull mold so that it provides a smooth transition for the next grp layer. Bridge the gap with tissue and glass cloth then apply resin carefully to fix the keel box in position. The polystyrene foam strips on the underside will eventually be cut away leaving only the hull sides with the original mold foam strips intact.

The Longitudinal stringers.

These are constructed from 3/8 inch marine grade ply cut on an arc matching the hull curve and which have been coated with a layer of cloth & resin leaving the outer edge uncovered. Mark a line such that the line follows a horizontal level which is the same level as the keel box. That is, when the hull is the correct way up, the stringer will be at the same height as the keel box. Make the stringers the length of the hull up to the outboard bulkhead so these can be used to secure seating, berths and other fittings.

Transfer the mold shape to a sheet of the supported plywood by measuring from the outer curve leaving 6 to 8 inches width. Mark the mold then cut through the mold skin sides with a knife and insert the stringers in position. Plane/skim off any protrusions beyond the mold surface. Using 2 inch fibreglass cloth tape, apply this to the exposed edge of the longitudinal stringers with resin to bridge the gap across the stringer insertion slot.

The Hull Lay-up.

From this point on the hull can be completed by applying one layer of chopped strand mat and one layer of cloth at the same time. At the keel box, overlap as far as possible inside the box, at least 6 inches to provide strength at the join but do not reduce the gap to below 2 inches wide from its original 2.5 inches. A technique will soon develop in applying the resin to the cloth with the brush rather heavily allowing the resin to soak through to the mat and then using the squeegee to spread surplus resin into surrounding areas before the resin cures.

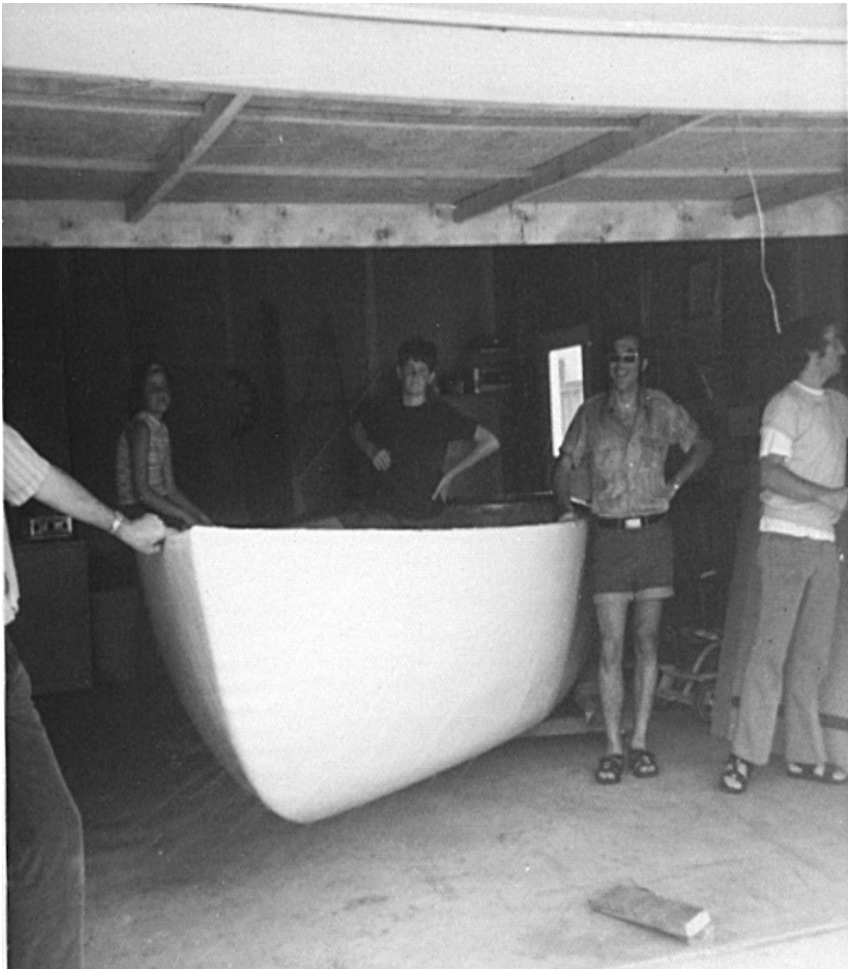
Work from the bow towards the transom applying the resin in vertical three foot sections down to the gunnel. The amounts of mixed resin will increase to about a litre at a time depending on outside temperature remembering that the pot life of a mix is always less than the lay-up. A new section should be started before the previous section edge has cured. Eventually each side of the hull can be completed in about an hour or so but not allowing more than 24 hours between layers. Six layers of cloth and six layers of chopped strand mat will be used for the hull with the overlaps over the keel centre line doubling this figure. The hull finished thickness on the sides will be about a 1/4 inch.

The final two layers can have a suitable resin based colour mixed in with the resin to give the hull some glamour. A further coating is applied using coloured resin and fibre glass tissue sufficient to fill in the dimples left by the cloth. The smoothness of the final coatings can be enhanced by using a sharp edge in a scraping fashion on any protrusions before applying the final coat (fragments of broken window glass edges will shave away roughness from a slow cured layer). The very final coat should have the wax surfacing agent introduced to completely seal the surface against moisture as it cures.

The number of layers applied should be sufficient so as not to allow the oil can effect when pushing hard on the hull. In the original there was no sign of this any where, and in its life time even after having been bashing the side of docks the hull was sound. I often wondered if the number of layers could have been

reduced but then its good to know you have a sound hull under you when caught out in a gale.

After the hull is fully cured it can be inverted and placed on supports. Before inversion, temporarily screw a sheet of ply across the gunwales to prevent damage when man handling it the right way up.



The Keel.

It will be easier to fit the keel before fitting the hull out since the hull will need to be raised sufficiently and can still be done by hand. To do this you will need a low wheeled trolley arrangement to slide the keel in position and then lower the hull over the keel until the pin bushes align.

Make a template of plywood so that the steel plate supplier has the exact dimensions to work with as it will be cut from a 3/8 inch sheet at the steel stockholders premises. Have them drill the plate for the bush unless you have the facilities. The weight of this will be about 160 lbs so you might need help loading and unloading. For the bushes, I adapted a screw type plumbers brass fitting which never needed replacing over the thirty odd years I used the boat. Make sure the stainless steel pin will pass through by reaming the bush to size when fitted to the plate. Have the pin turned on a lathe to match the reamed bush size.

A lined hole to take the lifting cable is positioned on the keel box where the lifting winch is to be fitted. This will be a metal tube slightly extending above the keel box right under the winch drum. A flexible cable type seal or half tennis ball which allows the lifting cable to pass through will keep any water from splashing upwards. The position of the hole should be such that the winch handle can be rotated through a full circle without the hands fouling the rear bulkhead. It follows that the final position of the bulkhead must be known as this will determine the position on the keel where the lifting point is sited. The siting is not critical but needs to be predetermined so that the keel lifting tangs can be fitted before the keel is attached by its pin.

Two stainless steel tangs bolted on each side of the plate which will be used to shackle the swaged terminated lifting wire. Do not rely on a hole in the plate to take a shackle as this will eventually elongate due to salt water corrosion and then release the keel at an inopportune moment.

One of the changes I made later with respect to the keel was to include a folding scissors like lower limit safety device in case

the lifting wire ever parted. It never did but just knowing that the weighted keel could never swing like a pendulum through an arc gave peace of mind. This is an optional extra to counting the turns of the lifting winch and forgetting how many turns you have let off.

The keel is weighted with lead which is applied over several bolts fixed in to the keel plate and used as thickness guides. I used an electric melting pot for the lead and although it wasn't possible to complete this as a single homogenous layer, the fitted bolts secured the lead by molding the metal around the screw threads of the bolts. Lead can be obtained from scrap metal merchants or building suppliers and you will need about 750 lbs in total. Clamp a length of aluminium angle material at the edge of the plate to stop over spill of lead when pouring, and do take precautions against burns.

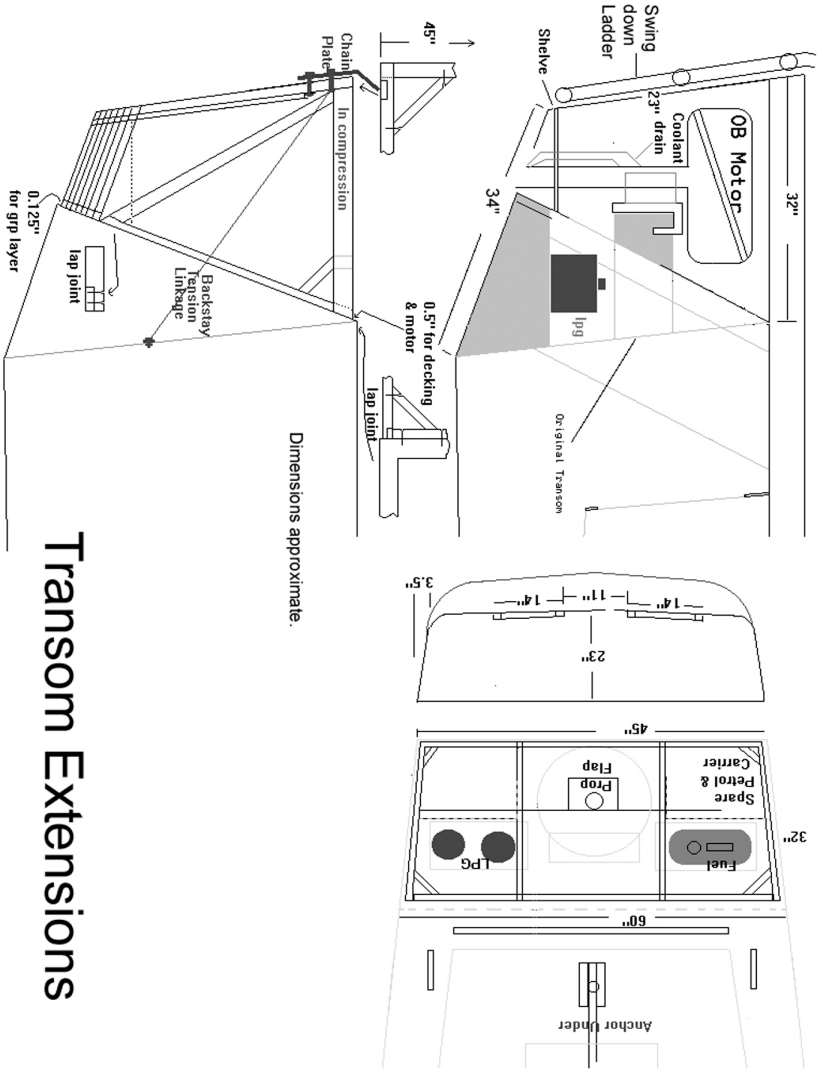
If you leave a half inch gap at the edge this can be later filled in and contoured using a mix of polyester resin and lead shavings. Level off any high spots and confirm the thickness is within that of the keel box. Wrap the finished plate with a layer of fibre glass cloth and resin as protection against electrolytic erosion. The weight of the keel will now be about 900 lbs in total. The keel finished thickness is expected to be 2 inches maximum which will allow a clearance in the keel box of at least 0.1 inches each side.

The Rudder.

As mentioned previously, the transom was later extended. First was to reduce the drag of water pulling on the hull when sailing which was due the transom bottom being about 1 inch below waterline. While the theory is or was that there should be a clean break at transom water interface, in practice this didn't work so a small extension was added to allow the hull water separation to occur without turbulence.

Secondly, it was thought that enclosing the outboard motor for security reasons and to house the rudder within the extension would complete the job properly. These additions can now be

incorporated as part of the hull and kept as a separate extension to the original transom such that the boat interior is separated from the fuel storage and outboard motor. Where the outboard exits the underside of the extension behind the rudder, two hinged flaps with semicircular holes were fitted to keep the motor enclosed until it needed to be removed for servicing. Normal access to the outboard can be gained through a hinged deck extension top when needed.



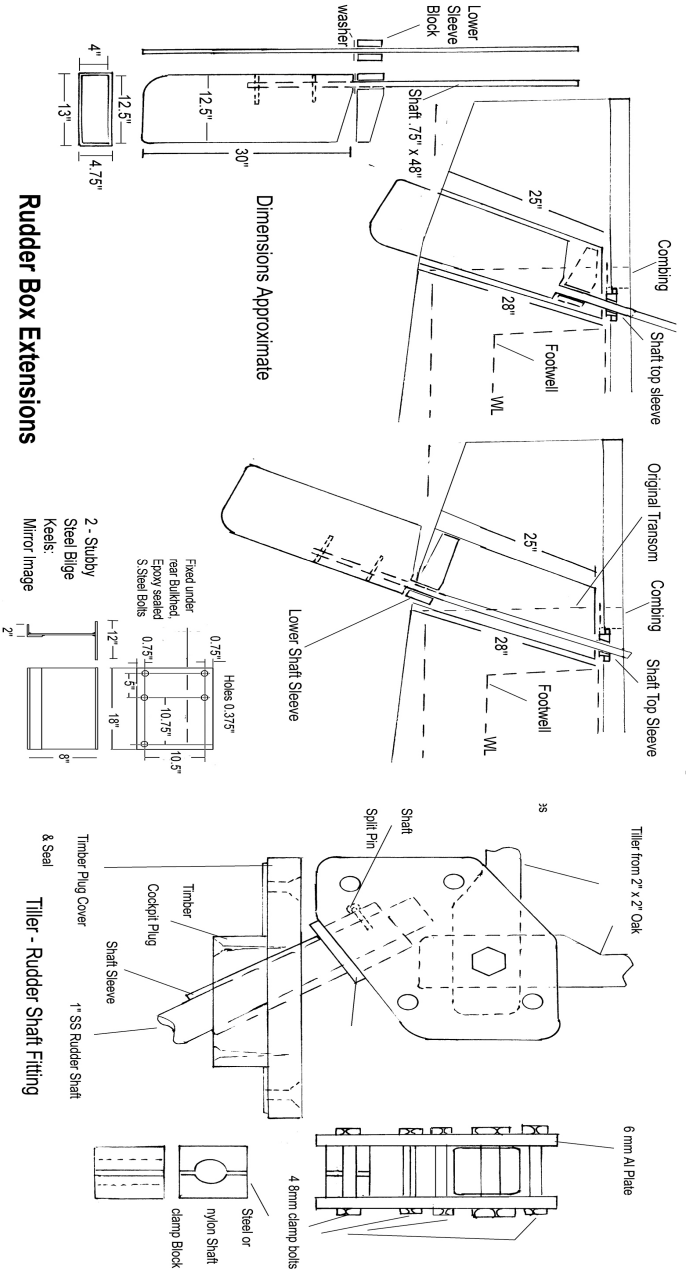
A rectangular tubular plywood rudder housing box was made and slotted in at an angle being fibre glassed in position. The rudder shaft passes inside the housing box and exits through a sleeved hole at the back of the cockpit seating, just outside of the cockpit combing. With the rudder down, two bush sleeve's support the shaft at the top and bottom. A split pin and washer at the top of the shaft stops the rudder falling through. The bottom sleeve was inside a timber block, made to slide up inside the rudder box housing, and when down is flush with the hull extension, so the inside of the rudder box must be dimensioned to at least the width of the rudder blade.

The rudder is made from a 1 inch thick plank of oak 30 inches long by 12.75 inches wide into which a 3/4 inch solid stainless steel shaft is incorporated. Two 6 inch x 3/16 inch diameter stainless steel pins are passed at right angles through the shaft so that under turning stress the shaft cannot slip inside the rudder blade. There is a leading edge on the rudder of 2 inches to aid in control of the steering and reduce steering effort. To fit the shaft, the blade has to be slotted carefully and then drilled through the side where the right angled shaft pins will fit. Apply epoxy over the shaft and slot to strengthen the rudder. The whole assembly is then glassed over and sealed.

With the tiller handle and top split pin removed, rudder and shaft block can be withdrawn downwards under the boat. When trailing the boat or grounding in shallow water just pull up the rudder into its housing and secure with a timber support between the tiller handle and cockpit surface.

The tiller handle needs to be very strong and is made from two pieces of 1 inch thick oak which is secured to the rudder shaft using a heavy clamp arrangement. I drilled out a square block of re enforced nylon to the shaft diameter and cut this in two pieces using a hack saw. Two 3/16 inch thick clamp plates sandwiched the nylon halves compressing them against the shaft using four bolts. A 1/8 inch stainless pin was included in the gap between the nylon halves so that the tiller handle could not slip on the shaft. The tiller handle is fitted between the clamp plates with a single bolt through the clamps and handle. There is no

room for flimsy bought out assemblies here as a broken tiller or loss of steering will be disastrous in rough sailing conditions.



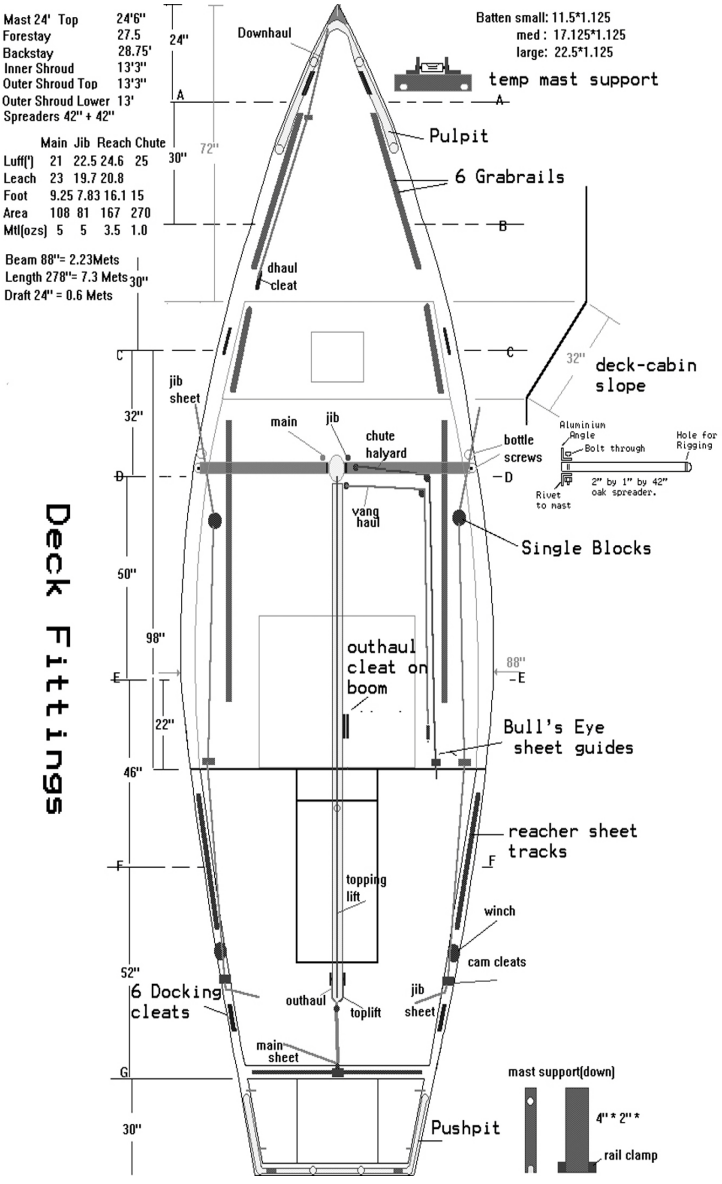
The Cabin.

Use 1/2 inch marine grade ply to fit two bulkheads fore and aft to the same height as the keel box and stringers. The forward one can be filled with polystyrene foam stripped from the hull walkways and sealed on top with resin coated cloth covered 3/8 inch ply to serve as a flotation tank and forward berth. Between the aft bulkhead and transom two more flotation tanks filled with old polystyrene foam and sealed were created to be used as under cockpit berths. All the ply used should be painted with polyester and secured to the hull with fibre glass matt and resin.

There is obviously a great deal of leeway in the internal construction of the cabin. The mast position is critical and must be sited as shown; where the mast is sited, an additional bulkhead was added from hull to cabin top providing greater strength. The cabin sides were stepped in about 6 inches at a point above the hull to provide a tow hold walkway along the outside edge. This was extremely useful for traversing along the hull edge using the grab rails when anchoring or tying up at dockside without having the need to clamber over the cabin top. This step continued aft to the transom and was boxed over to provide a cockpit combing and back rest. The top of the combing surface is used to fit sail tracks and other deck fittings.

In the cabin, starboard side lockers with sloping hinged sides were constructed and upholstered with foam padding to provide back rests. The seating area was stretched across the stringer and keel box top with cushions added for comfort. A dining table top was cut to fit the space between seating in the cabin which would double up as a berth when place across the stringer and the keel box.

Opposite the dining area, a galley was incorporated on top of storage lockers which were also attached to the stringers. The centre passage way had sufficient space to walk between the lockers and the keel box. A hand pump and a wash basin with


Deck Fittings
Mast 24' Top 24'6"
Forestay 27.5
Backstay 28.75'
Inner Shroud 13'3"
Outer Shroud Top 13'3"
Outer Shroud Lower 13'
Spreaders 42" + 42"
Main Jib Reach Chute
Luff(') 21 22.5 24.6 25
Leach 23 19.7 20.8
Foot 9.25 7.83 16.1 15
Area 108 81 167 270
Mtl(ozs) 5 5 3.5 1.0
Beam 88"= 2.23Mets
Length 278"= 7.3 Mets
Draft 24" = 0.6 Mets
24"
30"
72"
30"
32"
50"
98"
22"
46"
52"
30"
A
B
C
D
E
F
G
Downhaul
Batten small: 11.5*1.125
med : 17.125*1.125
large: 22.5*1.125
temp mast support
Pulpit
6 Grabrails
dhaul
cleat
jib
sheet
main
jib
chute
halyard
vang
haul
deck-cabin
slope
32"
bottle
screws
Aluminium
Angle
Bolt through
Hole for
Rigging
2" by 1" by 42"
oak spreader.
Rivet
to mast
Single Blocks
outhaul
cleat on
boom
88"
Bull's Eye
sheet guides
reacher sheet
tracks
topping
lift
winch
cam cleats
6 Docking
cleats
outhaul
toplift
jib
sheet
main
sheet
Pushpit
mast support(down)
4"*2"*
rail clamp

drain piped down into the top of the keel box was fitted together with a dual burner camping stove. Every bit of usable space was identified for storage. Forward of the mast bulkhead a camping toilet was originally incorporated as an alternative to the bucket & chuck it philosophy, though this was rarely needed since all the marinas had facilities on the dockside.

The cabin sides incorporated three windows on each side which were later covered over on the outside with darkened clear acrylic sheet. The cabin top was laid over timber frames and sloped forward of the mast to meet the fore deck. A commercial hatch was incorporated into the sloping section which made access to the mast and fore deck simple by folding back towards the mast. Anti slip material covered the fore deck and cabin top areas around the mast to prevent slipping on wet smooth surfaces.

The cockpit seating was hung under the gunwales and the foot well sloped forward to a cockpit drain which fed into the top of the keel box. The drain should have a sieve fitted to prevent tree leaves and debris from blocking the hole. Later a cockpit locker was incorporated to house lines, buoys and other stuff one accumulates as time goes by. All surfaces were coated with resin mat & cloth to keep waterproof. Access to under the cockpit well was provided by a small rear hatch and this space was used for fresh water storage, anchors and the like. Unused sails were kept under the cockpit seats when not being used as berths.

The Deck Fittings.

At the bow, a purchased stainless steel pulpit is secured with through deck bolts and load spreading plates below deck. Apart from safety reasons, the pulpit was used to lower the mast on to for transportation or going under low bridges and other sailing impediments placed across rivers. Likewise a push-pit guard rail was fitted around the cockpit as a safety grab rail.

At the bow nose, a bow roller assembly is secured to the deck with sturdy bolts. This fitting will be used to attach the mast fore stay so it needs to be well secured. The bow roller needs to be

wide enough to take the anchor chain and anchor line. For mooring purposes, six sturdy docking cleats are needed, two of which are mounted near the bow on the deck, two at the stern on the cockpit combing. Each was bolted on with an under plate load spreader so that they could not be pulled out under stress. A further two cleats were mounted mid ships for general purpose docking lines and dock buoys.

The jib foresail sheets pass straight via two deck blocks mounted on the cabin roof close to the outside near the standing rigging. Again these are bolted through the cabin top with load spreading plates to prevent any chance of the blocks being pulled out under sail. The sheets were fed via 'bulls eye' guides to cam cleats which are used to secure the foresail on the cockpit combing for easy access from the cockpit.

The mainsail sheets are fed via a triple sheaves sliding block with cam cleat. This assembly can be repositioned either side of the boat centre line on a transom mounted sail track for best mainsail shape. The transom sail track will take the full force of the mainsail and has to be secured properly.

A vang or 'kicking strap' was fitted for pulling down on the boom when it has a tendency to lift on down wind sailing; this made up using a twin sheaves block shackled at mid boom position and a twin sheaves block at the mast tabernacle. The vang block control lines are fed via a single deck mounted block to a cabin top mounted cleat near the cockpit.

Two cockpit combing winches are mounted port and starboard two give purchase when hauling in on the larger foresail reacher sheets. The lines terminate using the foresail cam cleats. A sail track mounted on the combing allows adjustment of the reacher sheet guides for best sail shape.

A foresail down haul line secured to the foresail head shackle can be fitted to assist in pulling the foresail down in strong winds. This was terminated near the fore deck hatch to a small deck mounted cleat.

The Standing Rigging.

The standing rigging which supports the mast includes one fore stay, a three piece split back stay, two inner stays along each side the mast and two outer stays at the outside sometimes call shrouds. Each of the stay cables are made from stainless steel 1 x 19 wires and are terminated in stainless steel thimble fittings which pass the cable ends in a loop around the thimble. A sleeve which has space for the cable to pass through twice is cramped on by a device much like a pair of bolt cutters. The choice of wire size will depend on the loads expected plus a large margin, 4mm diameter was found to be adequate at 1260 Kg (12.6kN) minimum breaking strain.

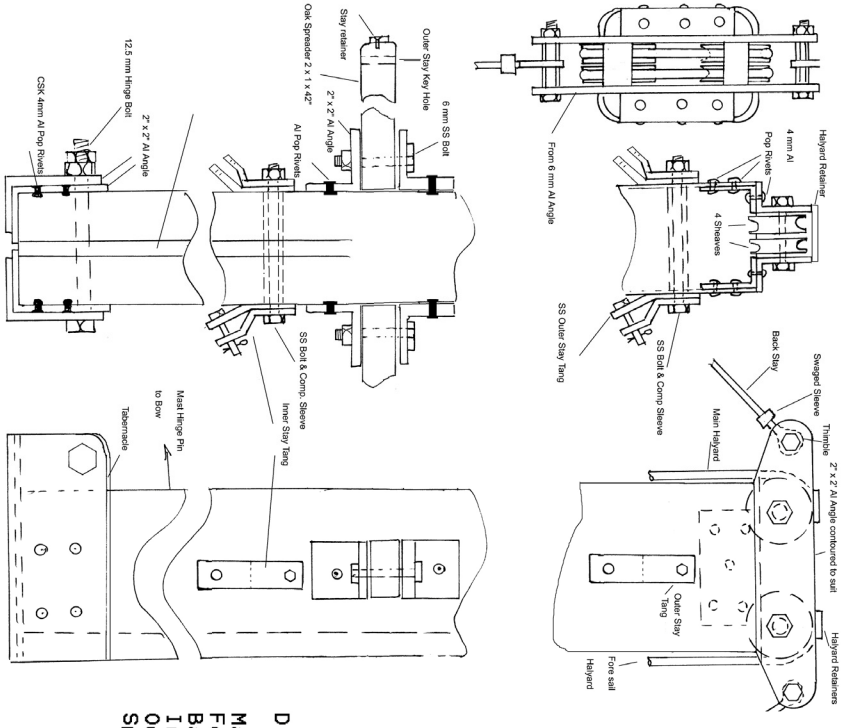
As these lengths are fixed, measurements have to be fairly accurate since the turnkey or bottle screw fittings need to take up any differences and have limited adjustments. Differences in the fore stay and back stay lengths are not so critical since the mast fore/aft leaning of an inch or so will make little difference.

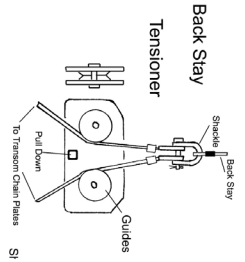
Depending on the construction used for the mast head, the fore stay and back stay are secured using a bolt or shackles through the cable end thimbles. The deck end of the fore stay is shackled to the bow roller fitting. The back stay divides at about 10 feet from the transom and the three thimbles are attached to a shackle. The transom end of the two remaining separate back stays are shackled to stainless steel tangs each attached to the side of the transom.

An inverted triangular shaped twin walled plate assembly with two internal sheaves is captive on the transom attached back stays. Pulling the triangular assembly down will cause the transom mounted back stays to tension the whole of the back stay so securing the mast. This arrangement allows release of the tension on the back stay so that the mast can be lowered under control after undoing the shackles.

The inner stays are attached to two mast tangs which are themselves bolted to the mast sides underneath the spreaders and these use an internal mast compression sleeve. An

alternative to this arrangement is to have a T shaped swaged fitting enter a keyhole slot system on the mast side but this must have tension on the stays to prevent the release of the stay by





Dimensions Approximate

Mast 24 feet Top	24' 6"
Forestay	27' 6"
Backstay	28' 9"
Inner Shroud	13' 3"
Outer Shroud Top	26' 3"
Spreaders 42" + 42"	

Mast Fittings

accident, not to be recommended when mast lowering. The deck end of the stays are attached to the bottle screws which are shackled to the tangs bolted on the hull.

The outer stays are attached at the mast sides at the top, again using two mast tangs which are bolted to the mast using an internal mast compression sleeve. The rigging wire passes over the ends of the spreaders before descending vertically to their bottle screw fittings. Siting up the mast sail track by eye is needed to tension the stays correctly otherwise the mast will have a port/starboard bend. The stays need to be tight enough to 'twang' but not overly tightened. Under sail, the lee stays will loosen a little but should not be overly floppy.

Mast, Mast head, Mast tabernacle.

The mast, ordered through a chandler, was a 24 foot long flat sided rounded front and back extruded anodised tube with integral a sail slide extrusion. To this will be added the rigging tangs with internal compression sleeves, a mast head fitting with sheaves for the halyards, a hinged tabernacle at the base, spreader fittings and three cleats to secure the halyards and down haul. Other hardware can be attached which provide a convenience such as for poles for winging out the sails, lights etc.

The position of the mast is generally determined by the centre of effort when jib and mainsail are up. This is found by drawing out the sails to scale and finding the combined geometric centre of each sail outline and combining them. The cabin side will also affect the final position since it will act as a sideways wind resistance barrier.

The under water profile of the boat is needed to determine its centre of lateral resistance which is the under water resistance to sideways boat movement. To find the centre of lateral resistance make a cardboard cut out of the under water profile with keel down but without the rudder, then using a pin, balance the cardboard cut out horizontally. The position of the pin hole shows the distance from the bow or stern where the resistance centre will be located.

For the sail boat to have proper balance when sailing, the centre of effort is usually just aft of the centre of lateral resistance. Thus without any rudder control and a side wind, this will allow the bow to automatically swing towards the eye of the wind rather than turn down wind.

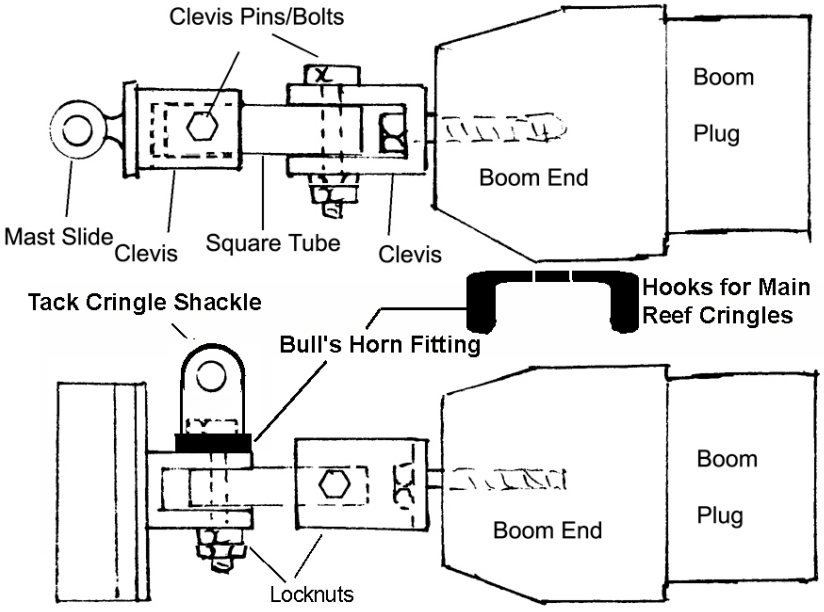
Moving crew or ballast around will alter the underwater profile, as will the hull and presence of the cabin vary the centre of effort. The waterline can be more accurately determined if the boat is tested by launching and lowering the keel. It is then a simple matter to temporarily mark the waterline using a dingy then transfer this line to the plans.

The cost of custom mast head fittings are expensive but can be reduced by fabricating an assembly using aluminium angle material, bolts and a few rivets. Two suitable pieces of angle can be shaped to fit over the top off the mast extrusion with overlapping ends for attaching rigging stays. The pieces are separated using two bolts and sleeves. Each sleeve passes through two separated sheaves so that the main and jib halyards will pass up outside the mast, over the sheaves and then back down the outside of the mast. Two further bolts and separation sleeves are used to attach the fore stay and back stay rigging ends. The assembly is secured to the mast using two smaller pieces of angle which are riveted underneath and fit within the mast. The sheaves assembly is then riveted to the inner angle pieces.

Similarly the mast tabernacle can be fabricated from aluminium angle material secured a load spreading plate under the mast. The mast is held in position between two pieces of aluminium angle using a single bolt through the mast. The bolt becomes the hinge pin when lowering or raising the mast. When on its trailer, the hinge bolt is removed when the mast is down so that the mast can be moved aft using a temporary roller placed on the pulpit supporting the mast. In this way the mast can then be supported additionally in the centre using a stand off and also at the stern on the push-pit or a suitable support.

The Boom.

The boom is made up of a slightly smaller anodised tube with an extruded channel able to take sail slides or the mainsail sewn in foot rope. At the outer leach end of the boom, a rounded blind plug is riveted into the extrusion. This plug has grooves around the end so that the sail out haul can be guided around the boom end and give some purchase to the line. The out haul line terminates at a small cleat attached to the boom. A small tang is fitted so that a topping lift can be attached, the other end secured to the top of the mast. The topping lift will keep the boom above head height with or without the sail raised.



Goose Neck Universal Joint

At the mast end of the boom a cast plug fitting is inserted into the boom and secured by rivets. Into this fitting part of the goose

neck assembly is bolted which is able to rotate on the boom end. The goose neck fitting is essentially a universal joint which allows the boom to move up or down and sideways so that the boom can be swung out from the centre line at right angles when sailing down wind. The fitting can also be slid up or down the mast in the sail slide track to aid in reefing the mainsail.

A shackle is bolted on to the gooseneck fitting into which the bottom of the sail tack cringle is attached. In addition, a bulls horn hook device is bolted under the shackle to provide a location point for the main sail reef cringles when the sail is reefed. A down haul attached to the bottom of the goose neck stops the boom sliding up the mast when the sail is under tension.

With the sail lowered or off the boom, the boom needs support else the boom can swing down and clobber someone. The support is a line attached to the mast head and boom end as previously mentioned, the topping lift. It is a little longer than the main sail leach so that it will not foul when under sail. It is not wise to substitute a temporary support from the boom to the back stay since when raising the mainsail it could fill and capsize the boat.

The Sail Plan.

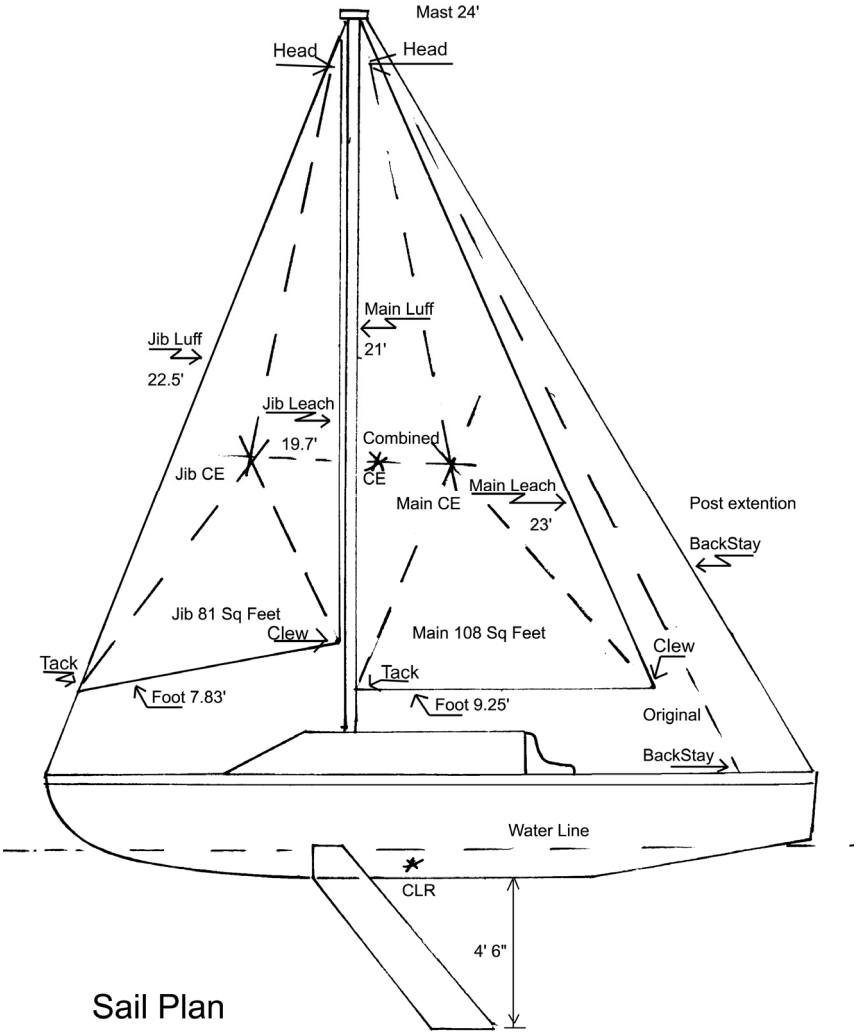
The suit of sails include the mainsail at 108 square feet, the jib at 81 square feet, the reacher at 167 square feet and a cruising chute at 270 square feet. The material is usually Dacron and the weight per square yard determine their strength. As expected the mainsail and jib are the strongest for maximum pull in high winds. The mainsail includes a sewn in stretchy nylon luff rope with extra cringles, so that when reefed the sail can be tied to the mast and boom. The head has a sewn in triangular strengthening piece to which the sail halyard is attached by shackle for hauling up. At the tack, a large cringle ring is sewn in which is shackled to the boom 'goose neck' fitting. Sewn in cringles at the reefing points along the sail's luff allow the sail to be quickly pulled down and slipped over the free bull's horn hook and then be re tensioned by the halyard.

The foot of the sail also has a stretchy rope sewn in to attach the sail along the boom rope guide channel. At the out haul end of the sail foot, the clew, another sewn in cringle ring has the out haul line attached so that the sail foot can be tensioned in high winds making the sail flat. The out haul end goes around the boom end terminating on the boom to a small cleat. Reefing ties are attached at one third and two thirds sail height as well as sewn in cringles at the leach of the sail. A thin leach line is included to allow the sail shape to be made full, that is less flat, in light winds. The foot of the main sail has a shaped section which is the belly and the leech usually has a Roach elongation with battens fitted. The roach adds further sail area higher up than that of a pure triangular sail. Sail making is best left to the experts!

Originally the main sail was fed into the mast rope guide but this presented problems when reefing since the sail had to exit the guide at the base. This was soon changed to include nylon sail slides which were shackled to the sail and which could slide up and down the guide easily and need not be removed unless the sail was stowed under.

The jib and reacher have built in luff piston clips which are easily attached to the fore stay. At the head and foot are cringle rings to take the halyards and sheets. The foresail can be kept within its sail bag and pre attached to the fore stay ready for use with the halyard connected and the sheets fed to the cockpit cam cleats. The reacher sheets, like a genoa , go around the outside of the shrouds to the guides on the cockpit combing.

A special long sock to house the cruising chute is required so that the chute can be raised under control in very light winds. The head is attached to a separate halyard than that of the foresails with the luff end of the foot shackled to the deck end of the fore stay. The sheets are fed to the cockpit via guides and the cockpit winches since the force in light winds is enormous and need full control.


Mast 24'
Head
Head
Main Luff
21'
Jib Luff
22.5'
Jib Leach
19.7'
Jib CE
Combined
CE
Main CE
Main Leach
23'
Post extention
BackStay
Jib 81 Sq Feet
Clew
Main 108 Sq Feet
Clew
Tack
Tack
Foot 7.83'
Foot 9.25'
Original
BackStay
Water Line
CLR
4' 6"

Sail Plan

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Chapter 4

Getting Afloat.

Crew Ready for a Float Test

Before the mast and rigging were installed it seemed a good idea to check the boat on the water and see the results of the work completed so far. Besides which, with the addition of an outboard motor attached to the transom bracket we could enjoy an afternoons sail, albeit under motor power. After scanning the classified adverts in the San Jose Mercury newspaper I had found myself a used single cylinder 4 hp Sears outboard motor for an affordable price so needed to try this out. I wasn't quite sure if this had enough oomph to push the boat along at its predicted displacement speed of about 5 knots.

First though I had to purchase a road trailer which I managed to acquire for the princely sum of $250 . This was a four wheeled trailer previously used to tow a large power boat and had space for big outboard engine which fitted between the chassis members. The fore post used for winching on the boat was not quite in the right position so with the help of a friend and an oxy-acetylene torch, the post was detached and moved along the 'A' frame at the front such that the sail boat could sit forward in a more balanced position. The post was gas welded back temporarily so that it could be arc welded later.

Soon the great day came along and with family and boat loaded we headed out to the small town of Alviso just a few miles away on a hot Saturday afternoon. This has a launching ramp mostly for fishing and small power boats but was suitable for a test launch as there was a fixed dock alongside. The Alviso slough leads out to the southern most tip of San Francisco bay but since this was a kind of test to see how the sailboat sat in the water and the outboard performed, I thought perhaps we should just meander a short way down the slough and back before the tide emptied the slough completely.

Launching the boat was relatively easy and we were soon tied up along side the dock. Wonder of wonders! Every thing appeared sound and the balance looked good without any leaning. We said a short prayer to the sun god and christened the boat with a can of pop.

Next I prepared to crank up the outboard and after a few pulls on the starter cord it fired up, if not a with a little hesitation. The outboard gurgled comfortably while it warmed up. A few turns were let off the keel just to give a little directional stability and we cast off the bow & stern lines. Slipping the outboard into its forward gear and adding a few revs we were off, at least we were moving away from the dock at a not very fast pace. More revs then, and soon I understood that we were going away from the dock under outboard exhaust power only. Too late to grab the dock, too late to jump the gap we were adrift in the Marina. As I tried to make light of my embarrassment fortunately a small power boat which was coming in to dock took pity on us and we gratefully accepted an tow back to the dockside.

Feeling like the biggest pratt ever, I soon discovered the reason for the affordable price I had paid for the outboard motor which turned out to be a sheared propeller shear pin. This pin protects the propeller from damage when the outboard propeller hits anything solid underwater and had done what it was intended for the previous owner. The cost of a new pin is pennies but without it you are dead in the water and of course I didn't have a spare to replace it with. Unable to improvise with a substitute that signalled the end of the days events.

Oh well, at least the test was completed and some fun was had by the kids playing on the dockside. Time to pack up and load the boat back on the trailer. This was done easily and it floated over the submerged trailer using the trailer guide rods to locate the best centre position. Pulling the boat up the ramp was a doddle with the Ford Country Sedan since this had an automatic gearbox and there was plenty of torque available at zero speed.

After tying down the boat at front and back we made our way over the hillock and down towards the rough track out of the marina. Applying the brakes a little as the car descended I looked in the driving mirror to see the front of the boat sliding forward to stop with the bow resting on the top of the car roof. Being unable to slam the brakes on further, I imagined the boat overtaking us on the roof if I did, I gently slowed to a stop.

Muttering words like what else can go wrong, or words to that effect, I observed that the winch post which had been temporarily gas welded in position was indeed so temporary that the boat movement had snapped the gas weld. This then forced the winch post to separate from the trailer allowing the boat freedom to move. The boat bottom, having been painted with hard ante fouling paint was like a slippery wet eel and hence had decided to go sailing unsupervised on top of the car.

Gathering up the winch support post and moving into a flat area, reversing the car while stabbing on the brakes corrected the situation and the boat slid backwards on the trailer. More tie downs all around and a slow trip home ended the days events.

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It was time to sort out the mast and rigging so the mast was ordered and the rigging purchased from a local chandler. The mast duly arrived and I could now get on with the fabrication the mast head and tabernacle using the known mast measurements. The inner and outer rigging chain plates were bolted through the hull for strength and the fore and aft stays fittings secured to the hull. With the spreaders fitted it was time to raise the mast using the hinged tabernacle and some temporary rigging ropes. While the rigging was secured at the mast end it seemed appropriate to allow a little extra rigging wire so that the swaged thimbles can be fitted when the actual length was proved. This was completed and the end terminations were then squeezed on the rigging wire at the chandlers who had the proper gear to do it.

In the mean time I had continued to scan the classified adds in the San Jose Mercury and had come across a boom plus sail listed. This seemed a golden opportunity so I high tailed it to the vendor for a look see. Complete with gooseneck and fittings, the boom had been golden anodised and was just about the correct length. The main sail turned out to be a lateen sail with full width battens which had been taken off a Chinese junk type sailboat a little worse for wear. Still, it had possibilities for some adjustments by my long suffering wife who was volunteered to

drag out her sewing machine. The sail height needed to be adjusted and the roach was so full that it was almost a square sail.

Finally all was completed and things were made ready for a second test, this time with repaired outboard, repaired road trailer complete with arc welded winch post and even a sail able to be run up a mast. What could go wrong ? The choice of test site was to be Lexington reservoir, a popular recreation area. Arriving after early afternoon was not a good idea, as in summer the wind can become quite fierce if it turns out that it is very hot further inland. There is a gap in the Santa Cruz mountains where the reservoir is located and this funnels the wind through from the coast towards the hot interior.

Still, with the boat on its trailer we raised the mast and attached the boom in a short time then launched the boat and motored across to a small sheltered area to tie up at a convenient tree. I wasn't keen to try our one and only sail just yet until the wind abated somewhat, especially with the children on board so we munched our way through lunch. As the afternoon progressed and the wind had passed its peak, preparations were made to motor out into the middle and raise sail. But first the keel needed to be lowered which we remembered to do and so away we went. Motoring into the wind raising the sail was a great reward for the work put in to date. Soon we were sailing on a reach with the motor shut down and just the sound of the water lapping against the hull. Even under the temporary main only, the boat handled well and so we soon made the end of the reservoir at which it became a down wind return.

What a great day! All to soon the wind faded as it does towards evening and so we headed towards the launching ramp where we fetched up into the remaining wind and lowered the sail. After winding up the keel I got the car and trailer to load up and then dropped the mast into its travelling position. This time the boat was tied with diagonal lines so there was no way it could move in either direction on the trailer.

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We had one more try out along the Alviso Slough , this time all went well and we made it the end of the slough before the tide turned. We also picked up enough speed to set the keel suspension wire humming which became the signal when we almost reached maximum hull speed. Because its so shallow at the southern end of San Francisco bay there is barely enough time to get out and back on the same tide. It was time to go further a field and so the next weekend we headed up towards Redwood City.

The marina here has a good launch ramp and plenty of space for boats on trailers which could be stored on land with masts up. This seemed just the place for the rest of the 1973 season. Along the Redwood Creek it took only ten minutes or so to get into the bay proper and although it is still tidal, a 2 hour sail could be had either side of the peak. The tidal range in the bay is maybe 6 feet on springs so the ebb and flow are not that significant.

In the 70's Howard Hughes, who became famous for the Spruce Goose, had become a recluse after a very active career as an Aviator, engineer, industrialist and film producer. He had become one of the wealthiest people in the world. One of his submersible mining barges, the HMB-1 being about 180 feet long and 70 feet high, was parked alongside Pete's harbour in the Redwood creek. This was so positioned that it caused a problem due to wind shear for sailing boats. Having only a single mainsail also meant that is wasn't possible to sail as close to the wind as one would wish to.

Coming back down the creek could be a problem passing this huge monstrosity since the wind would cross the creek diagonally, good for sailing back, but as the wind reached this 180 foot long 70 foot high wall it would bend along side it. As long as it was possible to tack across the creek it was usually possible to pass the metal wall. Adding to the problem was the fact that the tide was always on the ebb when returning so that while tacking across, the ebb caused drift back towards where you came from. With a full sail, and motor if necessary, this was not a problem.... unless as happened this day a gust of wind slammed over our one and only mainsail causing an abrupt stop of the

boom and an expensive tearing sound. The foot of the mainsail had split from clew to mast.

Of course, when things go wrong it happens in spectacular way and on starting the outboard to gain control this now decided to seize up. With little by way of options I hauled down the sail to the nearest reef points and tied the foot to the boom. Having recovered some forward motion we sailed on towards the Hughes barge positioning the boat to the opposite bank ready to pass the pinch point. The barge took up a large portion of the navigable route, but with a good breeze and full mainsail on a close reach it wasn't difficult to pass by. It was a different matter with a reefed mainsail as now the close reach wasn't that close and the reefed sail reduced the forward drive. Inevitably, as the boat drifted leeward on the reach things got worse and soon we needed to tack towards the opposite bank due to the wind shear from the barge. In doing so we were pushed back down stream by the ebb to where we started.

After another half dozen tries at passing the barge I reluctantly gave up and admitted defeat as the afternoon wind reduced and the tide ebbed further. What a pain!, now we had to make for the only other staging on the creek which was the local restaurant and which very fortunately had a launching ramp. So after tying up I left the family to a feeding frenzy while I took a taxi to the marina and recovered the car & trailer. It was time to bite the bullet and order a proper set of very expensive sails from the sail makers.

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I visited a local sail supplier with a copy of the drawings and left them for evaluation. Some days later I returned for the results and it was suggested that I purchase a main, jib and reacher from a maker in Hong Kong. The price was probably about half of one of the well known makes so the deal was done. In the mean time the torn sail was patched up and a new Johnson 6hp 'Yacht Twin' was purchased. This engine was much more powerful and being a twin cylinder with separate magneto's it was capable of running on one cylinder. Being a two stroke, there were no valves

and camshaft to keep oiled which makes two strokes less prone to failure from this aspect. Two strokes sometimes do have problems with carbon whiskered up spark plugs due to the petrol-oil fuel mix so carrying a spare plug and tools to change it are essential.

Under one sail, our expeditions out of Redwood City were limited but we still managed to get in a few days sailing while waiting for Hong Kong to produce. Eventually the call came to say the sails had arrived and I collected them with some excitement . Having them at home they were laid out in the back garden and inspected thoroughly. Brand new and whiter than white with all the cringles rings, reef ropes and battens they looked the part. Time then for running them up the mast and checking out the performance.

With the addition of a jib the boat now sailed closer to the eye of the wind and the main could be hauled closer to the centre line. Adding tell tales to the main sail showed how close the jib could be hauled in before turbulence became a problem. The increased wind speed across the main brought about by the funnelling effect adds extra 'lift' enabling the maximum hull speed to be reached earlier. For a displacement sail boat, the maximum hull speed limited is by the water line length and for a 20 foot water line this is about 6 knots. Without a knot meter, we were left to the ancient method of dropping a small chip of wood off the bow and timing the distance it took to pass it with a watch. At one nautical mile per hour this equates to about 1.7 feet per second and a 22 foot distance would take 13 seconds for the chip to be passed. Using this method only a very rough approximation could be estimated but still gave a clue. Listening to the keel wire humming it was also possible to gage the hull speed by the tone strength after its 'kick in' speed of three & a half knots. This became a useful measure of our speed through the water.

Changing the jib for the reacher really showed the way in lighter winds increasing the performance. This larger sail however, could easily force a capsize in strong winds so we had to predict the right time for a sail change. As always seems to happen, as the wind speed increases the enjoyment got from

bowling along at hull speed tended to lull a false sense of security until gusts became fearsome to handle. At this point, it becomes a bit of a white knuckle ride in controlling the boat while endeavouring to drop the foresail. Here's where a fore hatch is worth its weight in gold on a small boat as the sails can be dropped while still secured inside the cabin rather than standing on a bucking deck.

Getting the boat to sail in the 'groove' at peak efficiency requires some experimentation with the sail positions. It was a little problematic when close hauled because the main sheets when tight in would not pull the boom to the boat centre line. This was due to the use of a triple sheet block at the boom end and two double blocks at each side on the combing. When hauled in, the boom had a tendency to move leeward off centre which of course meant the main sail could not be kept central. A temporary remedy was to tie a line to a windward cleat and then around the leeward sheets to pull the boom over. This fixed the problem and allowed tacking angles to be reduced. Later a sail track was added to the transom and a block & traveller used to position the boom anywhere along the track.

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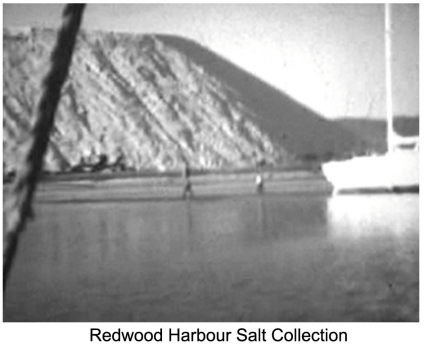
Suisun Slough
Petaluma
Napa River
Montezuma Slough
San Pablo Bay
Suisun Bay
Pittsburg
Richmond
Tiburon
Berkeley
Angel Island
Sausalito
Alcatraz
GH.Cove F.Wharf
Golden Gate
Aqu.Park
Yerbo B.
Oakland
San Francisco
Ballena
Alameda
Pacific
Ocean
San Francisco
Bay
San Leandro
Oyster Point
San Francisco Airport
Coyote Point
Redwood City
Half Moon Bay
Palo Alto
Stanford
Alviso
Mountain View
San Jose

Chapter 5

Sailing the San Francisco Bay

After one or two trips around the Redwood City area to shake out the wrinkles so to speak, I got together with a work associate who also sailed the bay to organise a weekend trip up to Angel Island. This is a 25 mile trip up to San Francisco and then a blast across the bay via Alcatraz towards the Tiburon peninsular.

Howard Hughes Mining Barge HMB-1



Redwood Harbour Salt Collection

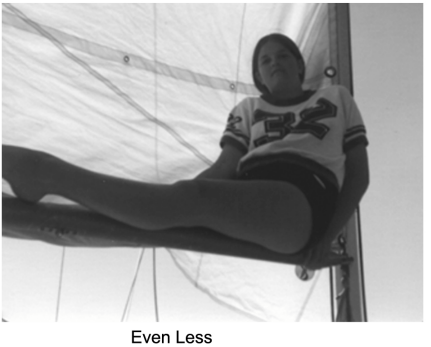
Good Fishing to be had in the Bay

Tug Watch

The summer wind pattern in the bay is fairly consistent being determined by inland land temperatures east of the area. This gradually increasing land temperature produces the largest thermal gradient by about two in the afternoon resulting in the cool prevailing north westerly winds being diverted through the Golden Gate. In summer this produces the famous fog which sometimes shrouds the Golden Gate bridge and it is very cold being straight off the Pacific Ocean. The chill is caused by the cold Humbolt current rising from the depths as it charges around the Pacific ocean. In the morning and evening hours however, the wind is light after the inland areas have cooled.

The plan was to get an early start and sail on up to San Francisco marina for a quick bite and then to do a top up refuel before starting the last five mile dash across the bay to Angel Island. The overall distance was reckoned at 25 miles as the

Not Much Action



Even Less

Captains Mate

Cool Bay Sailing

crow flies. We set off as soon as the incoming tide was enough to float us and quickly got under way using the motor.

The wind was virtually non existent at this time in the morning so sailing with main and reacher was not much help. Also, as we would have needed to take a large tack out into the bay to make any headway it was decided to use the outboard until we got some better wind.

Old Steamer Hidden from Street View

Passing under Oakland Bridge

Telegraph Hill

San Francisco Port Clock Tower

It was smooth going and occasional gentle sailing but we had all day so no need for concern. Eventually we tootled under the Oakland bay bridge and meandered along the wharves with engine assist mainly due to lack of wind being in the lee of the city.

The view of the city from the bay is quite interesting with inlets and old broken down docks to occupy us on our trip. As we got closer to Fisherman's wharf we could detect wafts of cooking smells drifting over from crab boilers at work for the tourists. Although we were close in to the wharves, we needed to keep a good watch for very large freighters which would come silently along from behind.

Passing Container Ship

Balclutha on show

UK Navy in Port

Sailing Companion

Rounding fisherman's wharf we passed the cross bay ferries terminal and headed in towards Gaslight Cove for some fuel. After re fuelling, we headed for the Aquatic Park anchorage for lunch.

Dropping anchor in the basin, the galley quickly became the focus point and soon soup and beans were bubbling away. These were readily demolished allowing a little time for some rest and relaxation before venturing out for the bay crossing. From our vantage point we could look back towards the city to a view of Ghiradelli square and see the cable cars being turned at the end of Hyde street.

After lunch was cleared away and things made ship shape again we raised anchor and headed out into the bay. The wind had increased a little but not enough to warrant a reef by any means, in fact it looked like it should be a perfect hours sail on a broad reach straight across to Tiburon. The plotted course was about 315 degrees magnetic which would clear Alcatraz to the west by about a half mile. In all a distance of about four miles in total to Ayola Cove on Angel island, perhaps an hours sail.

With the keel wire humming it took us twenty minutes to reach Alcatraz on the beam with little leeway lost. There were no prisoners to wave to as we passed by, the prison was closed in 1963 and became a recreation area ten years later. Now visitors with a macabre curiosity go out for trips around the outside or disembark with tours run out of the city's water front. In earlier years it served as a light house before becoming a military prison and then a federal prison. Of course it has been the setting for several movies since closing its doors to the last inmates, and now the nesting sea birds are reverting it back as a breeding sanctuary.

Leaving Alcatraz behind, the wind is now pouring in through the Golden Gate and strong enough to warrant a reef for our small boat. I had been practising putting in a slab reef in the past so now I had a plan to work from before climbing on deck. This entailed releasing the main sheets while hauling in on the pre attached clew reef line so that the boom would be angled upwards allowing the reef line to be secured at the boom end. Then up on deck to release the main halyard and under control lower the main sail until the tack cringle ring could be slipped over the unused 'bull horn' on the boom at the gooseneck. Finally put the tension back on the halyard and tighten the clew out haul

then check the sheets for sailing as reefed. Any loose sail material along the boom foot, the bunt, is then tied to the boom using the reef lines at leisure. All this could be done in less than a minute and not require heading up into the wind as long as the sheet tension was put back on as soon as the boom was angled upwards. Having pre installed clew reef lines is critical for this manoeuvre so these were already fitted for each reef position.

With the first reef in the mainsail made, control of the boat was more manageable and without much loss of speed we continued the journey without problems. Soon we were abeam of Angel Island's western side and began the slow gradual turn down wind into the Racoon Straight opposite the Tiburon peninsular. At the mouth of the cove I started the outboard and dropped the jib into its sail bag clipped to the fore stay.

Angel Island

Ayola cove is a popular destination for the sailing fraternity with the anchored buoys set around the outside edge in a circular fashion. The general idea is to pick up a buoy and lie between two so that the tidal set within the cove does not end up being broadside when tied up. Being able to wind up the keel meant we could take up a position close to the shore so all the larger boats were further in the centre. A choice was made and we made fast to buoys fore and aft using our docking lines and then killed the outboard. There is no wind inside the cove as it is well protected with the entrance facing north towards the Tiburon peninsular and the island itself steering any wind from the Golden Gate past the entrance. As a result the full power of the sun soon warmed everything and every body so sun hats and T shirts were essential.

We carried a rubber dingy for getting on and off the boat when not beached so this was unpacked and inflated ready for action. Somehow we all managed to get ashore using a series of journeys in the dingy and proceeded to explore the beach side area. Here we found several brick built barbecue pits and picnic tables set out under shade trees waiting for customers. There was also water available and most importantly shower & toilet

facilities. Further round the cove was the dock used by incoming ferries and any transient sailors who happened by. It wasn't long before the cove filled with overnighters puttering around looking for spare buoys and we were glad to have got in early for the long weekend holiday. There was no way we could move off the mooring now without loosing it.

Angel Island View of Ayola Cove & Tiburon Peninsula

Ayola Cove Anchorage

Ayola Cove Landing Beach

Swimming on a hot day in Ayola Cove

Returning to the boat after an hour or so it was time to sort out food for the evening meal having already decided to have it on board. To morrow we would fire up one of the barbecues and finish off all perishable food before the ice finally melted in the cooler. In the mean time as long as the kids were having a great time we could relax and enjoy some sunbathing and chatting to our sailing companions.

After a nights sleep and a hearty breakfast we ferried ourselves to shore intent on climbing the trail to the top of the island known as Mount Livermore. This is nearly 800 feet high with a trail all the way up and characterised as an easy walk. Try telling that though to a three year old who's mind is set on being carried after the first ten minutes of the uphill walk. Eventually we reached the top and surveyed all around, such a magnificent view and well worth the effort. From this vantage point the city and Golden Gate is clearly visible along with San Pablo bay, treasure Island, Oakland and the whole South Bay.

The old immigration station still exists in China Cove on the east side of the island as it was when operated in 1910 as an immigration control centre. This was built as a detention centre for people designated by the Chinese Exclusion Act of 1882, laws enacted to prohibit certain Asian nationalities. The law was repealed in 1943 when China entered the world war as an ally of America. The station was closed in the 1950's and is now operated as a museum.

The rest of the day was spent doing what sailors do when at anchor, that is generally moving coolers about and ferrying crew while somehow finding time to down a cold beer or two.

I had noticed a Ferro Cement ketch tied up in the cove centre and was curious to get a closer view. It was an interesting boat complete with miniature back garden perched on the stern. This was obviously a world sailor so I paddled over for a nosy. They say its a small world, it turns out that the owner and wife were from the north of England and close to where I hail from, roughly six thousand miles east.

The owner used to be in the valve (tube) research department at a Mullard's factory in Blackburn, Lancashire and had retired to roam the world. I was invited aboard and found the boat crammed with books and hardware of all description which he had collected on his world voyage. It was nice to be able to stand up inside the boat which looked to be about 50 feet long. I explained that my English ex employer was Ferranti Ltd who also

had manufactured valves for Televisions and armed services defence systems so we had lots in common to chat about.

Later after the day visitors had left, we all got together at the evening barbecue with the rest of the sailing fraternity for a bite and natter. It had been a great day for the family and a memorable experience.

The following day dawned and we made our preparations to sail back around the eastern side of the island and then past Yerbo Buena Island under the Oakland bridge. From there on past Hunters point towards the San Mateo bridge and into Redwood city. With some help from the incoming tide an anticipated time of five or six hours depending on wind, if the wind stayed light outboard motors would be fired up as we could run out of water in Pete's harbour after the tide turned. Departure time was intended to be 11 am and we finally got away around twenty past the allotted hour. At this time in the morning the wind in the bay was still light so out came the reacher to hank in support of the mainsail.

With hardly any waves we were soon picking up the keel hum as we bowled along on a broad reach. Approaching the Oakland bridge by about 12.30 pm the wind had picked up a little providing even greater sail power. Getting close to Hunters Point at about 1.30 pm I felt it prudent to change the head sail to the small jib as the wind was still increasing and the waves were building showing the odd white horse. An hour later we were experiencing a stiff breeze, lots of white horses and needing a reef in the main. Then it happened, the boom decided to part company with the mast at the gooseneck. Not knowing the cause, I sat on the coach roof and grabbed the halyard to lower the main and stuffed the whole boom with sail still attached into the cabin. The halyard shot up the mast out of reach flapping around but now with just the jib on things calmed down a bit, still we were barrelling along at close to full speed with my wife hanging on to the tiller.

Thoughts like any port in a storm came to mind as we continued our way, the nearest one being Coyote Point so with

the wind screaming in the shrouds I waved my companion onwards and headed towards Coyote under single jib only. As we closed in on the harbour the waves became very steep as the ground became shallower and with the full force blasting us it was a white knuckle ride for sure. We made it into the harbour and secured to a free pontoon to hear the vigorous slapping of halyards against the masts on other boats. A little later another boat came in under sail and heading to a free pontoon was too late in downing sail so ending up with its bow rearing up over the pontoon walkway.

After some investigation of the gooseneck I discovered the through bolt holding the universal joint had disappeared which had released the boom with all the jiggling about. This had been secured with a nylock nut which I had failed to tighten on with a spanner when the mast had previously been raised. I have since included an additional separate lock nuts in the gooseneck fitting.

Since the wind would take some time to subside, it usually peaks between 2pm and 4pm in the bay, it looked like staying strong well past 5pm and it was touch & go whether there would be enough water left to get back into Redwood city at Pete's harbour. So after a little persuasion I left a boat minder and sought out a taxi to get the car and trailer from where it was parked at redwood city. This seemed familiar to the last episode with the ripped main sail but hey, what the heck, we were on a schedule. For that afternoon we found that the peak wind at the airport was gauged at 34 knots!

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We enjoyed the overnight stay's at Angel Island on many occasions during which a planned trip under the Golden Gate bridge just had to be included. This seems a fairly straight forward sail on the face of it but needed some care since this was the only sea level gap in the coastal mountain range for many miles along the Pacific coast. In addition the tidal flow into or out

of the bay was quite fast and could easily whisk a small boat in directions not planned.

Aiming to pass under the Golden Gate bridge just before low water slack and then sail just a little way into the Pacific ocean before returning seemed the way to handle it and so we ventured out one morning on a close haul tack. As we closed on the massive bridge the force of the incoming wind became quite severe causing the mainsail reef to be required. Also, the Pacific ocean, with thousands of miles of unlimited fetch, increased the swell as we sailed under and left the protection of the bay entrance behind. With the wind pushing on the sea surface it soon became a cold, bumpy and uncomfortable ride under the classic summer fog bank above the bridge.

After a short while we came about and now the conditions were transformed by sailing down wind and virtually keeping time with the swell and wind. Once back under the Golden Gate bridge and out from under the fog the sun soon warmed us up. Back then to Angel Island for food and respite !

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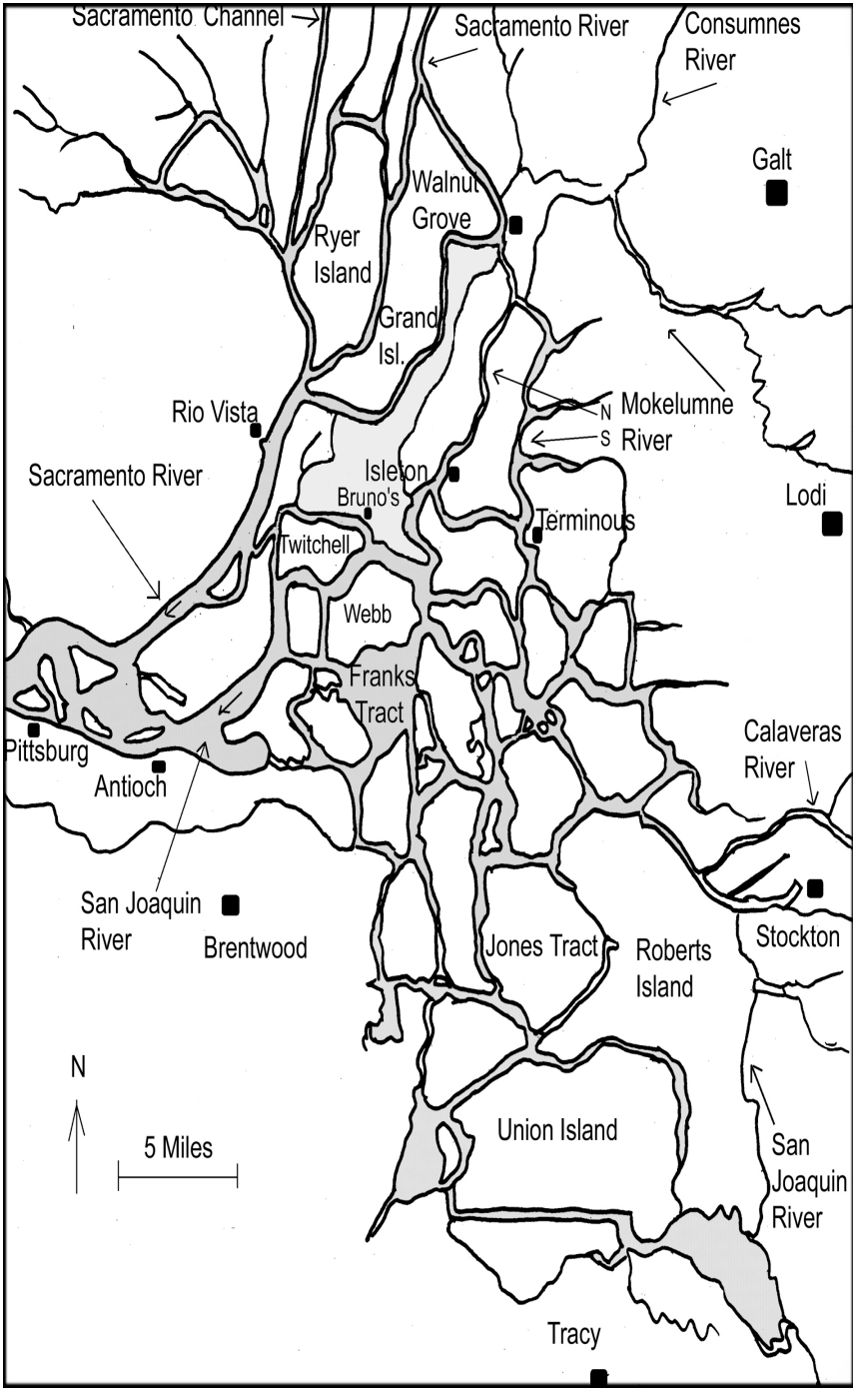

Sacramento Channel
Sacramento River
Consumnes River
Galt
Walnut Grove
Ryer Island
Grand Isl.
Rio Vista
N Mokelumne
S River
Sacramento River
Isleton
Bruno's
Lodi
Terminous
Twitchell
Webb
Franks Tract
Pittsburg
Antioch
Calaveras River
San Joaquin River
Brentwood
Jones Tract
Roberts Island
Stockton
N
5 Miles
Union Island
San Joaquin River
Tracy

Chapter 6

The Californian Delta

In the U.S.A, the centre of the Rocky Mountains is called the Continental Divide, this is where the rivers divide to flow east or west throughout the country. The west flowing rivers eventually exit to the Pacific ocean as opposed to the eastern rivers flowing to the Atlantic or Gulf of Mexico. Further west of the Rockies are the Sierra Nevada Mountains in which the Sacramento River and the San Joaquin River systems start.

The Sacramento river is the largest river in California weighing in at 447 miles being sourced from 6,000 foot headwaters flowing into Lake Siskiyou near Mount Shasta in the north. Its tributaries include the Feather, Pit, McCloud and American rivers. Gold searchers will know of the American river south fork from the historical references relating to Sutters Mill. This is where gold was discovered by an employee of John Sutter, James Marshal, in January of 1848 at the town of Coloma. The discovery lead to the great California gold rush and ultimately the building of the city's of San Francisco and Sacramento.

A tad shorter is the San Joaquin river at some 330 miles long. Its source is said to be at 11,000 feet at Martha Lake in the Sierra Nevada mountain range, around the Yosemite region. The Stanislaus, Tuolumne, Merced, Calaveras and Mokelumne rivers all feed into the San Joaquin. These great rivers empty at the only place possible where a gap exists in the coastal mountain ranges, that is into San Francisco Bay.

In doing so, the rivers meet in the California Delta area and create a superb fresh water and convoluted playground for water enthusiasts. The delta is populated with a vast quantity of river

pathways offering sailors this deep fresh water environment protected from large waves by virtue of limited fetch. In addition, because the area is well inland from the sea, the winds are warm in summer and so cool weather clothing is not needed. There are dozens of marinas all over the area where you can just tie up overnight. Also there are many other recreation stopping places where you can stay tied to a convenient tree, bang in a post or just anchor.

After a spell sailing in the bay area our next conquest of interest was to load up the trailer with the boat and head off into the Delta to explore. So with the requisite charts and maps food etc, we headed for a suitable staging post located on the chart called Bruno's Harbour, just south of Isleton town and off the San Joaquin river. The San Joaquin river water depth varies somewhat but depending on the river width it averages around fifty feet where the river width is about 0.5 miles. Because of the depth, the currents are not fierce in summer, about 0.5 knots, and there are plenty of counter currents to assist progress against the stream.

Our route took us towards Rio Vista and then along side roads perched on Levees to our destination. We were offered a mooring for a fair charge on a monthly basis so I took this up for a couple of months. After launching and putting up the mast we tootled across to the moorings where we dropped a stern anchor and headed nose in to the bank to tie up at the allotted post.

There was a mixture of power boats and sailing boats moored here of all shapes and sizes. Most were on seasonal moorings being pretty well organised with tents and barbecues set out. During the week the population would diminished somewhat except for retired people who usually gravitated to the restaurant and bar close by. This weekend, the immediate area was to be explored with a short trips on the San Joaquin river for areas of interest, basically somewhere to beach the boat and paddle about.

At night it was immediately noticeable that we were in a fresh water area as we became targets for marauding insects. These

seemed to know that we were newcomers to the area and were bent on inspecting every crevice possible. Mosquito netting is a must for sleeping on board and we were forced to improvise with anything we could find to fight back. The mosquito's mostly inhabit the Tule reed beds which lie in clumps along river banks but some of their relatives had emigrated to grass banks where we were located. Next time we would be prepared for action. I had a weeks holiday coming up and so we planned a small cruise up to Walnut Grove and down the Sacramento river to Rio Vista.

The following week we came prepared with mosquito nets, 'bug be gone' and a selection of inflammable smoking devices designed to send the bugs on their way. Not that it made much difference in the open air, those that went away just left more space for those who lined up behind. During the day though, with a breeze we were left alone to our own devices. As soon as we were organised, we set off cruising the Delta for real.

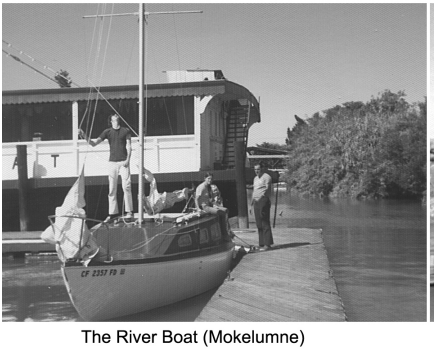
Our first port of call was to sail up river to a swing bridge on the North fork of the Mokelumne. This was about 4 miles or so and took us past the on the San Joaquin river. The Spindrift marina is located off the main river in a small diversion off a fairly narrow channel separated by a berm of Tule reeds. With a prevailing westerly wind it was possible to put some sail up and silently drift past the marinas until we got back on the main river. From here with the wind on our quarter we made our way up to Korth's Pirates Lair where the river does an about turn. Now it was a case of tacking to and fro across the river until the wind became more favourable past the Light House resort. Soon, as we approached Perry's Boat Harbour and the swing bridge crossing the river, the wind was back astern.

Now seemed a convenient time to stop at Perry's for food and stuff and also allow us to view the bridge passing procedure by boats unable to lower masts on the run. I had a rough idea about the passing procedure and had a suitable horn powered by a large air rubber bulb appendage ready for tooting. The bridge operator liked to collect several boats either side of the bridge before swinging it open to let them pass. If road traffic was heavy

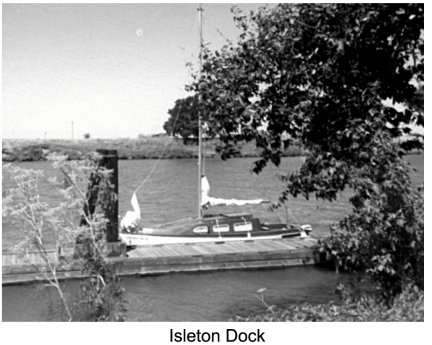
it could be a fifteen minute wait, and after certain hours the operator quit for the night so you became stranded overnight. Fortunately the bridge was high enough for us to pass under with the mast lowered, so these situations would not be problematic for us.

Mokelumne River Swing Bridge

Walnut Grove Marina



The River Boat (Mokelumne)



Isleton Dock

The charts shows only a cross delta channel system linking the Sacramento river with the Mokelumne river at Walnut Grove. This is a controlled channel with gates across the channel operated by the state water resources and fish conservation agencies. It was the means for adjusting levels from the Sacramento river flowing into the Mokelumne which feeds down to the San Joaquin river. There is a big issue relating to the use of the channel as it has been shown that salmon smolt can get diverted into the channel when heading for the sea. When that happens, survival rate of the smolt drops considerably, but then

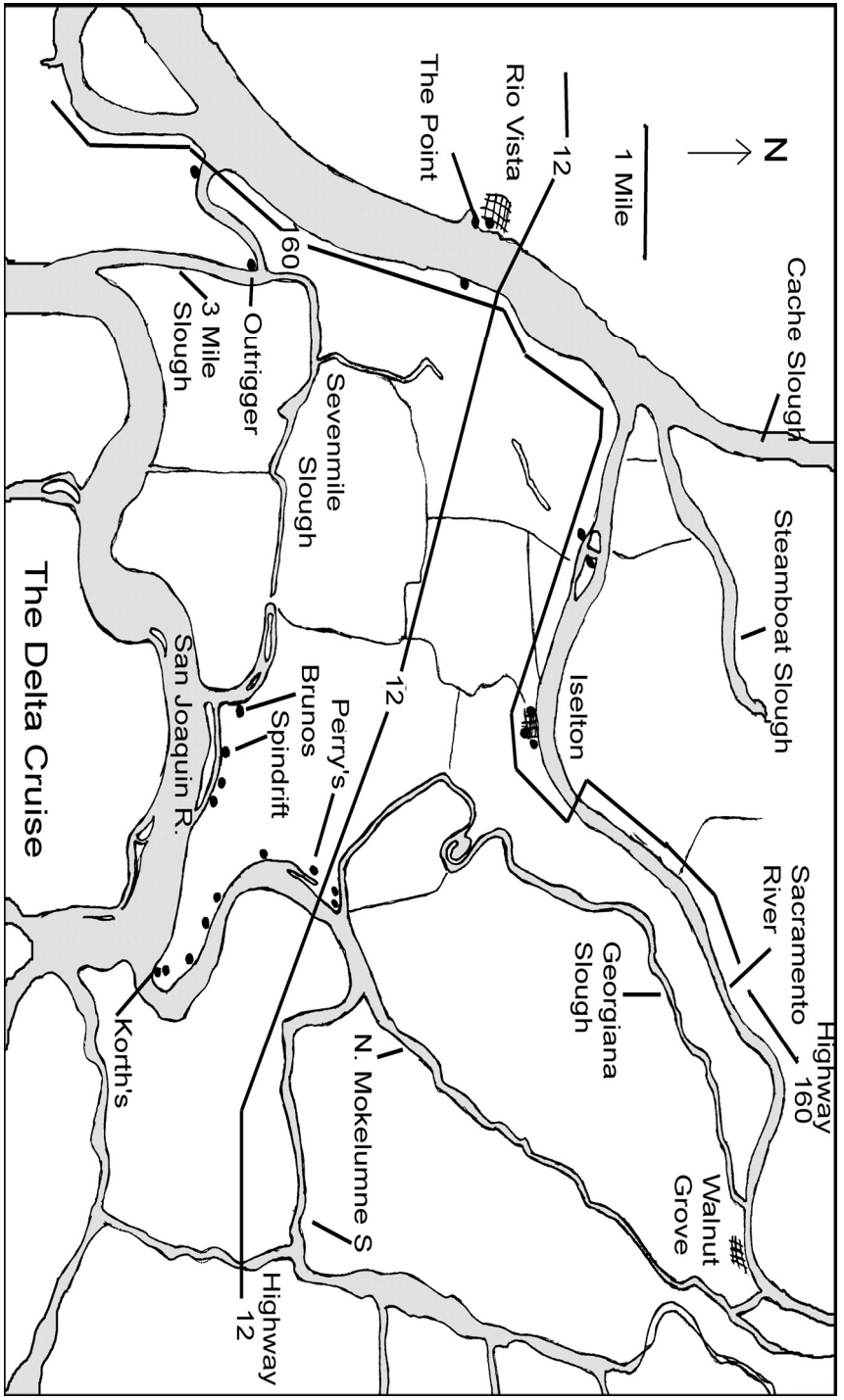
when the channel is closed preventing this, the water quality reduces lower down the delta so that the water taken out for the population's taps has increased salt present.

Since it was not possible to verify the gates would be open into the Sacramento through that channel, the only route left was to go up Georgiana Slough which although narrow, has a clear entry in to the Sacramento at Walnut Grove. In the mean time we opted for a small excursion up the Mokelumne north fork as an diversion for the family before entering the Georgiana Slough.
As soon as the bridge opened for river traffic we left Perry's dock and motored through the gap heading up the river. Here we found a suitable beach area to land on so with a line attached one of the crew jumped off the bow and made fast to a stump for an afternoons leisure.

As evening approached we motored back down the river against the dying wind towards the bridge and tied up at a harbour on the mouth of Georgiana slough to settle in for the night. The slough is about 12.5 miles long and varies in width about 50yds to 100yds, all the same it carries about 30 per cent of the flow from the Sacramento river. Its depth varies between 18 feet and 24 feet so the current is anticipated a little above the typical 0.5 knot of the Mokelumne. This far inland, the effect of the tidal rise and fall is small, less than two feet as opposed to about 6 feet in San Francisco bay when the moon is full and pulling with the sun on the spring tides.

Even so, sailing up hill along the slough may require a power assist when the tidal effect is unfavourable. Fortunately, any wind available will be on the beam or astern, so even though the slough is narrow, it will be possible to sail most of the way up to Walnut Grove.

Getting under way about mid morning we entered the slough under motor at a leisurely pace. The sun was already up and warming the fields causing mirages of the backgrounds to appear floating in space. Mosquito's were hiding under the grass leaves


N
1 Mile
12
Rio Vista
The Point
60
Outrigger
3 Mile
Slough
Cache Slough
Sevenmile
Slough
Steamboat Slough
Iselton
12
Perry's
Brunos
Spindrift
San Joaquin R.
The Delta Cruise
Sacramento
River
Highway
160
Georgiana
Slough
N. Mokelumne S
Walnut
Grove
Korth's
Highway
12

along the levee banks watching us pass by and wondering whether to take a chance to attack us, we were ready though with chemical warfare defences. As soon as a breeze came up we doused the motor and put up sail to glide along in total silence, the breeze keeping the mosquito's cowering on the banks.

Soon we had our first Georgiana slough swing bridge to negotiate, the low water vertical clearance charted at 13 feet and the high water clearance at 1 foot. These are clearances determined by the winter - summer variations of river flows. The bridge carried road traffic to the town of Isleton, if it wouldn't open we could lower the mast and motor under. The signal was a long blast on the horn followed by a short blast. I removed the rubber bulb from the horn ready to play the horn by sheer lung pressure. As soon as I raised the horn to toot, the bridge started to open as if by magic. I tooted anyway, one long and one short blast and we made ready to pass through, thankful that the mast and sail could stay in place.

Continuing on our way we passed by the old Southern Pacific Rail Road bridge to reach a convenient stopping place for a lunch break. In 1971 the area was flooded damaging the railway track which linked Isleton to Walnut Grove via the bascule lift bridge.. The bridge across the slough was installed in 1929 which enabled the Southern Pacific to carry freight and produce to and from the Delta. By 1978 the lines had been officially abandoned leaving the truckers to move produce by road which included asparagus, pears and sugar beet.

Our trip along the slough ended in late afternoon after negotiating the last swing bridge at Walnut Grove. The wind was now weakened and the sun shadow beginning to lengthen as we sought out a convenient stopping place on Sacramento River. On the inside bend of the river, on the opposite side to Georgiana slough, was a marina with separate docking facilities. This looked ok so we motored across and tied up. As soon as we landed, the crew grabbed their fishing gear and found a spot to drown some old frankfurters while captain and navigator put the kettle on.

We could not find any walnut trees when we went walk about, not that we were expecting great things with a population of about 500. Still, with a name like Walnut Grove I imagined large shady trees lining the streets just dripping with walnuts. Not a chance though, just your average suburban homes with large well watered gardens, presumably irrigated straight from the Sacramento River.

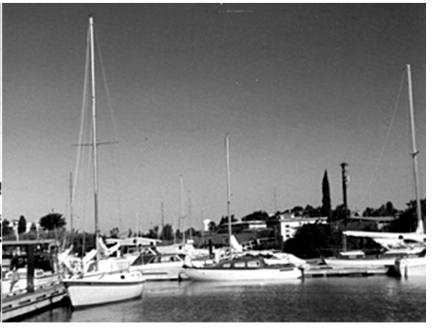
As for irrigation, in the morning the boat inside was somewhat wet on the floor due to a leakage from the river. Not what you would expect and it took a little time to discover the source which turned out to be the protective seal placed over the keel swing pin. The seals were fabricated from a tennis ball cut in half and attached over the ends where the pin protruded, attached using silicon bath sealant. Sailing in fresh water had caused the boat to displace a little lower in the water, just enough to bring the water level to the keel pin level where water had seeped through the pin bushing.

Although the half tennis balls were attached, there was a pathway to the inside of the hull through a break in the seal, not noticeable in salt water as the water level was further down the hull. The extra weight of provisions and the usual stuff one takes on holiday was just enough to show the leak. A little redistribution of the weight had fixed the problem temporally but a more permanent remedy needs to be sorted with the cargo lightened in weight.

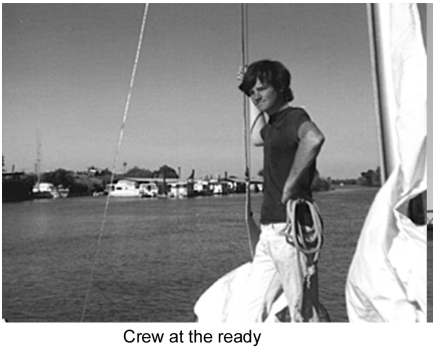
In the morning we started out for Rio Vista intending for a lunch break at Isleton town a few miles down the Sacramento River. This part of the river is not very wide as the river is split into various branches above Rio Vista. Near Courtland one division passes through Steamboat Slough which itself picks up tributaries split from the main river just south of Sacramento itself. In addition there is flow from the man made Sacramento deep water channel used for larger shipping to and from the city. These all meet at Rio Vista where the river widens to about a mile across, plenty wide enough for a spell of good sailing.

At Walnut Grove, this part of the river is only a quarter mile wide and being virtually directly into the wind and we needed to tack for a short distance . When we got past the ninety degree river bend at Hyde, the wind was on the port beam most of the way to Isleton. Going down river without the need of the outboard was a pleasant and peaceful experience running virtually parallel to Georgiana slough. As we approached the road bridge at Isleton I prepared for a delay and started up the outboard in case it was needed. Tooter in hand, one long blast followed by a short blast did the trick and the fancy Bascule bridge opened letting us through. A short while later we were tying up at the Isleton dock with the sails laid along the boom tied down.

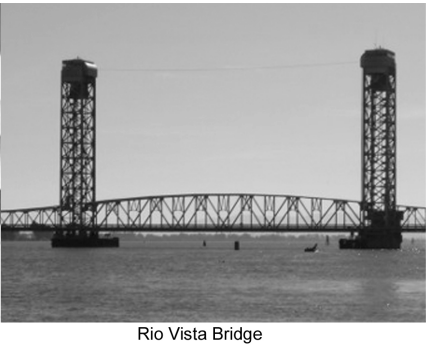
Isleton Bascule Bridge



Delta Marina



Crew at the ready



Rio Vista Bridge

We took lunch in a cafe within the town, enjoying the air conditioning which was wonderfully cool. The town grew from nothing during the gold rush era as miners sought out fruit and vegetables from the delta's farming community. With the influx of the gold seekers came farmers to grow the crops which fed them

resulting in a bustling community. To days population stands around 800 and the town is better known for its Crawdad festival in which it has become known as Crawdad Town, USA. The crawdads are crayfish resembling small lobsters which survive in fresh uncontaminated water.

At Isleton the wind is adverse when going down river and so the outboard motor was needed as a helper round the river bend. Past Ida Island we could see the junction of the Sacramento as it meets the Steamboat Slough and the Cache Slough to form the main body of water on its final run to the Carquinez Straits where it joins with the San Joaquin river. Once into the main river we could tack across on Port then Starboard tacks in the direction of the large central span lifting bridge crossing at Rio Vista.

Our target was to reach the Delta Marina next to The Point restaurant on the north side of the river and I was a little reticent to be the only one to close the main highway in order to pass through. Other power boat craft were able to pass under with no height problem. This bridge was built for large ships with a down vertical clearance of 24 feet at low water and an up vertical clearance of 150 feet. That posed a dilemma since the mast was 24 feet mounted on the cabin roof about 5 feet above water level. Waiting for another sailboat was one option but in the end I chickened out and lowered the mast as we got close so that we could motor under. While I sat on the mast keeping it steady, like a knight on a charger with the mast resting on the pulpit, the captains mate steered us safely under. Once through, with the mast back up and boom reattached we headed over to the marina, and as was the custom of the Point Restaurant bartender, he rang a large outside bell to signal our arrival.

According to charts, the town of Rio Vista stands about 22 feet above sea level at its present position on the Sacramento River. In the early years, 1862, the original town was sited at the confluence of Cache Slough and Steamboat Slough. At that time the river flooded and swept the old settlement away which resulted in the towns present new position. The new site was considered a safer position for its inhabitants and the town recovered becoming a thriving agricultural community. Its name

of course is of Spanish descent requiring no interpretation. Rio Vista also has the dubious pleasure of being positioned on the largest natural gas field in California. This field covers the 250 mile by 75 mile Sacramento Basin and gas is still being extracted at various sites within this field.

I don't suppose Humphrey the whale cared much about the gas field when he found himself lost up the Sacramento river in 1985, 60 miles from the open sea. With some help he eventually made it back to the Pacific only to return 5 years later and get stuck on a mudflat in San Francisco Bay. He was pulled off the flats by the coast guard with a cargo net and coerced back to sea by an amada of small boats banging on steel pipes. A lead boat playing a record of underwater sounds made by humpback whales preparing to feed enticed him to open water. He was seen again a year later at the Faralon Islands further off shore, his face now posted as an undesirable alien along with others. No green card for him then.

Dawn, Humphrey's girl friend, arrived in the Sacramento with her calf in 2007. These two made it past the Rio Vista bridge and had themselves a fishing vacation nearer to Sacramento city spending three or four weeks in the river. They eventually got fed up with the accommodation and decided to make a break for it without paying their dues, escaping safely to open water.

The following day we headed out into the main river and proceeded under sail on a broad reach under a gentle wind. As always we seem to be late getting away and the sun was already high enough to burn the youngest of our crew . The target was to find and enter Threemile slough, a mere three miles down stream located just before Horseshoe bend. At Horseshoe bend the river divides, part of which passes around Decker Island which has a semicircular periphery giving some credence to the bend's name. Threemile slough links the Sacramento and the San Joaquin rivers.

At the entrance of the Threemile slough is a lift bridge to negotiate and the waiting area is tricky since the river is scouring the entrance as it flows past. Adjacent to the bridge on the North

bank is Brannan Island state park, a popular park with launching facilities for day visitors. Tooter at the ready and under engine power we approached the bridge, its central span with the lift controller cabin perched aloft and blew the signal that we wanted to pass. After a couple of minutes wait the road barriers closed and the span started upwards to let us through. The wind was now astern so as soon as there was room enough I headed through 180 degrees and put up the sails once again. Before turning back down wind I released all the main sheet available ready to allow the boom to move starboard under manual control. Steering clock wise and holding the sheets tightly by hand, I let out the boom on the starboard side as the main filled. A minute later the slough did an abrupt 90 degrees left turn to port and we headed along the slough, wind abeam on the starboard tack at a good lick.

Passing the launching ramps of the state park, which was full of activity, we tentatively approached the Outrigger marina ready to jibe the main as the slough turned about through 160 degrees. With the mainsheets fully slackened, I began hauling in the boom by hand so that as the wind past astern the sheets could be payed out quickly on the opposite tack. Fortunately we completed this manoeuvre without mishap and I began tightening the sheets ready for a good beam reach down the slough on a port tack.

With the reacher fully filled we were flying along in a hot wind and a wave free stretch of water. This was great but we were overpowered, so much so that the pull on the reacher sheets made the rope as stiff as an iron bar. I needed to let off the foresail but the cam cleat which holds the sheet was biting deeper into the line and virtually jammed. The boat had never leaned so far over before and was not meant to be a 'tender' sailboat able to sail along at 45 degrees. We all hung on for dear life, feet jammed against the side of the cockpit as I struggled to lift the sheet clear of the cam cleat. Coming in the opposite direction was another sailboat going at full bore on the opposite tack. The slough is less than 200 yards across and the edge was not the place to be when powering along. The two boats were closing at least at 14 knots, both virtually 45 degrees tilt and as we passed with about 30 feet separation, I got a good view of its

bottom. No pleasantries took place as we concentrated on staying upright. Eventually the steel bar of the sheet pulled up enough in the cam cleat to release the foresail and the boat righted as the sheet whistled through my hands.

Thank goodness the cleats had load spreading plates underneath other wise the cleat would surely have pulled out of the cockpit combing. After changing the foresail to the jib, we continued down the slough at a more leisurely pace heading towards the San Joaquin. With the end of the slough in site it was time to prepare for another jibe to go on the starboard tack again. Once into the main river there were two more jibes to carry out as we headed back towards the home harbour at Bruno's. Rather than take lunch on the river somewhere, we decided to make the run for Bruno's, just another three miles up river, where we could enjoy the afternoon before packing up for home.

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We had a few more weekend trips around the Delta area, staying saturday nights in various marinas and restaurant locations like the Sugar Barge and Franks Tract before hauling out and returning to the Bay area. This time we took a mooring at San Leandro which has a dredged channel and can be used at any state of the tide. This was handy to take trips up to Angel Island an a friday evening without worrying about the timing as was the case at Redwood City. We enjoyed the year round option of the California sailing but as time progressed we reached the end of this period in our lives and prepared to return to the UK, boat and all. Having put the effort in the build, there was no way to leave it behind, besides, a whole new experience was waiting for us in the Irish Sea. I suppose its a bit of churlish to say our boat sailed across the great pond but indeed it did on the back of a container ship.

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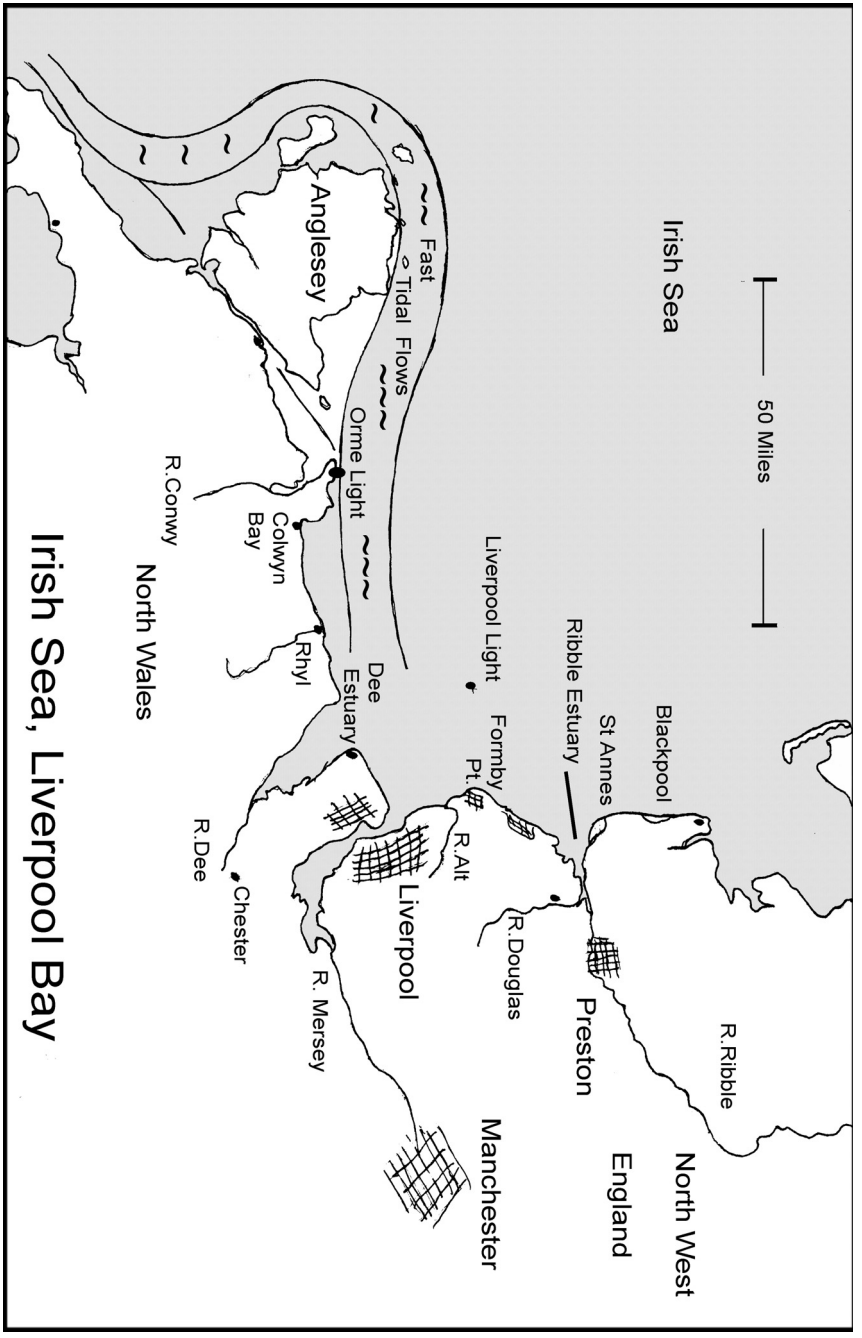

Irish Sea
50 Miles
Blackpool
St Annes
Ribble Estuary
R.Ribble
North West
England
Preston
Formby Pt.
Liverpool Light
R.Douglas
R.Alt
Liverpool
Manchester
R. Mersey
Chester
R.Dee
Dee Estuary
Fast Tidal Flows
Orme Light
Anglesey
Colwyn Bay
Rhyl
R.Conwy
North Wales
Irish Sea, Liverpool Bay

Chapter 7

Liverpool Bay & North Wales Anchorage's.

Weeks later I went to the UK Port of Liverpool and its container base to see about retrieving our boat. The boat had arrived and was still sitting on a container frame waiting to be craned off. All looked fine so I went to the dock office with my copy of the Bill of Lading to see to the formalities. I wondered whether I would need to pay import duty and the new European valued Added Tax but this was OK as I was a returning emigrant and these were considered as 'Chattels' as long as I retained possession for a suitable period of time. I was then given a date when I could expect to collect said Chattels and that was that.

I had already sorted out a local marina further north towards Preston to store the boat for the next six months. Since winter was approaching it was unlikely there would be any sailing until well into next year. The marina was at the end of an inland canal where there are lock gates to allow boats entry into the River Douglas, a tributary of the River Ribble. The Ribble was used to serve the northern town of Preston during the industrial revolution bringing in cotton for the Lancashire mills to convert into yarn and cloth. Richard Arkwright, born 1737 in Preston, is credited as being one of the father's of the industrial revolution.

With the invention of the Spinning Jenny by James Hargreave and the efforts of John Kay who had been working on a spinning machine, Arkwright made improvements producing a stronger yarn needing less labour. His new carding machine was patented in 1775. He went on to construct a horse driven spinning mill at Preston and later used James Watt's steam engine invention to power textile machinery. New factories established in the

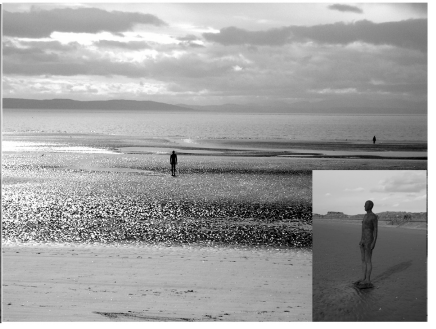
counties of Derbyshire, Staffordshire and in Scotland made use of the steam engine leading to the invention of the power loom.

The River Ribble flows a mere 75 miles from its source in the peat bogs of the Pennines along the Ribble Valley then via Preston, past its new marina, to the sea at Lytham St Annes. At this point, because of the shallow coastal area, training walls in the estuary are needed to stop the river silting and blocking the outflow. Dredging used to be the norm but this has now stopped since most of the sea traffic uses Liverpool as the main west of England port. Most of the area south of the Ribble is salt marsh and a haven for migratory birds.

River Douglas, Canal Lock

Ribble Estuary, Lytham

River Alt, Hightown.



Iron men on Crosby Beach looking at Wales

Just a few miles north of Lytham St Annes are the beaches of Blackpool, no match for the Pacific coast beaches, but popular enough for the inhabitants of the inland cities to enjoy their weekends when the weather is clement. The coastal line from

Blackpool to Liverpool is a very shallow lee coast, not a place to be stranded upon as it has been the sight of various shipwrecks pushed there strong westerly winds.

As if to underline this, in January 2008 the ferry MS Riverdance on route from Northern Ireland to Heysham port got in trouble during a westerly gale and ended up being beached at Cleveleys, the north end of Blackpool beach. All on board were rescued by coast guard helicopter leaving the ferry to fend for itself, now laying on its side awaiting salvage.

MS Riverdance at Clevelys, Blackpool

Further north, the port of Heysham where the Riverdance was heading is the entrance to Morecambe bay, a place where tidal inflows can outrun any person unlucky enough to be caught with an incoming tide. This was the scene of the recent tragic disaster which claimed the lives of many Chinese cockle pickers who were overcome by an incoming tide due to the ignorance of their supervising leaders. Subsequently a change in the laws governing these activities was enacted.

As such, whatever safe havens there are for small craft on the north west coast are hidden in river outlets such as the Ribble and Alt towards the River Mersey estuary at Liverpool. Even the River Dee estuary is a place to be shunned as this empties completely at low tide and apart from hiding behind Hilbre Island at the mouth of the Dee, there is little shelter to be had. The unfortunate small boat sailor in this part of the world has little option but to head for the Ribble or into the Mersey if caught out with an all too often westerly gale.

These places are littered with old wrecks as shown on the charts, most are now buried in the sand but can still be dangerous if bits of steel upper works are still present. Keeping to the marked channels when entering the estuaries is essential. It is especially dangerous if a boat should be thrust into the arms of Anthony Gormleys shore exhibition of iron men, now well grounded and off shore of Crosby. Further inside the Mersey lies the large ports of Liverpool and Birkenhead, these are guarded by locks to keep the water in at low tide. The locks usually open at half tide when rising and stay open until the falling half tide. Further inside the estuary, the ground becomes shallow where the start of the Manchester Ship Canal begins at Eastham Docks.

The 'Ship Canal' was opened in May 1894 to provide the city of Manchester with an independent sea route for its manufacturing industries. It is 36 miles long with locks along its route at Latchford, Irlam, Barton and Salford with the river waters of the Irwell and Mersey keeping the system topped up. A notable swing bridge at Barton carries the Bridgewater canal over the Manchester Ship canal. By retaining part of the Bridgewater canal within the confines of the swing bridge, using gates at each end, the opening and closing was a seamless effort. Many a time I had watched this episode, along with the Barton road bridge, perform this operation as I waited, sometimes impatiently, with my bicycle for the bridge to reopen. It always amazed me how these huge seagoing ships managed to pass through the gaps in the middle of a main road, some at quite a speed, without smashing the road edge.

The Bridgewater Canal was constructed by James Brindley to transport coal from the mine of the Duke of Bridgewater, Sir Francais Edgerton. The coal was needed for powering the industrial revolution when the canal was opened in 1761, it continued to transport coal until the mine closure in 1887. The canal is on one level having no locks and links to other canals throughout the country, now mainly used for pleasure boating. The Bridgewater canal is currently owned by the Manchester Ship canal company.

The building of the Manchester Ship Canal, which miffed the city fathers of Liverpool no end, reversed the decline of Manchester as a city which was at the mercy of the Liverpool Docks and the railways. Severe opposition to the canal by Liverpool delayed the passing through parliament of the authority to go ahead but finally the bill passed, championed by Daniel Adamson.

River Mersey Estuary

River Dee Estuary, Hillbre Isle

Liver Building, Liverpool

Replica of 1879 submarine Resurgam

On the east edge of Wirral peninsula, the western side of the Mersey estuary, lies Port Sunlight which is not a sea port at all. This is the name given to the model garden village by William Hesketh Lever for the benefit of Lever Brothers soap factory workers in 1888. This was an experiment in care and social housing by Lever to improve the working conditions and housing for employees. Named after its soap brand 'Sunlight' , Lord Leverhulme, as he became known, passed the reins of power to the Unilever group.

Sailing boats seeking shelter in the estuary would be able to find it on the western Birkenhead side gaining some protection from the land. There are several ferry service floating docks which can offer temporary shelter but a little care should be taken to avoid sea training walls at the estuary mouth. These protrude perpendicular from the land into the estuary in an effort to prevent silting sand sweeping in on the tides. Just beyond Seacombe ferry terminal is the main entrance to the commercial Birkenhead docks which has lock gates controlled from within.

At the Woodside Ferry embarcation area, directly opposite the Liver Building on the east side of the Mersey, a replica of the submarine Resurgam is on display. Resurgam was the world's second mechanically propelled submarine built in 1879 and measured 45 feet long by 10 feet diameter. Constructed in Birkenhead the submarine was powered by a closed steam engine driving a single screw and was tested successfully in trials off the north Wales coast. When being towed after suffering some engine problems it took on water through the open conning tower hatch resulting in its tow rope breaking. After lying on the sea bottom off the north Wales coast for over a hundred years it was re discovered by a fishing vessel in 1995 and designated as a historic wreck.

Outside Liverpool and the Mersey, the River Dee estuary is no place to be since it empties completely at low tide. As mentioned, the only possibility for respite against difficult conditions is behind Hillbre Island which becomes stranded in a sea of sand when the tide is out. At the end of the Dee estuary is the old roman walled town of Chester built mainly from sandstone. This is a good place

to visit but not by boat since the River Dee has several bridges over it and is not navigable much beyond Queensferry, and that is assuming there is enough time and water to make the journey of several miles along the coast line of Wales. There is a dam across the river in Chester where the fresh water exits into the Dee channel on its way to Liverpool Bay.

Rhyl Anchorage

Rhos Anchorage

Llandudno & Great Orme

Conwy Anchorage

All along the North Wales coast as far as Llandudno there is somewhat limited possibility for shelter. To have a wind over waves situation with an outgoing current swept across by a strong westerly could be disastrous for small craft and must be avoided if at all possible. The strong spring tide currents along the coast could well reach 6 knots forcing a boat to seek shelter with a following wind. A modern hazard in the area is now the off shore wind farm on the Constable Bank, not a place to be dodging around wind mills unless you intend to lasso one as a place to moor. Rhyl has a river entrance and hard standing in the local boatyard, the river entrance is being used as an anchorage

for small craft. At fairly high tides, this is also a possibility for an overnight stay. The entrance dries out at low tide and a fixed road bridge spans the entrance preventing masted sail boats from proceeding further.

Just before the Little Orme, at the west end of Colwyn Bay, there is a small anchorage at Rhos on Sea. Situated close to the town, this has a mole to protect the anchorage and behind this is a small area out of the tidal flow. On the eastern side of the little Orme relief from tide and wind is possible when afloat but beware of rock outcrops leading from the shore.

Further west from the Little Orme at Colwyn Bay is the Great Orme at Llandudno. The Great Orme protrudes into the main current flow producing a nasty chop when the tide is running. Out of the current, the town of Llandudno is well protected by the Orme and boasts a Victorian pier for day trippers in summer. This Victorian town has all the facilities for holiday makers but little or none for the cruising sailor. The pier is surrounded by a rocky base which is exposed at low tide. At high tide, a short visit in the bay could be envisaged but it is not generally used for overnight stays by yachtsmen who would favour the Conwy estuary.

Just around the Great Orme is Conwy which is the base for a large North Wales sailing fraternity. Here it is well protected by the Welsh Mountains with spectacular views of the Conwy valley and Conwy Castle built in 1289 for Edward I. The area includes enclosed marinas with chandlers and a large anchorage accessible by marked channel over quite a wide tidal range. There is an entrance light on a perch which is quite difficult to see against the background lights of the town when entering at night. The channel fairway buoy, unlit, is north west of the entrance marker and although it is possible to cut across the outside from the Great Orme at high tide, one should see the area first hand when the tide is low. There is a field of boulders along the Orme side which are waiting to rip out the bottom of unwary boats and first time entrants would be well advised to detour to the fairway marker some two miles west of the Orme.

Beyond the Fairway buoy, Puffin Island is seen lying off the coast of Anglesey. The whole area south and west of the fairway buoy looks inviting at high tide but at low tide all you will see is the Lavan sands. Shallow draft local boats can find a short cut to Bangor but a sailing boat should head for the scoured marked channel along the eastern side of Anglesey. This begins near the Puffin Island light house then wends its way down past Beaumaris and beyond Bangor to become the Menai Straits, the separation channel between the mainland and Anglesey.

Beaumaris Anchorage

Bangor Anchorage

Port Dinorwic

Caernarfon Basin

Beaumaris, so named in 1294 as 'beautiful marsh' has anchorage facilities and a floating dock for day tripper boats. There is a chandlers close by and most boats are hauled out on the hard in winter. Getting ashore from the anchorage will need a dinghy unless you can take the ground, and then you will need wellies. A swift current passes by the anchorage so boats should

stay out of the stream if just visiting. Protection from westerly winds is afforded by Anglesey but the area is exposed to the north and east, and with gap of the Menai Straits between the mainland and Anglesey, there is not much shelter from the south. The town has an imposing castle complete with moat built to keep the welsh in check by Edward I in 1295. A dock connected the castle to the sea at one time but has since been covered in. There are plenty of pubs and eating places within the town for the hungry .

A little further down the straits towards Bangor, Dickies boatyard lies to the east and just before the Victorian pier. There are many boats parked on the land around the yard and full launch and retrieval facilities along with a well stocked chandlers. At Bangor, temporary anchorage can be found anywhere in the area but at low tide it will be difficult to stay afloat. Bangor is a university town and is a busy place during the terms. A cathedral which dates from the 13th century is positioned in the centre of town below the university with the high street close by.

Passage though the Menai Straight is a tricky affair and dealt with later. Suffice it to say that careful analysis of the tidal levels and bearings play a large part in whether success or failure will be the outcome of sailing through the Swellies located between the two bridges.

Just past the Menai Bridges on the eastern mainland side of the straits is a small harbour called Port Dinorwic. Here is a place to take refuge and tie up overnight inside an enclosed dock otherwise its just a case of anchoring at the Port entrance outside of the main stream and taking the ground.

At the end of the Menai Straight lies Caernarfon, famous for its castle and being the place where the Prince of Wales was afforded the Principality. Again, this castle was commissioned by Edward I to keep the welsh separatists in line and is complete with Hanging Tower, in use until 1911. Follow the channel around the north end to negotiate a foot bridge usually opened at mid tide for visitors. The basin drains completely at low tide and boats can sit against the harbour wall under the castle shadow or moor

bow in on the opposite bank where space is sometimes available. The town has several good pubs and eating places. In summer, the newly extended narrow gauge Welsh Highland steam railway is able to haul visitors as far as Rhyd Ddu on the slopes of Mount Snowdon. Trails from here lead onward and upward for the more adventurous walker.

As a previous resident of Anglesey, for the small boat sailor circumnavigating Anglesey there is a definitive cruising guide by Dr. Robert Kemp. This explains in fine detail the intricacies of coves and anchorage's complete with approaches and tidal flows. It is not the intention of this book to repeat the finer details of this publication but to indicate from personal experience where suitable points of interest can be found for cruising sailing boats.

Red Wharf Bay

Point Lynas

Amlwch Port

Cemaes Bay

At the Northern end, Puffin Island lies off the Isle of Anglesey and from here the next anchorage available to the west is at Red Wharf Bay. Red Wharf bay empties at low tide except for a trickle along the western edge where the approach channel is located. Protection is afforded from westerly winds and many boats use this bay during summer for permanent moorings on its sandy sea bed. A handy pub and eating house lies along the mooring area and is a favourite place to visit. Taking a short cut across the bay at high tide is not advisable unless a depth meter is on board since the main part of the bay is already 7 metres above chart datum.

Moelfre Bay offers little protection although small boats do anchor in its bay. It certainly did not help the unfortunate Royal Charter from breaking up on its shores as it returned loaded with passengers, goods and gold bullion from Australia. Pushed ashore by a fierce gale, the iron hulled vessel foundered in October 1859 with the loss of over 500 lives. The local lifeboat station has a historical museum depicting the events which caused this disaster. Divers still forage the sea floor looking for gold and other items of interest.

Keeping well clear of Moelfre Point and heading towards Point Lynas the sailor will pass Dulas Bay with its narrow entrance near off lying outcrops of Ynys Dulas. On the western side of Point Lynas is a small anchorage in Llaneilian bay where refuge from easterly winds will allow entrance. Strong northerly and westerly winds will drive a boat towards a wall of rock and finding the narrow entrance in such weather brings to mind needles and haystacks. Once inside the bay however, complete shelter is afforded by the surrounding hillsides. The eastern side of the Point Lynas is sheltered from the westerly winds.

The Port of Amlwch from offshore is virtually invisible except for its outer protective wall. Using the charted East Mouse as a marker, about a half mile east of this the entrance harbour wall will be visible. At one time this port was extremely busy with boat building and shipping copper ingots from the one time worlds largest copper mine at Parys Mountain. Inside the port are the Pilot boat docks. These are used to escort sea pilots to incoming

freighters bound for Liverpool. Part of the harbour remains sufficiently full at low tide so yachts seeking shelter can enter at any tide state. Further inside the harbour, boats can be tied up or moored temporarily but beware of spaces that the larger fishing boats use. Much better to raft against a suitable sail boat or drop an anchor along the western edge of the harbour. The town of Amlwch has a supermarket and pubs, otherwise it might be described as needing some renovation.

Around from Amlwch is Bull Bay, some protection from westerly winds can be had in the small drying anchorage tucked in on the western side. Lines may be found traversing the anchorage attached to rock outcrops, and without local knowledge these could be hazardous for the unwary.

Just past Middle Mouse and before Wylfa Head is the harbour of Cemaes Bay having shelter from all but northerly winds. The outer bay has a sand base which will enable anchorage afloat if needed. Towards the harbour wall, this dries out within a half mile of the shore at low tide. In this pretty harbour there is usually space somewhere to anchor safely, but sometimes a little surge from waves in the bay would indicate the use of anchors for and aft. Hug the harbour wall as the harbour is entered since off lying rocks extend outwards near the opposite low wall at the entrance. Be prepared for the harbour master to do his rounds in the mornings collecting fees from visiting craft. The village has the usual pubs and local shops for stocking up provisions.

Wylfa nuclear power station dominates the area and just below this on the east side a small bay can be used as an alternative anchorage. Similarly on the western side, Cemlyn Bay can be used to anchor but this is not safe from north westerly winds. Cemlyn Bay is visited by Arctic Terns during the breeding season and is a protected nature area. Leaving this area one should strike north and west around Harry Furlongs Rocks which extends seaward a considerable distance as shown on charts.

The passage around Carmel Head is fraught with rip tides and is the place of several wrecks in the past. Some of these are marked by buoys named after the unfortunate ships. Beacons on

shore and off shore, mark the line where the West Mouse is located, this can be passed inshore. Passing around the head needs to be done during a tidal slack to avoid the up welling waters from below. These are pushed upwards by fast tidal flows running over submerged rocks and churn the waters into nasty steep waves. Going around the outside of the Skerries is just as difficult as the timings will need to be spot on to avoid the rips. Considering that most of the water entering Liverpool Bay passes around this head, the flow in each direction leaves only a short time at slack water when passage should be attempted. Tidal streams here exceed 6 knots at times.

Cemlyn Bay

Bull Bay

Holyhead Port

South Stack

Once in Holyhead Bay, a straight line course to Holyhead harbour wall will keep a boat clear of most of the tidal stream. Once inside the harbour wall, which is 2 miles long, protection from the elements is assured. Towards the town there are plenty

of trot lines with mooring buoys for the resident yachts. The Holyhead boat club has a tender which conveys sailors to and from the moorings and permission should be sought to use one. There are visitors moorings opposite the club house and now extensions to include floating pontoons have been completed. Full facilities are available and only a short walk to the town for provisions is needed.

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Chapter 8

Sailing the Irish Sea.

Back along the river Ribble and the Douglas tributary, at the Tarleton canal side marina the boat was to be left in limbo over winter. Unless you have alcohol to keep you blood from freezing, sailing during the winter is a no go occupation at these latitudes. The boat remained on its trailer throughout the winter with a large cover tied firmly on in a vain attempt to keep out the worst of the weather. A few times during the winter I paid a fleeting visit just to check on it, sometimes it was almost possible to walk over the canal on the ice in January but I thought better of it. When spring finally came, well after April, it was time to think about getting ready for a weekend sail to explore the rivers.

After the boat was craned off the trailer and floated on the canal, keel up and covers off, we got he outboard going and headed inland with the mast still down to see how tootling along the inland waterways fared. We soon came across a small wooden bridge over the canal where we had to disembark under the watch full eyes of a field full of cows. It was no good tooting the horn since it was our job to swing the bridge manually so we could pass.

This we duly did and closed the bridge behind us in case a cow decided the field looked better on the other side, as it always does. Our next obstacle was a bank full of club fishermen who had rods and poles reaching into the canal centre, it looked like a fishing competition was in full swing. We continued along passing each fisherman in turn as they raised the rods in attention, it was like we were passing through a church wedding assembly but under the glare of each for us having done the unthinkable.

After a couple of miles we came up against a closed lock and decided this was far enough. We were not versed in opening and closing lock gates, neither did we wished to be swept back from whence we came by an emptying canal pushing us along, so we tied up for lunch and had a stroll around the lock hoping that the fisherman would soon be through with drowning the worms.

At the lock we turned the boat around and started back to reverse the whole procedure. Passing the fishermen who were still at it on the canal bank, we soon reached the wooden bridge blocking our path. This time the cows must have got used to us for they all started to wander across the field towards the bridge. Quickly we passed by the bridge, re closing it, and powered up the outboard in case the cows decided to stampede. The cows had also brought over some friends by way of hundreds of flies which was pretty harrowing. Getting back to the 'marina', I was not impressed by this venture into the unexplored interior, not impressed at all and determined that that would be the last.

During the rest of the afternoon we installed the mast and got everything ready for the next weekend when the tide would be favourable in the morning. Compared to the tides of lower latitudes the swing at 54 degrees north are much more substantial with springs of about 25 feet.

In order to get out of the canal through its sea lock the river water backs up two or three miles leaving a limited time to get in and out. Boats going out are waiting in the full lock before the canal end is closed, so as soon as the water is deep enough for boats to get over the lock cill, the lock waters are then emptied into the river allowing the gate to be opened by the lock keeper. At this point boats are going down river against the incoming flow, all with engine power. The choice is a two to three hour tootle or a ten our lock out.

We decided on a ten hour lock out and having got prepared with lowering the keel, we powered down the river Douglas to be met by a low pipe stretched across our path. As we approached this, I hurriedly lowered the mast so we could pass under and we continued on towards the river Ribble while hanking on the sails.

At the Ribble, the inward flow was nearing its slack and so we turned east up the Ribble towards Preston for a look see. We only got a couple of miles inland before the flow turned to ebb but we had seen enough to satisfy curiosity, basically not a lot to encourage us much further on unless heading for some old buildings backing on to the river (Now re developed into a large Marina complex). We turned around then put up some sail for the trip down to Lytham - St Annes. With the two or three knot tide behind us we tacked where needed taking less than an hour to reach the sea entrance river sand bar.

At this point the options were to sail out of the marked channel then north around to Blackpool or south towards Southport, neither of each having proper anchorage's, or else beach on the shore at Lytham and go into town for a late lunch for a look at the sights. We opted for the latter since going out to sea would prevent us coming in later as the sand bar in the estuary would be uncovered at low tide. Up went the keel and we drove on to the shore under outboard with the rudder clear. Next it was simply a case of jumping off and walking along to attach both fore and aft anchors so that when the tide came in the boat couldn't drift off.

Well, when I said jump off it wasn't quite like that, it was a case of first working my wellie's on and sliding off the cockpit combing into ankle deep mud and walking in such a way as not to leave a wellie stuck behind me as I walked on. After a bit of to and frowing carrying muddy wellie's back to the boat we found ourselves with a mixture of footwear, me still in my wellies, ready to take on the town. Lytham - St Annes might be described as the des-res of the English west coast so we looked a bit out of place by the time we got to the village. Still, all was not lost as by the time we made town my wellie's had dried enough for my trousers to be pulled over the tops in a kind of disguise. This was good enough to make us more presentable while we sought out the local lunch purveyor.

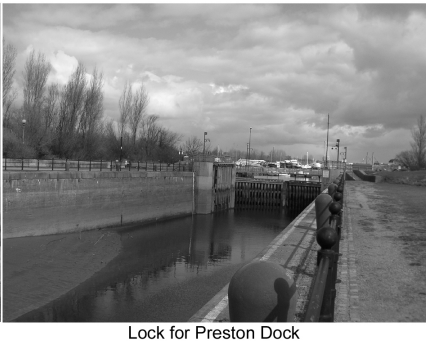
In earlier years the town was nicknamed Leafy Lytham due to its proliferation of mature trees, most of which are still here. The town plays host to the 'Royal' Lytham & St Annes Golf Club

where the British Open Golf Championships are held. We wandered around after lunch and then wended our way back to the open green area alongside the rivers edge. This is where a spectacular old windmill sits as the main focal point on Lytham green. The mill was built in 1805 on the green and has been renovated several times as a local landmark. Close by is the Lytham boat club with a small jetty for the convenience of sailing dinghy's.

Canal Moorings at Tarleton

R. Douglas Boatyard Moorings

R. Douglas off R. Ribble



Lock for Preston Dock

As the tide began to return we retracted our steps to the boat and I recovered the anchors to save hauling them up after we floated off. By the time we were afloat, it was getting quite late and I was ready to make tracks for home. The sail back was helped by the incoming flood and we ghosted along to the junction of the River Douglas at a gentle pace. Passing the

Douglas boat yard, the sails were taken down as and we made ready to motor around the bends and back under the pipe which crossed the river. As soon as there was space in the boatyard I determined to move our base here where the time available for being afloat was at least an hour more.

Arriving too early at the canal lock is a problem because the sides of the river have rocks which can gouge the hull. The only thing then possible is to wait in the centre of the river on the motor, stemming the flow while the level rises. This could be anything up to a half hour if timing has been misjudged. Finally the level rose enough to get into the lock with the keel up and the lock keeper did his bit closing the gates and filling the lock. It had been a long day by the time we got back to the mooring on the canal bank, not the best of places to be.

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Some time later, after moving down to the Douglas boat yard and over wintering there, a mooring became available at Conwy in North Wales where I had put our name down on their list. On the North Wales coast, Conwy was a main sailing centre for the North West being within 2 hours travel time from Liverpool and Manchester. I had acquired a mooring space on the Deganwy side of the estuary, for which I needed to supply a couple of single fluke anchors and a length of heavy chain to run between them. In the centre, a single length of chain was attached to a swivel joint and a flotation buoy shackled to the other end. These I supplied to the authenticated anchor layer for the anchors to be buried in the sand at the appropriate place. Having confirmed the mooring was now in position, we went over our plans to sail from our present base to Conwy for the next season. At the end of the season we would return to the Douglas boat yard so that any maintenance could be carried out closer to home.

The plan was to exit on the morning tide out of the Ribble and make a heading from the River Ribble end of channel marker of 232 degrees true. With a magnetic variation of 8 degrees west, give or take, our magnetic course would become 240 degrees.

(East is least, West is best, for the calculation). This would take us north of the Liverpool bar light , north of N.Hoyle buoy and towards the land mark of the Great Orme, highly visible in good weather. The total distance from the boat yard being 44 nautical miles, at an average speed of some 3.5 knots and 12 to 13 hours voyage time. We wanted to be in Conwy before nightfall so as to locate the mooring with relative ease, and also be there at high tide.

On the allotted day, having previewed the weather conditions, we set off from the Douglas boatyard as soon as we were afloat with plenty of fuel on board, on the engine and stemming the incoming flood. Pushing on down the Ribble channel, we came across steep chop as we reached the sea. This pounded the boat around somewhat but we continued driving onwards towards the end of channel marker. At some point the captains mate complained that there was water coming in so I went to investigate. Nothing was very obvious but still it shouldn't be there as no water was splashing in from the cockpit. Time for a taste test which confirmed salt water. There was a kind of bulge under the carpet covering the keel box, upon further examination of this I discovered a disaster in the making.

Due to the pounding getting over the Ribble bar, the keel support pin was now half way to coming out of its bush bearing leaving the other bush clear to pass water. If it came clean out the keel would drop down and end up dangling on its winch lifting cable, a submerged 1000 pound pendulum. The first thing came to mind was to push the pin back in by hand, but with 1000 pounds of keel hanging on the pin this was impossible. Grabbing a hammer I gave it a bash which moved it a millimetre or so back in the right direction. The problem now was to get the pin to re enter the bush from whence it came. The weight of the keel was tilting the keel just enough to prevent the pin lining up properly. I ferreted about in the tool box for something to jam between the head of the pin and the side of the galley seating. The hammer shaft was to long but a pair of vice grips would just do and these were jammed in the gap.

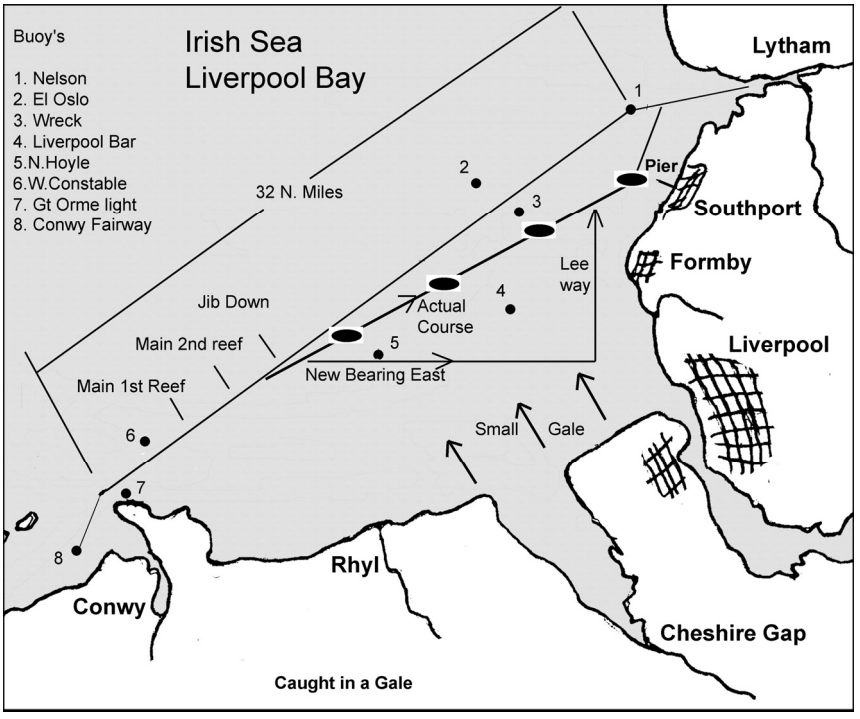
We were still being pounded by the steep chop and as a result the movement of the boat allowed the pin to get a finger nail hold inside the empty support bush. A bit more pounding followed by a bit more jamming eventually forced the pin back in position into its proper alignment. Phew, disaster averted, top marks to the captains mate. The cause turned out to be that the securing split pin had corroded through allowing the pin to withdraw. With the vice grips jammed solidly in position we continued our way. Later I replaced the split pin and covered the aperture with a layer of grp so that this could never happen again.

Whenever it was possible the sails were used in conjunction with the engine as we continued on our journey. The tide was now aiding us and although we were out of the main flow we had past the Liverpool Bar light vessel which could be seen in the distance. The Great Orme appeared out of the haze on the horizon, its distance from our vantage point some 10 feet above water level, would be some 20 miles away. Soon the tide was on the turn with the flood starting so we changed our course slightly to clear the Orme so as not to end up being slowed in our speed over the sea bed.

As we closed in on the Conwy estuary the light was beginning to fail as dusk approached. After passing the Orme we searched for the Fairway buoy which marks the start point of the entrance channel into Conwy. The channel is marked by can buoys at various intervals but in the dark virtually impossible to see. After threshing about for 10 minutes in vain, being at high tide I closed in towards the shore intending to follow it to Conwy entrance. Clunk, clunk came to us as I managed to find some rocks with the keel too close to the shore, so about face immediately and gain some more sea room. The entrance light to the estuary should have been visible but the road lights of Deganwy were the background of this black void in between.

Gingerly we slowly motored in the general direction of the background lights until we spotted the weak winking light of the entrance marker. The marker pole supporting the light is held in position by three guy wires which lead off from the top of the pole to anchor points below. These were now covered with water so

this was the next hazard to watch out for. Getting too close would stop us in our tracks. As we rounded the perch light the full anchorage came into view and with great relief we motored along to search out the mooring. This we found without much trouble and made secure to it and lifted the keel. The journey took 13 hours, a long day for all but a satisfying achievement.



When it was time to return to our base on the River Douglas in September, we chose what appeared to be a weather free weekend, opting to leave on a high tide early on a Sunday morning. With a clear blue sky and gentle breeze, I left the captains mate to drive back by road while I sailed out with number two crew. The reciprocal course to the Ribble entrance was planned and as the wind gently increased after rounding the Geat Orme the sailing was most pleasurable.

This wasn't to last however as the wind continued to gently increase, ultimately requiring the first reef to be put in. About 3 hours out, with the north Wales mountains slowly disappearing in the mist, the wind was still increasing from the south east and the second reef was put in as things were getting a bit rough.

Pretty soon visibility was down to about two or three miles and there were no landmarks to see anywhere. With it being a south east wind, this tends to blow unrestricted over the Cheshire plains, the welsh mountains acting as a funnel. The wind had grown so fierce and the waves fully built up, that the jib had to come down to prevent us being blown totally off course. So with the crew hanging on to the tiller I managed to tame the wild flogging jib sail which had been pulling the bow towards the north.

Without land marks, in this sea of white horses it was impossible to know our absolute position. The outboard motor was powered up and a new course was decided as due east, a precaution in case we were to miss the Ribble estuary by being blown down wind towards Blackpool. The waves were quite violent, every 4th or 5th wave would lift the outboard prop virtually clear of the water making the motor scream as it lost thrust. We carried on scanning the misty line off the bow, knuckles white and with the waves breaking on their tops. A few hours later flashes of light began sparkling through the mist, first on the starboard side and then on the port side of the bow. At first these didn't make much sense, then it dawned that these were reflections from car windscreens which I assumed were travelling along the coast road each side of the Ribble estuary.

Great I thought, just where we needed to be, dead opposite the Ribble estuary mouth, cars each side travelling on the coast roads. We continued on the same course as the coast line became clearer in view, trying to recognise the land marks. The cars would travel along then disappear to re emerge after a gap. This wasn't right though, buildings each side of the gap seemed to be on the same stretch of road. Then it clicked, the gap was the end of Southport Pier masking our view, and we were heading straight for it. Having previously walked out on the sands

following the tide on its way out, I had come across the wreck marked on the charts and had seen the remnants of its hull with its marine engine sticking up still in place. This was about two miles off shore and only marked by a small buoy thoughtfully placed by the West Lancashire Sailing Club, close to the end of Southport pier.

Once I realised our position it was a quick turn to the north along the coast hoping that we wouldn't strike the wreck. The immediate danger over, we headed in the direction of the estuary, still unable to actually see the estuary in the mist. It was close to high tide again and we needed to get up the Ribble back to the boatyard before the tide turned. Suddenly we hit ground on the north side of Southport, we were too close inshore and were bouncing around in six feet of water, at least 2 miles out.

I raised the keel a couple of feet and steered 90 degrees to the west thinking it was time to fix the depth sounder. After 10 minutes we resumed the northerly course looking for the Ribble channel marker. Eventually it came into view but we were already half way along the channel so it was a case of just slotting in as we approached it from the side. Once in the river everything calmed down and a wave of relief, so to speak, was felt on the home stretch. We made the boatyard finally in time to moor on the pontoon and then unloaded our gear thankfully, after an eventful day.

We made the trip to and from Conwy several times later, sometimes at night. This was pretty straight forward since the bright light of the Liverpool Bar, 40 feet high, served as a marker for half the distance. When that light went below the horizon behind us, the loom would still be present for a while then Great Orme light would be rising on our heading, being 325 feet above sea level. The Great Orme light has since been switched off with the advent of GPS for navigation.

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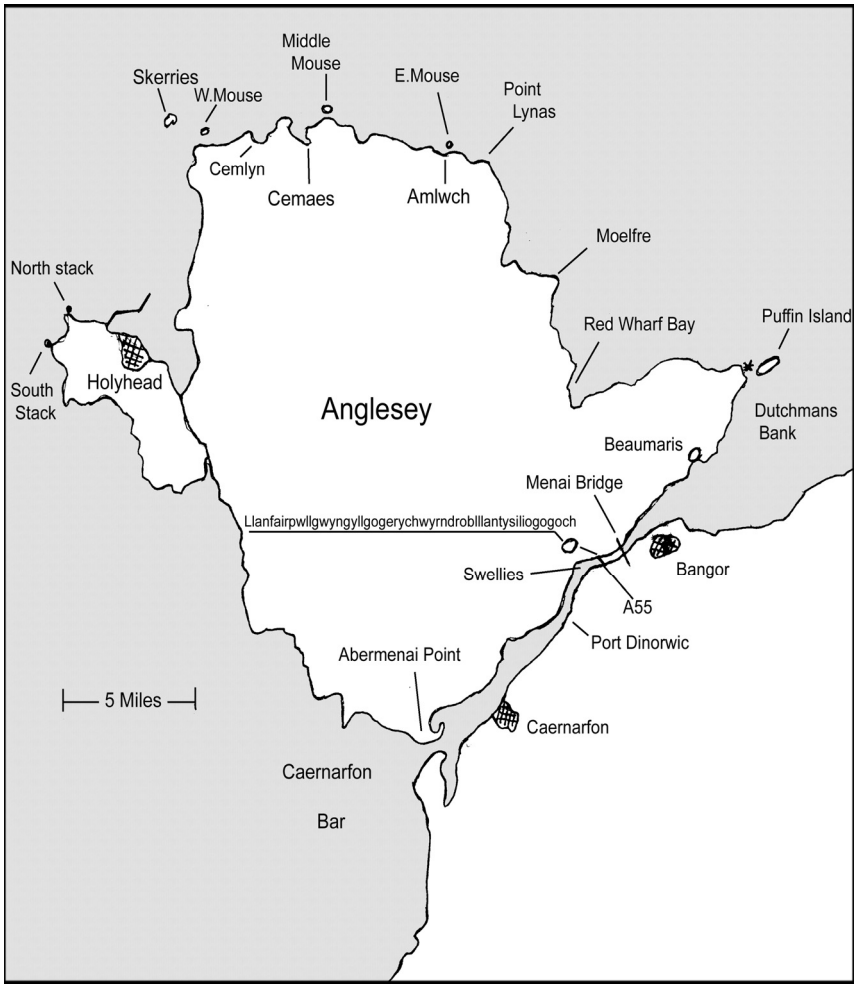
Being ensconced at Conwy allowed us to plan a trip to Caernarfon passing under the two Menai Straight bridges. The longest chain suspension bridge of its day, Menai suspension bridge built by Thomas Telford and opened in 1826 served to ferry Ireland's passengers from Holyhead to London. As expected this was opposed by ferry ship owners who would lose



a captive trade. The Britannia bridge was originally built by Robert Stephenson, son of George Stephenson, and was a revolutionary box tube construction designed to take locomotive drawn trains from London to Holyhead, this opened in 1850. It was accidentally burnt down in 1970 and was rebuilt to carry both road and railway. It is now supported underneath by arches.

A sailing trip such as this can be fraught with difficulties due to the time difference between the high tides at each end of the Menai Straits. Such a time difference causes ebb and flows within the straits which do not conform to standard procedures, that is because it can take over an hour for water to pass around Anglesey, high water at Caernarfon Bar does not equate to high water at Puffin Island. What is more, due to the channelling of water flows within the narrows and the difference in high water levels at each end, spring tides can see up to 8 knots velocity, with very little time at slack water to pass through.

Such was the problem that in 1953 when the training ship HMS Conway was being moved by tugs through the narrow Swellies, the timing was misjudged and the lead tug was unable to make headway due to high water slack being insufficient in time. When the rear tug disconnected intending to help the lead tug, the rear of the boat swung about and eventually struck the 'Platters' below Menai bridge. When the attempt to pull HMS Conway off the rocks failed, the falling water left the ship without support and the boat broke its back.

Sailing through the Swellies needs to be done when it is slack water there and not when it is slack water at Caernarfon Bar or Puffin Island. The visible slack water, high or low water, moves up and down the straits depending on levels at each end. For reference, Holyhead is taken as the tidal reference point and at Liverpool the high and low tides will be approximately an hour later.

At low water springs, the remnants of water contained within the straits is still exiting at Beaumaris and outside Caernarfon Bar in opposite directions. The Abermenai Point narrows, through to Port Dinorwic, is listed as low slack water on the Admiralty Chart.

A small current might then still be expected to be flowing in the Swellies heading out towards Beaumaris and Puffin Island.

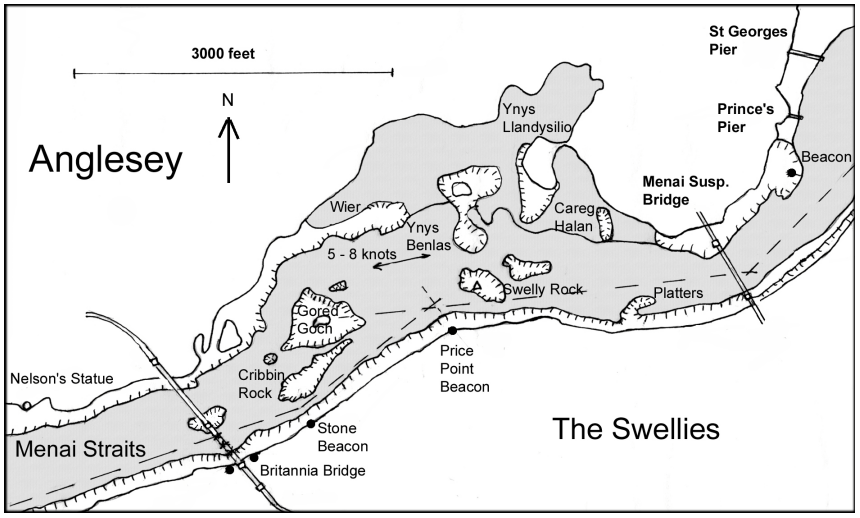
There is a tidal height difference between the high tide levels at Caernarfon Bar and Puffin Island, irrespective of the timing when these occur, of 3.3 metres or nearly 11 feet, a local anomaly of the Irish sea. If the high water levels stayed static, this is enough to create a strong flow from Puffin Island to Caernaron Bar making it impossible to sail against and with raging currents in the Swellies. Fortunately the high tide levels do not remain static.

As the new flood starts to raise levels at Caernarfon Bar, water begins to flow inwards towards Dinorwic and the Swellies, and because of the hours delay to move around Anglesey this flow has no counter resistance at Beaumaris to slow it. Eventually the level begins to rise at Puffin Island, its rate of rise now increasing faster than that at Caernarfon Bar. Soon this stems the flow from Caernarfon by a balancing virtual slack water at Bangor created by inflow from Puffin Island.

The rate of rise in the level of the tide at Puffin Island, being faster than at Caernarfon Bar, now forces this slack water, its level still rising, down the straits towards the Swellies. This occurs before high tide level is reached at Caernarfon Bar, about an hour before high water at Holyhead, leaving about a half hour before high water at Caernarfon Bar. This is the passage time for sailing through the Swellies.

With the high tide level at Caernarfon now virtually stationary and the level continuing to rise at Puffin Island, the slack water in the Swellies is now replaced by the incoming flow from Puffin, pushing the flow out past Port Dinorwic and Caernarfon. This is the stage set for the next six hours as the high tide is reached at Puffin Island and the high tide begins to fall at Caernarfon. Aided by this stream, a sailor can make Caernarfon doing 10 or 12 knots over the ground, less than an hour from the Swellies. Eventually the flow reduces as the low water level is reached at Caernarfon, then an hour later at Puffin.

When returning back towards Beaumaris, the sailor can be assisted by the inflow from Caernarfon Bar as far as the Swellies where the high water slack will be met. Being late is not an option since when the flow reverses again, it will increase rapidly and if still in the Swellies the boat will soon be sailing backwards.



Using the tidal rules of passage, at high tide we passed under the Menai Bridge at the suspension centre and using the back marker light beacon set a true course of 263 degrees, lining up with the marker on Gored Goch. After passing the Swelly Rock marker, we continued a little until Price Point where we could observe the Britannia Bridge leading light markers near the left pillar, this on a true bearing of 231 degrees.

Turning on to this course, then keeping a wary eye on the water surface, we continued on this bearing while looking out for the white stone beacon opposite the end of Cribbin Rock. As the stone beacon came abeam, we changed course again to 252 degrees true and safely passed under the Britannia Bridge a little to the port of the centre pillar. At high spring tides, none of the nasty rocks are visible, the real care is obviously needed when between the springs and neaps.

We thus made our weekend trip to Caernarfon, drying out in the basin along the opposite bank to the castle. On the return journey, the incoming flood helped us on our way once we were afloat so that the reverse course could be made as early as possible. Moving on through the straits as far as we could, before the current turned, allowed us to make Beaumaris in good time.

Now all that was needed would be a swift sail cutting across Dutchmans Bank to make for the Conwy Fairway buoy before the tide dropped to much. On the way in to Conwy, opposite Deganwy, we struck ground once or twice but lifted the keel enough to make the mooring. Being able to reduce draught from 5.5 feet to just 18 inches is a godsend in shallow water.

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After spending a few years based at Conwy, the family now dispersed on their own careers, we moved to our cottage on Anglesey on a permanent basis. I took up a kind opportunity presented by a previous work associate to provide support for a computer based plant monitoring system. The nearest sailing base was at Amlwch port which provided a tidal basin for local sailors. The port has a good launching ramp enabling the boat to be hauled out each winter where I towed it to the cottage for storage.

The boat hull would have to be cleaned off and new ante fouling paint applied each year. Most of the time the boat would be sitting on its mooring high and dry so it really didn't become massively encrusted with marine life, but it still had to be done. Working upside down with a scraper and wire brush is not the most pleasant job and should be carried out with eye goggles and a breathing mask, not on a windy day. When cleaned back, the hull can be inspected for signs of damage, gouges and the like, if necessary these should be filled with a mixture of resin and talc then smoothed off. Tapping the bottom of the hull should be done to test if de lamination has occurred and if so steps to repair this must be taken. I never found any problems in this regard.

The stubby keels however were gradually rusting thinner and eventually a new pair of replacements were constructed and fitted. In addition some areas of the cabin top skin layer were looking decidedly the worse for wear and needed repair. These were stripped back to the glass fibre originally laid over the 10mm ply, the grp was sound and still well bonded to the ply which was also sound. After a couple of months repair work in the summer, the boat was put back on its mooring looking ready for action.

For a short time I became a member of the Holyhead boat club in order to qualify for a mooring. The annual club fees were rather expensive and the mooring fees were additional. That was the price to pay for being able to sail off at any state of the tide. Once outside Holyhead breakwater however, the tidal flows would carry you off in either direction at a rate of knots. Out for a short sail one day at high tide, I opted for a sail around to South Stack to take photos for my son in law as he wanted to do a rock climb over the cliff. Having got the photos we started back but had misjudged the timing somewhat. With a strong westerly wind behind us, sails out wing on wing, motor on full power we found ourselves stemming the outgoing tide, basically stationary doing at least 6 knots opposite the North Stack light.

South Stack with its Tidal Race

Each time we moved towards the shore the boat lost ground and we fell back. Short of giving in and going around Holyhead to Trearddur Bay to wait out the tide, it was a case of inching inwards to try and get out of the main flow. After an hour of this we eventually got past the light, literally a few feet from the North Stack shore, and crawled back along the Holyhead sea wall where the current was less. Not a place to be at the wrong time unless you planned for it.

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Chapter 9

Mediterranean Adventure.

Being a trailer sailor gave us the options of mobility with little trouble to move to different venues, just a case of tying down the mast and boom and loading up. One year we planned a trip down to the Mediterranean by towing to Dover, crossing on the channel ferry and then trailing down through France, staying overnight in the boat at an air de rest. The journey would take 3 days overall and we would be accompanied by my brother in law in his motorhome, a trip regularly taken to enjoy the warm summers. Towing was not a problem as I used an old Range Rover with a powerful Perkins diesel engine. The destination was to be on the River Orb near the town of Agde, in southern France.

Driving down to Dover from Anglesey took about 10 hours with breaks. We took an evening ferry taking about 90 minutes to cross the English channel. After disembarking at Calais and then taking the road south we found a suitable rest area on the A16 at La Baie De Somme, just short of Abbeville. This was convenient as a fuelling stop and includes an overnight parking area, free of charge as we were on the toll part of the motorway. One has to be careful using the free stop areas, especially in summer as the caravans and motorhomes can be targets for criminals.

We took our overnight rest using the boat to 'camp out' in and after an early breakfast got on the road, as they say to Rouen, where we crossed the River Seine. Our route, we decided, was to take us via Evroux, Chartres and then towards Tours over the River Loire. Rather than stay on the road all the time, we opted for the night stop at a camping site near Tours at Veretz, on the banks of the River Cher. This allowed us to uncouple the boat trailer and have a drive into Tours for a visit. Also known as the

garden of France, the city of Tours is built on the banks of the River Loire having an imposing cathedral and pleasant park areas. Although it is the largest city in central France, the regions capital is Orleans.

Pushing on the following day brought us alongside the Canal Du Midi. This canal serves as a route through from the Atlantic ocean for sailing vessels wishing to avoid the voyage around the Portuguese coast line and Gibraltar. So as not to arrive late at our destination at the town of Valras-Plage which lies at the mouth of the River Orb, we decided to stop overnight at the Aires du Lauragais rest area alongside the Canal du Midi. This has complete facilities for travellers with restaurant and showers, it is a popular stopping place.

We arrived at the marina the following day and booked in at the office for a couple of weeks. After launching and stepping the mast we motored around to our allotted space between two largish power boats. The marina is a kilometre up stream of Valras, which itself has a large marina stacked wall to wall with all kinds of boats. The tidal movement is insignificant and our location was far enough upstream of the Mediterranean itself not to bother us with any surge from offshore waves.

After lunch we jumped on our bicycles and did a tour of the town to check out the food stores. Our travelling companions had already gone off to their regular camp site at Marseillan Plage so we were free to saunter around. Valras is not frequented by many foreign holiday makers, it's one of those towns which the French people know about but do not advertise widely. The Cafe's have no boards out advertising 'full English Breakfast', nor is it frequented by larger louts, its just a nice family resort town for the indigenous population.

It was great being able to sail off without analysing the tides and examining the weather forecasts in fine detail. The local weather conditions were posted on the marina office and we just had to watch the 'Voile Vents' listed, especially if a dreaded Tramontane was possible. This is a north westerly wind which can blast down through the Toulouse Gap at force 6 or more. We

enjoyed the sailing in this area, not going any great distance off shore and taking trips up the River Herault at Grau Agde.

River l'Orb, France

River l'Herault, France

En Route, France

When eventually it came time to retrieve the boat I tied it in position against the launch ramp dock side. Then got in the car and reversed the trailer down the ramp into the water while onlookers watched. Having positioned the trailer I next clambered on the boat fore deck and threw the bow line to the captains mate standing above the water line, ready for pulling the boat over the trailer. Of course the bow line landed short so wading in a little way in before I could say no, she retrieved the line. It was like slow motion, as on the next attempted step, the ramp being slimy with marine growth and algae, moving back up the ramp was an impossibility. I'm stuck came the plaintiff cry and a helpful onlooker linked hands to form a chain. Another go at stepping back was tried which had the opposite effect and the onlookers let go while the captains mate, arms outstretched, slid gracefully down the ramp into the warm water, while accepting the

inevitable. Being dressed for the occasion in shorts and top, now swimming, she found her way to the back of the boat where I lowered the ladder to receive a few choice nautical words from the captains mate.

There had been a few engine mis starts by the old Range Rover, some problem to do with the starter solenoid which had not yet been fully diagnosed. A hefty screwdriver placed across the end of the battery cable terminal and the starter solenoid terminal was occasionally needed to turn the engine over. There was already a large copper buss connection there so it looked like an intermittent break was happening internally somewhere. I kept the bypass screwdriver handy so when the engine failed to turn, I lifted the bonnet/hood and bridged the connection to start the diesel.

We made it back to the ferry at Calais and loaded on board ok. Of course it had to happen again, this time in the bowels of the ferry when getting ready to off load. All the other vehicles were started except us and I wondered how we would get out if the engine failed completely. Engine cover up, with my trusty screwdriver I jumped the connection and prayed while the engine turned. It started ok and we rolled forward with relief, all that was needed now was not to stall anywhere on the ramp going off.

Finally we made it home and I could start to analyse the fault properly by removing bits of the starter. The fault turned out to be a hairline fracture of the copper buss connection, a perfect fit on a 1/8 inch thick copper bar, repaired in a minute with a piece of flattened copper pipe.

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Chapter 10

Sailing Topics.

Putting up the mast after trailing.

Preparing the boat can be done on its trailer or on the water. If done on the trailer first checking that the extra height of the mast will clear all objects, power lines etc., when launching. This usually takes less than a half hour.

Release all the ties which have secured the shrouds, back stay, fore stay, halyards etc to the mast after the boat has been transported on its trailer. Remove the under centre mast support attached to the mast step. Release the lower mast hinged plate at the transom by removing the securing bolt passing through the support. Place the bolt on deck next to mast deck plate. Attach aerials and wind direction indicator if present.

Lift the mast at the back and manoeuvre while tilting the mast from the transom end, run the mast along the forward rubber roller. Tilting is needed to clear the cruising chute block, if fitted, which is behind the roller and tends to stop the mast from moving smoothly forward. As the mast moves to overhang the bow, hold the base of the mast down to stop it lifting as the mast weight moves forward. Move it forward in small movements holding it very firmly. When over the mast deck plate, manoeuvre the base of the mast in position and insert the swivel pin bolt.

Position the stays and shrouds ready for the mast lift. Make sure that no rigging wires can snag on cleats or trailer parts. Run the fore stay forward overhanging the bow pulpit, also the jib halyard and cruising chute halyard. Keep the back stay on top of the mast running to the cockpit. Make sure the shroud bottle

screws are leaning forward and that they can move vertical when the mast is raised.

Position yourself at the pulpit on deck and facing to the cockpit. A helper in the cockpit can keep tension on the back stay although this does not afford any lift effort. Raise the mast a foot or so then position a hand under the mast for the lift. Push up under the mast and move towards the cockpit until the weight starts to reduce at about 30 degrees off vertical. Check that none of the rigging can snag on deck cleats etc and continue pushing on the mast until the fore stay begins to tension and the shrouds are tight and vertical.

Generally the mast will hold this position unaided but it is wise to keep a tension on the back stay as you move to the cockpit to secure the back stay. Fit one securing pin in one side of the split back stay tangs on the transom combing, the split pin can be fitted later. This will ensure the mast cannot fall forward while the other side is secured.

The split pins are now inserted from the cockpit with only a small spread to hold their position. When secure, feed the back stay tension line through the jamb cleat on the transom and tension the back stay/fore stay until snug (Not overly taut). Check that the spreaders are at right angles to the mast and if not pull the upper outer stay forward or back to align the angle. Check the halyards are running down the mast sides and not caught around stays or in the wrong position.

Boom Attach.

Check that the boom gooseneck slide in the mast groove will be held in position where the boom is normally attached. If necessary, insert a slide stopper to prevent the boom slipping down out of position under its own weight. Rest the back of the boom on the deck and attach to the gooseneck using the bolts needed to attach the boom slide. Align the ‘Bull horn’ tabs downward and tighten the locking nut using a spanner. Do not rely on finger tight as the boom can become disengaged from its slide if in heavy seas and with mainsail up this could be

disastrous. The ‘bull horn’ tabs are where the first and second reef cringles are slipped over in heavy weather(See reefing later).

Attach the rear of the boom to the topping lift for support while the main sheet block is shackled in position on the boom end. Secure the shackles firmly and adjust the topping lift to the length which will allow it to be slack when the mainsail is raised.

Fitting Main Sail

Remove the sail from its bag and lay it over the boom in a concertina fashion. Take the clew and feed the sail rope into the sail groove on the boom at the gooseneck, pull the clew towards the boom end as you feed it on to the boom. Loosely fit the clew out haul in position though the block & around the boom end.

Fit the sail tack cringle into the shackle at the gooseneck and then tension the out haul. Attach the head of the sail to the main halyard and feed the sail slides into the mast groove while raising the sail a couple of feet or so. Insert the sail battens during this process. When all the slides are in the mast groove, insert a sail slide stopper in the mast groove to stop the sail slides from spilling back out. The boom can be supported by inserting a wooden sail stop in the mast groove until the sails are fully raised.

Fit the jiffy reefing lines through the leach sail cringles and secure to the boom cleats. The sail can be concertina folded over the boom and held on the boom using shock cords wrapping around the sail. Put the sail cover on when not in use to keep off the UV light which can degrade the sails.

Raise the Main

Raise the main only when the bow is facing the wind! Simply haul on the starboard red flecked halyard until the head cannot go any higher, secure to the mast cleat. Remove the boom slide stopper, take the boom down haul and pass one end around its mast cleat then push down on the boom at the mast to tension the sails internal luff rope.

If necessary pull the down haul down and slightly towards the cockpit to prevent the boom slide from binding on the mast. Make sure the topping lift is not lifting up the boom end. Tighten the sheets to prevent the boom from going wild until the sail fills. Slack the sheet if needs be....

Fit the Jib

With the jib still in its bag and its sheets protruding from the bag, fit the halyard to the head and attach the sail slides to the fore stay, raising the sail head a little to allow all the slides to be attached. The sail should have been put away essentially stuffing it the reverse of the way it will come out so that it can be attached without the wind filling it. This is best done before leaving the dock. Attach the clew to the pre installed sheets which are fed through the deck blocks to the cockpit cam cleats.

Raise the Jib

With the sheets loose and attached to the clew, pull the sail bag off, then haul on the halyard, preferably with the bow into the wind or masked by the mainsail, secure the halyard at the mast cleat. Haul in on the sheets to fill the sail.

Collapse the Jib

Simply release the halyard and grab the sail pulling it down. This can be done via the forward hatch. Tame the sail with shock cords as required. A Jib down haul can be used instead of pulling down on the sail itself requiring an extra line to be fitted. This is attached to the halyard shackle at the sail head and fed via blocks to the fore deck.

Collapse the main

Support the boom with a mast groove stopper, Release the halyard and pull down the sail at the mast and feed the sail over the boom concertina fashion or if in a hurry secure with shock cords.

Reef the Main

There are two options for reefing the main. Both need to be done quickly in order to maintain control of the boat under windy conditions. The first, as described earlier requires the main sheets to be slackened while shortening the pre fitted sail clew reef line, such that the boom end raises up at an angle supported by the sail. Then the halyard can be released so that the lowered sail tack cringle is hooked over the bull horn fitting at the gooseneck. The halyard is re tensioned and the sheets adjusted in as necessary.

The second option releases the halyard first and then lowers the main to the first reef cringle hooking on to the gooseneck 'bulls horn' fitting. The halyard is then re tensioned and at the boom end, haul in on the jiffy reefing line to secure to the boom cleat. The weight of the boom relies on the topping lift to prevent the boom falling into the cockpit.

You may need to free up the sheets if the boom tries to pull against the mainsheets until the reef line is secure. Tie up the loose sail with reef ties. This first reef can be used quite happily with the jib raised.

Which ever method makes most sense is the one to use. Repeat the procedure for a second reef, at which point the jib should be down and there will be wall to wall whitecaps.

Anchoring

One of the most important aspects in sailing is knowing how to stop the boat and anchoring. There have been one or two occasions when I have been forced into a situation where this was the final option before ending up being driven ashore or against a sea wall. The boats anchors must always be able to be set in circumstances when you least expect it. That means the access to the anchors has to be easily available and not at the bottom of a pile of other stuff in a locker somewhere.

The type of anchors that I used were Danforth's, one main bow anchor and one smaller stern anchor. Both anchors had a length of 3/8 inch chain attached, about 12 feet, so that the anchor line, 3/8 inch twisted nylon rope did not chafe or become tangled with the anchor as the boat swung about in the wind. The chain holds down the anchor in a horizontal position causing it to dig in under pulling stress and also reduces the amount of scope needed for the line. The line, being nylon had a degree of stretch which provides give which limits any fierce shock to the bow.

In a tidal stream, both anchors were deployed fore and aft since with only one anchor this would have to reverse its position as the stream reversed, possible allowing the boat pull out its anchor to drift off somewhere out of position.

The main anchor was always hung on the pulpit, held there by rubber shock cords, the anchor line and chain were allowed to fall via a deck vent into an accessible compartment under the fore peak. It was not coiled since this would create snags when pulling out the anchor line prior to being deployed. The bitter end was tied around a stout wooden spar to stop it coming up from under the fore peak.

Strictly speaking the anchor should be lowered over the bow as the boat falls off backwards, either wind driven or motor driven. The chain should already be on deck and the line ready to come up from stowage as the anchor and chain are lowered by hand, so allowing the line to run free. As the boat falls back, a little resistance can be applied to the line so as to cause the anchor to bite into the sea bed, but not so much that it skids across the bottom. The usual rule of thumb is to allow a scope of at least 7 times the depth of water under the hull, but the longer the better.

Its rather like fishing, as soon as enough line is deployed, the anchor can be set by slowing the boat using the line around a deck cleat while taking a transit sight on a suitable local object. Once set, a stern anchor can be put down by running out more bow anchor line to let the boat fall back further before lowering

the stern anchor. Then motor or pull the boat forward to the position where the transit was noted.

If you intend anchoring temporarily in an area not so designated such as a mooring area, then some kind of indication is usually provided. In daylight this takes the form of a black collapsible disk which can be assembled and run up the mast where it can be viewed at any angle as a sphere. At night, you must show an all round white light, generally at mast top. This is sometimes combined with a running light for night sailing.

The last thing you need when sleeping overnight at anchor are halyards slapping against the mast keeping you and your neighbours awake. A pair of shock cords hooked around the outer stays and the lines will solve the problem. As an alternative to this, we always slackened the halyard and propelled each loose length around opposite sides of the spreader stays, then taking out the slack tied it back on its mast cleat. Lighting cables running up inside the mast are also a problem, slapping the inside of the mast while the boat gently rocks drove me nuts. This was solved by feeding the cables through a soft aerated sponge material tied at various intervals which stopped the 24 foot dangling internal cable swinging against the mast.

I was glad to have the stern danforth to stop me when sailing back on the jib down a twisty channel in shallow water at Redwood City. Rounding the last bend I was heading for the launching ramp with the keel wound up, under jib only, ready to drop the jib and coast into the holding point at the ramp. There was a strong breeze blowing and as the ramp came into view there was no room to dock as it was full of boats, no space to be had. To the port side of the dock there was a blind ended channel in which to turn, and with having the keel up, I was reticent to round up fast as this would pass broadside to the wind and there was a strong possibility of a capsize. I let the jib fly but it made little difference to the speed. Out came the anchor and quickly lowering it over the transom, I payed out the line as much as possible while heading to a dead end bank at a rate of knots. At the last moment I tightened on the anchor line to slow the ton weight of forward moving mass, and with the help of the mooring

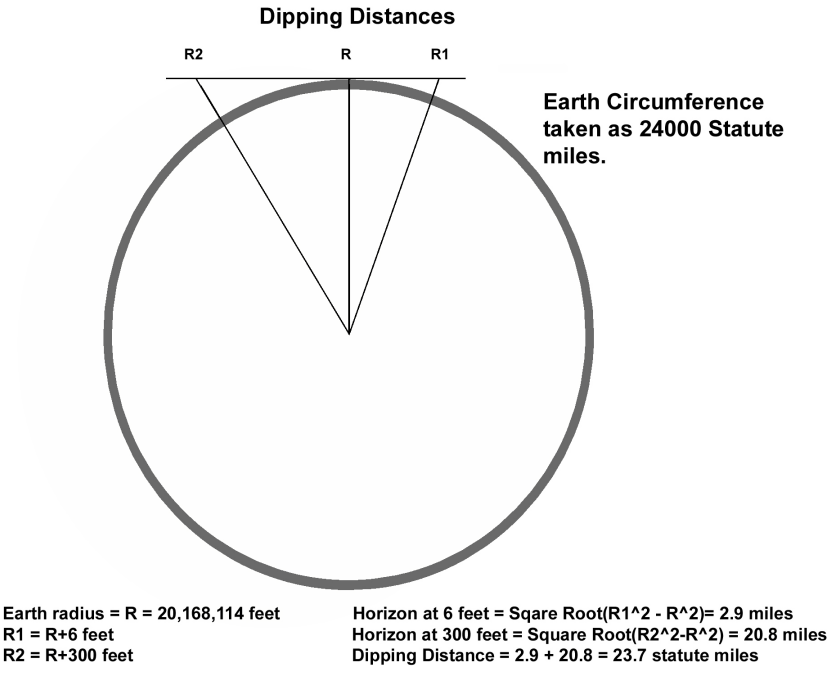
cleat stopped the boat in time. Apart from some hot hands and a degree of embarrassment it was a lesson learned, next time have the motor running and sails down.

Night Sailing

It's essential to be kitted out with proper charts and lighting equipment before embarking on a night sail since, apart from being illegal without lights, your life and others may depend on it. When under sail only, this requires the use of port (red) and starboard (green) such that they are both clearly visible when viewed from the front. In addition, when viewed from the side, the port or starboard lights will be visible to over an arc of 112.5 degrees. A compulsory white light visible at the rear covers the balance of the lighting making up the 180 degrees for each side. The arc of the rear light is therefore double the 67.5 degrees for each side or 135 degrees.

Under motor only, or motor and sail, you will need an all round white light as well as the port and starboard lights. The all round white light is usually mounted at the top of the mast where it cannot be masked by sails. Both the sailing only white light and the motoring white light are sometimes combined for dual use as an anchor light.

A good sailing compass is essential which will also have internal lighting that works, and for seeking out unlit nearby buoys a strong narrow beam torch would not go amiss. Apart from the flat earth society, a table of light dipping distances should be carried or else good calculator could be used if your table blows over board. These will only be needed if your GPS fails somehow, not unknown, so that a position fix can be established from known light points which are visible and charted. Light heights are indicated at high tide levels so if the tide level at the light is lower, its height above water level is therefore higher. This makes the dipping distance appear earlier or nearer than it actually is.



When we night sailed to Conwy, the Great Orme light listed at 325 feet, its dipping distance when combined with a bearing gave a pretty good fix being some 23 miles along the measured bearing. The Liverpool bar light, incredibly bright at 40 feet high dipping distance at 11 miles gave an alternate fix along our route. The smaller lit buoys were not always visible due to their and our height above water level since our horizon at 6 feet above the water line gave us a visual horizon of 3 miles. Anything below this height at 3 miles beyond our horizon could not be seen except from the crows nest.

Searching for local unlit buoys can be a nightmare being extremely difficult to see. They should be looked for with great care or journeys should be timed, if possible, to coincide with or be later than dawn. That way if channel markers have been lifted or simply swept away, at least you can see roughly where you are after a tiring night.

It is to be expected that when venturing off shore at night you already will have gained a proficiency in sailing and be fully confident in your abilities. If at all in doubt, get yourself off to the local college during a winter and take the RYA yacht masters coastal navigation course for some excellent tuition. If you carry a VHF radio, this has to be licensed so that you have a station identification apart from the need to be qualified in how to use it properly. Again, the RYA offer courses in this subject.

Instruments and Charts.

Some times too much reliance are placed on the use of instruments when what is really important is to carry a good detailed chart of the area you are sailing in. During day sailing, your eyes act as a pretty good set of sensors in establishing your local position, and unless you have suddenly become enveloped in fog, you will know your position simply by looking at the surroundings and a chart of the area.

The need for a good compass only comes necessary when you intend a long sea journey out of sight of shore. Closer inshore you can usually see a marker where you may want to head towards. Generally, for instance when heading up wind on a tack, it is the wind direction which determines your heading and for this a compass is not needed. The only times I found a compass was really needed was at night or when sailing over maybe a 20 mile trip. Even then, when sailing out of Conwy, the number of land marks around were sufficient to maintain adequate headings.

If however you were crossing an area like the English Channel and the tide was to carry you in opposite directions, you would not want to use a distant object as a navigation point since you would then be bucking the tide unnecessarily. Keeping a constant compass heading would allow movement across the stream while the boat simply traversed in each direction at right angles. The tidal timing would need to be right to end up at the desired destination.

That is not to say that a compass need not be carried on board, there are times when getting an accurate position fix by triangulating on mid distant objects can be a useful exercise. A pair of binoculars would also be a help if the boat can be kept steady enough in its three dimensional motion. Binoculars can be useful in searching out a local buoy within a short distance, say less than two miles away.

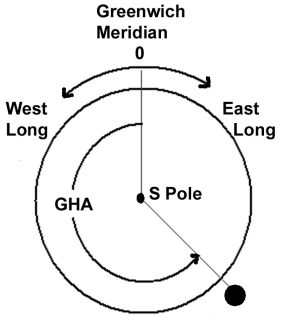
Looking for some very distant objects which may be over the horizon will not usually be of much help unless you are navigating towards that direction, and then you will be on a compass bearing anyway. All along the North Wales coast the welsh mountains are visible, due to the curvature of the earth it was extremely difficult to decide which was which. Even the highest peak of mount Snowdon appeared lower than nearer lower mountains at a distance.

Whilst in California, being at San Leandro Marina for a while, I was tempted into buying a Davis Mk 15 Sextant from the Davis Instrument Co, in San Leandro. This magnificent instrument has all the facilities for fixing your latitude position by sun sight and with the addition of the Greenwich Hour Angle derived from Greenwich Mean Time, your longitude can be found.

Greenwich Hour Angle or GHA can be obtained by a sun sighting when it is passing due north or south of the observer at local noon, the GMT then being then noted at any point on the earth's surface by a radio check or maintained by chronometer. This time is converted to the GHA using the mean rate that the sun appears to move from east to west, generally taken as 15 degrees per hour of time. By correcting this angle using the equation of time, the actual observed GHA is found.

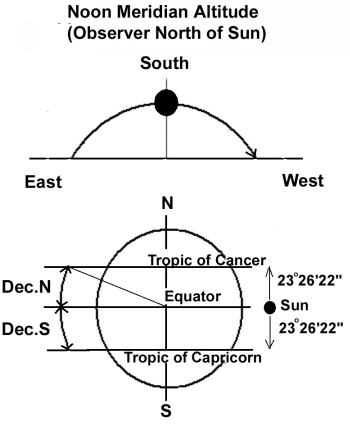
The correction is needed because the rate at which the sun travels changes constantly due to the effect of the earth's elliptical orbit around the sun. In addition, corrections are needed due to the inclination of the earth's axis and movements caused by planets and the moon. Having corrected the GHA this gives the precise angle, up to 360 degrees, in a westerly direction from the zero meridian reference line at Greenwich, England. This can

easily be converted to east or west longitude, and where the GHA is less than 180 degrees the west longitude is the same as the GHA. Over 180 degrees, it needs a simple conversion where east longitude = 360 - GHA.



Mean Sun GHA from GMT
at Noon meridian observation

Less than 180 deg, West Long = GHA(corrected)
Above 180 deg, East Long = 360- GHA(corrected)
Corrected using Equation of time.



Latitude = Altitude(corrected) ± Declination
Add when Sun North of Equator
Subtract when Sun South of Equator

Noon Longitude and Latitude

Latitude is obtained by observing the suns altitude as it appears due north or south at local noon. Using declination tables and a corrected altitude, the observer's distance north or south of the sun's geographic position is found. The sextant corrections depend on the observer's eye height (dip correction), the sun's semi diameter (since using the sextant will bring the reflected lower limb of the sun to the horizon), any index error of the sextant and any refraction error from a sun sighting at low angles.

Justifiably, the Davis sextant has a good name world wide for its quality, even though its construction is based on plastic materials. It looked the part and after some experimentation

taking sun sights, measuring a few vertical and horizontal angles it more or less sat in its box unused. Unless you intend travelling for days out of sight of land one can consider a sextant as an educational piece of equipment which at best can be used to measure how close a severed tree will fall to you when a vertical angle of 45 degrees is measured to its top.

After using the swing keel as a depth gauge a few times I decided it was time to invest in an ultrasonic depth meter just before the age of the digital readout. This proved to be a useful item for determining where to anchor and avoiding having to raise up the keel in shoal areas. The meter was calibrated in fathoms and feet with a circular dial. At the dial centre is the shaft of a small battery driven motor with a single clock finger attached. On the end of this finger is a small neon or LED indicator is fitted. The motor has two speeds for shallow or deep measurements. As the rotating finger passes through zero at the top of the 360 degree scale, an electrical impulse is amplified and sent to the 200Khz ultrasonic transducer creating a short time burst signal transmission. Simultaneously the small neon mounted on the finger end is illuminated showing zero.

At 200Khz, this signal is well capable of passing through the solid hull of a fibre glass or steel boat and passes easily through water to the sea bed. A reflection from the sea bed now travels back up to the hull where the transducer has long since ceased to transmit and now acts to receive this echo. The echo is amplified and passed back to the finger where the neon indicator lights up. The time delay through the water in both directions results in the second indication being several degrees further around the dial where the depth is shown in feet. In deeper water it takes proportionally longer in time to return the echo, and then motor speed can be reduced by 6 times so that the scale's calibration becomes fathoms, (1 fathom = 6 feet).

The depth sounder was used frequently, its transducer must not have any air between the transducer and the hull which will prevent the signals passing out. A small piece of plastic tube was glued to the hull and some engine oil added inside so that the transducer always had ultrasonic contact through the oil, even on

a curved part of the hull. An apparently well bonded transducer only needs the thinnest of air gaps to make it useless. There are now forward looking sonar's to detect under water brick walls ahead of you, perhaps significant for sailors charging ahead in uncharted waters.

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For all the trials and tribulations we went through, these were happy times adding to life's experiences. Finally though, creaking bones and ageing muscles began to take their toll and so we decided that we should pass the mantle on. One sees many boats well past their sell by date, unkempt and falling in to disrepair and I was of the opinion that this was a pure waste. I can understand that as the years roll on, owners are reluctant to part with such craft, but I never wanted this to happen with our boat.

Launching

Launched

Manoeuvres

Afloat Loch Lomond

After placing an add on the internet, we had an offer from a young chap who was interested in taking the boat over. I did the deal and towed the boat up to Loch Lomond in Scotland one wet weekend. There was no problem and we did the last launch for him at a local marina. Our boat looked fine, moored to a buoy waiting for its new owner to experience the joys of sailing. Now all we have are the memories and pictures, end of an era.

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Glossary:

Back Stay:	Standing rigging from mast top to transom.
Berth:	Sleeping compartment.
Bottle Screws	Inner and outer mast rigging lines tensioners.
Bilge:	Lowest point in a boat where water collects.
Block:	Captive sheaves to gain purchase on lifting gear.
Bulls Eye:	Deck fitting to guide lines along a surface.
Bulls Horn	Part of gooseneck fitting to hold mainsail reef cringle.
Bunt:	Loose sail along the foot when reefed.
Down haul:	Line attached to sail head to facilitate lowering sail.
Cam Cleat:	Self tightening grip for sail sheets
Chain Plate:	Metal strip with holes drilled to facilitate adjustment.
Cleat:	Device to terminate boat lines.
Cockpit:	Crew position at rear of boat.
Combing:	Boxed in space around the cockpit.
Cringle:	A sewn in grommet ring at the edge of a sail.
Cunningham:	A Down haul at the sail luff foot.
Fetch:	The distance a wave travels.
Foot:	Bottom of a sail.
Fore deck:	Bow deck.
Forestay:	Standing rigging attached to bow and mast.
Galley:	On board cooking facilities.
Gooseneck:	Universal joint fitting boom to mast.
Goose wing:	Jibing sail caught on backstay usually by boom lifting.
Gudgeons.:	Metal fittings attached to rudder to fit over pintles
Gunwale:	Outer edge of hull.
Head:	Top of sail or sea toilet
Helm:	Rudder steering control or position.
Jibe/Gybe:	To have sails change sides going down wind.
King plank:	Plank with cut out edge to fit deck planks in.
Leach:	Rear outer edge of a sail.
Lines:	Ropes for use on board decks.
Luff:	Forward edge of a sail.
Marine grade ply:	Plywood with none water based glues.
Mold/Mould:	Former for the hull layup.
Out haul:	Line used to stretch the sail along its foot.
Pintles:	Stern mounted hinge pins to take rudder gudgeons
Pole out:	Pole from mast to sail clew to hold sail in position.
Port Tack:	Sailing with boom out over Port(Left) side
Pulpit:	Grab rail around the bow on deck.
Pushpit:	Grab rail around the cockpit.
Reacher:	Large Foresail with high cut foot.
Reefed:	Shortened sail to reduce active area.

Roach: Leach extension on the mainsail.
Shackle: Metal fitting to connect chains together.
Sheets: Lines attached to sail foot to control sail shape.
Shroud: Outer rigging stay.
Spreaders/Cross Trees: Spars to keep outer stay rigging apart.
Starboard Tack: Sailing with boom over Starboard(Right) side.
Step: Deck end support of the mast.
Standing Rigging: Rigging stay wires to support the mast in position.
Tell tales: Light cotton threads showing wind path
Sail sides: Nylon sail fittings to slide in mast groove
Slough: A narrow water channel, sometimes tidal.
Tabernacle: Mast mounting arrangement secured on the deck.
Tang: A chain plate used to secure standing rigging.
Topping lift: A boom support line from mast top to boom end.
Wing on wing: Foresail and main sail poled out opposite sides.
Vang: Tackle to keep the boom from lifting under sail.