

### The Boat

**..finding a suitable boat to buy, build or have built...**

*It isn't easy to give advice about finding the right boat. Take this with a small pinch of salt as it is rather a set of personal opinions.*

Most boats that perform well under a Bermudian or gaff rig will continue to do so with a junk rig. Finding a suitable boat for conversion to JR is thus both easy and tricky. In this context I am only talking about cruising boats so racing problems such as handicap issues can be ignored.

To me there are three main classes of cruising boats; the *ocean cruisers*, the *coastal cruisers* and short distance sailers, i.e. *day-sailers and weekenders*.

### Boat Categories

**Last thing first, the *Day-sailers and Weekenders*:**

These boats frequently just sail from A to A and mainly in protected waters. Their owners generally have a job and need to get home in time. Speed, easy handling and manoeuvring will have a high priority. Offshore seaworthiness is not really relevant here. Directional stability and light helm is not so important since the sailing trips only last for a few hours anyway. Good oars or an outboard engine may be an idea to get you home. Many day-sailers and weekenders may have to answer to special needs such as shallow draft, easy trailing etc. Compromises...

**The *Coastal Cruiser* :**

The *coastal cruiser* has more in common with the *ocean cruiser* and sometimes must step into the role of both the day-sailer and the ocean cruisers. Coastal cruising can be just as hard as or even harder than ocean cruising, so the coastal cruiser must be tough and weatherly and be able to tack away from a lee shore in bad weather. There is less need for big tanks and holds for stores than when sailing into the blue, but a strong inboard engine is nice to have to get home in time and to improve safety. Although easy steering and good tracking is welcome on the coastal cruiser, quick manoeuvring and speed to windward is even higher on the priority list. This kind of boat is generally not trailerable, but by keeping the beam within max beam for road transport, it can still be trucked over land fairly easily.

**The *Ocean Cruiser*:**

The *ocean cruisers*, generally bigger than the others, are in their own class. Their skippers usually have no work schedule, so speed in all conditions is of less concern. Therefore the engine need not be so big, just reliable. A good ocean cruiser needs to be a tough, good load carrier which can be sailed or hove to with a minimum of fuss in all sorts of weather. Generally one also wants a bit more elbow room for the crew with really good bunks for each of them. A most important feature of these boats is the ability to track well with a minimum of input forces from the helmsman or self-steering systems.

There are three factors that contribute to tracking; position of CLR, balance in the hull and length of keel.

1. The *Centre of Lateral Resistance*, CLR must be positioned aft of the boat's *Centre of Gravity*, CG. Then, like an arrow, the boat will want to go in a straight line. With the

CG *aft* of the CLR the tiller can not be left for a second or the boat will throw itself into a sharp turn. Such a boat is simply directionally unstable.

2. A *balanced hull* is a hull that does not alter helm balance (much) as the boat heels. To achieve this, the reserve volume (i.e. above the LWL.) in the fore sections must be similar to that in the aft sections.
3. A *long keel* is of less importance to aid tracking, but will generally sail a straighter course than a fin-keeled boat. The long keel simply acts as a yaw damper, making the turns slower. Another asset with a long keel is that it often makes the boat easier to heave to, making less leeway in the process than a fin-keeler. Another advantage is that long-keeled boats make for easy slipping and drying out, often used by ocean cruisers.

***Para. 1 and 2 above are most important to produce a seaworthy ocean cruiser. Together with an efficient rudder they increase a boat's resistance against broaching. Broaching is a most dangerous, uncontrolled situation that normally is the first step in a capsize sequence.***

Unfortunately, these days big boat factories are pouring out sailing cruisers that are neither directionally stable nor have balanced hulls. Still they are being sold as ocean cruisers since their static swimming-pool stability has been found (or calculated) to be good enough. You'll easily recognise these boats by their sharp, vertical bows, wide sterns and huge steering wheels to cope with the weather helm. In a pinch these floating caravans could be used for marina-hopping, mostly in sheltered waters - and always with an eye on the weather forecast. You have been warned.

(..smaller versions of these boats, below 30ft and with big or even twin rudders, may give fast sailing and great fun for keen and agile sailors, but this chapter is about cruising...)

But don't take my word for it. Read what the great small-boat designer, *Phil Bolger* wrote about balance and cruising in his book...

**“BOATS with an OPEN MIND”**

(right). That book is recommended reading. (ISBN 0-07-006376-1)

By the way, many of his designs with free-standing masts are just begging for a JR...

A temptation that should usually be resisted is the raking midsection—that is, making the forebody deep and sharp, and the afterbody wide and shallow. As long as it's upright, this shape can be driven fast without making a lot of fuss. The sharp bow opens the water smoothly, and the shallow stern leaves it without pulling up a steep wave. But when such a boat heels, the big stern floats up and pushes the heavy bow down. She digs in at the bow, lifts her rudder, and tries to tear through the water cornerwise. A boat that shape has to be sailed upright. She needs an active crew to hike out and hold her up.

No cruising boat should be designed to be sailed that way. Even if the crew is heavy enough, they will get tired. Cruisers should have light afterquarters (see the elegant shape of *Wanda's* stern), buoyant cheeks in the upper parts of their bows, and hull depth carried well aft. All this allows a boat to be ballasted to bring her center of gravity back close to the middle of her topside buoyancy, which she will lean on as she heels. Her top speed will be less, but she'll be less demanding of endurance and vigilance.

**Copy from p.39 in *Boats with an Open Mind***

## **Building material**

It seems to me that any material; wood, steel, GRP or ferrocement etc. will work as long as the designers and builders know what they are doing, so I have no opinion here (..although I seriously like plywood – one can make just about anything from it...).

## **Buying or building**

Unless we are talking about small boats below one ton displacement, I would strongly warn against starting a home-building project, that is; unless you are well under 30 and not married. I have seen too many stranded projects. Still, some of the DIY designs are next to irresistible. In many cases they would be a very easy match for a professional boat-builder who could nail up an affordable boat for you (to paint and rig yourself). That option is worth considering.

Generally I suggest you go hunting on the second-hand market for a suitable boat which you can re-rig. Unless you have very special needs, there are lots of boats to choose from. The fine thing with production boats is that quite often you may get to test-sail the boat with the original rig, or at least you may read some test report about it in a boat magazine or on the web. When hunting for a suitable vessel, keep in mind that you need a place for the new JR mast(s). If the new mast position means you have to re-build a section of the interior, the domino-effect may take over: Before you know it, you have torn out most of the interior and suddenly have a much bigger project in front of you. Be smart, be lazy; the re-rigging job is quite a project in itself. Personally I find it easier to adapt to a non-perfect boat than to define and create the perfect one. I don't envy the perfectionists...

## **Rudders**

Boat designers generally put too little effort in rudder design. In my opinion there is no such thing as too good rudder control. A good rudder not only makes the sailing trips more enjoyable, but also safer. It may be the difference between a successful or missed tack in a critical situation.

On a junk-rigged boat, particularly on a sloop there is a need for an efficient rudder.

**(.. a JR sloop is defined as a one-masted boat with one sail – although technically and handling-wise it has more in common with the one-masted cat-rig...)**

The thing is, when the generally wide chord junk sail is sheeted out for reaching and running, the sail forces moves outside the boat and wants to turn her up into the wind. The Chinese knew all about this. Unlike the Europeans with their downwind-friendly square-sails the Chinese had to adapt to their fore-and-aft sails and tricky steering downwind. Therefore they developed seriously big, powerful, semi-balanced – and retractable rudders.

**(.. their rudders did more than just steering the boats. Together with a centreboard placed well forward, the rudders added a lot to lateral resistance as well...)**

All is not bad; to be fair there are plenty of boats available on the market with good rudders; you just have to shy away from those with inferior ones.

On smaller boats the rudders are generally relatively bigger – any imbalance in rig or hull can be handled with an efficient rudder. As the boats grow in size, the tiller forces grow too, so to keep these at a tolerable level, designers put more effort in making the hulls and rigs with better balance (..or should do so...).

## Some examples

### *Broreman*, my 5.5m Oslojolle (Norway)



.. My Oslojolle *Broreman* w/ Bm rig in 2007...

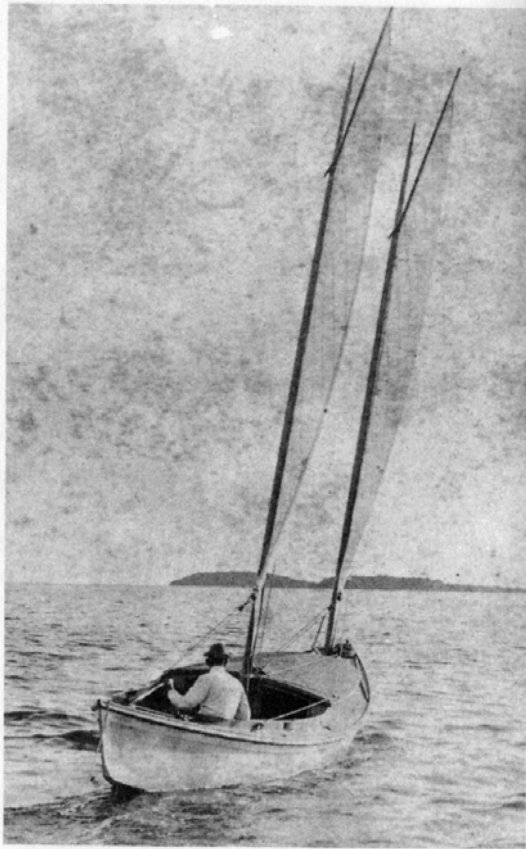


.. and with a JR in 2009...

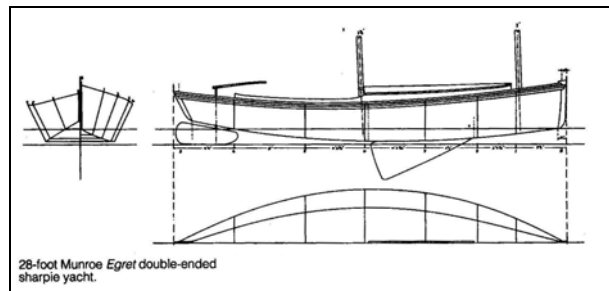
My 18ft c.b. dinghy *Broreman* is a typical day-sailer. She was designed in 1937 as a racing dinghy for 2-3 youngsters. Being rather narrow beamed makes her a bit tender. Still, her size and weight makes her useful for simple day-sailing with no need for dressing up in wet-suits. I didn't intend to fit a junk rig to this boat; it was more an experiment. However, the conversion has proven to be a huge success. The boat has become almost ridiculously easy to handle and this without losing much performance to the Bm rig. Still, *Broreman*'s most important quality now is the ability to continue sailing safely as the wind picks up. In fact, except *perhaps* when close-hauled in light winds, I think the JR version will be the winner every time.

Because of this I have revised my opinions about junk rigs in small boats: While big boats need junk rigs to make it possible to handle them with a smaller crew, small boats need a junk rig to speed up critical handling and thus avoid capsizing. With *Broreman*'s 1-part halyard lead aft to the c.b. trunk, I can adjust speed very easily so the oars see little use even in harbour manoeuvres. The big swing-up rudder ensures good control in most situations.

***Egret*, a 28' Sharpie/Dory (USA)**



*Egret* from astern. Courtesy of the Historical Society of Southern Florida; Ralph Munroe Collection.



*Ruel B. Parker* is the creator of some great boats in the day-sailer and weekender category, mostly in the American Sharpie tradition. What I like most with these boats is that they are fairly long for their displacement and beam. Long and trim boats always win over the short and fat ones, both in looks, elbow room and performance. The challenge is to *not* fill all that space with heavy equipment...

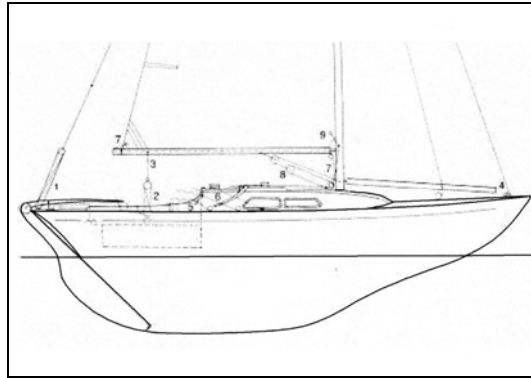
I have copied the photo and plans of *Egret*, shown above, from Parker's "**The SHARPIE BOOK**" ( ISBN 0-07-158013-1).

It shows his interpretation of Commodore Monroe's boat from the 1880-es. It is a bit a-typical for a sharpie, being double-ended. This must be a great little in-shore cruiser. With her balanced hull and almost dory-like mid-section she has proven to be quite seaworthy too. I wish she were mine. Then I would fit her with a junk sail on the fore mast and just have a little sprit-boom mizzen way aft. With such a yawl rig the boat could be kept under control in most conditions even with that shallow rudder. And I bet she would really move too...

**Maritornes, a 26' International Folkboat, IF (Sweden)**



.. I am lucky to have crewed in *Maritornes* many times..



Design by Tord Sundén

The IF came to life in 1967 and since then over 3000 have been built. At 26ft length, a bit over 2 tons displacement – half of it being ballast, she is a great little coastal cruiser which can take just about any weather. Although not fitted with a powerful diesel, she can still get you home in time. I don't know of *any* 26-footer that goes better in a stiff headwind than the IF. Unlike her slightly smaller sister, the Nordic Folkboat, the IF has self-draining cockpit, so can also cross oceans. Many have done just that. Even so, thanks to her moderate size and easy handling she is a great day-sailer. All she would need to be perfect is a big JR. With her generous rudder on the stern she is well prepared to cope with it.

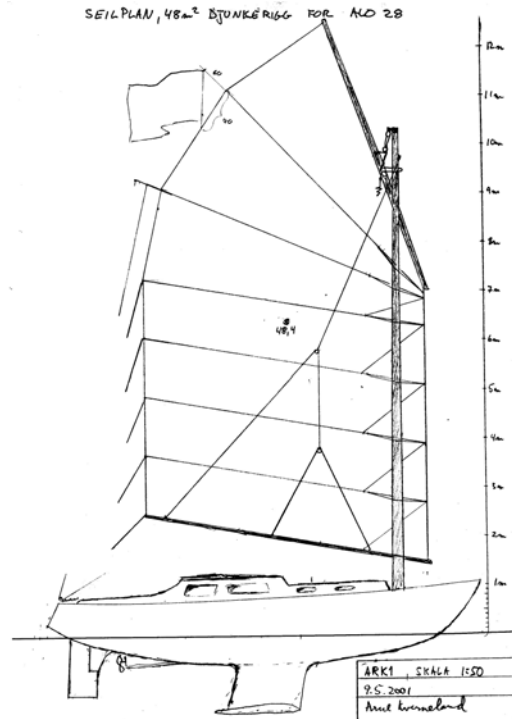
There is one thing I regret with the IF:

They should have been available in all sizes; IF26, 29, 32, 35, 39...

## Johanna, my Alo28 (Norway)



.. Johanna running before in an F3...



.. Johanna's sail plan sheet 1...

The first Alo28 was built in 1968 and by 1980 about 300 were sold. Her lines are similar to wooden boats of the fifties and sixties except that she was given a fin keel with much of its weight in the bulb. Thanks to her skeg at the rudder and around the original propeller shaft, she is directionally stable, but only just so. Her spoon bow and narrow stern ensures balanced lines so even when heeled to 30° the tiller remains light. The lines which result in a rather short waterline, are more comfortable than fast; she only crosses the sound barrier of 7 knots once or twice a year. On the other hand it doesn't take much wind so reach 5 or 6 knots.

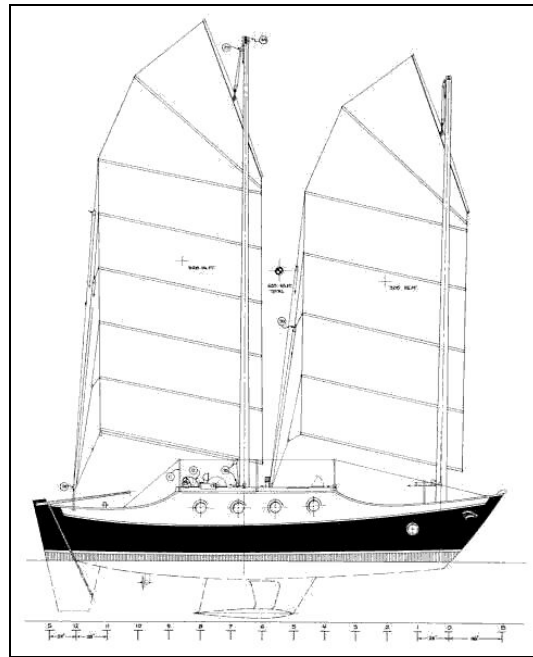
When I started to convert her from Bermudian to junk rig, I had a problem: With her long cabin I had to position the mast far forward. In addition, the boat had demonstrated some lee helm with the original rig. For this reason I had to increase the chord of the sail to regain a balanced helm. This could have given problems with weather helm when reaching and running, but in the end I got away with it fairly well: When close-hauled in light winds there is a little bit lee helm left, but as the breeze picks up the tiller gets neutral at 20° heel and then there is a light weather helm at 30°. I usually reef at 30-35° heel – this boat likes to be sailed on the ear, just like the Folkboat. When falling off to a reach the weather helm increases as the sail moves outside the boat, but thanks to the efficient and semi-balanced rudder I cope. Still I wouldn't have liked this rig setup if I had long ocean travels in mind. Then I would have yawl-rigged her with at least 0.5m shorter chord in the mainsail (which is 5.7m). Nowadays I use Johanna mainly as a day-sailer and for that the sloop rig is perfect. I haven't bothered with fitting a running tack parrel and long batten parrels to shift the sail forward when reaching. As long as I can control the boat easily downwind with typically one panel more than she carries upwind, there is little reason for the extra controls when cruising. There is just a fraction of a knot to gain with it so I prefer to keep the sail balance almost constant. To optimise this boat as a coastal cruiser, she should be fitted with a diesel engine and one of those 3-blade Kiwi propellers with feathering blades.

(.. when I bought the boat in 1998, the diesel engine had broken down for good, so I just replaced it with a 10hp outboard...)

## ***Badger*, a Benford 34' Sailing Dory (USA)**



***Badger* in Stavanger 2006 with new cambered sails**



**The Benford 34' Sailing Dory, with JR in the Hills' style**

*Jay Benford* is another of my favourite designers. Even so it was some time before I got to like his range of dories. I could see his point about easy building, but could it sail? I guess it took the Hills to convert me. When Pete and Annie Hill built *Badger* to the Benford 34' Sailing Dory design and gave her a 2-masted junk rig, and then sailed thousands of miles in her, the message finally started to sink in.

The hull has well balanced ends and there is a big balanced (?) rudder. Building form scratch they were free to make their choice of rig so the two sails are almost equal in size. This makes it possible to play around with the centre of effort (CE) of the sail area to suit the conditions.



*Badger* visited Stavanger Junk Rig Rally in 2006. The conditions were light and I didn't get around to sailing her myself, but just take a look at the wind vane self-steering: A simple vertical axis vane driving a trimtab on the rudder has been enough to control the boat over thousands of miles. It says a lot about how easy *Badger* is to handle. If you want a world traveller for two people, on a budget, I bet you'll have a hard time finding something that beats this one.

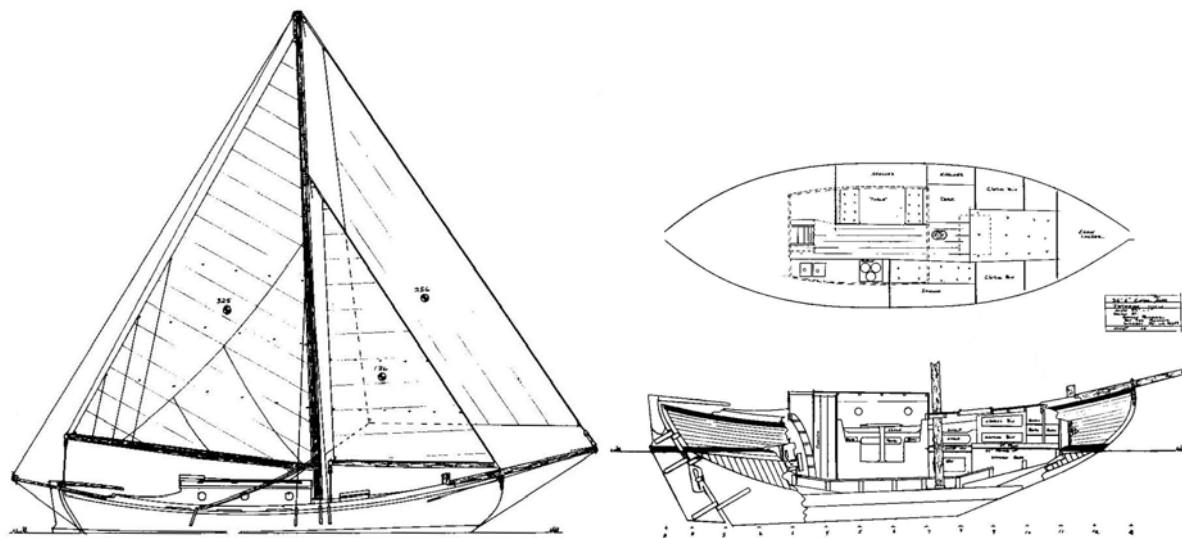


The book *Voyaging on a small income* (ISBN 0-961096-5-5), written by *Annie Hill* is well worth reading. In the appendix of the book one also finds a number of study plans and useful facts on these dories.

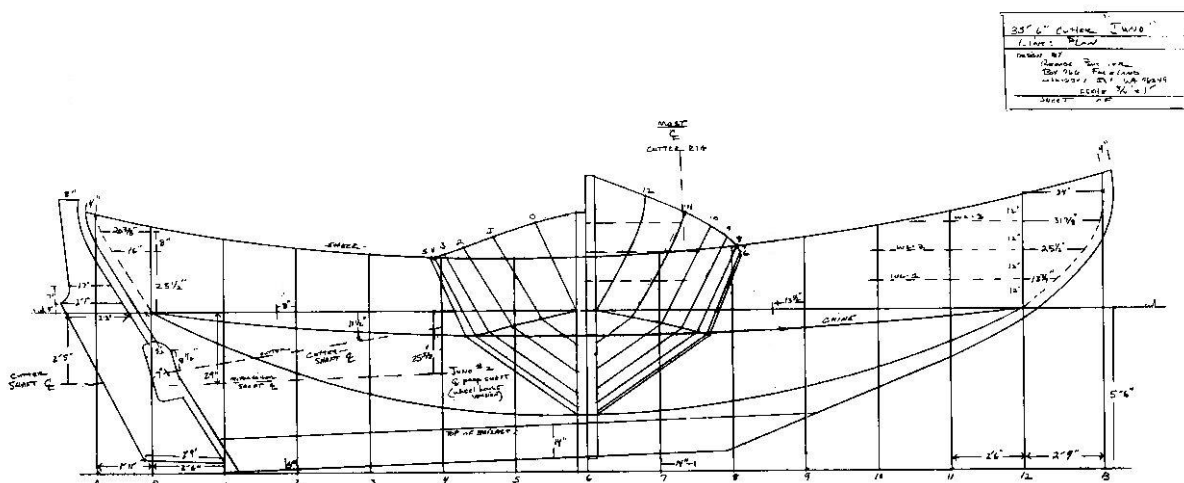
**And finally there is *Juno*, George Buehler's 35.5-footer**

When I first saw the lines of *Juno*; I couldn't take my eyes from her. I knew she would be a classic from day one. That sheerline, oh...

(.. I think it was in *Yachting Monthly* in the late seventies, presented with white lines on black background in a sort of black-white blue-print. She had three foresails and the freeboard at the middle appeared to be zero... I run short of words to describe her – she was... PORNOGRAPHIC...)



What Buehler has created here is a cross between many designs. In a way you get the virtues of the Colin Archer double-enders, but the building process is so much simpler.



Unlike *Badger*, *Juno* is not a plywood and epoxy boat. She is built in a simplified plank on frame way by ordinary standard planks right from the lumber yard, plus some plywood. The planks above the chine run parallel with the sheer while bottom is cross-planked. Of course she can also be planked with plywood as most of the hull lines are very plywood-friendly.

This boat is a great ocean cruiser just as she is, but anyone who has sailed in junks will not go back to fighting on the fore deck – it would be like going from automatic gear to manual... So a JR would be needed. For serious offshore use I would avoid the sloop; I guess I would go for an almost-yawl kind of ketch. For more coastal cruising I would make a closer study of a JR schooner, fitted with a big mainsail on the main mast in today's cutter position and with a smaller foresail on a fore mast forward of today's samson post. To avoid too much weather helm I guess one would have to increase the drag of the keel, that is; make the keel 4-8" deeper at the heel.

Wow, just thinking of it... I wish I had deeper pockets...

Anyway, George Buehler has many other fine designs too and his book **"Buehler's Backyard Boatbuilding"** (ISBN 0.87742-257-5) is very good reading, well written and with many study plans and practical details in it.

### **Rounding off**

There are of course hundred of other designs that deserve to be mentioned, but I can't go on forever on this. Just note that there are many good designs from the seventies waiting for you at a reasonable cost.

To sum it up:

- Choose a boat to fit your intended use
- Go for a good boat rather than a modern and impressive one
- Offshore boats *have to be* well balanced and track well

PS:

Slieve McGalliard who proof-read this chapter, added a final note:

**"My only comment on the content of the chapter is that you have not mentioned Samson, which I think would be a fantastic ocean cruiser."**



*..Samson on the board and on the fjord...*

Oh yes... and then there are all the others. Sorry folks, I have to stop here...