NEWSLETTER of the

Advanced Sea Kayak Club

AN INTERNATIONAL SEA CANOEING CLUB

OPEN TO ALL INTERESTED IN THIS ASPECT OF CANOEING

AIMS Promotion of sea canoeing · Communication · Organisation of events and conferences · Safety and coachin

ADVANCED SEA KAYAK CLUB

NEWSLETTER NO.88

NOVEMBER 1991

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EDITORIAL

I have just returned from touring the west coast of the White Sea in the USSR. I was there to undertake a recce in preparation for taking a large group of British school leavers there next summer of 1992.

Since my return there has been the unsuccessful coup. The situation is now even more conducive to our proposed expedition and I am looking forward to spending six weeks in the Kandalaksha area which is in the far north-west of the White Sea, 170km above the Arctic Circle. We shall be kayaking of course and there will be science work to do as well as other activities such as climbing and sea diving.

I wish I had more time to tell you about the people we met and the sights we saw. I can tell you that the USSR is full of potential for wilderness expeditions. Should you wish to pursue expeditions in the USSR then a friend, Sergey Ragimov has recently started RA Tour Agency. His address is 7-2-68 b-r ROKOSSOVSKOCO, Moscow 107370, USSR.

It is ASKC renewal time again. I have enclosed a renewal form. It would help if I can have your renewal soon, as I do not want to leave it too long before compiling the ASKC Address List.

Do not forget SUNDAY, 6TH OCTOBER 1991 (see my Editorial of September in edition No.87) ..... ASKC contact day.

Frank Goodman of Valley Canoe Products recently mentioned in passing that he had now retired. I cannot see Frank ever making a complete retirement Retire from VCP maybe, but his contribution to the sport of canoeing and kayaking is and will remain legendary and you just do not drop out by simply announcing retirement.

Nonetheless, I know we all wish Frank and his wife Doreen, all the best for a long and well deserved happy retirement. See you on the water again soon.

From: Steve Burge, Lowestoft, Suffolk

I've just returned from three months working for Operation Raleigh in Prince William Sound, Alaska. What a place! I was leading groups of venturers on kayak based projects for the Alaska State Parks but that's probably a story for "Focus".

Anyway upon my return I had two ASKC Newsletters on my door-step (under the bills!) and after reading them I thought "perhaps after all this time I've got some ideas to put forward". So, here it goes.

It concerns rescues and the like. One of the things we tend to do in deepest Lowestoft, is try all the things in 'the book', in all sorts of conditions, so that we will hopefully be able to do it for real if we have to. When a new boat appears on the scene we pile into the sea and rescue it - funny lot.

I've paddled an extended keel Nordkapp for a number of years and have started paddling in doubles quite a lot over the past two years. Now I have trouble getting back into both of these. The Nordkapp I have real problems with, especially in a swell or breakers trying to do an "over the back" re-entry. I fight my way over the splits, impale myself on the deck pump (nasty!) and then just as I lift one leg out of the water ... splash. This is on a calm day, fairly near the beach. O.K. - off with the buoyancy aid and tie it to the paddle - better, but I've just removed the best bit of insulating kit I have!

Doubles They're different aren't they? Very high (Oseans) and difficult to climb into, especially if you are down wave. It takes a lot of energy to "mantle-shelf" your way back in.

Anyway, when I went to Alaska I was given a load of doubles with no buoyancy except sea socks, a pool and lots of people who had never paddled before. Each person basically had 20 minutes to learn support strokes, draw strokes and a rescue. But what rescue could be taught in that time and stay in their minds?

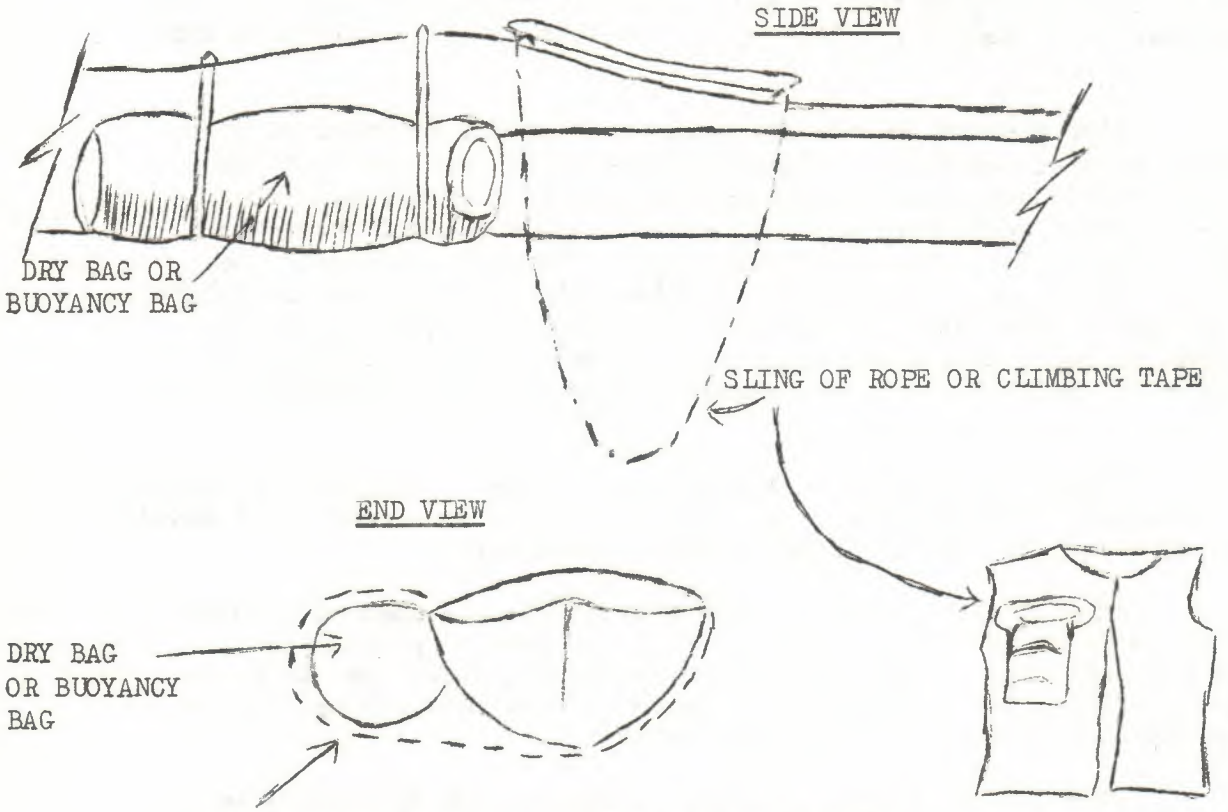
What I came up with (with my colleague Mark Bridgeman) was a rescue where the boat is righted and emptied (by pulling the "foot" of the sea sock through the cockpit). A loop of climbing rope or tape is then passed around the cockpit rim with enough slack in the water to provide a step. The swimmer then stands up and steps into the boat. If each paddler gets in from opposite sides then a second stabilising boat is not required. It works best if the paddlers weight is kept low as you get in. Complete novices in a pool were rescuing themselves in under a minute. Try it and let me know what you think. Each person was provided with a "sling" which was carried in a buoyancy aid pocket with a loop at the top to grab hold of. The boats were $18\frac{1}{2}$ feet long, 36 inches wide (similar to Oseans).

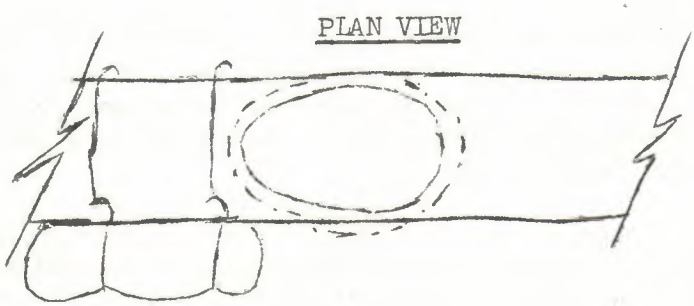
Back to Nordkapps and the like. How about rigging a "bungee" to each of the chart elastics so that one end is fixed and the other is easily detachable. A empty dry bag or air bag behind the seat can then be removed by the swimmer and attached to the side of the boat, by the bungees, as an outrigger. The sling (conveniently still in my buoyancy aid pocket, sorry Mr Raleigh) can then be used to get in from the side with the air bag. I must stress that I haven't really played with this idea yet but the possibilities seem good: paddler to swimmer resuscitation without having to enter the water and put the rescuer at risk, reassure and injured or sea-sick paddler, improving a Nordkapps

photographic possibilities when you've got non-waterproof camera gear and need both hands. You could even use it as a diving platform or when you need a wee! I'll be experimenting over the remainder of the summer but I'd be interested to read anybody elses findings.

Anyway, back to that "Focus" article then another letter to you on the American view on "low impact camping", a very worthy cause.

Cheers guys.





PADDLING THE RIM OF FIRE
by ROWLAND WOOLLVEN

'Cape Ommanney? - round here we call it Cape Ominous, and I certainly wouldn't go round it in one of those!' Just one of the reactions we created on our travels around the south-eastern corner of the 'Rim of Fire' - the Eleutian chain and the Alexander Archipelago of South East Alaska.

Six of us set out on a cold but bright morning in early June 1991 from the ferry terminal at Wrangell, aiming in the long term to reach Juneau via the outside route around Baranof, Chichagof and Admiralty Islands and taking in Glacier Bay on the way. As it turned out, our journey stopped in Sitka after 253 nautical miles and 21 days travelling - but there's always next year for the rest of the trip! We flew to Calgary from Europe and then sped (quite literally!) to Edmonton in order to catch the Greyhound to Prince Rupert and thence the Alaska Marine Highway ferry service to Wrangell. As an aside, people in Canada only use the Greyhound when they literally have no other option - after 24 hours sharing a bus with, amongst others, four native Indians on drugs, the six of us can tell in graphic details the reasons why! We packed our Nordkapps in Prince Rupert and carried them as hand luggage onto the ferry - at this stage our jet lag and US Immigration officials made an unhappy combination, but we eventually persuaded them to let us in! We awoke from our bivvi site under the terminal porch to find ourselves eye to eye with a pair of Bald Eagles who clearly thought that some breed of giant green maggot in a crispy Goretex wrapper had been especially delivered for them!

For four of us this was the first time in Alaska so we had our introduction to manhandling laden kayaks over giant beams of timber on the shoreline - something we would get resigned to over the next month. It also introduced us to 'seaweed gymnastics' - usually more entertaining to the onlookers than the acrobat! Over the next three days we moved west down Sumner Strait encountering whales, sea otters and a variety of sea conditions. On one day we took four hours to make an eight mile crossing - the sind and sea state being very much against us. In contrast, the following day began in flat calm so we quickly regained our mileage average! At the end of the first week we rounded Cape Decision and turned north up Chatham Strait. 'Rounding the Cape' somewhat inadequately describes a day in which we progressed from paddling in a decidedly lumpy sea to meeting the first of our Pacific swells in a Force 7 - it was like sitting on the top of the South Downs, watching a green valley roll away for ever and ever. A Nordkapp feels very small in such places, and being blown flat along the deck by the force of the wind didn't help. Taking the first available bay after the Cape led to our first bear encounter - Andy and I discovered two big black bears at the back of the beach - and I'm not sure which pair moved faster out of the area! Camping that night was a relatively sleepless affair including one paddler throwing out of his tent a bag of sweets which he had taken to bed by accident! The squirrels had a field day! The inlet of Port Malmesbury which we reached on the following day provided us with our jumping off point for a 12-mile crossing of Chatham Strait.

It was easy to see that the adrenalin was flowing - we broke camp that day in half the usual time and made an overall speed of three knots on a four hour crossing. The reward for our labours came in the small settlement of Port Alexander, just north of the southern tip of Baranof Island. Here, in true frontier style, the local store owner Bud Jodway had improvised a heat exchanger around the exhaust of the generator which kept his freezers going. This heated an outdoor 'hot

tub' in which six paddlers were found very quickly! The icing on the cake was Bud providing us with endless beers - 'ain't got no liquor licence, so you boys have it on the house!' Port Alexander in its heyday supported over 2000 people involved with the whaling industry. Today, a little over 200 call it home, few of those being there year round. The fishing industry now predominates and we were able to get a reasonably clear weather picture from the crews in harbour. Most of them could not understand our willingness to put to sea in such small, and to them frail, craft - hence the quote at the start of the article. Mind you, we weren't that keen on the thought of going out in some of their vessels! Rounding Cape Ommanney was relatively straightforward as we caught the end of a favourable weather window, but as soon as we turned north we were chased up the outside coast by a south-easterly bringing with it some quite bad weather. The west coast of Baranof Island is extremely remote and for the first time we felt we really were out in the wilderness - until we realised that the Belair float planes operating out of Sitka had been given the job of overseeing our progress by Bud. It became something of a daily routine to be buzzed by Biggles - who seemed pretty determined each day to get lower and closer than the day before! The bad weather pattern culminated in being caught nearly two miles offshore in a Force 6 - at which point the top 6 ft of a big greenie broke all over Andy, totally up-ending him. His was not the only breath being held and he responded to the challenge by producing a really immaculate roll when it was needed. On the run in to shelter a couple more exciting moments were had including my boat being stood on end and two others coming a little close to rocks. The reward for our efforts was a perfect campsite in Byron Bay - popular with the local grizzlies too - and some excellent fishing; two fish provided enough food for six for two meals. We discovered that landing a 30lb ling cod on a hand line in a Nordkapp was definitely something that should be included in the BCU Advanced Proficiency Test. If you stay upright, you pass!

The next three days included two where we were stormbound in different coves. One bolthole was the lagoon to the rear of Close Bay. We entered at half tide and it was only when we came to leave next morning that we discovered that the entire lagoon emptied through a gap in the rim of about 8 ft. As a result we exited at some speed through standing waves of at least 4 ft - somewhat greater if you were unfortunate enough to time your exit with the bottom of the trough of the incoming Pacific swell. Above North Cape we entered the Inner Passage which provides good protection for the next three days north to Sitka. At one campsite we were woken by a most peculiar sound which turned out to be a humpback whale cow and calf asleep in the bight by the campsite.

The next stop was at Goddard hot springs - a natural bath house where we had a good soak looking out over the Pacific to the extinct vulcano of Mount Edgecumbe. Here we also met the United States Coastguard - or at least two of the members of a helicopter crew who were helping to fly in materials to improve the bath house. One of them turned out to be a sea paddler and as a result we were given an invitation to visit the USCG station in Sitka and use their facilities for a good clean up whilst we restocked with food in Sitka. The next day he actually paddled six miles out from Sitka and met us half way - he found the Nordkapps a little tippy after his plastic boat but by the end of the day was beginning to see why we were so keen on them.

Sitka is a frontier town on an historic site - the Tlingit tribe had a settlement here for many generations before the Russians came, naming their town New Archangel. On the sale of Alaska to the US, the town reverted to being called Sitka and is today a prime port of

call for the cruise ships which frequent South East Alaska. The USCG could not have been more helpful and were excellent hosts. The local press were also very interested in our trip and the story made front page news (resulting in a few of those 'say, are you guys those mad British kayakers?' moments!). A day and a half in civilization was more than enough and we headed back out onto the water. By now we knew our flights had changed and we only had one more week of paddling left. Because of this we planned to try the circumnavigation of Kruzof Island, coming back into Sitka to catch the ferry south. Initially too, the weather was very pleasant and we paddled across Sitka Sound and past the St Lazaria Islands on flat seas with good visibility. Off the islands we had our closest encounter with whales - coming to within inches of a pod of humpback whales. It was exhilarating but also quite scary being so close to something so big.

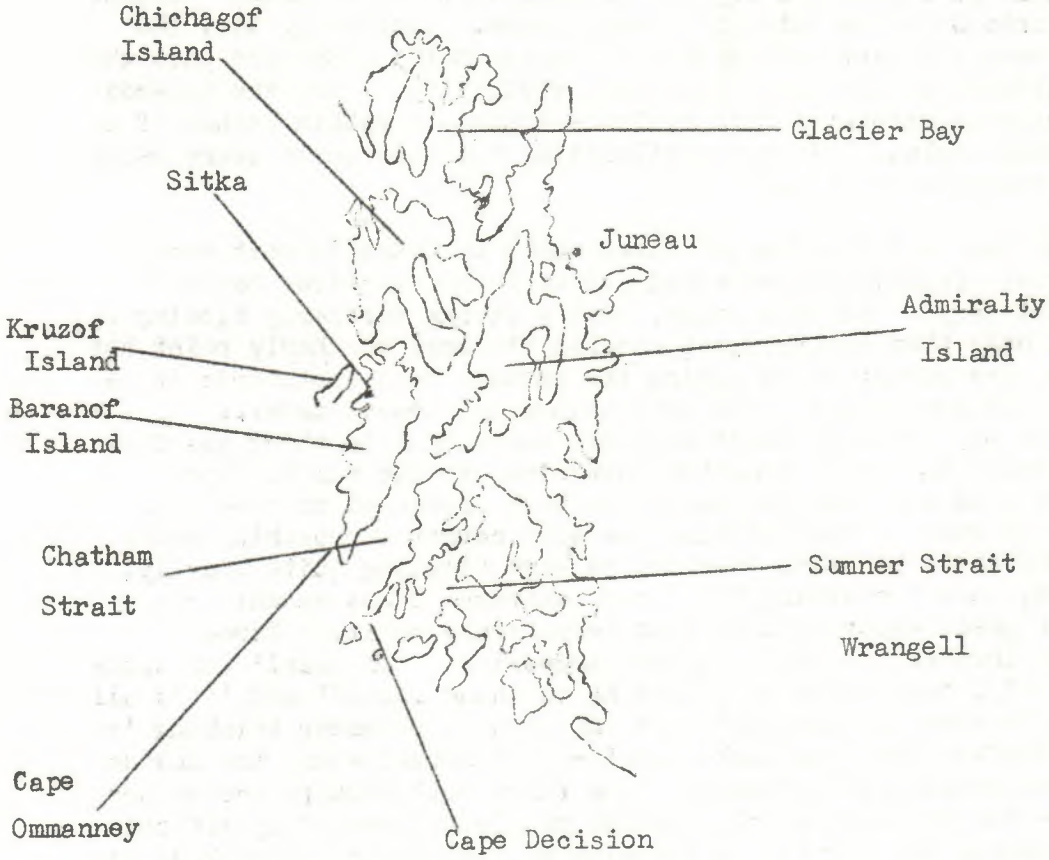
For the next two days we moved north up Kruzof's west coast but the weather steadily deteriorated and we found ourselves beached again on Point Mary. At this stage, with a strong northerly blowing we realised not only that our trip had reached its most northerly point but also that we were committed to riding the weather back southwards if we were not to miss our flight. Of such things are dramas made... Recrossing the bay south of Point Mary was uneventful in thick sea fog and a steep swell but as we committed ourselves to the run to Cape Edgecumbe the wind rose and the swell and seas increased to give us a really advanced ride. Several times we were caught approaching reefs a long way off shore on which wave trains were breaking quite heavily. At this stage, whilst scouting for a cove entrance I was caught by a 15 ft wall of green water with my name very firmly on it. Three thoughts went through my mind in quick succession: 'Oh dear!' (or words to that effect!), 'how close am I getting to those rocks?' and 'it's all irrelevant, I'm blowing bubbles!' At one point I remember thinking 'so that's what surfing the tube looks like' - as I looked along the inside of a very spectacular green tunnel. The first roll attempt scored one out of five - but at least I got a breath of air and sorted myself out to make the second one count. Everything on both front and back decks was hanging off on its retaining cords - the first time I had ever been subjected to such a violent buffeting. After a pause to paddle clear and restow gear we continued, a bit further off shore, but the weather gave us no respite for the next five miles. By comparison, as we rounded Cape Edgecumbe we went in 50 yards from hell to heaven. Behind us, 15 ft seas with a Force 5 and vicious line squalls whilst in front was limitless visibility, calm seas and azure blue skies! None of us had ever seen such a marked contrast in such a short time or distance. We found later that such weather patterns occur regularly in Alaska and that the USCG always expect to have to operate in the very worst of weather.

Our onward return to Sitka was uneventful and we caught a local Alaska air flight to Ketchikan the following day. What had taken us 17 days of hard paddling to achieve, we retraced in 40 minutes to the accompaniment of Bach and champagne! From Ketchikan we caught the farry to Prince Rupert and then underwent again 'death by Greyhound'. The final campsite was the mezzanine of Calgary airport - apparently to the chagrin of some of the security guards! A total of 28 days away, 21 on the water, 17 actually paddling.

Memories? - endless trees; fantastic sunsets; breaching whales; sea otters in the kelp; bald eagles by the hundred; being awoken on consecutive days by snoring whales and curious hummingbirds. The attractions? - a real sense of commitment and adventure; knowing that your paddling decisions really do matter; the rewards of going out

to the red line, running it and coming home again afterwards. All of us are going again.

(The team consisted of Tony Ford, Harry Harris, Paul Hart, Andy Lukes, Jim Ross and Rowland Woollven.)



MALSTROM
by CAPTAIN ROY WEBB

"What an Epic; seas like mountains, the thundering of a thousand Wildeebeast". Yes, many a time I've sat in John's conservatory and listened to his salty tales of Corryvreckan that any Sea Captain would be proud of.

I am of course referring to that turbulent, sometimes whirlpool, stretch of water north of Jura on the west coast of Scotland; a Mecca to which many a sea kayaker has been and gone, and even more armed with bicycle clips and beer money dream of going.

Whirlpools are rotary masses of water that spin rapidly about a central, usually depressed, core or maw. Centrifugal force creates a fearsome funnel effect causing the sides to well up dramatically. At times the water itself disappears through a central cavity to a lower chamber, giving the false impression of a ravenous, bottomless abyss.

These whirlpools occur frequently in comparatively shallow water passages connecting two larger, deeper bodies of water having different circulation patterns. Under 'ideal' and unobstructed conditions the whirlpools rotate anti-clockwise in the northern hemisphere and clockwise in the southern hemisphere due to the earth's rotation. This, however, is normally overridden by local topographic/hydrographic conditions Numerous physical conditions can generate or perpetuate these whirlpools, but usually include the confluence of opposing tides, currents, winds, outcrops of rock and reef, underwater irregularities, natural hydrographic gradients, gravity or any combination thereof.

Apart from our own 'Whirlpool' in the Gulf of Corryvreckan other famous whirlpools include the Charybdis Whirlpools of Homeric fame in the Straits of Messina between Italy and Sicily; In Naruto Strait in Japan; and closer to home Malstrom in the Southern Lofoten Islands off Norway's west coast.

Maelstrom is now generally used to cover all sizeable whirlpools; however it was first used to describe the Norwegian whirlpool of which we speak. The term originated from the Dutch "Malen" (to grind or whirl) and "Strom" (stream) hence "grinding stream".

Near Bodo, 55 miles south-east of Malstrom there is a lesser known but sometimes more torturous stretch of water the Saltstraumen, connecting Saltfjord with Skjerstadfjord. Each change of tide sees a tremendous amount of water surging through this channel with a roar heard miles away. On a day to day basis Saltstraumen would be taken as the fiercest, but for singular displays of unmatched oceanic fury given the ideal conditions Malstrom is unsurpassed.

The Malstrom harks back to legends and superstitions of Middle Ages. In the late 16th century mention was made in the English Geographer Richard Haklyts book "The Principal Navigations, Voyages, Traffiques and Discoveries of the English Nations" in which he describes the journey of a Fransiscan Friar Nicholas de Lynna to forbidding subpolar regions in 1360 during Edward III's reign.

Malstrom first appeared in Mercator's Atlas in 1569, and in 1645 on Sexagesima Sunday such was its fury the noise is reputed to have damaged homes and buildings on nearby Mosken Island.

Since then Malstrom has been immortalised by various illustrious writers; Jules Verne, Norwegian Poet Peter Dass and Edgar Allen Poe's "A Descent into the Maelstrom", a salty tale if ever there was one!!! Many an eye would pop if given the right quantity of ale a recital came forth, to quote Poe "Never shall I forget the sensation of awe, horror and admiration with which I gazed about me. The "kayak" appeared to be hanging, as if by magic, midway down, upon the surface of a funnel vast in circumference, prodigious in depth and whose perfectly smooth sides might have been mistaken for ebony, but for the bewildering rapidity with which they spun around, and for the gleaming and ghastly radiance they shot forth, as the rays of the full moon .... streamed in a flood of golden glory along the black walls, and far away down into the inmost recesses of the abyss."

In real life Malstrom, 90 miles north of the Arctic circle near 67 48 N 12 51 E is within some of Europe's best fishing grounds and connects Vestfjord with the Norwegian Sea, and is nearly five miles across broken only by two islets three miles across.

When wind and tide oppose the thunder of the collision can be heard in excess of three miles away substantiating that Sexgesima Sunday. In summer a deceptive calmness lingers leaving disappointed visitors. However in winter a possibly fatal ending awaits any small craft venturing within its grasp, Edgar Allen Poe or not.

From: Pete Salisbury, Secretary Paddlers International, Sutherland, Scotland KW14 7RY

CHANGE OF NAME

Hope this letter finds you well. I had intended to contact the various canoeing/kayaking magazines to let them know of the changes but a recent family bereavement put things on hold for a while.

This is to inform you that 'International Long River Canoeist Club' no longer exists ... the new name of the organisation is 'Paddlers International' - this change was necessary not only because of its long, cumbersome name, but the fact that our organisation also covers seas and rivers, short and long, plus the difference in interpretation of the word 'canoe' and 'kayak' caused confusion.

Is it possible you could put a mention of this change into your magazine (I've also enclosed a god sheet giving fuller details) - be much obliged.

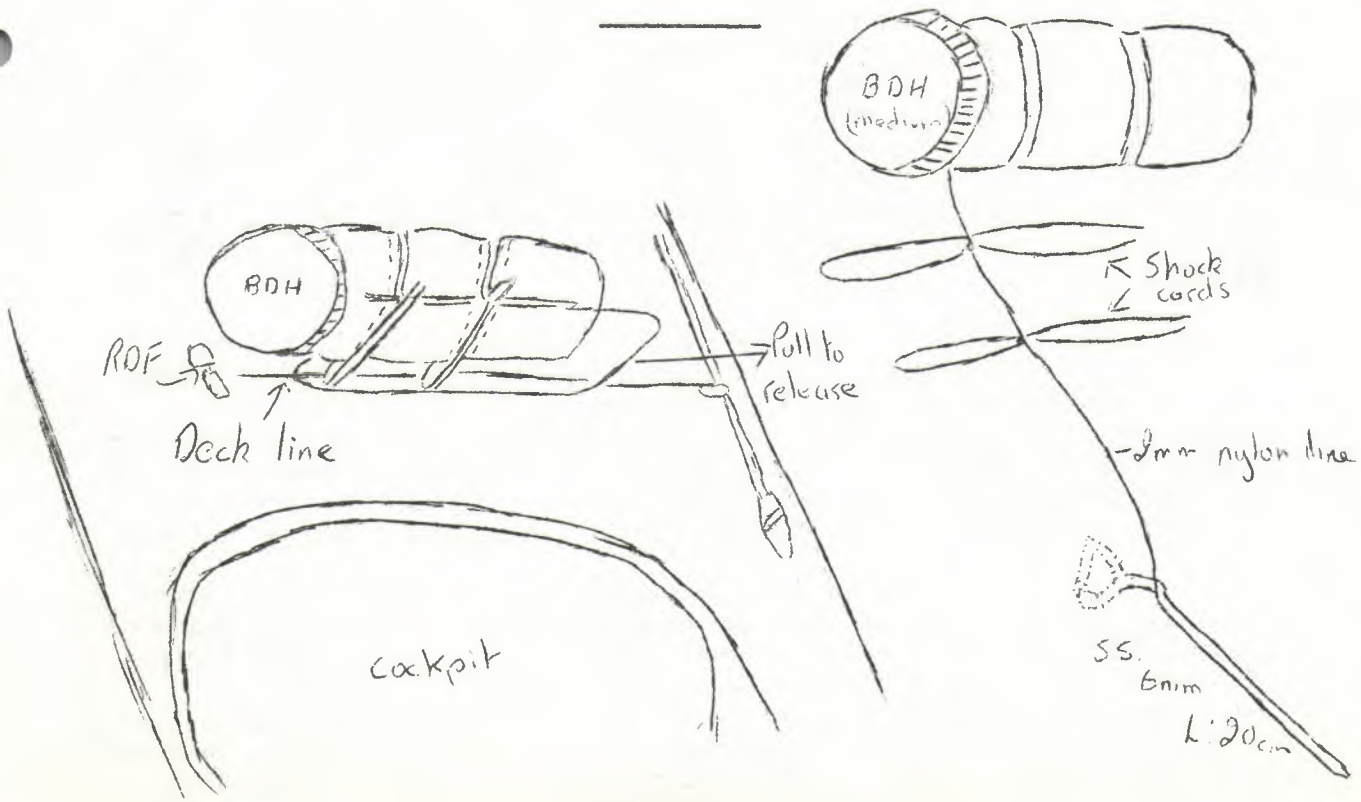
From: Didier Plouhinec, Lescoff, France

I don't agree with R. C. I. Woolven about the split paddle rolling when he says it's a further refinement to angle the tee piece handle. It's O.K. when you can succeed the roll while swinging your paddle aft (from the front to the back) of the kayak, but if you need to swing again you paddle forward (from the back to the front) you have to twist twice more your wrist, and this isn't the best to do a good rolling. But I agree that split paddle must be carried on the front deck. I use a normal Eskimo paddle as spare paddle, it's much better than a split one, but it can be stored on the front deck, only if it's an unfeathered paddle (a short Eskimo paddle 2.08 m, the grip is only 40cm).

Chris Ellis asks: how to carry flares? I have given the solution in one of my last letters. I use a BDH medium container. In mine I have plenty of items:

3 Red flares
1 Nicognal
1 Fluoreceine (fluo powder 20 gr)
1 Compass
1 Cyalune (a plastic stick which gives a fluo light 24")
1 Waterproof lamp
A whistle
1 Mirror
Repairing tape
A light nylon orange jacket (can make a very good flag at the top of the paddle
Telephone card and small coins (10^F) plus list of coastguards telephone numbers
Tablets of Coramine glucose (hypoglycemia)

With the quick release system it's very easy to remove your BDH safety box from the rear deck.



HUMAN EFFECTS OF CLIMATE CHANGE

by CRISPIN TICKELL
President of The Royal Geographical Society

Let me begin with the case of the boiled frog. If a frog is put into boiling water, it will naturally try to jump out. But if it is put into water of normal temperature and the heat is gradually increased, the frog will first warm to it, become bemused, and then quietly expire. This is not an experiment I wish to commend, but it has lessons for another animal - ourselves. If drastic change takes place abruptly, we notice and react to it. If it takes place gradually, over a few generations, we are hardly aware of it, and by the time we are ready to react, it can be too late.

Our genetic inheritance allows us comprehension of only limited time and distance. Few can grasp the reality of time extending 50, 60 or 100 years: and few can grasp the reality of distance beyond hundreds or thousands of kilometres. So to grasp the problems of an environment deteriorating over several generations, with subtle changes in the climate is intrinsically difficult. It is the more difficult on account of our extraordinary success as an animal species. Unconsciously we have been changing the environment to suit our needs ever since our ancestors settled on a stable way of life, and moved from hunter-gathering to agriculture. But following the end of the last Ice Age, we began the process which has led to destruction of many of the world's forests, clearance of the land for cultivation, and the arrangement of stone, brick and concrete we call cities. This new way of life led to a steep increase in the population and unperceived strains on natural resources, in particular the fertility of the soil. Population crashes followed. We can see for ourselves the litter of past civilizations in Harappa, Minoan Crete, Petra and the classic sites of pre-Columbian Mexico. The reasons for these crashes were probably unrecognized at the time.

When the industrial revolution took place some 250 years ago, these problems took on new orders of magnitude. Population rose still more steeply: two billion in 1930; four billion in 1975 and an estimated eight billion by 2020, of which well over one-third would come from five countries - China, India, Brazil, Indonesia and Mexico. Land clearance accelerated. Energy generation through fossil fuels changed the chemical composition of the atmosphere, and industrial development contaminated land, sea and air. Throughout there was an implicit belief that natural systems were almost indefinitely tolerant. Even now economists are strangely reluctant to take account of environmental factors.

The changes we have made to the environment are often too familiar to be recognized. In countries we label 'industrial', change grew out of previous history, and was sustained by an agricultural revolution with much increased food productivity. The physical environment of these countries was resilient, with big natural resources including regular rainfall. The result was that although cities spread and the environment was greatly changed, little irremediable damage was done.

The same cannot be said for elsewhere. Change has not grown naturally out of the past: in many cases there was no preceding agricultual revolution to sustain an industrial society. Environment and resources were likewise different, with vulnerable and delicate ecosystems in forest and desert, poor leached soil easily destroyed, unreliable patterns of rainfall, all made worse by rapidly growing populations, and often well-meaning misapplication of methods and technology

useful elsewhere. Many countries have not achieved that agricultural underpinning essential to their growth and rising populations, and have little prospect of doing so.

More recently we have become aware of what could be the trigger for the greatest changes of all: changes in the chemistry of the air which have led to acid deposition in areas downwind of industry, to holes in that friendly shield of ozone which makes life possible, and to the prospect of global climate change.

Climate has often been regarded as one of the invariable factors affecting human society. In fact climate is in constant change, but usually within well-behaved limits. Those living on the margins of the four geographical zones of ice, temperate areas, desert and tropics have long been sensitive to small changes. When the Little Ice Age began in the fourteenth century, those growing wheat in Greenland or Iceland lost their livelihood; when the warming of the present century began, the mountain glaciers shrank and new land was opened for cultivation.

The idea that mankind could affect the climate is relatively new, but positive evidence is accumulating. The relationship between land use and climate, and in particular trees and rainfall, has been demonstrated. More recently we have established - as a fact and not a hypothesis - a relationship between the quantity of carbon dioxide in the atmosphere and average global surface temperatures.

This is not the occasion for a disquisition on the greenhouse effect, or perhaps more accurately stated, the global heat trap. We have got used to the present broad equilibrium of heat entry and heat loss, and our pattern of existence relies on it. The problem is that by increasing the volume of certain trace gases in the atmosphere, we are likely to move the limits of the equilibrium in ways that cannot be determined.

We know that atmospheric carbon dioxide is increasing by just under half of one per cent a year (and now accelerating), mostly as a result of fossil fuel consumption, and that atmospheric methane is increasing by over one per cent a year. The methane comes from land clearance, natural gas release, paddy fields, biomass burning and ruminants. The other principal greenhouse gases (apart from water vapour and ground level ozone) are chlorofluorocarbons, which were unknown before the 1950s, and nitrous oxide. The chlorofluorocarbons come from industry (refrigerants, aerosols, etc.); and most of the nitrous oxide comes from land conversion, fertilizers and fossil fuel consumption.

The effects, now and in the future, of the icrease in these gases remain a matter of dispute; but the conventional conservative wisdom is that global mean temperature will rise by at least 1.5°C by 2050. It is unlikely to rise by less, but it could rise by much more. Already the mean temperature of the Earth has risen by around 0.5°C over the last 100 years.

This range of increases may seem small. But so was the drop in global mean temperature of between 4°C and 6°C which prevailed in the last Ice Age. Moreover, the use of an average figure conceals the drastic changes which would take place at certain latitudes. Whereas the change around the Equator might be small, that in temperate areas could be substantial, and that round the poles could be of the order of 7°C and upwards.

Efforts have been made to estimate the likely effects for particular latitudes and regions But the models are not sufficiently refined However, taking account of what happened in previous periods of warming, there would be a shift of temperate conditions northwards in the northern hemisphere and southwards in the southern hemisphere; rainfall might be heavier near the sea and round the Equator, but droughts could increase in the interiors of continents; there would be a lively heat exchange between the Equator and the poles, leading to more storms, droughts and deluges; and there would be a rise in mean sea levels from a combination of thermal expansion and melting ice.

As the oceans represent an element of inertia in the global thermostat, the rise in sea levels might take longer than the rise in atmospheric global temperatures. At present the best guess is a rise of between 24 and 38 centimetres in the next 60 years, but it could be less and could be more. The current rate of rise is around 2.4 millimetres per year.

Changes of this kind have been known before in the Earth's history. Living things made the necessary accommodations with some loss of plant and animal species. For us the problem is less change than the rate of change. The threat to our ways of life is visible, but more so in some places than in others. It is also clearer in abstract than in personal terms. But it is already obvious that changes to the environment, particularly in global climate, could affect millions of our fellow human beings: how they live, where they live, whether they live. We face the spectre of a major refugee problem.

No animal would be more affected than ourselves. During previous periods of warming or cooling, our species was able to respond with its feet The last period of cooling showed a human invasion of the Americas and Australia over the land bridges which emerged when sea levels fell The last period of warming showed a human invasion into the areas liberated from the ice a good example is where we now stand. But in a new and more drastic period of warming, there would be few places for people to go. For other people are there already. We have left ourselves no room for manœuvre. Warming might release land for settlement in what is now arctic tundra (albeit with the risk of releasing major quantities of that potent greenhouse gas methane), but there is no imaginable way in which populations living elsewhere in areas under sudden stress could pick up their bags and move.

Yet already the number of the world's refugees is steadily increasing. According to the present definition, a refugee is one who 'owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country'. There were less than five million refugees in 1978, and almost 15 million in 1990. Most of them were fleeing from war, persecution, and the other consequences of political breakdown.

It requires a leap of the imagination to work out the numbers which would be on the move in the event of global warming on present estimates. A heavy concentration of peoplelives at present in low-lying coastal areas or along the world's great river systems. A rise in mean sea level of only 30 centimetres would have substantial effects. Such industrial countries as The Netherlands might be able to construct sea defences to protect vulnerable areas, but even they would have difficulty in coping with high tides and storm surges of a kind which might be more common.

For most poor countries such defences would be out of the question. Many of those living and working in, for example, the delta areas of the Nile, the Ganges and the Yangtse would be forced out of their homes and livelihood. For example, Bangladesh would lose up to a quarter of its land. Islands such as the Maldives in the Indian Ocean, Kiribati, Tuvalu and the Marshall Islands in the Pacific, and some islands in the Caribbean would soon become uninhabitable. Bangladesh with its population of 114 million, and Egypt with its population of 55 million clustered in the Nile Valley, would be particularly affected.

The present temperate areas, where most of the world's industry and agricultural production now lie, would not escape. The food surpluses which at present act as a buffer stock to cope with deficits elsewhere, could quickly disappear. The climatic variation would probably be greater in these countries than towards the Equator, and such areas as the northern Mediterranean, the American Middle West and the southern parts of the Soviet Union would be vulnerable. There might well be compensation in opening up new lands, and some areas would benefit, at least in the long term. Ways of mitigating change through application of technology could certainly be found. But the industrial countries through the sheer complexity of their societies would face major problems of adjustment As someone from a poor country once said, 'we are so far behind that we are now well ahead'.

What then could be the scale of the human problem 30, 40 or 50 years from now? Degradation of the environment is not necessarily gradual. It can proceed with jumps as physical thresholds are passed. Thus semi-arid land can become desert, former forest land turn to laterite, water become dangerously polluted, and sea levels change in a few years. If only one per cent of a world population of 8 billion in 2020 were affected by such events, that would still mean some 80 million migrants or environmental refugees; and five per cent would produce 400 million. Even 80 million would represent a problem of an order of magnitude which no-one has ever had to face. Yet the flooding of a quarter of Bangladesh alone could displace over 30 million people.

We forget at our peril that civilization is a fragile thing. The first cities appeared only about 5000 years ago, and until recently were so unhealthy that their populations required constant replenishment from the surrounding countryside.

Industrial society is a highly artificial construction with an internal logic not unlike one of its own machines. It rests on the use of a particular kind of energy stored from the early history of the Earth. Now we are getting the bill for it. This bill looks impossibly large. Some of the damage we have done to the environment is irreversible within human timescales. The chemistry of the atmosphere has already changed, and even if we could immediately cut back man-made emissions of greenhouse gases, the effect would be with us for hundreds of years. But we can certainly mitigate the problem.

A programme of international action would need to include the elaboration of new energy policies designed to conserve energy; reduce consumption of fossil fuels, especially coal and oil; promote more efficient vehicles, wider use of mass transport, and better urban planning and building design; develop alternative sources of energy especially solar and reduce burning of fuelwood in poor countries. It would need to include getting rid of chlorofluorocarbons and noxious emissions, and coping with the accumulating problem of waste disposal. It should include changes in land use to promote reforestation and wood harvesting; new methods of agriculture, including agroforestry; and the

management of wilderness, deserts and human landfills through application of old and new techniques, including biotechnology.

Humanity must also accept the need to adapt. With greater knowledge of what is likely to happ, we can prepare ourselves for change. This may require small changes as well as big ones: from the food we eat (for certain plants will do better than others in a carbon dioxide rich world) to major public investment in energy, desalination for fresh water, and protection against rising sea levels. More needs to be done, through a variety of methods, to curb human population increase, to inculcate understanding of the environment and other living creatures within it, and to support economic develooment worldwide only on a basis which is sustainable over generations.

The sum of the measures required to mitigate the effects of change and adapt ourselves to it may amount to as big a revolution in human society as the industrial revolution which has directly or indirectly caused it The problem is without precedent. It involves the world itself, and the ability of our species to cope with the unwitting results of its actions.

The first step to wisdom is to recognise the problem, with its roots in population increase, degradation of the environment and - it must be said - wrong-headed attitudes and wrong-headed policies The next step is to do all possible to prepare for the future. As the movement of refugees across frontiers would be extremely unwelcome, and could be resisted even by force, governments must work in the first instance to manage the problem themselves. In doing so, they would need, and have a right to, help from the international community. Action to accommodate refugees across frontiers would be immensely more difficult, and without international agreement could risk creating tension, disorder and conflict on a major scale.

Science is full of surprises. Things to not necessarily happen in linear or step-by-step fashion. A measure of unpredictability and chaos is endemic. As animals we are both tough and adaptable, but our toughness and adaptability could be tested beyond endurance. We have grown, lived and flourished as elements in specific natural surroundings. Those surroundings or ecosystems could be so damaged that they could fall apart, as they often have in the past, and be replaced by different ones. We have to look to our present companions in life in their marvellous complexity as well to ourselves if all are to survive and prosper.

FIRST MARINE NATURE RESERVE FOR WALES

Skomer was declared recently by the Secretary of State for Wales, the first statutory Marine Nature Reserve for Wales and only the second one in Great Britain.

Skomer MNR consists of the seabed and shore around Skomer Island, the Marloes Peninsula and includes 27 kilometres of coast and 155 hectares of seabed. Skomer Island is itself a National Nature Reserve. A number of the animal and plant species that occur in the reserve are not usually found north of Skomer because the water is too cold. Among these is the very rare carpet coral, the only stony-coral to be found in shallow waters in Britain. Skomer MNR is a monitoring site for the long term study of marine invertebrates.

Over a quarter of a million seabirds nest on Skomer's cliffs and clifftops each year. Skomer MNR is also one of the most important seal breeding sites in south-west Britain.

HEADWINDS
by MIKE EMERY

A year ago, I and my colleagues were caught in vicious gusting headwinds whilst rounding South-West Cape: the story is recounted elsewhere in this issue. During the climax, I was barely making headway through the water, and when on one occasion I allowed my bow to move significantly off the wind, I was unable to put the boat back on course without outside help.

A couple of months later, returning from Tasman Island (also described in this issue), we were again caught in similar conditions rounding the southern bluff of the entrance to Fortescue Bay. Forewarned, I took great care to keep my bow exactly on the wind. On occasions I was moving backwards -- it was easy to judge with the cliffs only a few metres away -- but over a period of perhaps 10 or 15 minutes, I was able to gradually work my way past the head to more sheltered waters. Nearby, two in a double were less fortunate. Out of the corner of my eye I watched as they also let their bow swing slightly off the wind and then were incapable of getting back on course. Barely making headway myself, I was in no position to assist, and they were forced to let their boat swing downwind, head out to sea while picking up as much speed as they could manage, then use their rudder to make a wide sweeping turn up into the wind again, well out from the headland. They reached the beach long after I did.

I have thought much about those two incidents since, and the result is this article. The suggestions I am about to make have not been tested in practice -- I don't go out in those conditions voluntarily and I've managed to avoid being caught in them since -- but I believe they should be helpful to anyone caught in such conditions in the future. I hope they can become the basis for discussion.

(1) It is easy to forget that, while we have all become accustomed to using rudders, a rudder can only help steer a boat if it is moving through the water. A near-stationary boat cannot be steered with a rudder.

(2) Consider the case of a boat sitting stationary, beam to the wind (fig.1). The rudder acts as a skeg or fin at the extreme rear of the kayak. The wind tries to push the boat sideways, but because of the fin, the stern is much more reluctant to slide sideways through the water than the bow -- so the boat swings round stern to the wind. The same will be true (to a lesser extent) if the boat has the wind off the bow, the situation that we are considering (fig.2). The wind will try to push the boat backwards (and it is up to the paddler to resist that) but it will also try to push the bow downwind with more success than the stern, causing the bow to swing further off the wind and exacerbate the problem. If the paddler has sufficient forward speed, he can use his rudder to get back on course, but if as in my case the forward speed is almost zero, then the rudder cannot help. The paddler must then try to use sweep strokes to rotate the boat back to the required course. In this, he or she is likely to be thwarted -- by the rudder! To swing the near stationary boat back on course using sweep strokes, the bow must swing in one direction while the stern swings in the other, and the rudder is acting as a large fin to prevent sideways movement of the stern. Not only did the rudder cause the problem, but it is also obstructing its solution.

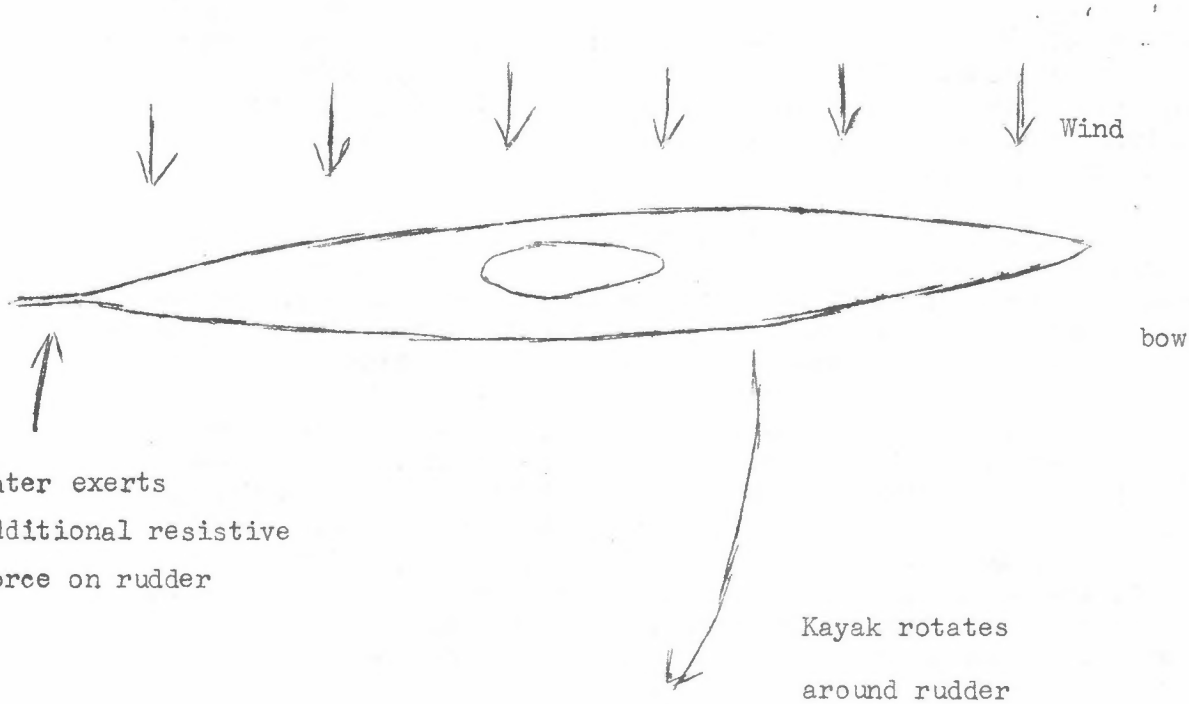

Wind
bow
Water exerts
additional resistive
force on rudder
Kayak rotates
around rudder

Fig.1

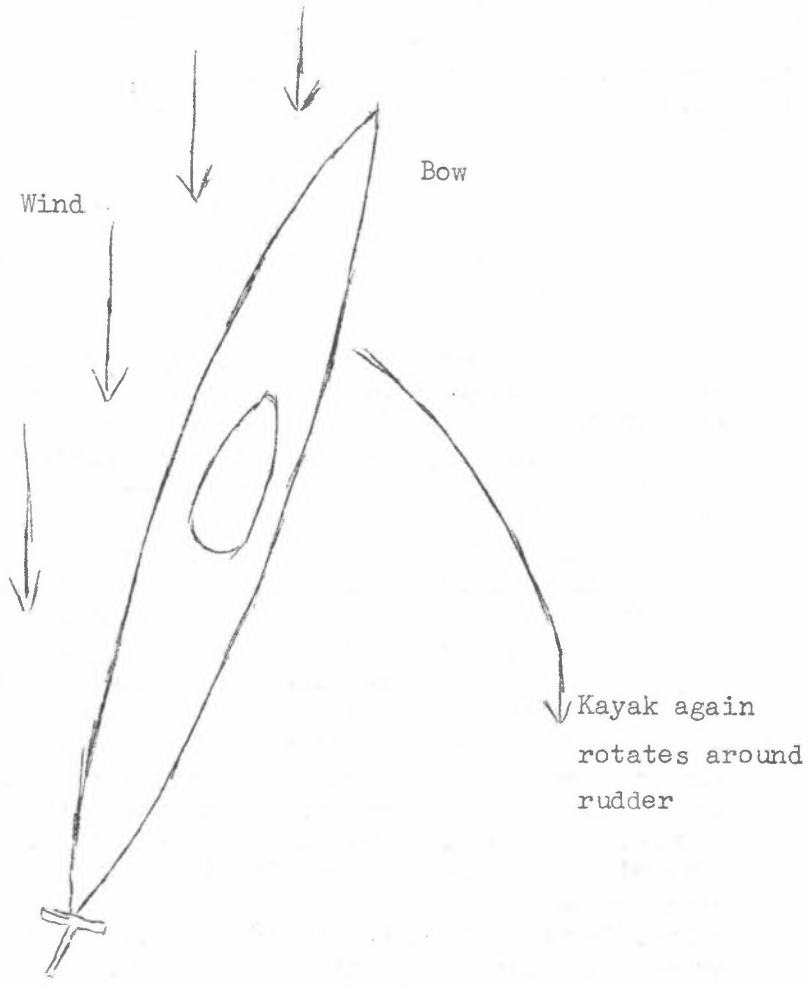

Wind
Bow
Kayak again
rotates around
rudder

Fig.2

Solution 1: Stow the rudder

That may sound like stating the obvious, but keep in mind the conditions under which this has occurred. In our rapidly varying conditions, you may have been very grateful for the rudder only a few minutes before, while making reasonable headway under a stiff beam wind. Now you're fighting with everything you've got, trying not to lose the centimetre it took you ten seconds to cover. Would you feel like putting down your paddle and fiddling with deck lines to raise the rudder between paddle strokes?

A really sea-worthy boat is one in which the rudder can be raised or lowered almost instantly, with no more than a flick of the appropriate wrist, and with barely a pause in the paddling rhythm. That wasn't true of either of the boats I paddled in the incidents mentioned above. One had the raise/lower cables behind the paddler where they were difficult to find let alone see: the other had a stiff rudder blade, which entailed parking the paddle, grabbing the cord with both hands and pulling very hard. Perhaps I deserved what I got.

(3) The psychological pressure under these conditions to keeping giving all you've got, to try to go a bit harder and start getting somewhere, is very high, and the idea of slackening off briefly certainly didn't occur to me off South-West Cape. On reflection since then, I suspect it would have been the best thing I could have done. Paddling as hard as I could, I barely made headway. If I had eased off, I would immediately have begun moving backwards. With the wind on the left of my bow, I could then have put the rudder to the right, let the rudder pull the stern round as the wind pushed me back. I could have helped by paddling forward on the right. I would have lost a few metres in the process, but that would have been better than relying on outside help to get back on course, or spending the next 15 minutes sweeping out in a wide circle and fighting back up into the wind. So we have

Solution 2: Let the wind blow you backwards, back on course

There's a problem with that too. Many of us have not bothered to fit stops to our rudders to prevent them swinging sideways further than is useful. In our December '84 issue, Adrian Dean explained that a rudder stalls and begins to lose effectiveness when it is swung beyond about 14°. That figure may depend a bit on the thickness and detailed shape of the rudder, but there is no doubt that tilting a rudder beyond about 20 or 30° simply transforms it into an eddy-maker. Worse still, if you try to paddle backwards with the rudder down, whether under the severe conditions we are talking about here or simply backing out of a cave, a rudder with no stops will simply flap over to one side under the reverse pressure of the water and you will be unable to straighten it with the pedals until you move forward again.

To summarize:

A sea-worthy rudder will

(a) Have raise/lower cables where you can see them.

(b) Be easy to raise and lower

(c) Have stops limiting its deflection to somewhere around $14\text{-}20^{\circ}$.

When paddling into a severe headwind

(a) Decide whether you want your rudder down at all.

(b) Keep your bow exactly into the wind, until you have travelled far enough that you can make a large course change.

(c) If you do get off the wind and can't sweep-stroke back on to it, consider letting the kayak blow back slightly while using rudder and paddle to swing the bow back.

Templates

Cardboard templates were shaped and cut for the fibre-glass mat at the bow and for the bulkheads. These were left with the mould.

Stern

To facilitate the squaring of the stern for the rudder post, we used the solid stern cut from Mike Edwards kayak, as a plug in the mould. Mike has kindly agreed to leave it with the mould.

Rudder cable tubing of black plastic and glassed to the deck before assembly required a slight modification to the mould to allow exits, but these can be plugged if not required.

Hull/Deck Assembly

We had problems at the stern and the bows!

Because of the sharp configuration and curvature, the first foot or so of both ends sprung away from the hull mould during curing. Our solution was to wedge pieces of wood between the side in the offending areas. To these we tied lengths of string which could be jerked out of the cockpit after taping up.

This worked well for the stern, but the narrow 'beak like' bows was another story and after experimenting with cramps which weighed a tone, we settled for thin copper strips secured by self-tapping screws and then removed the cramps.

If there is any other advice wanted, please feel free to ring me on 296490.