FILE

PERIHELION Newsletter 11

Comet Class Association

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NEWSLETTER NUMBER 11

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FROM THE CHAIRMAN

Well, what a variable start we have had to the beginning of the season in all respects.

Firstly, the weather has treated us to all manner of variations from real biting Brass Monkey weather at Cam in April, through perfect warm sunny days at Slough and Kennet Valley in early May to hot and breezy conditions at Grafham Water.

What will June bring forth I wonder? Any backers for a return to cold wet miserable conditions - no, probably not as the odds must be in that direction. Let's hope I'm wrong.

Secondly, the attendance at our meetings has been a trifle disappointing with only 7 braving the elements at Cam, a better number at Slough and Kennet Valley and a rather low entry of 23 for the Inlands and it's prestigious new Association Trophy.

The organisation of these meetings takes quite some effort on behalf of both the Association and the Clubs involved and we will only be able to maintain a full programme if you, the members of the Association, support us in attending the events. Don't leave it to somebody else because he may have left it to you! Do come and join in, irrespective of your ability and racing experience because we guarantee you will enjoy the fun and the challenge.

I hope that, by the time you read this newsletter, we will have had good turnouts at JCB in the Midlands and Chipstead in the Southeast. More importantly, perhaps, the National Championships are due at the beginning of July at Shoreham and I hope as many as possible of you will make a special effort to attend.

I have had a number of complimentary comments on the layout of the last newsletter and my thanks go to Stuart for his work on our behalf - long may it continue!

We have had two training days since the beginning of the season, organised by Brian Hunt at Kennet Valley and Will Turner at JCB. My thanks go to both of them for the considerable time and trouble they put into organising these events which I am sure were well received by the members who attended the sessions.

As always I am in dire need of articles for the newsletter and it would be particularly interesting to hear from anyone who attended a training session with their comments and suggestions for similar future activities.

I am sure that a lot of Comet owners use their boats for casual sailing and holidays - there must be some stories to tell us from out there, where ever - don't leave it all to Jackie, even if her sailing exploits do lend themselves to a good story!

I hope for all our sakes that the fine weather does continue and that you have good sailng where ever you may be throughout the season. I do hope to see you all somewhere at an open meeting or sailing event - I'll be there, will you?

Best Wishes

Keith Lamdin.

P.S. Is no one interested in a Comet Cadet section?!

DRAYCOTE WATER INVITATION PURSUIT RACE - SATURDAY 18TH MARCH

We arrived at Draycote Water early, the reservoir being very easy to find. After rigging the boat and getting changed I had something to eat whilst listening to the Sea Cadet Band!

At the briefing the Race Officer explained the complicated course consisting of about a dozen marks and he then gave the weather forecast, force three increasing later.

The speed of the first boat on the water, a Mirror, suggested the wind was stronger than a force three. Whilst rigging the boat the wind kept blowing the boat off the trolley. It was definitely stronger than a force three!

Once on the water, as I did not want to be late for my start, I ignored Dad with the camera and headed for the start. Dad could always take pictures at the end of the race. I enjoyed a fast plane down to the start line - followed by a capsize. I righted the boat without much difficulty and noted the quick arrival of the rescue boat.

I did not get a particularly good start, being too far down the line. I soon got left behind the other boats that started with me due to the horse coming untied. Eventually I reached the windward mark and sailed downwind on the fastest and longest plane I have ever had.

I capsized again and this time righting the boat proved to be impossible. Everytime the boat came up it was blown straight over again. After about a quarter of an hour I gave up and sat on the top of the boat. There was no sight of the rescue boat now!

Eventually I drifted ashore on the far side of the reservoir near a 505 which had lost its mast. About a dozen other boats were also in the same trouble and so we kept each other company while we were waiting to be rescued. After half an hour with the wind gusting to force seven there were only thirty boats still racing out of one hundred and fifteen starters. The rescue boats with no one left to rescue began ferrying people stranded on the far side of the reservoir back to the clubhouse, myself included.

At the clubhouse I got changed and listened to some of the stories. Most boats had suffered some kind of gear failure or had capsized. I found out the race had been won by Steve and Greg Irish from Draycote Water in a 420.

Finally we took the car around to the other side of the reservoir, loaded the boat back onto the roof and headed for home. Dad did not get his picture after all!

Thanks to Margaret and Barrie Hylton for lending me one of their new Comets.

Chris Robinson.

32ND FROSTBITE SERIES

From the middle week in October I motored down to Cliff, on the Isle of Grain, Kent, to sail my Comet on the gravel pit lake used by the Blue Circle Sailing Club. The slow handicap fleet consisted of Miracle's, Pacer's, Topper's, Solo's and single handed Mirror's.

Racing was very enjoyable varying from force 0 to 6 winds and as frostbites go it was quite a warm one!

The last race of the series was on a Sunday just a week before Christmas. With the wind starting about force four, I had my sail reefed as capsizing was definitely not on as I had no wish to fall in the cold water.

The first lap the Comet was fighting it out with a single handed Mirror and a Topper. There were lots of sailboatds which were flitting in and out everywhere. The other Comets and Solo were miles in front.

On the second and last lap, the wind seemed much stronger at about force five gusting six. All the boats and sailboards seemed to disappear! The sailboards all capsized around the gybe mark and just gave up. The Topper went into irons and the Mirror gave up as well. As I gybed around the windward mark, the boat was still upright and about ten yards in front was John Windibank's Comet, upside down, with John trying to get it up!

My boat was going very fast and, with the sail right out, if you were not careful it did tend to go by the lee. The water was spraying everywhere, the Comet was rolling like a drunken goldfish and I was getting very excited, thinking that if I could just keep the boat afloat around the last buoy, just a few yards ahead, then I should beat John.

Then disaster struck! A Snipe, from the fast handicap fleet, appeared, it seemed, from nowhere. I swerved the Comet to avoid it and I capsized and turned turtle. Four times I got the boat up and then it turned turtle again while I finally fell into the water. It was so cold that all my energy seemed to go.

The safety boat men hauled me out like a rag doll! As soon as my legs began to feel that they belonged to me, the safety boat men said - "You're fit and smiling, you can get your boat back up" and with that I was pushed out onto the Comet!

Needless to say, pointing the boat to windward, it just veered round and, as it was coming up, started to turn towards me. My move was not quick enough, the Comet hit me bang on my inside knee. By then, I looked around and realised we had been blown onto a lee shore with a nice lot of small rocks. The only thing to do was to dismantle the Comet. David came roaring up in the car and, with his help, I limped around endeavouring to put the boat on the roof of the car.

After I had changed into dry clothing and was limping from the Club I met John coming in my direction. His mouth and jaw were very swollen as the boom had hit him round the face on the gybe. He did manage to sail his boat back.

So we had two Comet sailors nursing their injuries over Christmas but it was all in good fun!

Jackie Hudson.

COMETS AT SLOUGH

Eighteen Comets took part in the ICI Slough Open Meeting on the Bank Holiday Monday, 1st May, in near perfect sailing conditions with a light to moderate breeze.

The day ended in triumph for Damon Perrin of Aylesbury S.C. who won all three races by a large margin having led from start to finish each time.

This overshadowed a fine performance from Andrew Pearce of Kingsmead S.C. who easily finished second in the first two races, once recovering from the back of the fleet, and who just overtook Graham Butler of Kingsmead on the line to gain third position in the last race.

Keith Lamdin of Aylesbury was one of the unfortunate helmsmen to miss a mark and be disqualified from fifth place in the first race but did well to gain fourth place in the second race after again recovering from a poor start.

Peter Adlington of Kennet Valley S.C. finished a good second in the last race to be fourth overall while Derek Chidell led the home team with consistent sailing to be placed third overall and claim the veteran's prize from a large number of contenders!

Overall Results:

1st	296	D. Perrin	Aylesbury S.C.
2nd	20	A. Pearce	Kingsmead S.C.
3rd	199	D. Chidell	ICI Slough S.C.

AMS MARINE BUILDERS REPORT

The year so far has been extremly busy for AMS Marine. At the time of writing (early June) 57 Comets have been built this year, the waiting list is about two months with the next available sail number 335.

After a busy week in April interviewing potential Comet builders and a couple of false starts, a new recruit started this week.

Recent Boat Shows included Bristol at Easter which was rather quiet, although after following it up with a demonstration day at Chew Valley Sailing Club, we now have the first Comet going into that club. Margaret Hylton also took the Comet to Ipswich for the East Coast Boat Show in late May.

Whilst Margaret was at Ipswich, Barrie Hylton and myself were having a great time at Grafham Sailing Club at the Inlands. Fantastic weather all weekend and some large uncomplicated courses made for some memorable sailing.

The next major event is of course the Nationals at Shoreham where we will have our own AMS Marine rescue boat for filming videos and a bit of rescuing if necessary! See you at Shoreham.

A M Simmons.

INLAND CHAMPIONSHIPS

A competitive fleet of 23 Comets entered the Inland Championship at Grafham Water over the weekend of 20th and 21st May. The fleet was rewarded with an excellent sailing weekend with hot sun and moderate to fresh easterly winds.

The practice race was dominated by Andrew Pearce who led from start to finish.

In the first points race Pearce retained his form to lead at the windward mark closely followed by Damon Perrin, Gary Bullock and Charles Williams. These four soon opened a large lead over the fleet and, in a freshening wind, Pearce just retained his lead over Perrin to the finish with a clear gap to Bullock and Williams.

On Sunday morning, the second points race saw Pearce again leading from Perrin in a moderate force 3-4 with a gap to Bullock, Brian Hardy, Brian Robinson and John Windibank. At the windward mark on the second lap, Pearce capsized allowing Perrin into the lead, Hardy was through to third with Neil Beaton and Keith Lamdin joining the leading group for the first time. At the finish Pearce had retaken the lead and Bullock had regained third place ahead of Windibank.

With the easterly wind freshening to force 4-5, the third points race saw a group of eight boats, including all the main contenders, arrive together at the windward mark. After a shake-out during the first triangle, Perrin was leading closely followed by James Withall and then Vic Fagence, Bullock and P. Brodie with Pearce behind Lamdin in 7th place. After another lap with Fagence capsizing on the run and Pearce gaining places, the in-fighting had allowed Perrin to establish a clear lead which he held to the finish followed by Pearce, Withall and Robinson.

The final points race started back to back with a reduced fleet and Perrin requiring a win to take the overall prize. At the end of the first lap, Perrin led narrowly from Withall with Fagence, Bullock and Pearce in pursuit. On the third beat, the lightweight Withall performed miracles to overtake Perrin and, with Pearce in 4th place, the overall prize belonged to Pearce.

At the end of the second triangle, Perrin again led narrowly with Pearce in third place and everything was again wide open. However, a capsize by Pearce on the final lap settled the issue with Perrin winning the race from Withall and Fagence.

The following prizes were presented by Doug Brown, Commodore of Grafham Water S.C.

1st	Damon Perrin	Aylesbury S.C.
2nd	Andrew Pearce	Kingsmead S.C.
3rd	Gary Bullock	Kingsmead S.C.
4th	James Withall	Aylesbury S.C.
5th	Vic Fagence	Middle Nene S.C.
6th	John Windibank	Gravesend S.C.
1st Lady	Jackie Hudson	Wilsonian S.C.
1st Junior	James Withall	Aylesbury S.C.
1st Veteran	Brian Robinson	Hunts S.C.

Keith Lamdin.

SAILING YOUR COMET - PART 4

I have so far considered sailing the Comet from the point of view of inland sailing on flat water with no waves and static water with no current or tidal effects.

However, sea sailing is different! Firstly, the water flows from one direction to another dependent on the tides and, secondly, it goes up and down dependent on the waves! This does significantly complicate the sailing equations and sometimes proves offputting to the majority of inland sailors.

This article attempts to explain the basic causes and effects of sea sailing and to provide some guidelines to overcoming the special situations encountered at venues such as Gunfleet and at Shoreham.

TIDES: Tides are caused by the attraction effects of the moon and the sun in conjunction with the natural effects of the earth's gravity. At the point of new and full moon, the attraction forces are acting along the same line to create the greatest tides known as "springs" while, at the first and fourth quarters of the moon, the attraction forces are at right angles and the smallest tides occur being known as "neaps".

The effect of the tide is to produce a rapid movement of the sea into and out of the tidal river and estuary basins thereby creating the resultant higher and lower water level at varying points around the coast.

In flowing into the Thames Estuary to produce the high water level at Tower Bridge, the tidal stream floods southwards past Gunfleet from Walton towards Clacton until high tide is reached.

There is then a slack water period of about one hour during which the water level remains relatively constant and the water flow rate is basically negligible.

From the high tide level, water begins to ebb out of the Thames Estuary northwards from Clacton towards Walton at a steadily increasing rate to reach a maximum flow rate at half tide after about three hours. Thereafter, the flow rate, whilst being in the same direction, begins to steadily reduce until the water level is at its lowest about six hours after high water. At this time there is again a period of about one hour of slack water around the low water mark.

The cycle then repeats in the opposite direction, alternating between high and low water over a period of slightly more than twelve hours for repeated high water levels which therefore slip daily in time by around one hour.

In open water of constant depth, the rate of the water flow is fairly predictable for each tidal cycle and builds steadily from slack water to the mid-tide point before decreasing again steadily to slack water, (fig 1).

In shallower water close inshore, the reduced water volume combined with the frictional effects of the seabottom cause the flow rates to be significantly reduced from, say, an open water mid-tide rate of three knots to an inshore rate of perhaps only about one knot with proportional reductions in flow at other points of the tidal cycle.

TIDAL HOURS	FLOW KNOTS OFF-SHORE	FLOW KNOTS IN-SHORE
HW	0	0
+1	1	.5
+2	2	1
+3	3	1.5
+4	2	1
+5	1	.5
LW	0	0

FIG 1

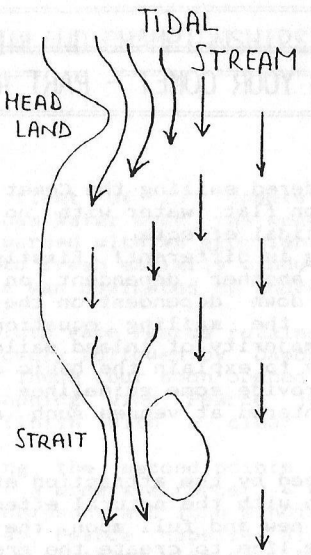

FIG 2

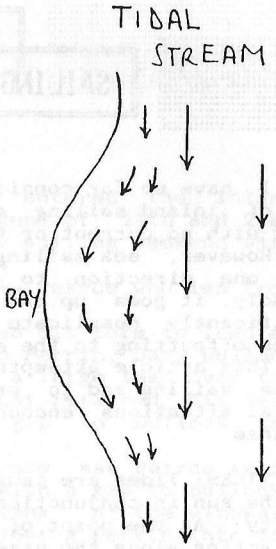

FIG 3

If the tidal stream is concentrated into a smaller volume by headland or a narrow strait then the flow rates increase in order to allow the water volume to pass the obstruction in the tidal cycle period, (fig 2). Conversely, if the water flow enters a wide bay capable of passing a greater volume then the water flow rate will decrease, (fig 3).

Further, the tidal stream will attempt to flow firstly in relatively straight lines and indentations in the coastline may cause back eddies of the stream to match the coast whilst the main stream will effectively take short cuts in an approximation to the shoreline, (fig 4).

It is also important to note that the tidal stream generally changes its direction inshore a little while before it changes in the middle of a tidal estuary or in the deep water channel. In addition, the tide is also affected by the prevailing wind to the degree that a strong wind acting with the tide will increase the flow rate and produce a higher tidal level. In these conditions the turn of the tide will be retarded in time while, with a wind blowing strongly against the tide, the time of the turn of the tide will be advanced.

Thus, the tidal effect is a complicated but definable stream of water for any specific piece of coastline where local knowledge is of definite use but which can be negated by a logical view of the probable water flow.

How does this affect our sailing? The answer is GREATLY because the tidal stream acts directly for or against the movement of the boat through the water giving rise to a difference between the boat's speed through the water without tidal effects and boat speed over the ground (seabed!) with tidal effects. In effect, the tidal stream acts as a moving carpet of water working either for or against the progress of the boat.

If the boat is going in the same direction as the tide then the tidal stream adds to boat speed giving an enhanced speed over the ground and, in general, giving an advantage to the boats in the strongest stream.

If the boat is going against the tide then the tidal stream acts against boat speed giving a reduced speed over the ground and giving an advantage to the boats in the weakest stream.

I have simplified the effects by assuming the boat's course to be directly upstream or downstream but the principle holds to varying degrees for any cross stream course, (fig 5).

The basic rule to remember is come inshore to sail against the stream and go offshore to sail with the tidal stream.

Finally, it is worth remembering that the tide also has an effect on the apparent wind strength felt by the boat depending on whether it is acting with or against the true wind. A lee-going stream, by carrying the boat away from the true wind, will reduce the effective speed of the wind and a weather-going stream will increase the effective wind speed by carrying the boat up to meet the wind. This effect of modifying both the apparent wind strength and direction is true for all angles of stream and wind and is particularly significant in light winds when the wind, tide and boat speeds do not differ greatly, (fig 6).

It pays dividends to look carefully at the race course area for the expected state of the tide and to consider the various course options to take advantage of or minimise the disadvantage of the tide. It will also help to visualise the course offsets that may be necessary to lay a course to a mark across a stream which will not only change the boat's speed but also affect the direction in which you would make good your course.

The sensible judgement of tides is a matter of common sense and experience particularly as the tidal effect is not obvious whilst sailing the boat on open water without any fixed points of reference.

If in doubt ask the locals and then get out on the water before racing to ascertain whether they're telling the whole truth and to form your own opinion!

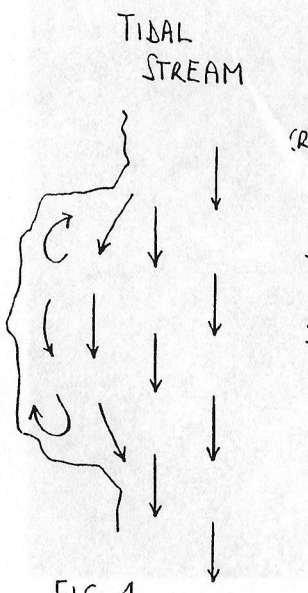

FIG 4

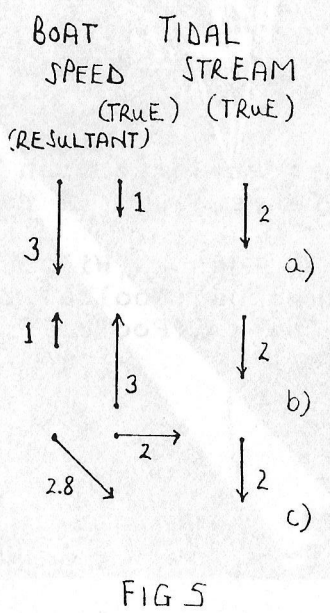

FIG 5

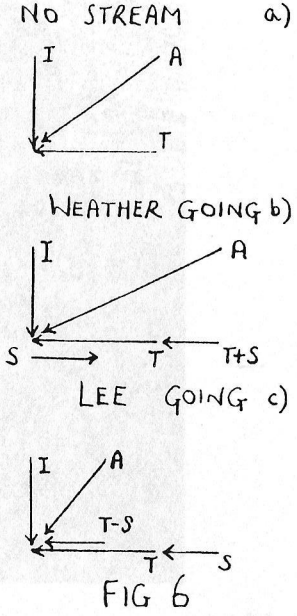

FIG 6

Prizewinners at Comet Open on 6th May
at Paxton Lakes S.C. (L to R)

3rd David T. Hudson (Wilsonian S.C.)
1st Barrie Mason (Poolhall S.C.)
2nd Frank Cowern (Poolhall S.C.)

Gordon McIntyre - proud new owner
of wooden decked Comet No. 1.

WAVES: Looking now at wave formation I will firstly consider it in isolation from the tidal flow although, in practice, there is a significant interaction between the two elements of sea behaviour.

The effects of waves are caused by the frictional forces of the wind in blowing a moving airstream across the basically stationary surface of the water and disturbing a relatively shallow boundary layer from the surface separate from the almost undisturbed deep water layers of the sea.

The friction of the wind causes a volume of water at the boundary layer to be moved in the direction of the wind and, in so doing, an oscillation is set up in the boundary layer causing a wave effect to be created. The wave structure will have a repetitive period, height and wavelength which is directly in proportion to the wind strength and the depth of water disturbed. The wave shape is slightly asymmetric with the crest of the wave being steeper and narrower than the trough and the face of the wave being steeper than the back, (fig 7).

In relatively deep open water the wavelength between peaks and troughs of the wave system is rather long and the height of the wave accordingly lower while accommodating the same volume of water in movement.

As the wave system approaches shallowing water the same volume of wave water is restricted by the sea bed and forced to move upwards giving a shorter wavelength and reduced velocity to the wave system. The wave shape changes giving the characteristic steeper, narrower crests and flatter troughs and leading to the breaking wave peaks which, for example, make launching from an open beach a relatively perilous operation compared to sailing in deeper water with more regular wave formations.

If the wind and wave direction is not at right angles to the shore-line there is a tendancy for the true wave direction from deep water to be refracted as the waves run into shallow water due to the slowing of one end of the wave line before the other. This attempt to cross the shore-line at right angles will result in a further confused wave pattern close to the shore as the incoming waves are relected from the shore. In such cases the out-going reflected wave may fall into phase with the in-coming incipient wave to form exaggerated crests and troughs further adding to the difficulty of managing the boat in waves near a shallowing shore.

As the wind forces increase from medium to fresh and then strong winds, the overall water volume in motion increases giving an increase in the wave height to the degree that the peak or crest may break and cause a disturbed fall of water on the face of the wave. In extreme cases this may appear almost as a smaller wave on top of the main wave and this significantly exacerbates the overall effect of the wave system.

Finally, the wave effects do not occur in isolation but are modified by the tidal stream depending on whether the moving water volume created by the tide is acting in opposition to, at an angle to or in line with the water volume associated with the wave movement.

If the tidal stream is weather-going against the wind then the two water movements are in opposition and the effect is to create shorter steeper waves in direct proportion to the strength of the tide. This effect is often most noticeable in enclosed tidal waters and shows as a short chop which in strong winds and stream can be quite vicious and almost uncontrollable.

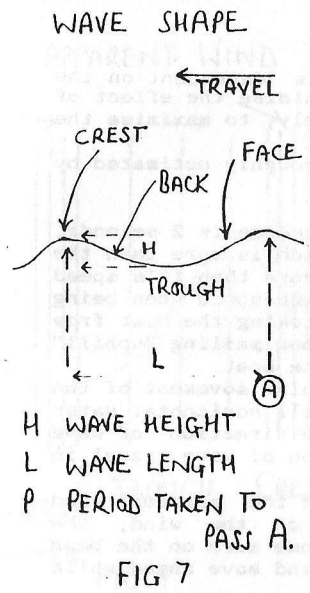

FIG 7

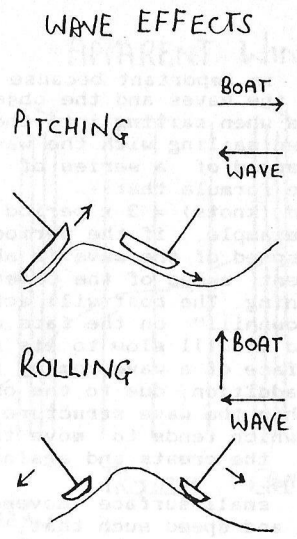

FIG 8

If the tidal stream is lee-going with the wind, although a greater volume of water flows in that direction and the water level on a lee-shore will be high, the effect is to produce lower and flatter waves and, even in quite severe wind conditions, a strong tidal flow can produce unnaturally quiet water conditions. As the calming effect is dependent on the tidal flow, paradoxically, in this case the larger and steeper waves are to be found where the tide is weakest.

How does this affect our sailing? Well, quite noticeably because the water movement inherent in waves will cause the boat to pitch or roll dependent on the angle of the direction of the waves to the course of the boat, (fig 8).

In severe cases of the boat beating into a steep breaking sea the sheer force of the water acting against the hull can cause the boat to lose momentum, take on water over the bow and finally lose steerage control. Even in lighter winds and smaller waves, there is an effect as the rig is fanned about by a relatively erratic movement of the hull and, taken together with the tidal effects, the whole practice of sailing the dinghy can seem altogether different.

SAILING ON THE SEA: Nethertheless, it is important to know that the basic principles still apply:-

sail the boat upright
set the shape of the sail to the conditions
and, maintain attached airflow around the sail.

but, now we must add the appropriate provisos for sailing on the sea.

In considering the techniques for sailing the Comet on the sea it must be said that we are lucky in that the shape of the boat's hull is well suited for sailing in waves. Specifically, the fine entry to the bow enables the boat to cut through waves which are moving against the course being sailed and the rather flat stern sections of the hull enables us to stay on the face of waves moving with the direction of the course being sailed.

This is important because wave sailing is dependent on the speed of the waves and the objective is to minimise the effect of the waves when sailing into them and, conversely, to maximise the effect when sailing with the waves.

The speed of a series of waves can be roughly estimated by the simple formula that:-

speed (knots) = 3 x period (seconds).

For example, if the period of a wave sequence is 2 seconds, then the speed of the wave is about 6 knots which is more than the displacement speed of the Comet although not more than it's speed when planing. The boat will achieve its maximum speed when being helped "downhill" on the face of a wave overtaking the boat from behind and it will slow to its slowest speed when sailing "uphill" into the face of a wave coming from ahead of the boat.

In addition, due to the oscillating circular movement of the water within the wave structure, there is a small horizontal water movement which tends to move the boat in the direction of wave travel at the crests and against the direction of wave travel in the troughs.

This small surface movement will affect the apparent wind direction and speed such that, when sailing on the wind, the apparent wind will decrease in strength and come more on the beam as the crests are reached but will increase and move ahead while in the troughs.

This effect gives us a practical application in that, when sailing to windward in waves, it is usually advantageous to luff up the face of the wave slightly to the crest and then to bear away a little down the back of the wave into the trough before repeating the cycle up the next wave face.

This technique of weaving through the wave formation as it opposes the forward movement of the boat achieves a number of things in parallel. By luffing to the crest we reduce the time spent on the uphill face, using the fine entry of the bow to cut cleanly through the disturbed crest and gain ground to windward by using the slight reduction and freeing of the apparent wind. Having broken through the crest of the wave, the boat is borne away to accelerate down the back of the wave, using the apparent wind as it comes ahead and strengthens to develop more boat speed prior to reaching the next wave crest, (fig 9).

It is essential to ensure that the oncoming wave crest does not strike the hull at an angle on the windward side as the slamming effect of the wave against the boat can virtually bring the boat to a standstill. The over-riding objective is to sail up and through the face and crest of the wave as quickly as possible even at the expense of quite large changes of course. In previous articles I have said that the movements of the rudder should be as slow and gentle as possible and, in large wave forms, this is still the objective.

However, in a short sharp chop where the wavelength between crests is quite short, quite sharp and vigorous helm movements will be necessary to negotiate the crests and, in this case, take priority as the slamming effect of hitting a wave badly far outweighs the additional drag of rudder movements.

When sailing off the wind and reaching or running, the weaving technique is still of importance in using the wave to the maximum in the hope of promoting planing down the face of the wave as it overtakes the boat from behind. As the boat reaches the top of the wave there is a tendancy for the apparent wind to come forward on the beam and to decrease slightly in strength. By bearing away at the crest the forward movement of the wind is neutralised and the speed of the wave face will help the boat to surf or plane and remain on the wave face, (fig 10).

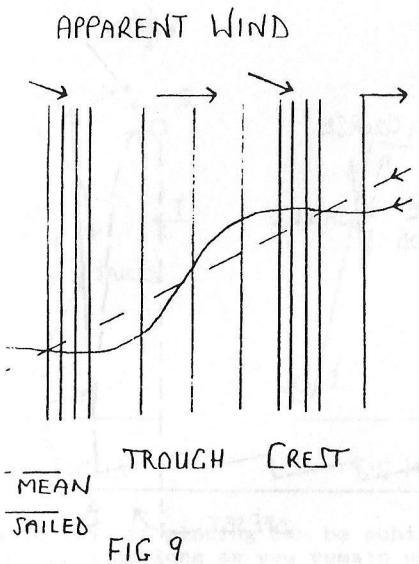

FIG 9

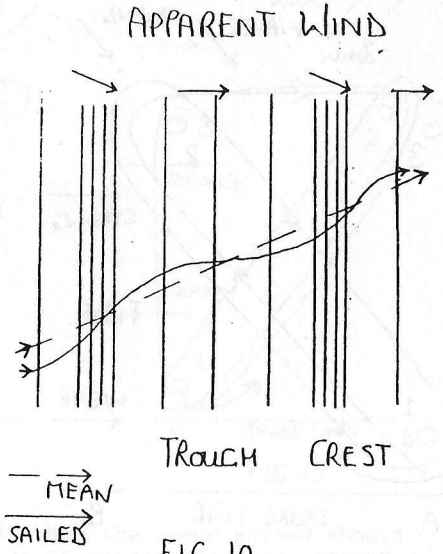

FIG 10

The ability of the boat to rise up with the wave as it approaches from behind is helped by the helm leaning forward to avoid the stern sinking into the face of the wave and, then, once on the crest, and accelerating down the face of the wave, the helm's weight is leant aft to keep the bow from being pressed downwards into the earlier trough. This action of keeping the bow up will hold the wide flat after sections of the hull at an angle to the wave surface which will help the hull to maintain planing speed.

Once again, the movements of the rudder to find the easiest and fastest route through the waves in avoiding any slamming and creating planing conditions may be quite vigorous and, together with any movements of the body or alterations to the sheeting angle of the sail, are intended to use the waves to the maximum benefit where possible and, conversely, to avoid any slowing effects which may occur.

Sailing in waves does need practice and I recently spent a couple of hours in the Comet off Gunfleet S.C. at Clacton. In a moderate force 3-4 and an awkward lumpy sea, it was noticeable that, at first, my movements and boat control were decidedly tense and erratic but, after a period of getting used to the seas, my sailing became much more natural and the boat seemed much easier in sailing through the waves. Obviously it is more difficult for the inland sailors to practise the techniques of sea sailing but, at the very least, it is worth getting out on the sea well before the start of each race just to practise sailing to the rythym of the prevailing wave conditions.

Having considered the techniques of wave sailing and the effects of the tidal stream, I will illustrate the requirements by reference to a mythical race held in conditions found at venues such as Gunfleet.

The race course, tidal stream and wind with wave conditions are shown in fig 11 with the normal course of triangle followed by sausage legs.

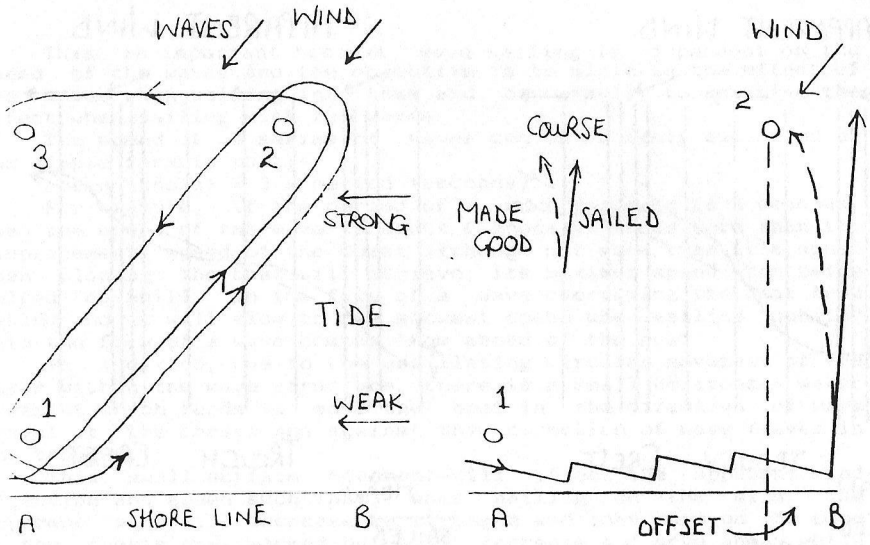

FIG 11

FIG 12

In sailing the windward leg from mark 1 to 2, the prime consideration is the avoidance of adverse tide which is achieved by short-tacking along the shore, within 100-200 yards, in the weakest tide from point A to B. On this leg the wave system may be quite confused and it is essential to maintain boat speed at a maximum over the ground rather than concentrating on pointing. The heavier helms may find a tendancy for the boat to be stopped slightly by the chop and can tolerate a slightly fuller setting of the sail to compensate, (fig 12).

Having reached point B, the course involves a long laying tack towards mark 2 with a considerable offset allowance for the increasingly adverse effect of the tide. As the boat progresses offshore the wave formations will become increasingly regular and rythymic which allows the helm to concentrate on sailing the boat smoothly for the best compromise of boat speed and pointing. At all times the lay line course must be held well above the mark to allow for any backing of the wind direction and for the stronger offshore stream.

From the windward mark 1 to the wing mark 3, the course will be a broad reach which can be sailed in a straight line to make the maximum use of the favourable tidal stream. The helm concentrates on sailing the boat smoothly through the waves and on promoting surfing or planing speeds, particularly down the face of waves as they overtake the boat from behind. It may help to steady the boat to have rather more plate than usual and to bring the sheet in slightly as long as the airflow remains attached.

From the wing mark 3 to the leeward mark 1, a similar broad reach is complicated by the cross-tide direction of the course. This requires the boat to sail a relatively closer reach for the first part of the leg whilst in the stronger stream before bearing off to a broader reach as the stream effect weakens. At all times it is essential to remain above the direct line course from 3-1 as any distance lost to leeward will eventually have to be made up by beating against the tide. Because of this constraint the course is the most important consideration rather than the wave sequences

FIG 13

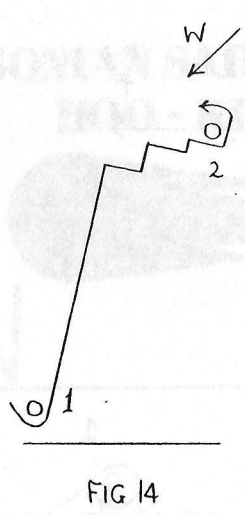

FIG 14

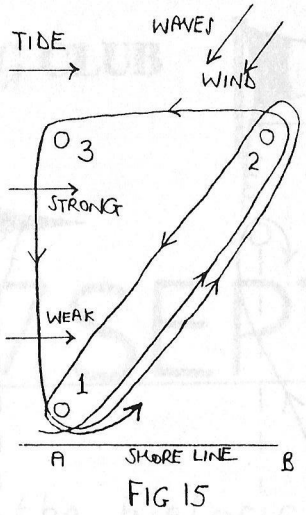

FIG 15

although if planing can be achieved then the speed gained should be used as long as you remain up-tide of mark 1. In this respect, a leading marker onshore is of use to give a continuous bearing for the course made good across the tide rather than the course being sailed, (fig 13).

The next windward leg to mark 2 will be similar to the first and only adjusted by differing values of tidal flow which determine the degree of offset required at point B. Should the race timing reach the point of slack water with no appreciable difference in water flow rates across the course then the leg may be more conventional as an even-sided beat between 1 and 2. Given no tidal difference, it is better to sail the windward leg out to sea as the more regular wave formations make it easier to find the groove of good boat speed, pointing and minimum wave stoppage effects, (fig 14).

Finally, for the run from mark 2 back to 1, the course is more of a straight down-wind, down-tide, and down-waves leg with only a small deviation to allow for any stream effects at the start of the leg. The helm concentrates on sailing through the waves for maximum surfing speed at all times and only gives priority to the exact course as the boat approaches mark 1.

By way of further illustration, I will now consider the same course, wind and wave direction but with the tidal stream being reversed from a lee-going stream to a weather-going one, (fig 15).

In this case, the windward leg from mark 1 - 2 will involve a long starboard tack out into the strong favourable stream before sailing a conventional even-sided beat in regular waves offshore to mark 2.

For the leg from the windward mark 2 to the wing mark 3, the straight or rhumb line course from 2-3 may not be the best choice. Depending on the actual strength of the adverse stream and the ability of the boat to plane quickly in the actual wind and wave conditions which prevail, it may be better to sail a course firstly directly inshore, then along the shore in the weakest tide before returning offshore with an appropriate offset to allow for the adverse stream, (fig 16). It is a matter of experience to know which course will pay but only if a continuously high planing speed gives real boat speed over the ground will it pay to stay out in the adverse tide rather than sail the additional distance.

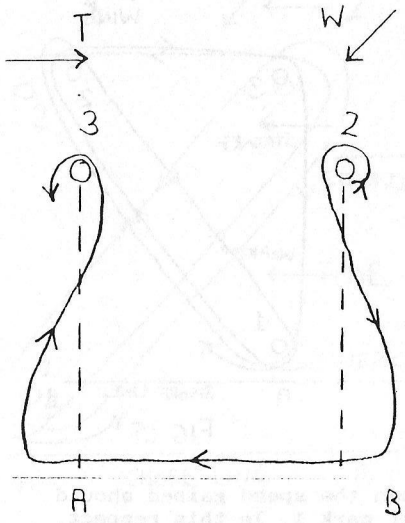

FIG 16

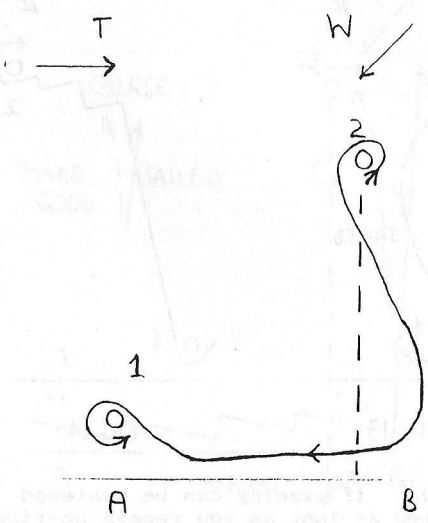

FIG 17

Having reached the wing mark 2, the broad reach back to the leeward mark 1 becomes even broader as the boat must be sailed consciously to leeward of the direct course to negate the effect of the weather-going stream. Again it worth using a leading-mark onshore to give an indication of the course made good across the stream rather than the course being sailed by the boat.

The next beat from 1-2 will be similar to the first until the timing of the race makes it absolutely certain that the main stream has turned out to sea which, remember, happens slightly after it turns onshore after slack water.

Then, finally, for the run back down the sausage from mark 2-1 it will pay to head directly inshore from the windward mark on a more effective broad reach before taking another broad reach along the shore in the weakest adverse tide possible, (fig 17). This course will almost always pay due to the relatively slow sailing leg of a dead run from mark 2 unless the wind and wave conditions are such as to allow continuous surfing on the run when the tidal effects may not be such a penalty as the extra distance being sailed on the dog-leg course.

These examples are only intended to emphasise the major elements of sailing on tidal waters in wave formations and they cannot possibly cover all the variations which can occur in the different locations we use. The changes in wind, tide and waves at each location produce an almost unlimited range of variables which can be explained by reference to the basic theory.

Even more so than sailing inland, it is essential to get afloat early at the sea venues and to experiment with the right rig settings, course directions and wave techniques before the race starts - once the gun has gone it may be too late!

I would like to acknowledge the assistance given to me for this article by the classic Ian Proctor book - "Sailing, Wind and Current" which, although published 35 years ago, is still by far the best treatise on the subject.

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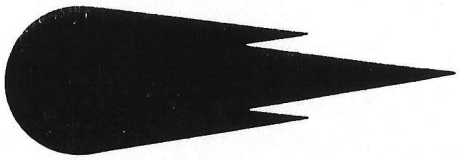

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