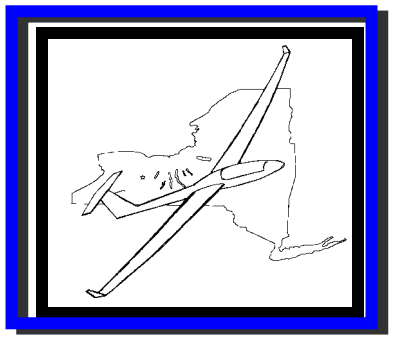

Introduction To Cross Country Soaring

Part I of II

Original Material Prepared From The Experience Of

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Kai Gertsen has logged more than enough miles in a glider to fly around the World…four times. Kai Gertsen has prepared a booklet on Cross-country soaring. Your editors feel that the info in that booklet would be of interest to every pilot and will present it here with current additions and revisions.

INTRODUCTION
to
CROSS-COUNTRY SOARING (Part I)

This publication does not offer any new, brilliant strategies, nor does it reveal any deep guarded secrets. All the material presented here has previously been presented in other publications and used by glider pilots for many years. This is merely an effort to present the very basics in one booklet for the aspiring cross-country pilot.

…..Kai Gertsen

TYPE OF GLIDER

While the latest ultra-performance glider with and L/D approaching infinity would be great, an intermediate type with a glide angle of 30:1 will do nicely. On the other hand, on the average eastern day, it is simply not possible to successfully practice any of the following X-C techniques in anything with a 1-26 performance.

MAP PREPARATION

In a sailplane, we do not have the time or space to unfold and fold sectional charts. We need a single, one-sided map, which covers the area within which we intend to operate.

Unfortunately, the sectional charts have been carefully arranged such that most glider ports are located near the border of the charts so that typically two or more sectionals need to be joined together to create a one piece single sided map.

Before covering your map with clear vinyl it is important to draw concentric circles around home base. The purpose of these circles is to enable you, at any time, to estimate your distance from home and the altitude required to get there. If you are flying a sailplane with a glide angle of 30:1 then circles in increments of 5 miles make sense as an L/D of 26.4:1 will get you 5 miles per 1000 ft. loss of altitude. This gives you a little margin of safety, which is always a good idea. Also, 200 ft per mile is a nice handy, round number to work with. Some allowances of course, have to be made for the effect of wind, which on most soaring days amounts to about 15 mph. A good rule of thumb is to anticipate covering approximately 3.5 miles per thousand feet or losing 1400 ft. in 5 miles if going upwind. Downwind should net about 6 miles for every 1000 ft.

DEFINITION of CROSS-COUNTRY SOARING
The fine art of getting ill while going nowhere very slowly
at great expense and inconvenience…but great fun!!!

DON'T PART WITH YOUR ILLUSIONS. WHEN THEY ARE GONE,
YOU MAY STILL EXIST BUT YOU HAVE CEASED TO LIVE.
…..Mark Twain

NAVIGATION-SIMPLIFIED

With reference to the map and a couple of prominent ground features, point the glider on the heading you need on the first leg. Don't forget to make some allowance for cross wind. Note the compass reading and you know the compass heading for the first leg. Repeat this process after rounding each turn point.

OFF-AIRPORT LANDINGS

At some sites it may be possible to lay out a route which permits airport hopping. For this method to be practicable the airport spacing should not be greater than 20 miles. The idea is that you don't go beyond reach of one airport until you are within reach of the next.

This is an excellent way to get initiated and if possible, the first few cross-countries should be done this way. However, serious cross-country soaring can not be done without the possibility of a field landing and no cross-country, airport hopping or otherwise, should be attempted without being fully prepared to perform an off airport landing. Off-airport landing is a subject in itself and is covered in another chapter.

TECHNIQUE

There are really only three things you need to know, which are:

1. **WHERE TO GO**
2. **HOW FAST**
3. **WHEN TO THERMAL**

WHERE TO GO

DETERMINE THE RELATION OF LIFT TO CLOUDS

Exploring the conditions before pushing off is a good idea. A half hour can be well spent in establishing where the lift is with respect to the clouds. It is not always upwind, but whatever the relationship is it will tend to hold true for the rest of the day and this bit of knowledge should minimize the amount of searching and fumbling associated with getting established in each thermal.

RESIST TEMPTATION TO TURN BACK

In the event you encounter a prolonged stretch of sink immediately after heading out, you may be tempted to make a 180 degree and go back home. This is generally a mistake as you will then be flying through the same area of sink and are likely to find yourself with marginal altitude to reach the airport.

IF ENCOUNTERING A LONG STRETCH OF SINK, TURN 90 DEGREES

Chances are that you are on a street, unfortunately the wrong kind. Your best bet in this situation is to make a 90 degree turn. Stay on that heading until the sink subsides, then get back on course.

FOLLOW PATHS OF LIFT

Supposing your effort resulted in a zigzag course of 15 degrees but only reduced the sink rate by half? No need to feel bad, it was well worthwhile. Think of it this way, your 30:1 glide ratio got to be 60:1 and the extra distance flown, over say a 20 mile run would be a mere .75 miles.

FOLLOW PATH OF SHORT CYCLING WISPS

Short cycling wisps can be worthwhile, especially if there are no other cu's around, even though they are likely to vanish before you get there. The wisps indicate an area of convection and are likely to cycle again. Keep in mind that thermals tend to trigger from the same sources throughout any given day.

STAY UP-WIND OF COURSE LINE

If at all possible do not get down-wind of the course line. Purposely heading down-wind should only be done to remain air borne. This of course becomes less significant on days when the wind is light, but on a day when it is blowing at 20 kts. getting back on course after a slow climb originating down-wind can be exasperating. However, don't be obsessed with getting back on the original course line. If you have drifted significantly off-course the prudent thing to do is to draw a new course line from your position to the goal and abandon the original. Remember, your compass heading will now be different.

FOLLOW CLOUD STREETS

Cloud streets tend to line up with the wind. It usually pays off to follow the streets even if they are as much as 30 degrees off track, but don't get too far off-course and cross over to the next street at 90 degrees so as to spend the least amount of time in the sinking air between the streets. The rate of sink between well-developed streets is likely to be much greater than what we normally encountered between cu's.

STREETS ON BLUE DAYS

If the wind is 15 knots or more the thermals are likely to form in streets aligned with the wind direction, notwithstanding the absence of clouds.

UTILIZING CLOUD STREETS 90 DEGREES OFF-COURSE

Once in a while a cloud street as much as 90 degrees to the intended track can be helpful. Suppose you are about to cross a sizable hole on a day with a strong cross wind. If there is a good, solid looking street going upwind at the edge of the hole, if it is good enough to enable straight cruising at cloud base, it can be worthwhile to follow it upwind for a few miles. You can then set off across the blue with a bit of a tail wind.

FOLLOW TERRAIN FEATURES ON BLUE DAYS

Don't be discouraged by the absence of clouds. Paul Bikle once remarked that the advantage of blue days is that you don't waste a lot of time chasing after dead cu's. Most thermals drift along the terrain unable to break free of the surface tension of the boundary layer until they are triggered by terrain features, such as rivers, the border line of wooded areas, the up-wind shore line of lakes, the end of ridges, etc., bubbles can also be released by a tractor driving across a field. It is even possible for you to trigger your own thermal by flying through a bubble which hasn't reached the buoyancy to break free on its own. Then of course, there are the more obvious sources such as ridges facing the sun, slopes facing into the wind and gullies in ridges, dark patches, towns and ripe wheat fields. Conesus is a good example of the effect of a lake with a northwest wind the thermals are triggered by the dome of cold air over the lake and a line of cu's can often be seen along the length of the lake.

WATCH CONDITIONS AHEAD WHILE CIRCLING

You should know where to go before reaching the top of your climb. While circling it is a good idea to select a couple of cu's in the direction you are going and monitor their development every 360 degrees. This is sort of time-lapse photography and you will get a good idea of their development.

JUDGING DISTANCE TO CLOUDS

Judging the distance to the next cloud can best be done by looking at the shadow on the ground. Also, when close to cloud base, the best indication as to how the cu's line up and direction of cloud streets is to look at the shadows.

EVALUATING CLOUDS

When the sun is low, as in mid-October, the clouds will appear to be better defined when looking toward the sun than they do when looking away from the sun.

LINE UP WITH STREETS BEFORE YOU REACH THEM

If there is a cloud street ahead, you can increase the likelihood of flying in better air if you line up with the street long before you actually reach the clouds.

THINK AHEAD

You should always know where you want to be 2, 5 and 10 minutes ahead. Never get behind the glider. Before you leave a thermal you should not only have one cu selected but one or two back-ups in case the first doesn't work, and if all goes to pot, where to find a suitable field.

RIDGES AS LAST MINUTE SAVES

A ridge can often be used to prevent a premature landing. If there are ridges in your area, always plan ahead so that you can reach a workable ridge if all else fails, preferably one with a suitable field at the base. A thermal will ruffle the treetops in a rotary motion as it drifts across a ridge. If you are ridge soaring, waiting for a thermal to come by, this kind of vortex in the treetops is a helpful sign. When hunting on a ridge, hawks tend to hover directly into the wind, making an excellent weather vane, a good indicator of the angle of the wind to the ridge.

PLACES TO AVOID

Lakes, even small lakes, if they are elongated and the wind direction is along the lake, can create a significant area of stable air down-wind. Another situation, which can be troublesome, is to get caught down-wind of down-sloping terrain. This also will stabilize the air mass inhibiting convection. Expect weaker conditions over wet terrain.

KEEP TRACK OF WINDSPEED AND DIRECTION

A change in wind direction will influence the relationship of lift to the clouds. Also, should you get to the point where you need to evaluate fields, you ought to know the direction you will want to land in

HOW FAST? –OBJECTIVE

As you leave each thermal, the objective is to get to the TOP of the next one as fast as possible.

MacCREADY RING

Back in the early fifties Paul MacCready determined that there is an optimum speed to fly between thermals and that that speed is based on three things; the performance of the glider, the rate of sinking air between thermals and the strength of the next thermal. To display this optimum speed he devised a speed-to-fly ring consisting of a rotary ring fitted around the variometer, calibrated for the specific glider. You set the ring to the expected rate of climb of the next thermal and the variometer needle will point to the optimum interthermal speed. This circular slide rule has now been replaced by computers but we still have to enter the thermal strength.

MacCREADY SETTING

Conventionally the MacReady setting is based on the last climb. This is all well and good if you are flying in reasonably uniform conditions, where you can expect the next thermal to resemble the one you just left. However, there are many days in the eastern part of the country where this is not the case. Keep in mind that the thermal you just left is history. It is really the strength of the next thermal that matters, and using your estimate as to what that might be can often provide a more sensible MacReady value than blindly using the rate of the previous climb. A simplified criteria for establishing the MacCready setting is to set it at the rate of climb you are willing to stop for.

AVERAGE RATE OF CLIMB

Don't be misled by the variometer. The average rate of climb is the altitude gained divided by the total time associated with a thermal, including the time spent centering, which turns out to be about half of what the averager indicates during the better part of the thermal.

CORRECT INTERTHERMAL SPEED

The good news is that adhering to the optimum speed between thermals is really not all that critical. If we stray as much as plus or minus 10 mph from the correct speed it will not significantly impact the average speed achieved. Chances are that you will do better to err on the slow side rather going too fast. Most often the air we fly through has a greater impact on the optimum airspeed than the estimated rate of climb in the next thermal. Be sure to slow down in reduced sink and speed up when the rate of sink increases. However, when slowing down, even when going through lift, don't get below the speed for best L.D., the loss of altitude if entering sink at minimum airspeed will be excessive. *The main thing is to be sensitive to the air you are flying through and adjust the airspeed accordingly.*

BE PREPARED TO CHANGE GEAR

You constantly need to be alert for changing conditions, If for instance, the clouds ahead seem to be down-cycling, you may want to slow down. A couple of cu's in a row with no lift may also be an indication of deteriorating conditions, slow down, and of course, if you are about to cross a sizable hole it will be prudent to get down to the speed for best L.D. Conversely, you may have had to shift to survival mode crossing a soft stretch, but you must be prepared to start pushing again as soon as conditions improve.

WHEN TO THERMAL—MINIMIZE CIRCLING

Keep in mind that whenever you are circling you are going nowhere. Consequently, you want to be sure that whatever circling you do is worthwhile. Every time we stop for a thermal there will be time spent centering. For this reason it pays to take as few thermals as possible.

DECIDE ON A MINIMUM RATE OF CLIMB

During the half hour you spend locally evaluating conditions, prior to starting, also decide on the minimum rate of climb you will be willing to stop for.

THE ACCEPTABLE RATE OF CLIMB VARIES WITH ALTITUDE

The closer you are to cloud base, the more selective you should be. Lets say that shortly after pushing off at cloud base after a 5 kt. rate of climb you encounter another thermal of the same caliber after only losing 500 ft. You may consider "S" turning through it, but anything else would be a waste of time. A thousand feet further down it may be advantageous to stop for another 5 kt. climb but you may be too high for a 3 kt. thermal, and so forth. Eventually you may get as low as you want to get, in which case you will be willing to stop for anything. Another situation to guard against is the tendency to hang on to a mediocre thermal, from a low save, after reaching an altitude at which you would have passed up a thermal of this strength had you encountered it while cruising

OPERATING BAND

Conventional practice is to consider the operating band to be the upper two thirds of the convection layer. If the maximum altitude is 6000 ft., the operating band should be 2000 to 6000 ft. Spacing of thermals is proportional to the height of the convection layer (there are few things in gliding which are certain, but this is one of them). This is the reason cross-country flights are possible even when cloud base is low, as the thermals will be closely spaced. Conversely, expect a long way between thermals when cloud base is high. So if you find yourself at 2000 ft. on a day when it goes to 8000 ft. you may be in trouble.

BIRDS AND OTHER SAILPLANES

A soaring bird circling is a good indication of a worthwhile thermal. A circling sailplane may not be. Avoid needless detours. Before joining another sailplane, be certain that it is indeed climbing. On the other hand, if it is climbing don't waste any time, join up as quickly as possible.

OTHER GLIDER AS A THERMAL PROBE

Sharing a thermal with another glider is like having a remote thermal probe to indicate where the best air is. It works better than any variometer. By closely watching the vertical displacement of the other glider around the circle you will get a perfect picture of the lift distribution. But for this to work you must be at the same altitude. It is important to be comfortable in the company of other gliders. If this is a problem for you, get help from an instructor.

WHEN TO LEAVE A THERMAL

It is time to push on when the rate of climb drops to two thirds of the mean. There are of course times when it makes sense to climb to the top, as when faced with a hole or when approaching deteriorating conditions.

HOW TO LEAVE A THERMAL

Having decided it is time to leave, make one more 180 degree, then tighten the turn so as to get on course, going straight thru the thermal and picking up speed in the process. It is always best if you can have your cruising speed established before entering the sink surrounding the thermal. Unfortunately, this technique must not be used if you are sharing the thermal with someone else. If there is a lot of dead air ahead there is another trick you can use to get a bit more advantage before casting off, but it requires a strong thermal which doesn't weaken at cloud base. What you do is make an extra turn or two after your climb is restricted, converting the lift to extra speed before setting course. Again, don't try this with someone else around.

WHAT TO DO DEPENDS ON WHAT LIES AHEAD

Situation awareness is crucial at all times. Remember, what you do at any given time depends on what the conditions look like on course. As stated previously always be (think) ahead of the glider.

IF YOU GET LOW

In the interest of safety, as you reach the 1500 ft. level the most important thing you can do is to turn the radio off. Being low on a cross-country flight will probably provide the most demanding situation you will ever encounter in your flying career. Aside from trying to stay up, you must also go through the process of selecting a suitable field, just in case, with the myriad of tasks that entails. You will definitely not be in need of other things to occupy your mind. The radio will not help you stay up. Nor will it help you land. It will only distract your attention from the task at hand, at a time when you can ill afford it. There will be plenty of time to contact your crew later.

PRACTICE FOR CROSS-COUNTRY WHILE FLYING LOCAL

First, let's define local flying. Local flying is by no means restricted to the perimeter of the airport. It simply means that we are within glide ratio of the airport with some allowance for the pattern and other eventualities. Even with a moderate glide ratio of 30:1 this gives us a considerable area to practice in. The objective of practicing is to have as few untried skills to cope with as possible when the time comes.

Local flying is generally detrimental to cross-country. It is all very well and wonderful to float around at cloud base over the airport enjoying the view, but you don't learn much. Worse, because there is little incentive to optimize performance, bad habits, which are not always easy to break, tend to creep in. To be beneficial each flight should have an objective.

SET ALTIMETER TO SEA LEVEL

Set the altimeter to S.L. on all flights. Chances are that when you go cross-country, there will be other gliders around. So when someone announces being in your proximity at a certain altitude it's nice to be using the same language.

THERMALLING AND CRUISING

If you have done a lot of local flying chances are that you thermal and cruise at the same speed. Also, you probably do not bank steep enough to maximize your climbs. Because of the low stalling speed of a trainer with a light wing loading, it will climb reasonably well with moderately banked turns, but a higher performance glider needs to be banked rather steeply to climb efficiently. Also, get accustomed to increasing the speed between thermals. Even if you don't bother with MacCready settings you can improve your performance by simply making a guesstimate. If in a modern glider, you won't be too far wrong with an interthermal speed in the range of 65 kts, on a day with 200 ft/min thermals and about 80 kts if the rate of climb averages 400ft/min. The K-21 does not do well much above 65 kts..

ALWAYS CARRY A MAP

Point the map in the direction of flight. Practice map reading, noting relative terrain features and how they relate to the map.

ALWAYS CARRY A CAMERA

Naturally it should be mounted in accordance with FAI guidelines. Taking turn point pictures is not as easy as you might think. Fortunately, this is something that can be practiced right at the home airport and well worth the effort. There are few things more exasperating than making an FAI qualifying flight only to have it rejected due to unacceptable turn point pictures. However, this means T.P. verification is rapidly becoming obsolete.

OPTIMIZE EVERY THERMAL

Never be satisfied.

LOCATING AND CENTERING THERMALS

To effectively practice locating and centering thermals limit your climbs say to 2500 ft. then spoiler down to about 1500 ft. and look for another thermal.

PRACTICE NOT CIRCLING

Take the first thermal to the top. Then see how long you can stay up without circling. This exercise makes you more keenly aware of the conditions and the importance of planning ahead. This is something you can practice very nicely when flying passengers, in case you are involved with this activity at your club. Passengers generally do not like going around in circles and if you keep them up for more than 25 minutes they either get sick or bored or both.

LEAVE THE THERMALS EFFICIENTLY

Practice leaving the thermals as you would on a cross-country flight, but don't cut through the center if you are sharing the thermal with someone else. Get in a habit of leaving the thermals as soon as the rate of climb drops down to two thirds.

ALWAYS CARRY A BAROGRAPH

A barograph trace will show if you exit the thermals in an expedient fashion. The trace at the top of each climb should be in the form of a sharp peak. Rounded tops are a sure signs that you linger too long. It is also important to get accustomed to operating the barograph and preparing the barogram.

GPS

If you plan to use a GPS you should get well acquainted with it while flying local. Learning to operate the GPS on your first cross-country is definitely not a good idea.

CONCENTRATE ON EFFICIENT FLYING

Be selective, use only the strongest thermals. It is easy to drift into complacency when flying locally. Don't get in the habit of being content simply to stay up.

KEEP TRACK OF CONDITIONS

Keep track of conditions while you are climbing so that you know where to go next, before you reach the top of your thermal, just as you would on a cross-country flight.

FINAL GLIDES

One of the most difficult things to judge is the distance a sailplane can cover from any given altitude. The only way to develop this judgment is to make a lot of final glides. Fortunately, there is really no reason why we can't finish every local flight with a final glide. When it is time to come down, get yourself some distance away e.g. 10 miles out at 4000 ft. this should get you home with 2000 ft. in hand, which is a sensible plan for the first few attempts. As you gain confidence you can plan to arrive with 1500 ft. but this is the minimum until you are approved for cross-country.

MINI TRIANGLES

Practicing triangles with turn points between 6 and 10 miles from the airport is an excellent way to monitor your progress. Establish a start and a finish line and be sure to take turn point pictures or use GPS T.P. verification.

GLIDER FLYING IS THE NEAREST YOU CAN
GET TO HEAVEN WITH YOUR CLOTHES ON.
……HANS CHRISTENSEN

RACING VERSUS CROSS-SOUNTRY

You may say, "All this business of optimum cruising, being selective, etc., is all very well but I am not interested in racing, I just want to go cross-country."

As mentioned earlier, on the average soaring day in the eastern part of the country we are typically blessed with a 15 mph wind. In the old days when most of our flights were down-wind dashes we could afford to stay with every scrap of lift and not worry so much about efficient flying. Even if we only managed 25 mph with a 15 mph tail wind we would nevertheless cover a respectable 160 miles in a four hour flight. However, now that closed circuit flights have become fashionable we do need to at least practice some of the techniques used in racing, to some extent. The same performance which netted 160 miles with a 15 mph tail wind would only get you 64 miles on an into the win, out & return.

OPTIMIZING YOUR RATE OF CLIMB

PREREQUISITE

Instrumentation

Efficient thermalling is virtually impossible without a total energy compensated variometer as any variation in airspeed will give false readings as to lift distribution. As we must be vigilant at all times for other traffic and at the same time monitor the variometer constantly, an audio variometer is also essential.

Skill Level

The prerequisite for being able to center thermals with a reasonable level of efficiency is the ability to make well banked, coordinated, steady speed turns in either direction.

In addition to increasing the rate of sink, any slipping and skidding also changes the noise level, which is a major input we use in controlling the airspeed.

Skill Level (con't)

It is absolutely essential to maintain a constant airspeed, as any variation in speed will skew the circle, making it impossible to keep track of our path.

Being proficient and comfortable at turning in either direction is important, as when entering a thermal it generally pays to turn in the direction of the rising wing, as this ought to be the side the thermal is on. Accordingly, you will be greatly handicapped if you have a weak side, you should therefore practice your weak side at every opportunity until you feel equally comfortable turning either way.

DIRECTION OF TURN

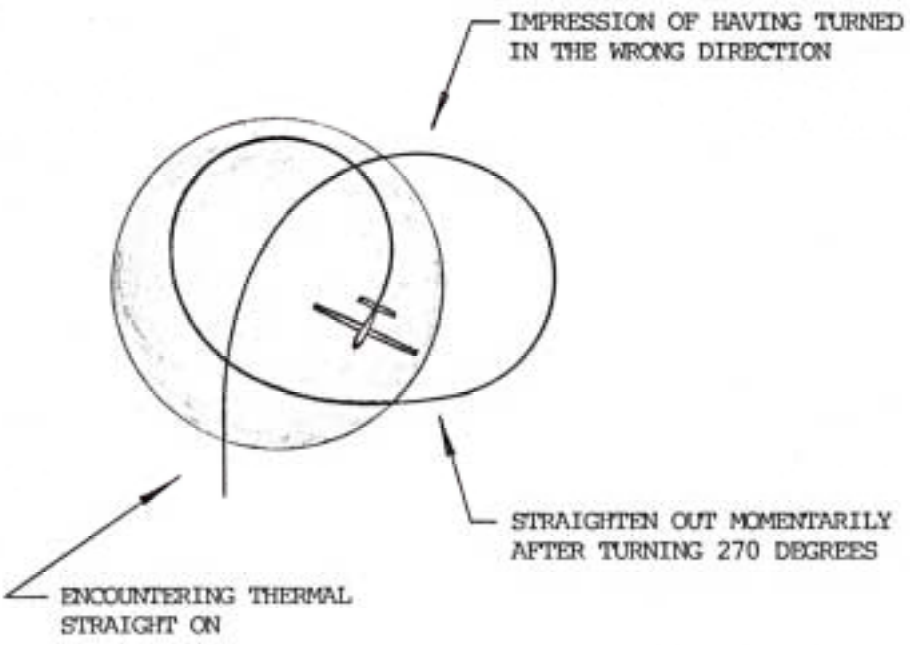
The first indication that lift is near is an increase in the rate of sink. If you are heading in the right direction you are likely to encounter some turbulence as the rate of sink diminishes – now get ready and pay close attention to which wing wants to come up as that will be the direction in which you will want to turn. Nonetheless, in spite of having turned toward the rising wing you will, in all likelihood, get the impression that you have turned in the wrong direction. By the way, the chances are this will happen nine out of ten times. But don't worry, this happens not only to you, this happens to everybody, and there is a logical reason for this. In years past, when we would draw our flight path on a piece of paper, we would depict a turn entered from a straight path by a concentric circle tangential to a straight line. This, of course, is impossible. The path from the point where the turn is initiated to the point where the bank is established is not circular but elliptical, thus, even though we turned in the right direction we may come out the side, creating the impression we went the wrong way. This is the reason it most often is necessary to straighten out completely after 270 degrees for a second or two and then tighten the turn as the rate of climb increases. With a little bit of luck, this should place you closer to the center.

One mistake, which is often made, is to change direction of turn. In the rare instances when this maneuver is successful it is generally attributable to pure luck, in accidentally stumbling into another core, as a means of centering it is useless.

WHEN LOW

If at 1200 ft. or less, rule number one is: don't leave what you have for something better. You may even be loosing slightly at first, but nine times out of ten, if you stay with it, the rate of climb will gradually improve as you work your way toward the center.

WHEN LOW (con't)



AIRSPEED

It is said that you should speed up in sink and slow up in lift, which is all well and good but that does not apply in thermals. I have had the thrill, on a number of occasions of occupying the rear seat with a novice in the front who attempted to apply this technique. The demonstration resembled a roller coaster ride and, of course obliterated any sense of lift distribution.

The airspeed should be constant, and the optimum speed will depend on the type of glider and angle of bank. Some gliders do best if flown near the stalling speed, yet others climb better if flown a little faster. It is imperative that you not be afraid of stalling the glider. If you have a fear of stalling, you most certainly will tend to fly too fast, and many pilots do.

As we all know, the stalling speed increases with the rate of bank, so more speed is required as we tighten the turn. When low, don't forget to add some extra speed in the interest of safety.

ANGLE OF BANK

The most common mistake is not banking steep enough. Except when flying a glider with a really light wing loading, such as a 1-26 or a 2-33 it is simply not possible to stay within the size of thermals we typically have to cope with in the north-eastern part of this country. If your angle of bank is not at least 35 degrees you are going to fall out of the thermal somewhere along the way.

ANGLE OF BANK (con't)

Keep in mind that 35 degrees of bank will seem like 45. Thermals, of course, vary in size and structure. If the thermal is fairly big 35 degrees of bank might be optimum, if it's smaller or there is a strong gradient in the distribution of lift, i.e. the lift is considerably stronger in the core, the rate of climb will improve as you tighten the turn. The ideal angle of bank will be somewhere between 35 and 55 degrees. Beyond 55 degrees the sink rate gets to be excessive.

Tight turns are especially needed when attempting a low save, not only because thermals are smaller in diameter close to the ground, but also from the standpoint of safety. Stall recovery from a steeply banked turn is crisp and instantaneous, with very little if any loss of altitude, this is not the case if stalling from a gently banked turn. Flat, slow turns close to the ground have brought many a pilot to a bad end.

WHEN TO TURN

The question is often asked, should you turn right away when encountering a thermal, or wait a few seconds. It depends, if you are low and looking for a save the best bet is to turn right away, any hesitation and there is a good chance you may miss it all together. On the other hand, at higher altitudes there are a number of reasons why you should hold off for a few seconds; you probably have some idea of the kind of lift you can expect based on your experience for that day or by the shape of the cloud, hold off until the rate of climb approaches your expectation; if it's a huge cloud, some exploring is generally required to seek out the strongest cell. If on a cross-country flight you wouldn't want to turn until you reach the minimum rate of climb you are looking for. However, when you do turn, do so aggressively and establish an angle of bank of no less than 35 degrees right away. In all likelihood it will be necessary to straighten out momentarily after completing 270 degrees of the circle, as we discussed earlier.

OPTIMIZING THE CLIMB

The first objective is to form a mental picture as to the lift distribution, and then continue to shift your circle, in small increments in the direction of the strongest lift.

If the variometer actually shows sink on part of the circle you need to take more drastic corrective action and straighten out completely to move the circle away from the sink, toward the good side. Don't make the mistake of tightening the turn when you are in the sink in an effort to expedite the process of getting back into the lift, if you hold the turn on a bit too long it may have the effect of centering in the sink, simply maintain the same angle of bank till it's time to straighten out. In this situation it's a common mistake not to move over far enough so that you wind up going through the same sink twice. (see Part II)

End Part I