CHAPTER XI

TESTING, TRIMMING, AND FLYING YOUR SAILPLANE

Now that you have your Oly 650 completed, and the equipment installed, it's time to see if it will fly. Although the procedures to be described were written with the Oly 650 in mind, they apply to most any sailplane, and can be used to trim future sailplanes. The procedures presume that you have never flown a radio controlled airplane, and that you are all by yourself. Any experience you may have had will shorten some of the familiarization of hand gliding. If you happen to have a copy of the RCM Flight Training Course book, it will be helpful to review Chapter 20, "How the Controls Should Work." It may also help your orientation to sit in a chair at home, with the plane on the floor in front of you, facing away. Turn on the radio and transmitter and make an imaginary flight. Watch the control surfaces to make sure you are moving them in the right direction to turn the way you wish.

Section 1 — Glide Tests

We will begin our trimming by making test glides. Hopefully you have a grass field handy; an athletic field or very large lawn area, such as a park, is ideal. A football field is good because it doesn't have trees. Trees have a habit of jumping in front of gliding sailplanes. Select a time of day with little or no wind. Also, select a time when there are no dogs or children in sight. It is terribly distressing to have a large Irish Wolfhound retrieve your sailplane; or have two kids fall on it while fighting for the honor of picking it up.

Assemble the Oly 650 using six #64 rubberbands. Again, check the radio; stick left — rear end of the rudder goes left; stick right — rudder goes right; stick back — rear end of elevator goes up; stick forward — elevator goes down. With the trim levers on the transmitter centered, both rudder and elevator should be in neutral. If not, adjust as described in Chapter VII.

One thing to remember when gliding or launching a sailplane — don't be wishy-washy; do things firmly. The first thing we will do is get confidence that nothing violent will happen, and the thing will glide. Always do all launching **into** the wind. Eventually, you may be in a situation where launching in slight downwind conditions is inescapable, but until you are thoroughly experienced don't do it! Another habit to acquire is to wiggle the controls before **every** launch. This will prevent the disaster of launching with the radio turned off!

What you are going to do now is face into any slight wind, holding the Oly 650 in your throwing hand at shoulder height. Hold your transmitter in your other hand; you are not going to use it, but it will give you something to do with your spare hand. Turn on the radio and transmitter, which is a good trick with both hands full. Now, run full tilt; let the plane lift slightly out of your hand — watch how it sails.

Does it tend to climb, or dive, or turn? Now, catch the plane — don't let it get more than a couple of inches from your hand.

The plane should float buoyantly, straight ahead. If it consistently tries to climb, dive, or turn — stop. Check for any wing warps, by sighting down the bottom of the wing.

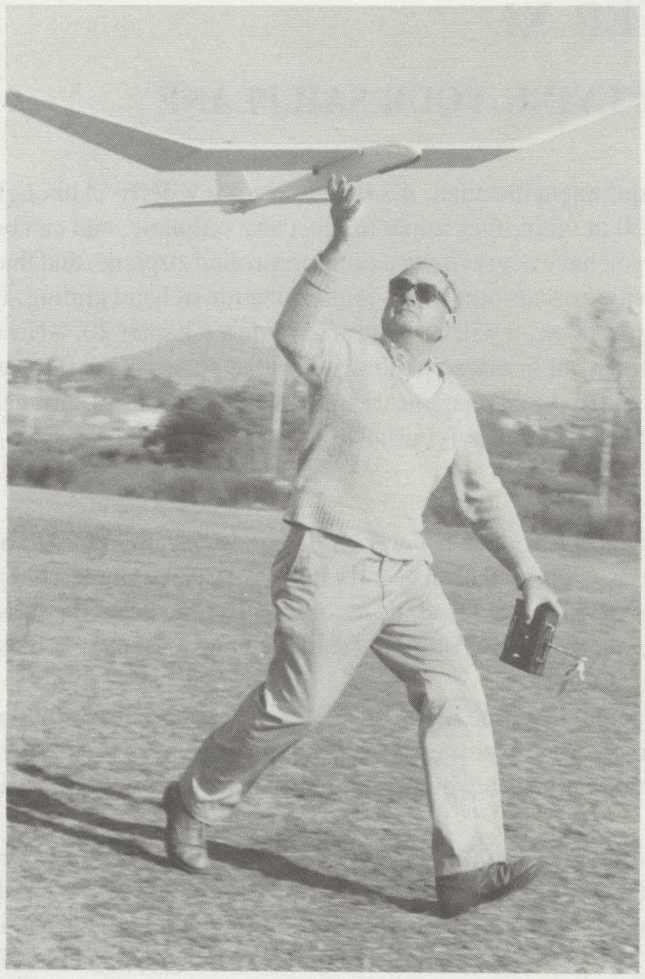
Check that the wing is properly seated, and not on backward (don't laugh, this happens), etc. When you get your breath back, try it again. This time, let the plane fly a little longer before catching it.

Correct any slight turning tendencies with slight displacements of the trim levers on the transmitter. Make sure each time you release the Oly 650 that the wings are level.

When you finally have a semblance of confidence in the 650's ability to sustain itself in the air; or are on the narrow edge of a cardiovascular seizure, take another run, and let it fly all the way to the ground. Don't try to control it. Let it free flight. Incidentally, if you are doing all this on a football field, don't run into the goalpost while watching the antics of the sailplane. Do this several times, making any small needed trim corrections with the transmitter trim lever. The plane should fly straight ahead, and land gently. If it seems to glide too steeply, landing heavily, pull the elevator trim lever back a bit. If it seems to try to fly nose-high, or mush along, push the elevator trim lever up a bit.

Section 2 — Hand Gliding

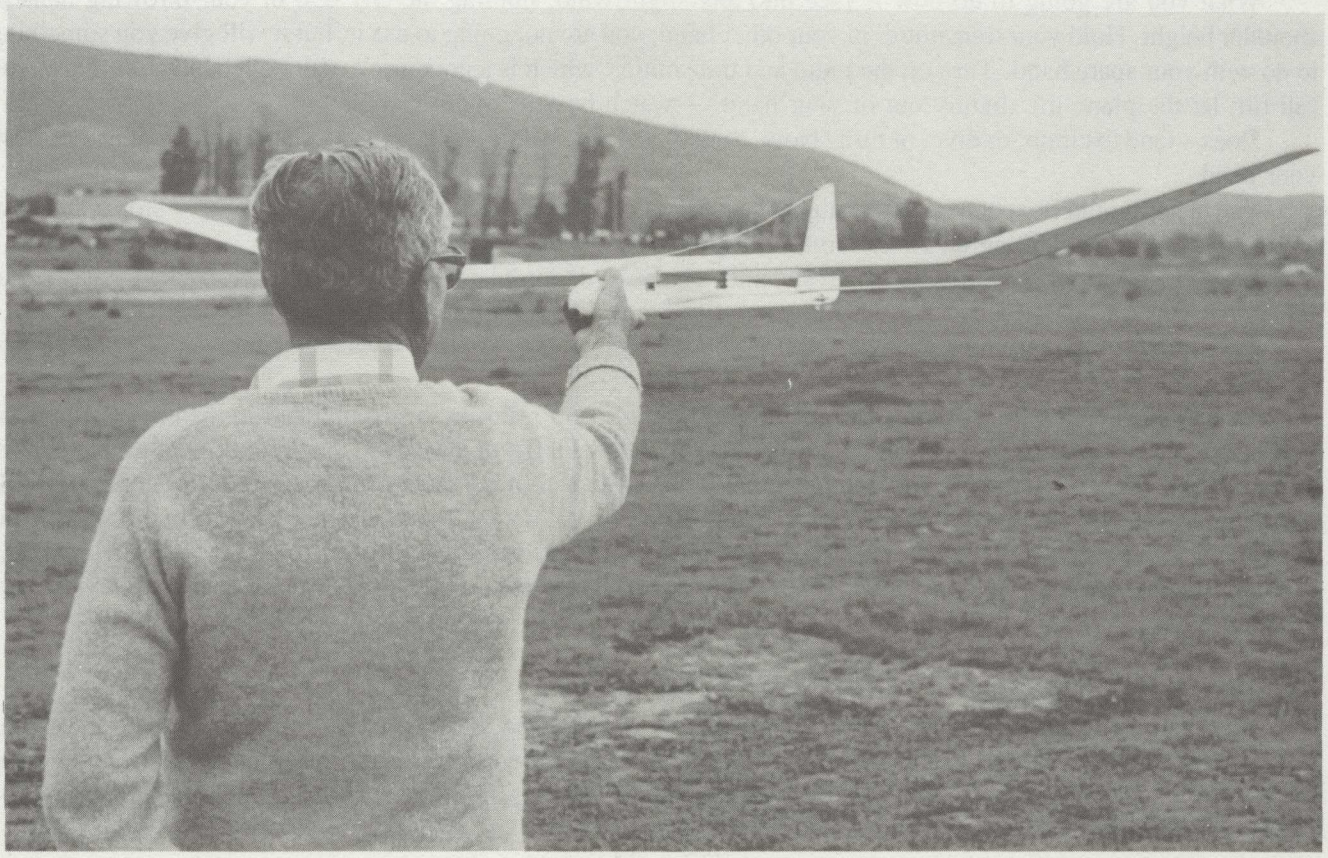
Now you are ready to graduate to the big league — hand gliding. The idea here is to do what you have been doing without all the running. If you are a bowler, you are halfway there. The idea is to launch the plane at the same speed as when you were running — without running. In test gliding, the sailplane should be thrust straight out — firmly. **Do not throw it upward.**



Glider is allowed to lift out of hand to test trim.



Glider is then caught.



Check for wing warps by sighting down the wing.



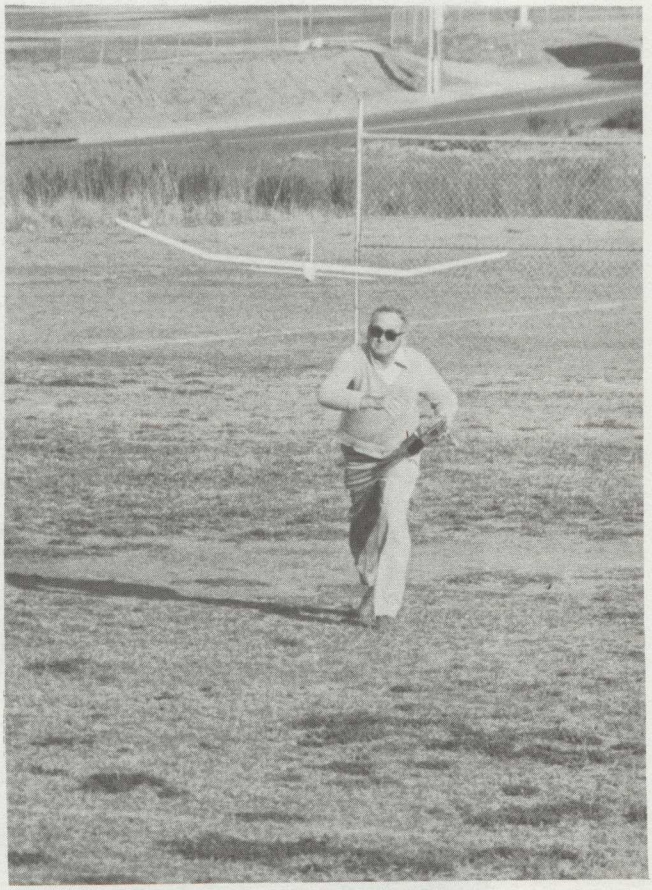
Test glides are made firmly.



The glider is thrown straight out, not up.



The plane should glide straight.



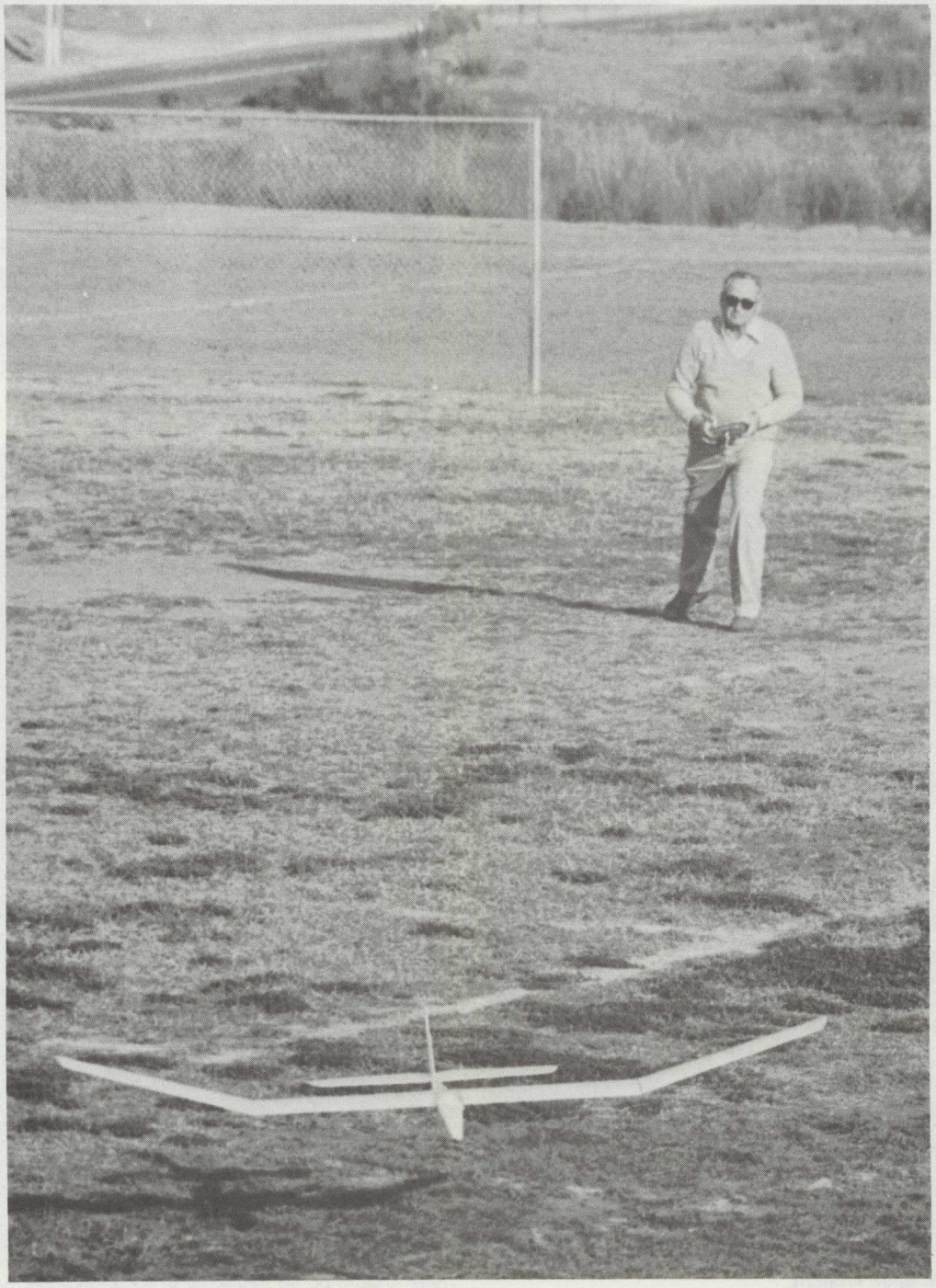
There should be no tendency to an undulating, or wave-like glide.

The Oly should glide straight out, flying at a constant angle of descent (no roller coaster action).

The Oly should make a good landing, fifty or sixty feet out. If it comes down rather steeply, and lands rather hard, you are either: not **quite** launching firmly enough, or it needs a tad more up-trim (transmitter trim lever back a bit).

If it tends to roller coaster a bit, or noses up into a stall, and comes down hard, you are either throwing too hard, or it needs a tad more down-trim (transmitter trim lever forward, or up, a bit). If the glide tends to curve in one direction every time, move the transmitter trim lever in the opposite direction, slightly. Keep this up until you can get a good straight glide every time. It is best to do all this when there is no wind. Gusts of wind will change the flight enough that you can't tell whether it needs trim adjustment, or whether it was the wind.

When you are getting a good straight glide every time, look at the position of the rudder and elevator. They should both be very close to neutral position. If the rudder is displaced more than a couple of degrees from the neutral position, go home and look for any warping or twisting in the wing, rudder, or fin, and correct the condition. If the elevator is **slightly** displaced from neutral, don't worry about it.



Landing should be straight out 50 or 60 feet away.

Section 3 — Applying Control

Now, we are ready to apply a **little** control over the glide. Make sure the radio and transmitter are turned on and, again, make a test glide. Quickly get your hand to the stick. When the glider is a foot or so off the ground, apply just a bit of up-elevator, by pulling back on the stick slightly. You will see the nose come up, and the glide will stretch out a bit, and the landing will be more gentle.

After a few glides, while experimenting with elevator control, try the rudder. Push the stick slightly, either left or right. The glider will make a very gentle turn. One caution — be patient. Sailplanes do not, in general, react instantaneously. Sometimes new fliers, not seeing immediate response, apply more and more control. Suddenly, they are in an over-control condition. The sailplane over-reacts, and — thud. When the ship is a foot or so off the ground, apply a bit of opposite rudder, then back to neutral, to get the wings level. Keep practicing these test glides under control until you get a bit of confidence in basic control, and understand how the glider responds to this control.

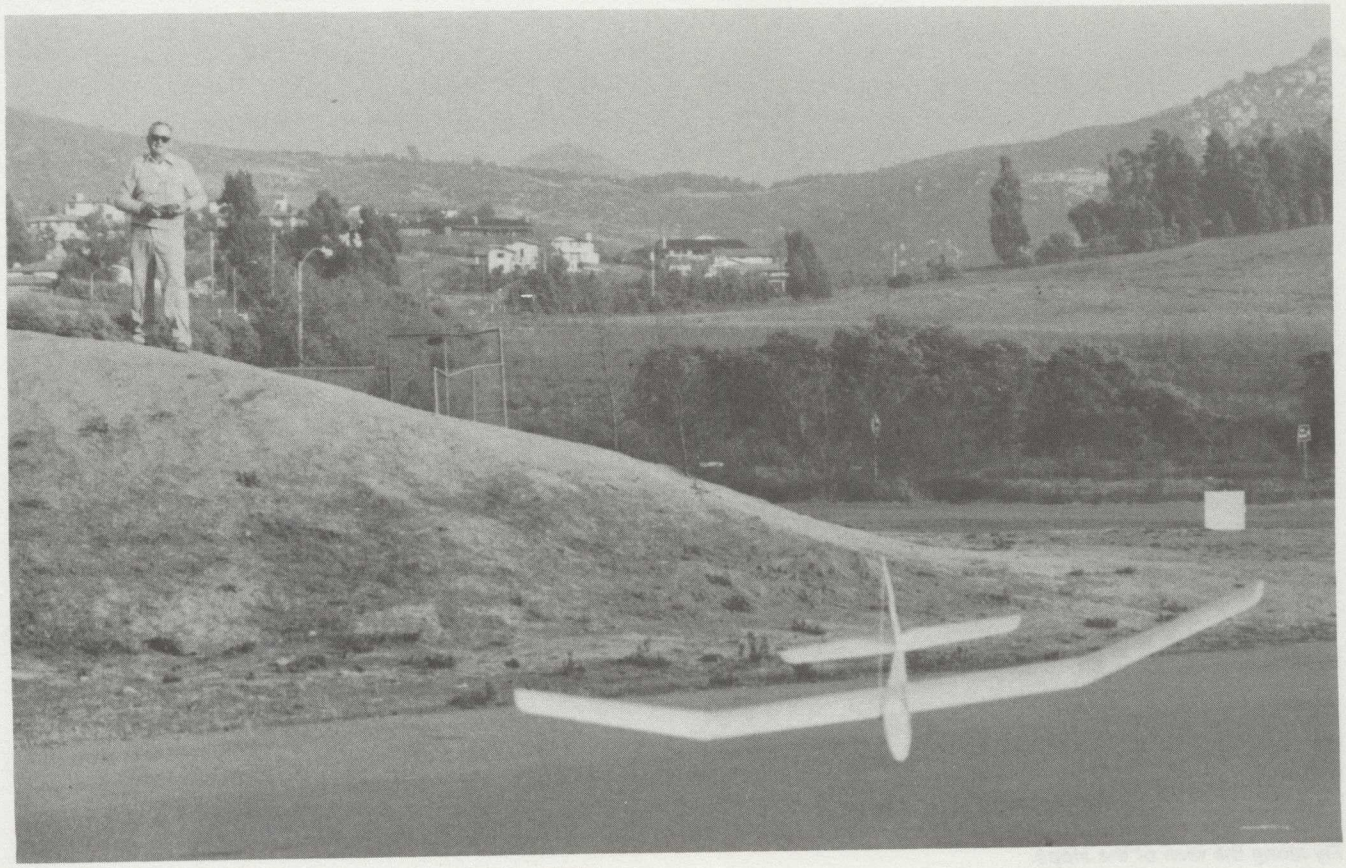
If you have had previous R/C experience, you can eliminate the free flight part of the testing. Most experienced pilots, however, go through the controlled test glide routine on a new sailplane. It is the quickest way to set the initial trim. It also gives the experienced pilot a preview of the ship's response. He can get a feel whether more, or less rudder throw (deflection) is needed.

If you have no previous experience, remember these procedures are written assuming you do not have any experienced sailplane pilots in your area. If there are, get some help, both in trimming your ship, and learning to fly. But, be sure the "experienced pilot" is really experienced. Even a thousand hours at the controls of a full-sized plane does almost no good as training to fly an R/C model.

Section 4 — On A Little Slope

The next step depends on a number of factors — all related to where you live. A reasonable next step is more hand gliding, but with more of a chance to feel out the control system. One of the best ways to learn to fly a glider is on a slope. On a good slope, lift is relatively constant, permitting the student to concentrate on guiding the plane, rather than staying in the air. Good slope sites are hard to come by in many parts of the country. If you can find a small hill, overlooking a big grassy area, this would make a good training area. The hill need only be 6 or 8 feet high to give you a little more air time. You will need a clear area in front of the hill to land in. Parks are a good place to try, if you can find an area clear of trees.

If you find such a place to fly, again select a time when there is no wind, kids, or dogs. Assemble your glider and test the controls. You may want to start only part way up the slope to get the feel of control. Glide straight out a few



Later on, a little hill will give a chance for test of controls.

times, flaring slightly for landing, with a touch of up-elevator. Use the same launching technique as before; thrust the glider straight out from the shoulder, firmly, but no so hard as to cause it to go up into a stall. When you launch from the top of the hill, you will have enough altitude to try a gentle turn. Fly straight out until clear of the slope, then turn very gently, then back the other way. When two feet from the ground, level the wings (push the high wing down with the stick), and apply a little back stick to flare for landing. Just don't do anything suddenly — easy does it. If your landing space is restricted, or the hill is high enough that obstructions might come into play, continue the gentle circle round and round, leveling the wings for landing. If you have enough height, try a square pattern. Fly straight out, make a 90 degree turn left, and straighten out. Now, fly parallel with the face of the hill for awhile. Now make a 90 degree right turn, flying straight out from the hill again. When close to the ground make sure your wings are level and flare for landing.

Keep up this practice until you are confident that the glider will do what you want, not what it wants to do. Put a white handkerchief or paper plate, or such, out in the landing area as a target. Try, time after time, landing near the target until it comes easily. If a larger slope is available, progress to that one. If the prevailing wind is directly into the face of the hill, try flying when there is a 10 or 15 mph wind blowing. Try the rectangular pattern. You may find there is enough lift to stay up longer. If you find your glider going up slightly after launch, push the stick slightly forward to get the nose down and then release the stick. Fly straight out from the slope until well clear, then make a left turn, and fly parallel to the slope as in the rectangular pattern. Fly a ways, then make a right turn away from the slope, but continue a full 180 degrees. Now fly back along the face of the slope in the other direction.

Make another 180 degree left turn and fly back parallel to the slope face. Since the wind will tend to blow the glider back toward the slope face, you will have to apply a bit of rudder to keep the nose of the glider pointing slightly away from the slope. Always land with the glider pointing into the wind. Be alert that the ship does not "balloon," that is rise up into a stall, when coming around into the wind. Get corrective down-stick in as soon as you see the nose start to rise. Also, on landing, watch for any tendency to turn. Keep the noise pointed into the wind — be alert. In windy conditions, keep it straight; keep the nose down; the wind can get under a wing and you can get into a turn that you don't have enough rudder authority to correct, and the ship will cartwheel. If your slope is a right and proper slope site, you will soon learn how much or how little wind is flyable. If it is a good site, you will soon find yourself flying higher than where you launched. You can then explore the slope by flying back and forth, and out away from the slope, to see what the lift pattern is — where it is good and bad. One caution: behind the slope is usually bad news. The wind will come up the slope and curl over the crest causing all sorts of turbulence. You can get banged into the ground trying to land behind some slopes, so be careful until you are thoroughly familiar with the wind pattern.



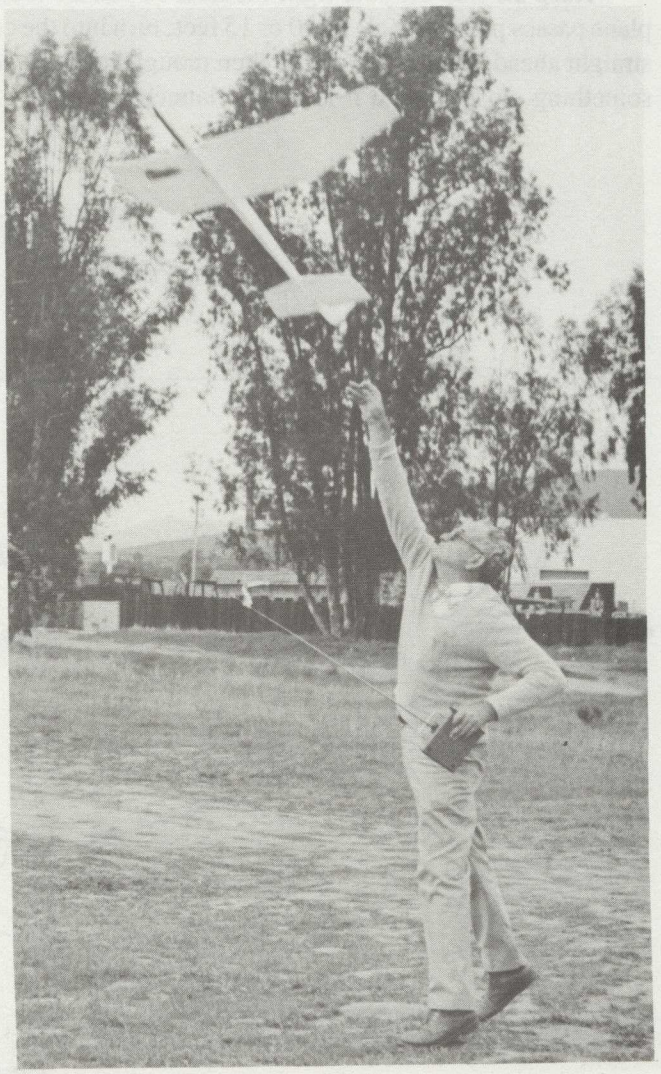
Fly along the face of the slope.

Section 5 — Launching With A Hi-Start

If you are in an area where there is no reasonable hill to practice from, you will have to proceed straight away to the hi-start. If you had some hill practice, and have a bit of confidence in how your ship responds to command, you are also a candidate for hi-start launch. You will need a hi-start like the one described in Chapter X, and a large field. The field should be at least 700 feet long (in the direction of the prevailing wind) by 200-300 feet wide, hopefully with few obstructions around the edge. The stake is placed at the extreme upwind end of the field and the hi-start laid down the middle. Choose a time for the initial flight when there is no wind. Leave your airplane lay and stretch the hi-start out about 200 feet. Stake the parachute ring to the ground using a large screwdriver and go get your transmitter and airplane. Here's where it pays to have three hands. Turn on the radio and carefully check the operation. Pull out the transmitter antenna and set the transmitter on the ground. Now, grab the parachute firmly, and pull out the screwdriver. If you weren't holding tight, the parachute goes zinging down the field, and you must repeat the process. If you **were** holding tight, pick up the airplane with your throwing hand and hook the parachute ring to the tow hook. Make sure you have a good hold on the plane, without crushing the fuselage. At this point, you have nothing to fear except fear itself. Pick up the transmitter with your free hand in such a position that you can get the other hand to the stick quickly after launch. One thing you must do is act firmly, and positively. If you do two things right you can't miss; first, you must throw the plane smoothly and firmly up at about a 45 degree angle.



Launch at 45° angle.



After launch, glider goes up steeply.

The airplane must have enough speed to generate enough lift to go up. If you just let go, the darned thing may fall out of the air. The second thing is to make sure the wing is level when you launch. If you throw it with one wing low, it will turn toward the low wing and you will have to make an immediate correction. If you remember those two things you will hardly have to touch the stick at all. Your glider will go up very steeply.

You don't have to touch the elevator control. It may wander slightly off course. If it does, bring it back with very gentle corrective rudder. Don't do anything suddenly. Above all — think! Even though no control is necessary, think about what you will do if the ship turns left — apply a bit of right stick, right! Keep you mind open. It's easy for your mind to go completely blank.

When the sailplane reaches the top of its arc, just keep it headed straight out. The whole thing is automatic and, with a well-trimmed ship, you really don't have to do much. The parachute will fall off by itself most times. If it doesn't come off when you think it should, you can hurry the process by a pulse of down elevator. This will dip the nose, releasing tension on the line, and the parachute will come loose. About the only time the parachute won't come off by itself is when the glider flies through some lift on launch and it rises putting tension on the tow line. In this case, a touch of down elevator will do the trick.

Okay, now you are about 400' in the air — if all went according to the directions. The object of the first flight is to get down safely — on the field. First, just let the sailplane free-flight. Watch it carefully. If it starts a series of roller coaster-like motions, stop them by turning the plane. Any time you want to settle down a ship that is stalling around, put it in a turn. If you try to do it by correcting with elevator, you may make it worse, until you have more experience. When you get it settled down, find the transmitter elevator trim lever and slowly feed in a little down trim (lever up). Since you made considerable trim glide tests, it is not likely that the ship will be far out of trim, even on the maiden flight. If elevator trim is required, keep turning the airplane to keep it generally close to the field. Don't let it fly out of sight while adjusting the elevator trim. Now, using only rudder control, fly it round and round in a circle with yourself as the center. Try to keep it within the bounds of the flying field.

Keep the ship off your right shoulder so you are looking to the right at it, turning as it circles the field. When the plane passes point A at about 10 or 15 feet, turn into the center of the field, straighten out and land, keeping it pointed straight ahead. Don't try to turn, even though you land down the field a ways — unless you are heading for a tree or something. Just pretend it is a hand launch.

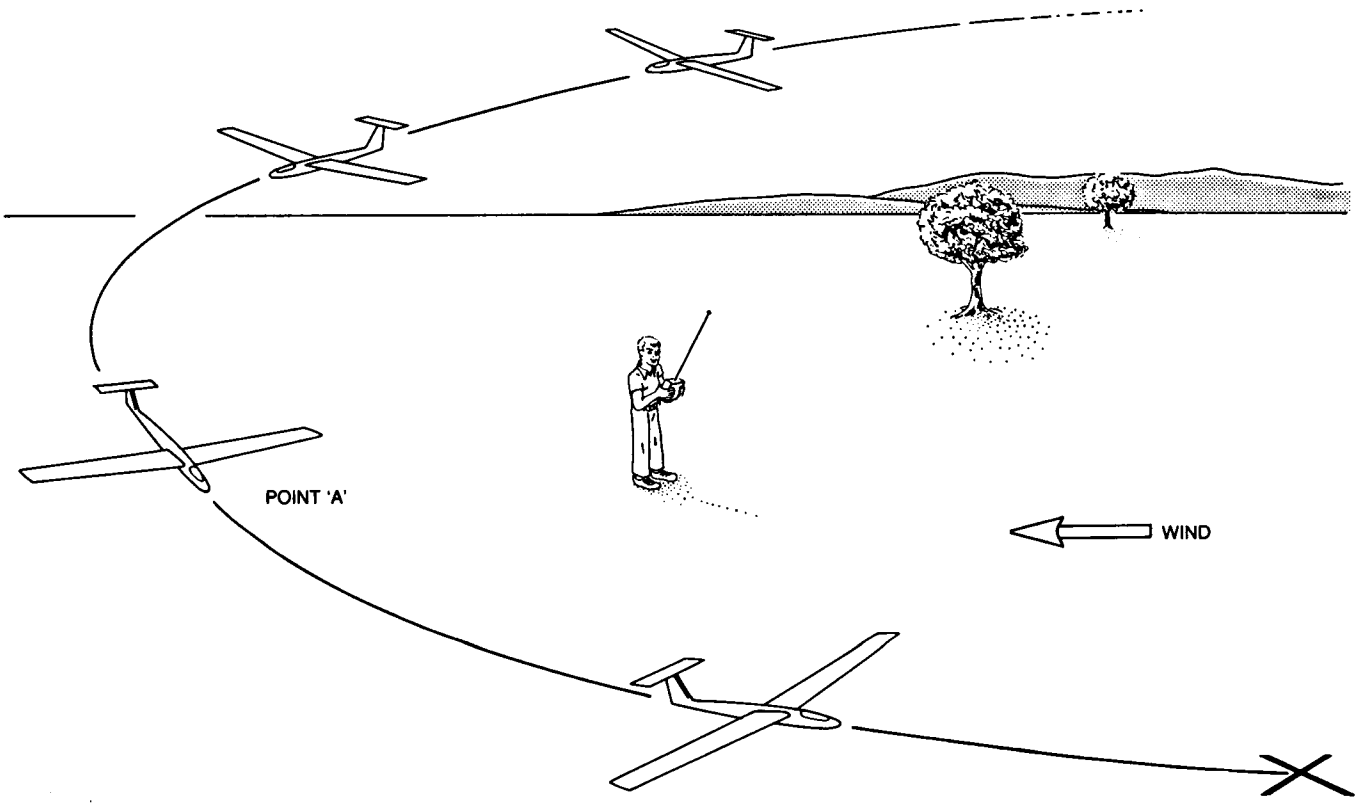


FIGURE 1
BEGINNING LANDING PATTERN

When you hook your first "boomer," take care not to get so enraptured with it all that you let the sailplane get out of sight. A plane that is just a speck in the sky is nearly impossible for a novice flier to control. You can't tell whether it is coming or going. A really powerful thermal will take a sailplane out of sight in just a few minutes. When you get to an altitude where you are beginning to feel uncomfortable, come down, you can go look for another one at a lower altitude. To get down from a thermal can sometimes be a problem — just don't panic. It takes time, and sometimes it doesn't seem that you are coming down, when you really are. When you are ready to come down, fly out of that area. When the plane appears to be coming down, stay in that location, and watch it carefully. A good way to come down is to hold full up-elevator, and full rudder. The plane will spiral down, almost in a spin, but will do it gently. Just hold this position until you are at the proper height. The least desirable way is to dive the plane. It is **very** difficult to tell how fast the plane is going. You can tear the wings, or the stab off in a second, if flutter develops. Any airfoil will develop flutter if it goes fast enough, so just be careful. Use the more gentle ways. If you are good at inverted flight, turn the plane over. Airfoils are very inefficient upside-down.

Another type of lift develops when the wind blows — wave lift. This type of lift is generated by some irregularity or thermal activity on the ground.

Wave lift takes the form of lifting air, forming a stationary ridge which is sometimes quite wide, over a path 90 degrees to the wind direction, but is usually narrow in the direction of the wind. The lift also tends to move back and forth, but is relatively stable in the direction of the wind. The lift also tends to build up and die out, seldom lasting as long as 10 minutes.

Wave lift is recognized by its stationary nature. In wind, thermals will move downwind at a speed slower than the wind — but they do move. If you are flying upwind and encounter an area of lift, you naturally start to circle to locate the thermal. If you sink on the downwind side but encounter strong lift upwind, it is probably wave action. You just park, heading into the wind, and you will go up. Waves have a definite height. Some are quite high, others not so high. It seems to help to range back and forth a hundred feet or so. Be alert, when the lift seems to be waning, fly quickly several hundred feet either right or left. If you don't relocate the lift in one direction, try the other. Just don't die, sitting in one spot. Eventually, however, you will lose lift in every location and it is prudent to get the heck out of there and look for something more promising.



FIGURE 2
GENERATION OF WAVE LIFT

Each time you fly, check the position of the trim levers on the transmitter to make sure they haven't been knocked out of positions. Continue the simple training pattern until you feel comfortable, and can handle the various situations that arise. Try flying in light wind, always launching and landing directly into the wind. Gradually work in varying flight patterns before entering the landing pattern. Put out a target, and practice trying to land near it. Keep working toward the landing pattern as shown in Chapter XII, Figure 1. Read the section in Chapter XII on landing. In this landing pattern, the entry altitude is set up by circling so that entry of the downwind leg is always made at the same altitude (determined by judgment). The ability to make precision landings is important because sooner or later you will find yourself flying at a strange field with obstructions, which have a habit of jumping in front of sailplanes. Also, you may eventually wish to try your hand at a contest or two, where precision landings are a part of the ball game.

The thing that causes new fliers the biggest problem in landing is the fact that the plane is coming toward you, and control is reversed. Eventually you will react automatically with the correct control, but in the beginning it is confusing. There are several ways to get around this problem. Some fliers look over their shoulders at the landing airplane. This will work, but it is not really a good long term solution. It is hard on the neck, and merely begs the question. Another way is to mentally talk to yourself. Just tell yourself that if a wing drops, gently move the stick in the direction of the low wing. A method that worked for me way back when, was to keep the ship in a series of very gentle S turns — back and forth. That way I always knew which way I had turned last. Whatever method you use — concentrate — but don't go to sleep. In a very short time you will begin to react automatically, without thinking about it. It will take practice, practice, and more practice. Every time you land, pick a spot and try to land near it. That is the only way you will become proficient at precision landings.

A word of caution when landing in the wind: When flying with the wind, the plane appears to be going much faster than it really is. Remember, the important thing is how fast the ship is going with respect to the surrounding air. If the plane is going 20 mph, with respect to the ground, and the wind is blowing 10 mph, the plane only has an airspeed of 10 mph. The lift generated by the wing depends on airspeed and angle of attack. If the plane flying downwind does not have enough airspeed to generate enough lift to support itself, it will sink rapidly. In an attempt to keep it airborne, the new flier tends to pull back on the stick, to increase the angle of attack, thereby, generating more lift. Soon the wing reaches the stall angle, and the plane falls out of the air. It is especially critical if the plane has a tendency to tip stall; that is the tip area reaches stall conditions and, therefore, loses lift, before the inner panel of the wing. As a final turn is started, the yaw, combined with the dihedral, can cause a very quick tip stall and it is possible to find one's self upside-down. Anyway — the way to avoid all this embarassment is to fly fast downwind — keep that airspeed higher than it looks necessary. You do this by keeping the nose down, even holding a bit of down elevator. Or even better, make it a habit to put a little down trim in the transmiter, which will help the whole landing process. This will help to avoid ballooning when you come around into the wind. It is easier to overcome the down trim with a little back-stick than it is to overcome ballooning tendencies with down-stick.

Section 6 — Thermal Flying

As you continue to expand your flying skills, you will feel more and more comfortable in the air and you can stretch the hi-start out to 250 feet. You will begin to notice more things about the sailplane's flight. Sometimes you will notice that it will rise and fall in its flight; or one wing will rise when you are in level flight. This means you are **probably** flying through a thermal. The trick at this point is to locate the center of the thermal, and judge its size. Normal thermal size is perhaps 50 to 100 feet in diameter, though some can be as small as 20 feet and others are huge. Thermals tend to start out small at ground level, and build up like a funnel. Sometimes when you get high up, the whole sky is going up and you can cruise around anywhere, in lift. Sometimes the thermal will disappear at 200 or 300 feet. Anyway — when you detect a bump or turning of the sailplane, remember the location and turn back for a look. Some people say to turn toward the wing that goes up, that's where the thermal is; but, in truth, it doesn't really matter which way you turn. Fly back through the area. When you get another indication from your sailplane, start to circle. Turn in the direction where you **think** the thermal might be, based on your two encounters. Turn in a circle of perhaps 20 feet or so in diameter. If the sailplane rises on one side of the circle and falls on the other side, you are on the edge of the thermal. Straighten your turn so as to move the center of your circle toward the rising side. When you are centered in a thermal you will rise all the way round. Pull your transmitter elevator trim lever a bit down (up-trim), and concentrate on making a smooth circle. The secret of thermal flying is to fly smooth! Every time you stall the airplane, you lose 20 feet, and it doesn't take long to lose the thermal. Some thermal indications are not for real. If you rise when you come around into the wind and fall going downwind and can't seem to find a spot where you go up all the way round, you are in a "stick thermal." That is, the extra lift from the wind or inadvertent up-stick movement can look like a thermal. Go try somewhere else. Finding, and working a thermal takes much practice and skill, but is sure rewarding. It's a real thrill to find your first thermal and go up, and up.

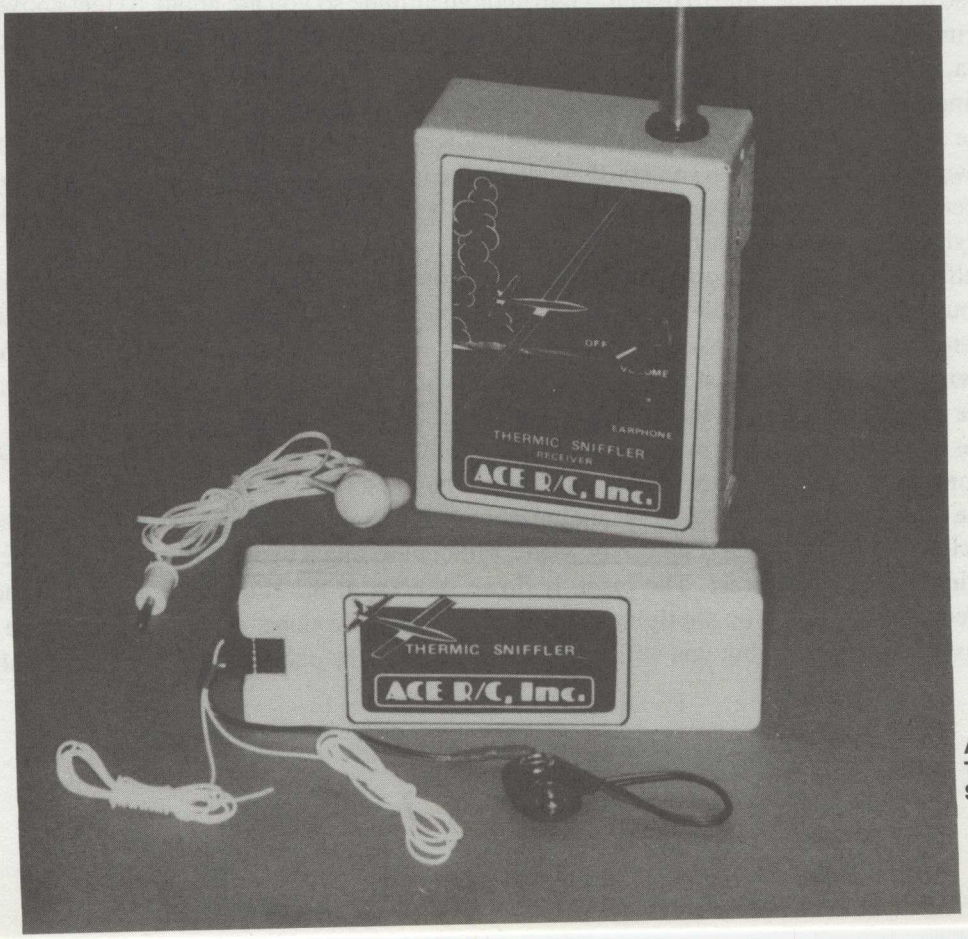
Section 7 — Thermal Sensors

There is an electronic gadget which will tell you whether you are going up or down; it's called a Thermal Sensor.

Thermal Sensors consist of an airborne unit which weigh two or three ounces, and a radio receiver which hooks on your belt. They tell whether you are flying at a constant altitude, or rising, or falling. They also tell you how fast you are going up or down. However, all they do is whistle at you. It's like having a girl whistle at you — it's up to you to determine why.

The Thermal Sensor works on changes in air pressure. Aside from the 9 volt transistor battery and switch, the whole thing is contained in a transparent plastic tube 1¼'' in diameter and 5'' long and weighs about 2 ounces. As the tube is raised and lowered — even only a foot or two — air density changes enough to cause air to exit and enter the tube. Entrance and exit of the air is through a very small orifice into a cleverly designed cavity. A pair of thermistors, in a balanced bridge circuit, measure the rate of air flow and whether it is going into or out of the tube. A tone is generated, controlled by the thermistor bridge. If the Thermal Sensor is held still, we get a steady reference tone. If we move the Sensor up at a constant speed, we get another tone, higher in pitch. The faster we raise the Sensor, the higher the pitch. If we stop and hold the Sensor still, the tone will return to the original reference pitch, even though the Thermal Sensor is at a higher altitude. If we now lower it, the tone will be lower than the reference tone. The faster we descend, the lower the tone. This tone is used to modulate a low-power transmitter. We can now put the whole shebang in a sailplane and listen to the rock and roll with a receiver hooked to the belt, with an earplug stuck in your ear. Okay, that's how it works, now what do you hear? When you launch you hear a whoeeeeee. When you get as high as you are going, the tone returns to the same one you heard when you were holding the ship in your hand; so it's time to get off tow. When you fly through a thermal, you hear a wheeeyoooo, the tone rising as you enter the thermal and falling as you leave it. So, turn around and look for the wheeee, trying to get the tone as high as possible — which means you are going up fast.

Thermal Sensors are extremely useful in three situations. During launch they tell you when you have reached the top. It's not all that easy to tell when you've topped out. When the plane is directly overhead, a Sensor is invaluable. You really can't tell visually whether you are going up or not. The last situation is when you are way out, scratching for thermals. It can be very difficult to tell if the plane is in lift; at least it takes long enough to find out for sure that you can be in deep trouble. At other times, when you have good visual contact, it is easier to see lift as to translate what you are hearing. In any case, if you are not flying smoothly, you will get information from your Sensor that will do more harm than good. Anyway — are they worth the hundred and some odd bucks they cost? They are at least interesting. It all depends on your pocketbook and interest in this sort of device. At this writing I know of only one U.S. manufacturer — Ace R/C, Inc., Box 511B, 116 West 19th St., Higginsville, Missouri 64037.



Ace Thermic Sniffler.

Section 8 — Slope Flying

If you have a site in your area suitable for slope soaring, you are fortunate. A great part of the United States is either too flat or too wooded or too something, to offer a slope site. Learning to fly radio controlled sailplanes is much easier when flying from a good slope than launching from flatlands. The principal reason is that you get more air time during a flying session because you eliminate the constant launching. Also, launching is easier and does not require any equipment. The whole process is much neater. As opposed to getting out a hi-start, laying it out, taking it in, etc., you can just walk up, and heave your ship off the cliff and you're in business. This sometimes means you can get in a bit of flying on the way home from work.

Finding a Slope

What you need is a hill or bluff with the prevailing wind blowing almost directly into the face of the sloping surface. Trees or houses on the slope are undesirable, as they can cause turbulence, and besides you may have to land there if the wind quits. You also need a clear area at the top where you can land safely. Before you fly at any slope site, decide where you are going to land. The hill need not be really steep; you just need a surface to create a wave of lift out front. Lots of things will work; a sand quarry cut into the side of a hill; the face of an earthen dam; or a bluff along a river or lake (provided there is a beach area to land on).

If you find a candidate slope you still need to go through the hand glide routines described previously to get a feel for the trim of the airplane and control. When you are reasonably adept at turning the plane and controlling pitch, you can give it a go from the slope.

Although never is a long time, I feel quite secure in telling you that lift is **never** behind the top of the hill; it is always out front. Select a day when the wind is blowing about 15-20 mph and is relatively steady, not gusty. Assemble your glider and check out the radio. Face the wind and hold the glider at shoulder height. Now launch firmly and slightly downward just as though you were aiming for a spot at ground level and out 15 feet or so. **Do not throw the ship upward.**

Now apply enough down elevator to keep the glider level, and fly straight out from the face of the hill.

As the lift increases, the glider will rise above your head; do not let the nose come up, but keep the fuselage relatively level. When the ship is well out away from the slope face, make a gentle turn and fly parallel to the slope face. After getting used to flying in this direction, make another turn **away** from the slope, all the way round 180 degrees and fly parallel to the slope in the other direction. Pass by yourself and when it seems appropriate, make another 180 degree turn **away** from the slope and fly back and forth repeating the pattern.

When you've had enough excitement for one flight, it will be time to land. I hope you previously planned your landing, because now is not the time to plan it. Gain enough altitude so you are about 10 feet above the landing area and fly downwind, turning back toward the landing area when you are about 50 feet or so downwind. Now head for the landing area, concentrating on keeping the nose down and into the wind. If you see you are too high, don't try to land, but continue right out over the edge, and back into flying space again.

Gain some altitude and try it again, this time a little lower. If you encounter turbulence you can't handle, get it down the best way you can. Tall grass, or a bush will ease the landing. Of course, it goes without saying, that if there is an experienced pilot available, take lessons from him (or her). Let the instructor launch, and land, and guide you through the flight. This saves much repair time.

After a half dozen flights and perhaps a bit of repair, you will be somewhat more at ease. Barring any unusual happenings, you will probably be able to get up and down by yourself. Don't become discouraged, it will come — you will get better and better. Lift patterns on slopes differ, and change with changing winds. After many flying sessions, you will learn where the best lift can be found. It's fun to go exploring a slope with your sailplane, but you must always be prepared to land at the bottom, or halfway up the slope.

Sometimes you get caught below the landing area without enough lift to get back home. An alternate safe landing area somewhere below is a necessity and should be explored before you need it.

If the slope is not too steep, a downwind landing can be made right on the face of the slope. If the slope is grassy, without obstructions, this type of landing can be made without too much danger. Since you will be landing with the wind, the landing is made quite fast. The plane is flown directly at the slope and, as the ground is approached, up-elevator is fed in gently until you are flying at about the angle of the slope — then ease the plane onto the ground. It isn't as bad as it might appear, but you will need a bit of room as the plane travels fast and will slide in the grass a ways.



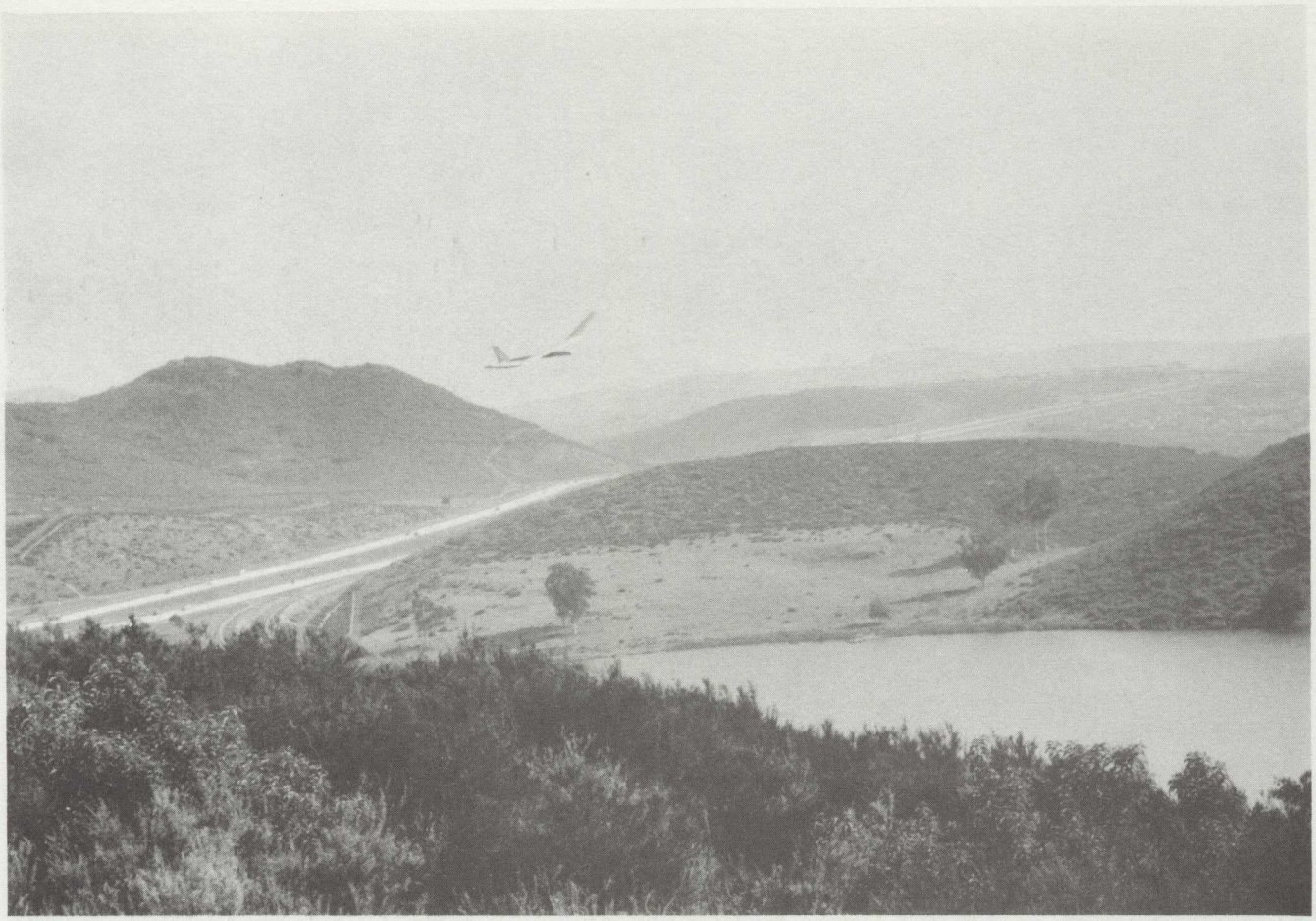
Ocean slope site — the cliffs at Torrey Pines, Calif.



Inland slope site.



Launch slightly downward from slope.



Fly parallel to slope.



If you are too high, don't land.



Be prepared to land in odd places.

Section 9 — Glow Engine Version Flights

This version of the Oly 650 should be put through all the glide tests of the non-powered version. If you've never flown R/C before, you should go through all the steps up to the hi-start launch. In this case it would be well to bolt a weight on the nose in place of the engine. This will keep from getting dirt in the engine during the learning process. Rebalance the ship using the balancing fixture. When you have gained enough confidence to try a powered flight, reinstall the engine. Again, check the balance.

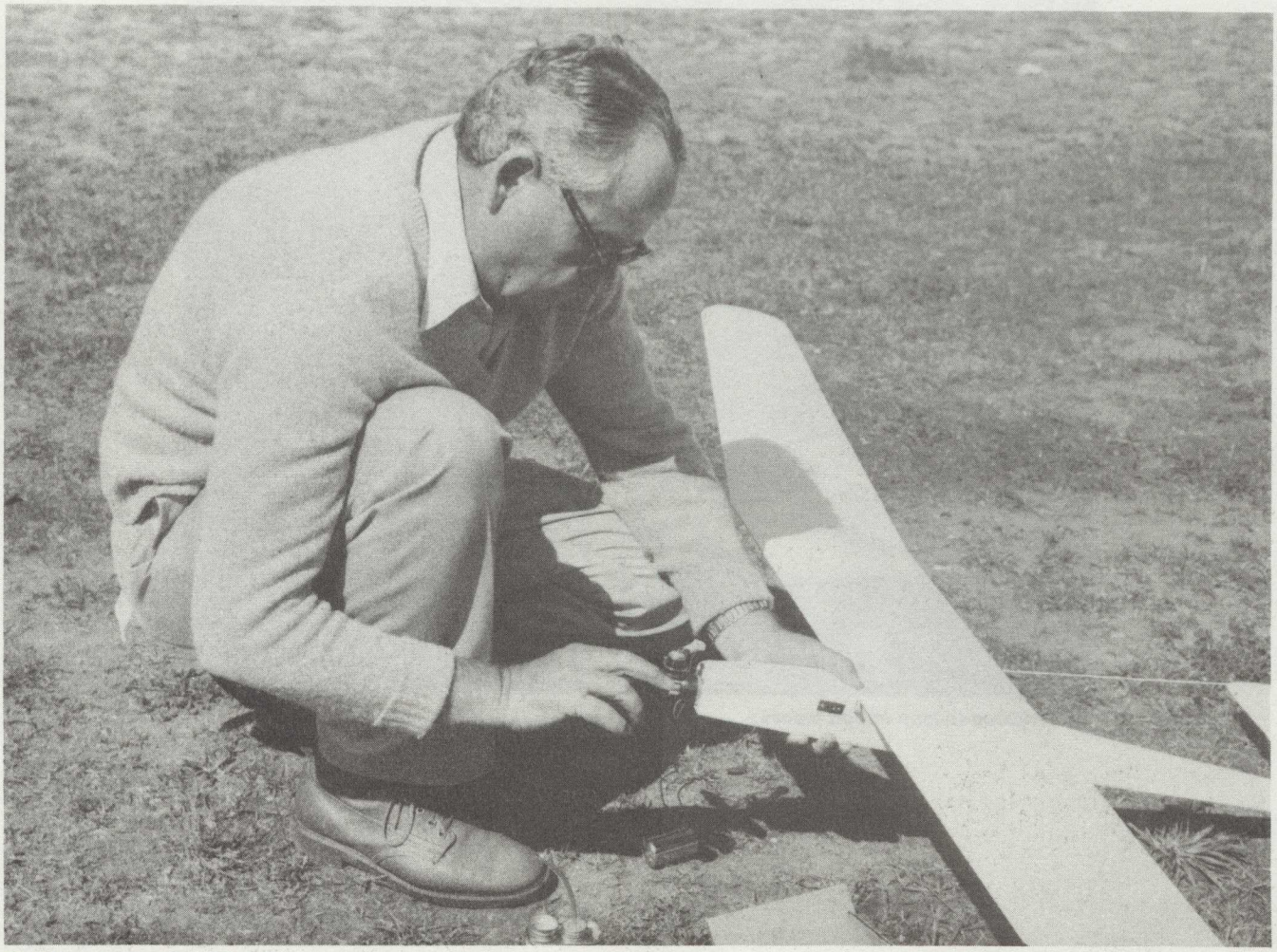
It is well to practice starting the engine at home, if you have limited experience with glow engines, and tolerant neighbors. Read the instructions that came with the motor very carefully. When you have started the motor a few times, turn on the receiver and the transmitter, start the engine and peak it out. Try both elevator and rudder control. They should move smoothly with no jitter or hesitation. If the control is not perfect, the engine vibration is affecting the receiver operation. Check the installation to be sure the receiver and battery are fully encased in the foam rubber and not touching the fuselage anywhere. Check the servo mounting screws. They should be tightened just to the point where they begin to compress the rubber grommet, no more. If the problem persists, try a different foam, either softer, or firmer. If all efforts fail, have the radio checked for vibration problems by a service agent. In any event, do not attempt to fly until the problem is cured. This is not a common problem, but it does happen.

If there are experienced fliers in the area, for heaven's sake get help in learning to fly. If there is no one to help you, you can learn by yourself, it just takes more work. The Oly 650 is a very gentle sailplane, and quite easy to learn to fly.

For the first flight, select a day when there is no wind. Select a flying site well-removed from houses, trees, kids, etc., etc. Turn on the receiver and transmitter.

Start the engine and adjust the needle valve so it is running slightly rich; that is, with the needle valve slightly backed off counter-clockwise from the peak setting.

Be sure the engine is running the right direction; they **can** run backwards. With the plane in your throwing hand, wiggle the control to make sure the radio is on (do this before **every** flight). Pick up the transmitter in your free hand. Launch the Oly firmly, straight ahead.



Starting glow engine Oly 650.

The plane should climb out in a gentle left turn with no control corrections required. It should continue to climb in a gentle spiral until it runs out of fuel. If it appears to be getting a bit too high, use the rudder to turn a bit tighter. This will stop the climb. If the ship begins to roller coaster or go into a series of stalls, put it in a turn. If you are not experienced, use of the elevator will only aggravate the situation. Try not to use the elevator at all, fly rudder-only. When the engine quits, fly around and around yourself, with the plane off your right shoulder, landing as described in the glider section, and shown in Figure 1. Keep flying this pattern until you acquire enough confidence to experiment a bit. Just keep thinking; don't do anything sudden; don't panic!



Peaking glow engine before launch.



Launching glow engine Oly 650.

Section 10 — Electric Power Version Flights

Since the electric power units weigh 16 ounces, the wing loading of the electric powered Oly 650 will be considerably higher than the glider version. The gliding speed of the electric will be 20% faster. Due to this increased weight, the possibility of damage in a bad landing is higher, for the electric. For these reasons, hand gliding the electric version should be limited to straight-ahead controlled test gliding.

Follow the charging instructions for the electric system. The wing should be removed and the motor battery slipped out of the fuselage while charging. The battery gets warm during charge and it is better if additional cooling is provided. At the end of the charge cycle, put the plane back together and turn on the radio and transmitter. Wiggle the stick to make sure the radio is on, and launch firmly, straight ahead, with the wing level.

The electric Oly will climb slowly in a gentle right turn. Do not try to force a steep climb by using elevator. It should climb to 400 to 500 feet. At 3 to 4 minutes, the motor will begin to lose power and the plane will start to lose altitude. Fly it round and round yourself in the same way as the glider section instructed, finally landing down the middle of the field. The motor will still be turning, and the ship will land rather fast, so give yourself lots of room.



Launching electric powered Oly 650.

CHAPTER XII

LAUNCHING WITH AN ELECTRIC WINCH

Section 1 — Winch Power

While it is probable that you started soaring using a hi-start for launching, it is also probable that somewhere along the line you will be called upon to launch your sailplane using an electric winch. While winches come in varying degrees of speed and power, they are generally categorized as "6 volt," or "12 volt." This refers to the number of cells in the battery used to power the winch. In general, the 12 volt winch is much zippier than the 6 volt but, of course, this is not always true. The power developed depends on the condition of the battery and motor, size of the drum, and even the quality of the electrical connections in the system.

Section 2 — Winch Safety

First, the safety aspects of the electric winch. Winches are perfectly safe devices, but so is a rattlesnake, if you know how to handle it and are ever alert. A winch is a mindless thing that keeps on grinding along as long as your foot is on the pedal; and sometimes when your foot is **not** on the pedal. There are two ways the winch can runaway, that is, run when your foot is not on the pedal. First, the solenoid which sends current to the motor can fail with the contacts closed, or welded together. Secondly, the footswitch can fail. There may be a mechanical failure in the switch itself, or the electric cord may short. It can happen that if the winch line breaks, it can whip to the rear and grab the footswitch cord and wind it into the drum. This breaks the cord and may cause a short circuit, which causes a runaway winch. Does this sound impossible? It isn't, I've had it happen to me.

To deal with a runaway winch, the battery cables must be easily disconnected. Either the clamp must be loose enough to slide off the post, or a quick disconnect provided. A large knife switch which mounts on the battery is available from Recreational Vehicle supply houses, or an arc welder quick disconnect can be had from welding supply stores.

Aside from these rather rare mechanical failures, which are beyond your control, there is the human failure. Whenever you step on the footswitch, make sure the system is clear, and no one has their hands on the line, or near the winch. Also, when walking near the winch, be extremely careful not to step on the footswitch!

The last type accident is, of course, wing breaks due to improper winch technique. Especially in windy weather, the winch should be pulsed to keep the launch speed down. A very careful watch should be kept on the wings to detect any bowing, indicating wing stress. After experience has set in, you will have a feel for the whole thing and proper launch speed will come automatically.

Section 3 — Learning To Launch

So, now that we all know what the warning track feels like, let's try a launch. If you are launching on a winch, there is probably an experienced winch operator nearby. If so, have him launch you for a few times until you get accustomed to the techniques. If you have used a hi-start, do just as you did before. Stand well back of the launcher so you will have a good view of the start. Wiggle your controls to make sure the radio is on. Give the launcher the ok and — up, up and away. If the tow hook is properly located and the glider trim is proper, the ship will go up quite steeply. Watch for any tendency to veer off course and correct immediately. If the rudder correction does not take, you are probably going up too steeply and have a wingtip stalled. Push the nose down and have the launcher stop the winch. Concentrate on straightening the ship out for landing. Use the trim lever to put a little down trim in the elevator and try again.

If the ship should pop off tow during launch, it means you are going up at too steep an angle. Immediately apply down elevator to get the nose down and prepare to land. Check the position of the tow hook. If may be too far aft. Correct position depends on personal preference and glider characteristics. It normally works well about 1/4" ahead of the Center of Gravity.

When you feel comfortable with the launch, it's time to try it yourself. The most important thing is to keep alert. The safest launch, until you gain a lot of experience, is straight out, or just slightly up (about 20 degrees). It doesn't matter which foot you use on the pedal — whatever feels natural. Get a good hold on the glider; again, check the controls to make sure your radio is on. Start the winch and let the tension build in the line until it feels about the same as the hi-start. Now, **don't just let go of the airplane;** throw it firmly and smoothly. But don't throw yourself off balance. If the wind is blowing, start pulsing the footswitch immediately. If not, start after the ship is up 20 feet or so.



Typical launching technique.

Proper pulsing of the winch will come after a few tries. It's like patting your head and rubbing your stomach. Just keep tapping the footswitch at a regular rate and keep the ship climbing at a brisk rate. Do not slack off the pedal unless you are in trouble. You do not want the line to go slack; keep it moving. When you reach what seems to be the top, slow the pulsing until the parachute comes off the hook, then give the footswitch one last quick pulse. This will prevent the elasticity of the line from throwing some loops at the drum and causing a snarl.

If the parachute does not slip right off the hook, dip the nose; that should do it. In the unlikely event that the parachute ring should become fouled in the hook and not release, circle directly over the turnaround and descend quickly and smoothly. If you do not stay over the line but try to make a long straight landing, you will come to the end of your tether and you may have a bent airplane. While it is unlikely that this will ever happen to you, it's nice to know recovery procedures.

Section 4 — Using A Retrieval System

One other thing I should mention is launching on winches using a retrieval system. Most retrieval systems have a spinning reel which pays out a line which is attached to the winch line near the parachute. This retrieval line will billow out in back of your ship. When the parachute is free from the glider, it is pulled back to the winch by the retriever. Aside from seeing the retriever line behind your ship, you won't notice any difference. Just be sure that when you launch, the retriever line is free from snagging anything, such as the winch, then launch normally.

So, there is all the help I can give on winch launching, the rest is up to you. Just keep thinking — don't let your mind go blank. And remember, a winch is like a horse; once it finds out you are afraid, it has the upper hand.



Local club contest.



Regional contests draw many contestants.