



Derek Piggott

Beginning Gliding

Is gliding for you? What sensations will you feel the first time you go up in a glider? Can you start to glide at any age? Is it a disadvantage if you have already flown a powered aircraft?

Anyone interested in gliding – or anyone wanting to improve their efficiency as a pilot – should read this book for an authoritative all-round picture of the sport. It is far more than an instructional manual and is very much concerned with the feelings and difficulties of the beginner – knowing what should be done is far from being able to do it, especially in flying.

This, therefore, is a book which tells you not just what to learn but *how* to learn it, and, more importantly, how it should be taught. It stresses the value of good communication between instructor and pupil, both to explain the pattern of instruction and also to discuss the likely problems a beginner will come across in the learning process.

Derek Piggott's first book, *Gliding*, is already established as the indispensable reference book on the subject; this successor will join it as the essential companion of all those who fly, or would like to fly, gliders.

With 83 figures and 8 black and white photographs

Cover photographs by Steve Bicknell

Why this book was written

Soon after the publication of my first book, *Gliding*, it became obvious that, although it was a valuable reference book, it gave the beginner very little real assistance with his personal problems in learning to glide. Knowing what has to be done is far from being able to do it, particularly in flying.

Most of this book has been written to help the beginner and his instructor to see how to make learning to glide easier.

I expect that some readers will be disappointed to find so little about soaring techniques. However, the basic principles of soaring are in my previous book and there have been few improvements over the years except for better gliders and glider instruments.

I hope that this book will help many pilots to fly more efficiently and safely, and that they will enjoy reading it.

Derek Piggott

Beginning Gliding

The Fundamentals of Soaring Flight

Derek Piggott

*To Wally,
With sincere good wishes
Derek Piggott*

ADAM AND CHARLES BLACK
LONDON

First published 1975
A & C Black Limited
4, 5 & 6 Soho Square, London W1V 6AD

ISBN 0 7136 1578 8

© Derek Piggott 1975

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of A & C Black Limited

Printed and bound in Great Britain by
Morrison & Gibb Ltd., London and Edinburgh

Contents

List of illustrations	6
Introduction	9
1 Is Gliding for You?	11
2 The Glider and Your First Flights	23
3 Learning to Glide	34
4 Help with the Landings	54
5 Spoiling the Gliding Angle	77
6 Using the Airbrakes	89
7 Planning the Approach and Landing	102
8 Stalling and Spinning	135
9 The Effects of the Wind	147
10 Aerotowing	173
11 Advice for Power Pilots Converting to Glider Flying	190
Appendixes	
A The Yates Effect	198
B Gliding Awards and Records	200
C Conversion Tables	203
Index	205

Photographs

between pages 88–89

Typical cockpit layouts of an ASK 13 two-seater training glider and a Kestrel high-performance sailplane

ASK 13 two-seater training glider and Caproni Calif high-performance two-seater sailplane

19 metre all glass fibre construction Kestrel sailplane and a Kestrel with tail parachute deployed

Typical two-drum winch and preparations for an aerotow at the launch point

Figures

1	Parts of a glider	14	22	Directional control when wheel is ahead of C of G	74
2	Handling on the ground	18	23	Directional control when wheel is behind C of G	75
3	Danger areas on a gliding site	21	24	Sideslipping	78
4	Flying attitudes	24	25	Spoilers	79
5	Pitching	24	26	Airbrakes and geometric lock	81
6	Banking	26	27	Types of airbrakes and flaps	83
7	Yawing	27	28	Comparison between effect of airbrakes and flaps	84
8	Big Dipper	28	29	Various uses of airbrakes	90
9	Chair-o-plane	29	30	Stretching the glide	94
10	Sensation of sideslipping	33	31	Closing airbrakes to prevent a heavy landing	97
11	Aileron drag	39	32	Controlling the approach and landing	104
12	Slipping and skidding in a turn	40	33	Effects of changing the attitude	106
13	Control movements for a turn	42	34	Aiming point technique	107
14	Limitations on the circuit	47	35	Detecting over- and undershooting	108
15	Circuit planning	50	36	'Play it safe' method of approach	109
16	Styles of landing	55	37	Approach angles	110
17	Variations in landing characteristics	57			
18	Aids to judging height	61			
19	Changing perspective views	62			
20	Perfect landing	67			
21	Round out	69			

38	Judgement and the angle of approach	112	60	Turning onto base leg in strong wind	151
39	The 'clutching hand' effect	113	61	Drifting across wind	153
40	Height and distance method of approach	118	62	Wind gradient	154
41	Angle method of positioning final approach	120	63	Veering and backing	155
42	Wire frame training aid for landing	122	64	Effect of wind gradient	156
43a)	Running out of height on circuit	124	65	Effect of wind gradient on a low turn	158
43b)			66	Lee waves and turbulent flow	160
44	Running out of height and speed	125	67	Exchanging height for speed	162
45	Loss of height in sinking air	126	68	The result of the Yates effect	163
46	Integrated power flying and gliding	127	69	Formation of thermal bubbles	164
47	Effect of bank on height lost in a turn	132	70	Cross-section of thermal bubble	165
48	Airflow in normal and stalled flight	134	71	Inflow and outflow in a thermal	166
49	Stalling and the centre of pressure movements in flight	136	72	Circling near a hill	167
50	Speed and angle of attack in flight	137	73	Dynamic soaring	169
51	Variations of stalling speed in turns	137	74	Path of a model aircraft in still air and in wind	171
52	Lateral damping	138	75	Normal aerotow position	175
53	Autorotation	139	76	Keeping station on aerotow using a sighting mark	176
54	Full spin and spiral dive	141	77	Weaving on aerotow	178
55	Full spin and recovery	143	78	Getting back into position on aerotow	179
56	Spinning off an over-ruddered turn	145	79	Rope break on aerotow	184
57	Blocks of air	148	80	Rope break procedure	185
58	Landing into and with the wind	150	81	The wave off	187
59	Track over the ground while circling in strong wind	151	82	Airbrakes open on tow	188
			83	The Yates effect	199

Introduction

In Britain it is customary to use the word *glider* whereas in many other countries the same aircraft are more commonly known as *sailplanes*. Both are correct.

By definition, every motorless aircraft is a glider, but a sailplane is a glider for soaring flight. Most of us visualise a sailplane as a beautifully designed modern machine but even a Primary glider or the Rogallo type of hang glider is really a sailplane since it is designed for, and is capable of, long soaring flights. Probably the only gliders which are not sailplanes are some of the flying devices which are dropped from high flying aircraft for research purposes and, of course, the heavy military troop-carrying gliders of the Second World War.

For the purposes of this book I prefer to use the word *glide* in connection with learning to fly a glider or sailplane. Soaring is only one aspect of gliding and is by no means the most important. Safe gliding is a matter of basic flying skills and an understanding of glider flying. These are the foundations of soaring flight.

Many readers will not be familiar with the use of knots (nautical miles per hour) as a unit of speed in connection with flying. A knot is almost exactly 100 feet per minute and this makes it particularly useful for glider flying where the pilot may want to estimate his gliding angle quickly. For example, a rate of descent of 2 knots at a speed of 60 knots indicates a gliding angle of 1:30 in no wind. The same calculation with the variometer calibrated in feet or metres a second and speeds of miles or kilometres per hour requires a mental calculation involving multiplying by 60 twice, and this is not practical for the average pilot in flight.

It seems probable that in spite of the move towards metrication, discriminating glider pilots will continue to use knots and nautical miles for measurement, at least in countries where heights are referred to in hundreds and thousands of feet. The nautical mile has the added advantage of being one minute of latitude and this enables a pilot to measure or estimate distances on any map or chart by referring to the distance between lines of latitude, instead of having to find the scale – which may be inaccessible at the time.

Conversion tables are given in Appendix C.

1

Is Gliding for You?

Age	12	Deafness	17
Nervousness	14	Height and weight	17
Intelligence	15	Day-to-day fitness	19
Health	15	Colds	20
Eyesight	16	Menstrual periods	20
Disabilities	16		

If you are interested in becoming a glider pilot, the first thing you should do is to go along to a gliding club and have at least one flight to see what it feels like. (Read about first-flight sensations beforehand so you know what to expect – see Chapter 2.) It is always possible for a prospective member to have a flight before making the decision to join as a full member or attend a course of instruction. This will involve spending most of the day at the club and will give you a chance to chat to other beginners and meet their instructors.

Gliding instruction can be a very tedious and frustrating business, especially if there are a large number of beginners and only limited facilities. You should, therefore, try to talk to the other beginners to find out how much flying they actually manage to get, and how long it takes to reach solo standard. If you ask the older and more experienced members you will probably just be told how much better the facilities are than they were when they learnt to glide. This is cold comfort if a good day's flying is only one short glider flight, especially if you have arrived before nine o'clock in the morning and stayed on pushing gliders until dusk.

If you are within reach of several gliding clubs, you should visit them all and try to get a flight at each one. Before joining one, consider carefully what each offers.

If you get a regular time off on weekdays, or intend to spend your holidays gliding, it will be worth travelling a little further to a bigger club operating on a full-time basis. Large clubs tend to be rather less personal, but have the advantage that there is usually more equipment of all kinds so that a minor mishap does not stop all flying. If the club has a motor glider for training, the whole process of learning will be speeded up, for a motor glider is capable of doing two or three times as much training as a two-seater glider and is not dependent on winches or tow cars.

If you will be doing all your flying at weekends, the nearest club will probably be the most attractive. But before you actually pay an entrance fee

and a year's subscription, consider carefully. Are you prepared to spend at least one whole day every fortnight at the gliding site during the period it will take you to learn to glide? Your answer will depend on the amount of flying you can get each time you go gliding and on how valuable your spare time is to you.

Alternatively, can you afford the time and money to have several weeks' continuous training on a gliding course? This is usually a far more efficient way of learning if you can set aside the time to do it. Some clubs run concentrated training courses on both motor and ordinary gliders, whereas others run Holiday Courses, designed for pleasure rather than instruction.

If you are uncertain whether you really want to glide, a Holiday Course may be attractive as the training is usually taken less seriously. A week on a gliding site having a few flights each day makes a novel kind of holiday and gives you a chance to see if you really like flying.

An up-to-date list of gliding clubs and gliding courses can be obtained from the British Gliding Association, or, in other countries, usually from the National Gliding Association or the National Aero Club concerned. If you have never been up in a glider and have just picked up this book to see what it is all about, one of the first questions you will find yourself asking is, 'could I learn to glide?' The answer is almost certainly yes, but it is worth discussing some of the problems and doubts you may have.

Age In the United Kingdom, the minimum age for flying solo in a glider is sixteen, compared with seventeen for a motor glider or light aircraft. Personally, I would not encourage any young person to start serious flying training until they are nearly old enough to go solo. There is a real risk that they will become frustrated, as everyone else, learning at the same time and no more competent, is going off solo. Although many young people are very mature in their outlook, others are not. A small number are quite incapable of concentrating for more than a few minutes while in the air and any serious training is largely wasted on them. However, young people who are interested should be encouraged to make a start by flying a few times a year until they are nearly old enough to solo.

Probably the best age for learning to fly for most people is between eighteen and twenty-five. However, there are many students up to the age of fifty learning to fly, and really there is no definite limit.

It is possible to go on gliding to a ripe old age but this is not always wise. Most old, experienced glider pilots seem gradually to lose their critical sense and fail to realise that they are beginning to become a danger to themselves and perhaps to others. Probably because they lose their concentration, they tend to find themselves suddenly confronted with an unexpected situation which they ought to have foreseen.

Doctors seem to find difficulty in assessing this gradual slowing down process in a person who in every other way is physically fit. This poses a major embarrassment to gliding instructors who eventually have to tell

someone that the time has come to stop flying solo. Not many pilots are really still 'with it' beyond the age of sixty-five and many are too old at fifty.

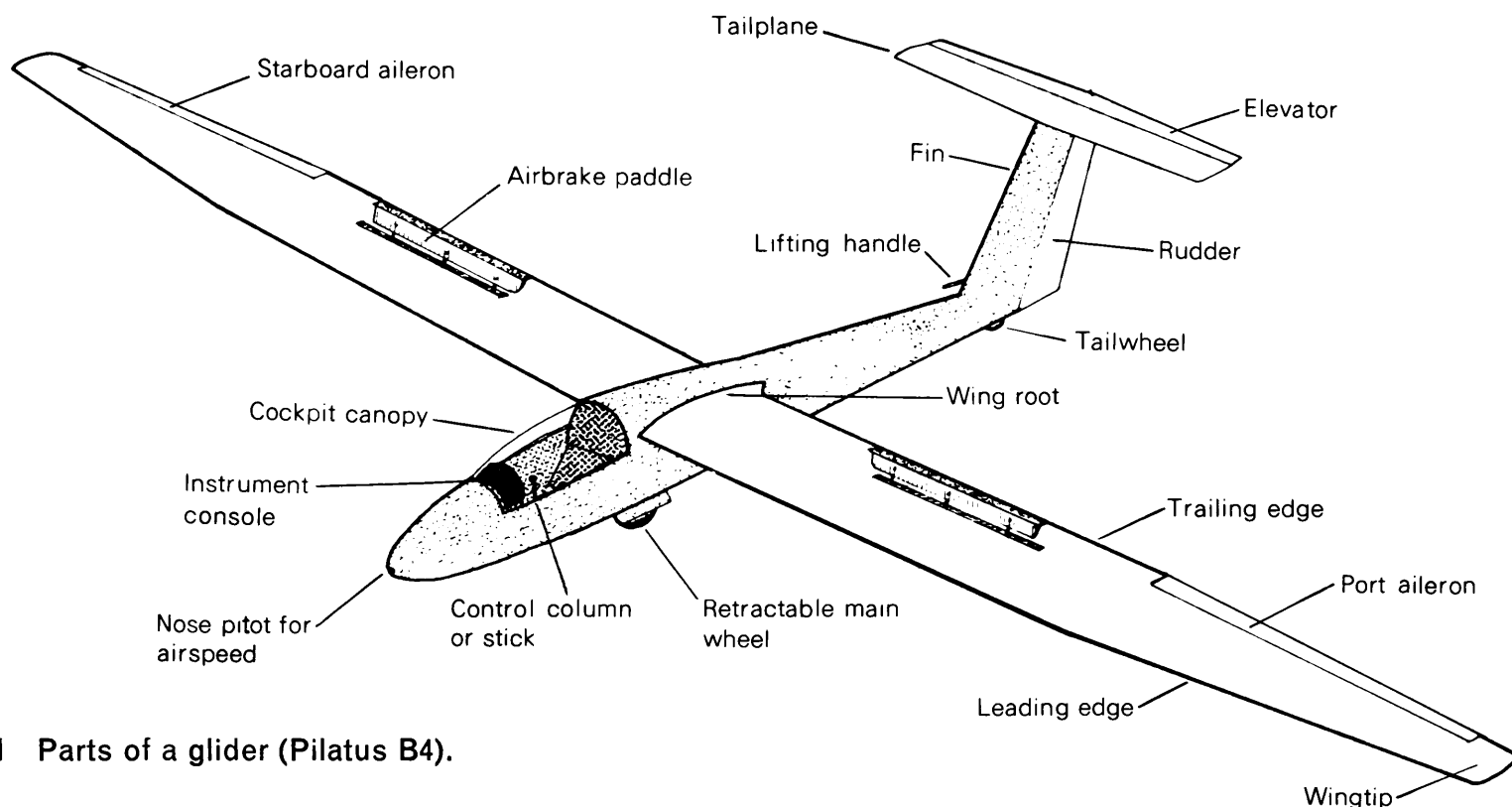
Learning to fly is a very different matter and, for the majority, even fifty is really too old to start gliding. At this age it is often difficult to learn to co-ordinate hands and feet in the completely new manner required for flying a glider. It also takes much longer to learn to relax and become confident in the new environment. However, the real problem is almost always inconsistencies in performance caused by concentrating on one thing at the expense of all the others.

There are many situations that can occur in a glider which if unchecked lead to serious problems. Some older people seem to have difficulty in thinking clearly and decisively when faced with a sudden, unexpected emergency. This kind of situation does not occur very often with a modern powered machine except in the very unusual event of an engine failure. At any other time, except perhaps in bad weather, the pilot can open the throttle and climb up to give himself time to sort out the difficulty. In this respect the glider pilot is far worse off as he is committed to every landing and can have no second attempt.

Unfortunately, it is not until the final stages of training that an instructor can form a proper assessment about a person's ability to make decisions. Many elderly students are often rather slow learners, so that they need a large number of flights before they master the handling well enough to make a start on the planning of each flight. It is not really enough to be able to get up and fly a rigid circuit pattern satisfactorily. To be safe, the pilot must be able to cope with every possible situation that may occur. Often, these students learn to deal with a situation on one day, only to forget completely about it on the next. This kind of problem is a greater worry to an instructor than anything else. Even when every possibility seems to have been covered by instruction and the pilot has been checked and rechecked to make sure that he is safe, the unexpected may happen and the instructor can only blame himself for not stopping the pilot earlier.

Very slow learners do eventually learn to *fly* the glider safely, but these are usually people with slow reactions who cannot give their attention to more than one or two things at a time. It is always a great disappointment to both the instructor and the student to have to give up the idea of solo flying, particularly after a long battle to master the technique. In the end it is a matter of whether the student can fly and think logically and quickly at the same time.

Usually, these slow learners are the keenest and most willing helpers on the gliding site and with luck, they will still find a special niche for themselves in their club. Once they have accepted their limitations, they can continue flying without the constant psychological pressure which may well have spoilt their enjoyment previously. It is ideal if they can join a two-seater syndicate so that they fly with a friend who can get to know their flying and act as a safety pilot.



1 Parts of a glider (Pilatus B4).

The policy of gliding clubs varies considerably from place to place. At Lasham, I have always taken the view that the Centre is there to train pilots and to give enjoyment and recreation to the members. We have several pilots who continue to fly dual although they know that they will not be able to fly solo. Within reason, they are just as worthy a cause as the potential pundit. Providing that they enjoy their flying, I feel that they are always an asset rather than a liability to the gliding movement.

Nervousness It is quite normal to be nervous at first and this will only really disappear after a number of flights. If you have a nervous temperament and, for example, have found it impossible to learn to drive a car confidently, it will take a long time for you to learn to glide and you will probably not enjoy it. People who are under any treatment for a nervous or mental problem should not start to learn to fly without both the agreement of their medical adviser and the Chief Flying Instructor (C.F.I.) of the club.

It is particularly important to ask your doctor if any medicines or drugs you are taking have side effects which could be serious when flying. You are not a fit person to fly solo if you need tranquillisers to calm your nerves before you go up! You need all your faculties for safe flying and there should be no question of flying after drinking even small amounts of alcohol.

If you are rather nervous and tend to panic, this will make your training longer. You will need to understand what you are doing in much greater detail than the average pupil so that nothing can happen which you do not

understand or which has not happened before. Again, the instructor will be unable to tell you whether you will overcome this problem until near the end of the training, so do not bother to ask him after one or two flights.

Looking back over the thousands of students I have helped teach to glide, some of the most rewarding have been those with special problems, particularly nervousness.

I remember especially a middle-aged lady and her first few flights in the Falke Motor Glider. She literally clung to my leg and cried out in terror every time that we banked even slightly. I admit I was slightly surprised when she announced her intention of joining the club as a full member. However, gradually she overcame this fear, until after about five or six weeks of flying once or twice a week, we were able to start practice stalls and even incipient spins. Each new experience was a traumatic one for her and a new psychological problem for me to overcome. At last came the day when I could sit back and ask her to fly me around without any bogies left. I remember every detail of her first solo and how proud she was to have mastered the art of flying and become a really relaxed pilot at last.

However, she was probably the exception to the general rule that the very nervous person seldom makes a good pilot.

Intelligence – how bright do I need to be?

A good instructor can explain everything you need to know in order to learn to glide and become a good soaring pilot in plain language that a child of twelve could understand. No technical, and certainly no mathematical, knowledge is required. Perhaps being able to read and look things up for yourself is the only advantage any education will give you.

The main essential is to be reasonably quick-witted and to want to learn badly enough to persist until you have mastered the art. Motivation is probably more important than innate ability.

Health

Gliding will always involve a certain amount of physical work and of standing about in all weathers on a cold airfield or hilltop. It can never be just a matter of climbing into a glider, flying it, and then going away again without giving some sort of help. However, we are not all blessed with perfect health. Apart from pushing and launching gliders, there are plenty of other ways in which we can pull our weight as a club member.

Most people are fit to glide. However, you should not fly if you suffer from any kind of epilepsy, giddiness, fainting fits or sudden migraine. Diabetics and people who have suffered coronary problems *may* be fit enough but must consult their doctor and the C.F.I. of the club before learning to glide.

If you have suffered from a slipped disc, you will have to be careful. You should never carry the tail of the glider as it may only require a jerk or twist to set you back many months. It is safest to take the wingtip or push on the nose.

Hay fever is another serious problem on gliding sites. In the summer when

the soaring conditions are good, the pollen count is at its highest and if you suffer from hay fever, you may find that you have to give up flying. Once in the air and above 2000 or 3000 feet, the air is much cleaner than on the ground and you may find relief from your suffering. Asthma is also helped by flying at height. Unfortunately, most of the drugs used to relieve both hay fever and asthma can seriously upset a pilot's concentration and judgement.

Eyesight The need to wear glasses is no bar to flying gliders, or in some cases, to holding a Private Pilot's Licence. It is essential for safety to be able to see well enough to spot other aircraft at a distance since you may meet them at closing speeds of several hundred miles an hour.

Poor eyesight can cause serious learning problems, particularly if you have only one eye, or have one with very poor sight. Serious muscular defects and double vision cause difficulties when learning to land and these may prove insurmountable in some cases. Normal colour vision is not necessary for gliding but is usually required for power licences. (It is sometimes possible to obtain a concession, especially if you can show that the defect has caused no problems when flying gliders.)

The minimum standard suggested by the British Gliding Association for eyesight is the minimum for driving a motor car. (Must be able to read a car number plate at 25 yards – corrective glasses may be used.) If you normally fly with your spectacles you should always carry a spare pair in case of loss or breakage during flight.

Disabilities To the disabled person, a disability is just an inconvenience which a little ingenuity will overcome. It is quite remarkable how quickly a way can be found round most difficulties.

For example, one of my beginners had lost one arm at the shoulder. To my astonishment he soon found how to hold the stick between his knees near the top of the wire launch in order to be able to use his one good arm to pull the cable release. Later he adapted his circuit planning to allow him to open the airbrakes fully at the top of the approach, again holding the stick between his legs. In this way he could make a normal landing without difficulty. Later he devised a CO₂ operated device to open and close the brakes on the K8. By means of a lever on the stick he could operate both the stick and airbrakes with one good hand. This was reasonably safe for winch or car launching but could have been highly dangerous for aerotowing if anything went wrong. A further aid would have been needed to allow him to release immediately without taking his hand off the controls. Otherwise solo aerotowing could never be really safe either for him or for the tug pilot.

A certain minimum amount of strength is needed to use the controls and this presents an insurmountable problem to people who are partially paralysed. However, with all disabilities the only thing is to try flying the glider and find out how serious your particular problem is going to be.

One-legged pilots *may* be able to work the rudder, but any artificial leg must be secured to the rudder pedal so that it cannot slip across and cause a jam. In flight, the leg can mostly be helped with a hand to reduce the effort, but it is important that full rudder can be applied at all normal speeds.

Many of the situations which cause difficulties can be foreseen and avoided with experience. Nevertheless, it is often better for everyone if the disabled person can accept the idea of learning to glide and of then sharing his flying with another pilot in a two-seater, rather than flying solo.

Deafness Deafness is hardly a disability on its own, it is just another challenge to the instructor. Most completely deaf people rely to a great extent on lip-reading, so that the essential facts can still be explained provided they are combined with plenty of drawings and demonstrations with a model. The instructor has to be particularly thorough in order to make sure, by practical tests in the air, that his student has grasped all the ideas which have been talked about in the briefings.

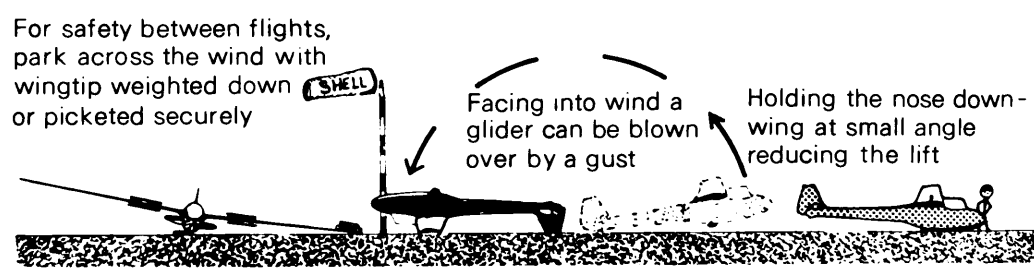
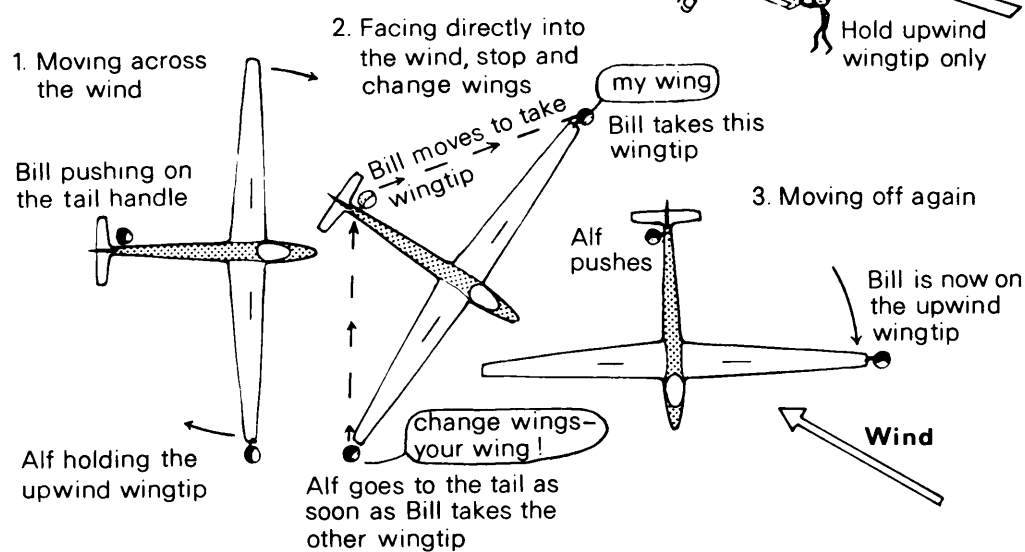
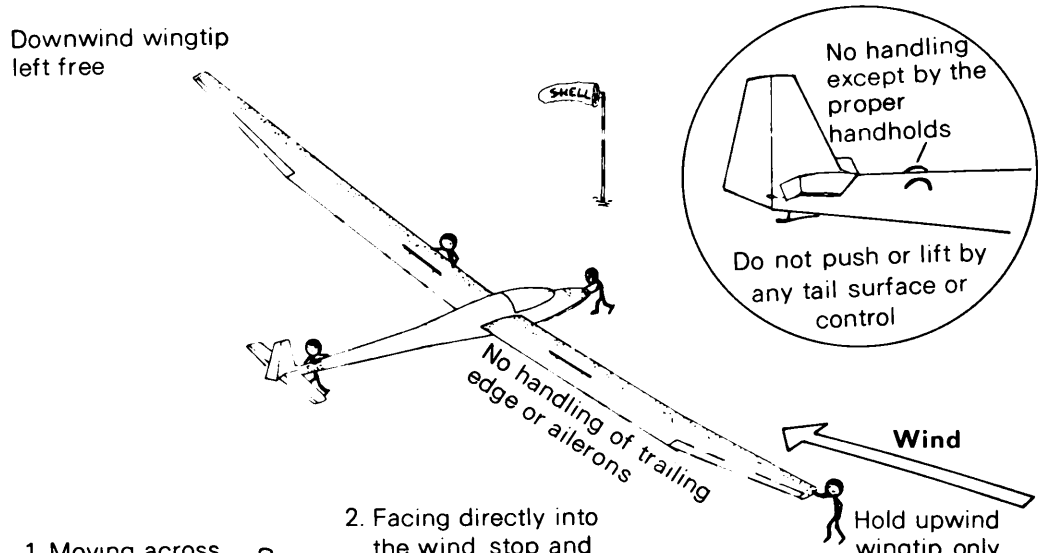
Side-by-side seating is essential when teaching a completely deaf person and the instructor must learn that it is no good offering advice during the flight. In particular, it is vital not to talk at all during the approach and landing. If the student sees that the instructor is talking to him, he will instinctively turn round to try to lip-read. This can be disastrous on the final approach!

Both deaf people and people with very poor eyesight are a serious danger to themselves and others on the field. They may not be aware of gliders and powered aircraft coming in to land near them and they may not hear warning shouts or see the danger. If possible, they should be encouraged to wear conspicuous clothes so that pilots and club members recognise them and realise their limitations. The dangers of propellers and winch cables should be explained to them before they are left alone at the launch point.

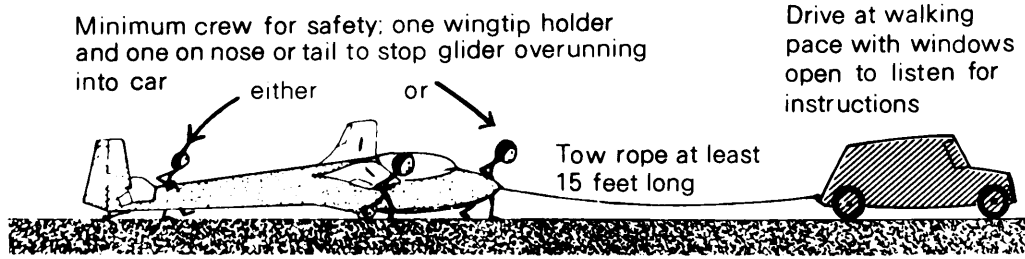
Height and weight The cockpits of gliders are usually designed to suit a fair range of average-sized pilots. This means that if you are either very small, very fat, or very tall, they are either fiendishly uncomfortable or impossible.

Small pilots need extra packing on the seat and behind them in order to reach the controls easily. Usually they will weigh less than the minimum permissible, normally about 150 lb (68 kilos), and will have to carry additional ballast as well as wear a parachute, which weighs about 20 lb.

The ballast can be in the form of weighted cushions fixed to the seat so that they cannot move forward onto the controls. The minimum cockpit load is critical because the glider may be unstable if there is insufficient load and it is tail-heavy. The situation is difficult if you are a small woman who weighs only 90 lb. You would need 50 lb of ballast and a parachute to fly safely! (My own advice is to make sure you find an admiring enthusiast to carry the ballast for you – you will not carry that weight far.)



Never leave glider unattended unless it is properly parked



2 Gliders must be handled correctly on the ground or they can easily be damaged.

If you are very short, you may even need special thickened shoes to give you longer legs to reach the rudder pedals easily. An old pair of shoes with an extra sole of thick plywood glued onto them will do. It is essential to be able to apply full rudder in both directions without having to stretch your leg out straight.

Short fat people are the most difficult to cater for. Without blocks on their shoes they may find that although they can reach the rudder their stomach gets in the way and prevents them from getting the stick right back. If you are so endowed, make quite sure you can reach all the controls on both two-seaters and solo machines at the club you propose to join.

Many gliders are notoriously short of leg and head room. If you are over 6 feet tall you should make a special point of trying the cockpits of both the dual and solo machines to make sure that you can get into them (before joining the club)! Someone of 6 feet 2 inches is about the maximum that most gliders will accommodate.

It is generally accepted that very heavy pilots will exceed the maximum cockpit load that is stated in the cockpit (about 220 lb). This usually means that the glider will be overloaded so that it would not be wise to do aerobatics or cloud flying. In effect, exceeding this weight limitation downgrades most machines from Semi-Aerobatic (stressed to 5g) to Non-Aerobatic Category (stressed to 4g). For ordinary flying this is not a serious restriction. However, it is wise to consult a senior instructor about the effect on a particular type of machine. On a few modern types the centre of gravity moves too far forward and this causes abnormally high tailplane loads which can be dangerous.

It is wise to keep the maximum flying speed to a figure below the normal limitation in order to restrict the tail loads. (This is no handicap as the glider is not normally flown at high speeds.) The other main risk of damage due to a very heavy pilot is from a slow landing. An extra 5 knots of approach speed is needed to give extra elevator control for the round out and landing. Otherwise there is a risk that the control at lower speed may not be sufficient to overcome the extra nose-heaviness.

Day-to-day fitness

It is surprising how silly many people are when it comes to drinking and driving, or deciding when they should go to bed with a cold.

Flying is much less forgiving than car driving and it is much more a matter of survival than of whether you will lose your licence. Pilots must learn to say *no* flying if they have had even a single alcoholic drink that day. The American accident statistics for light aircraft show conclusively that any alcohol seriously reduces the ability of a pilot to cope with an emergency. In fact, the majority of the pilots involved in serious accidents showed evidence that they had been drinking recently.

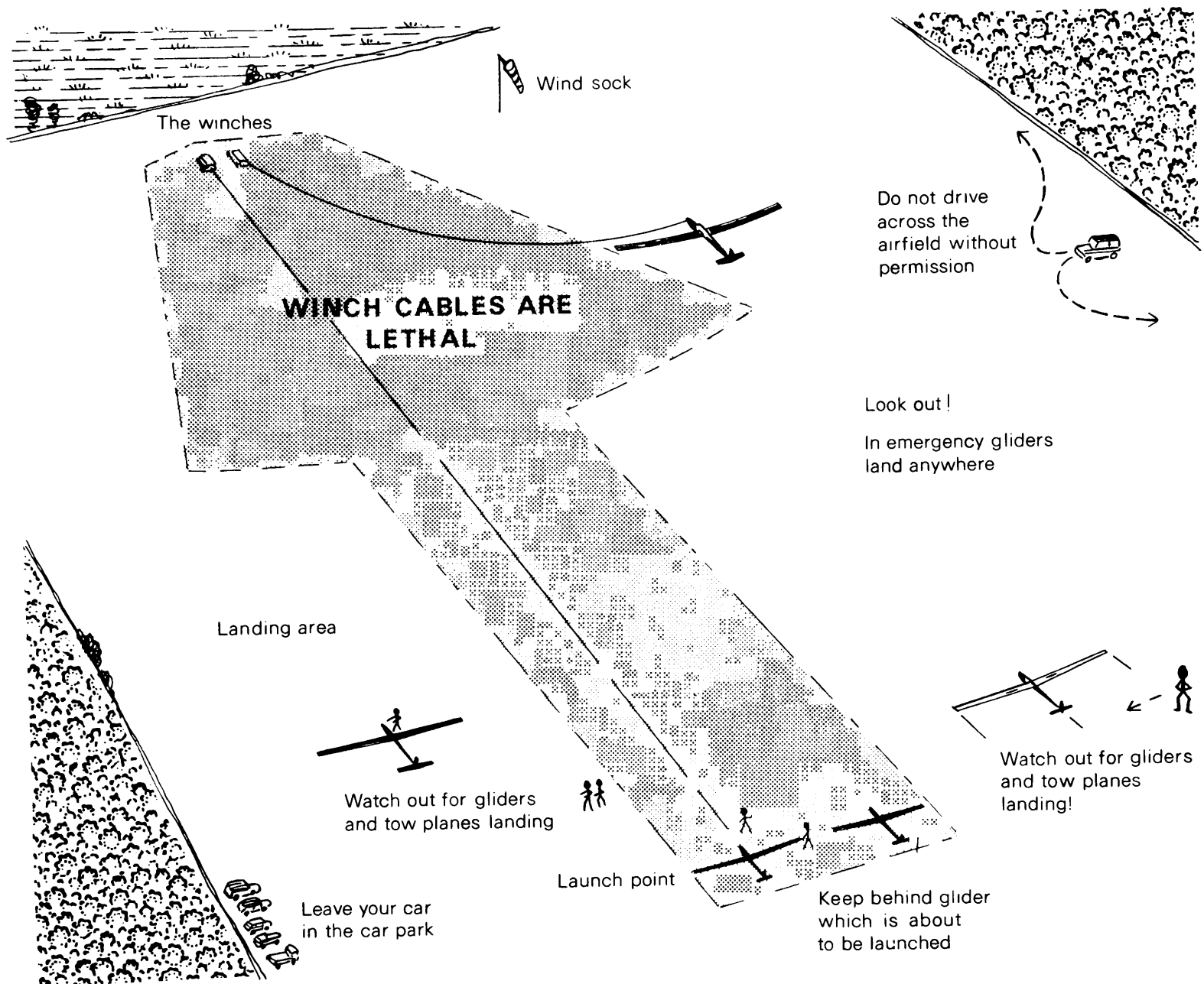
The Tiger Club, a famous sport flying club in England, has a little notice in all their machines on the instrument panel. It says **All aircraft bite fools.**

Pilots who fly when they are not feeling absolutely fit are fools. Time and

time again after an accident, the pilot reveals that he had not been feeling really well before he took off. Perhaps tired after a particularly heavy week's work and having promised his friends a ride, he had flown against his better judgement. A few drinks, a few aspirins, or a hangover from a party the night before, are real reasons for not flying solo that day. Flying is always simple *until* the unexpected emergency occurs. Then you need all your skill and speed of reaction to avoid an incident and prevent a serious accident.

Colds *Never* fly with a bad cold in the head. Once you are unable to relieve the changes of pressure as you climb and descend, you may do serious damage to your ears. Quite apart from not feeling well and having slower reactions, there is a real risk of either bursting an eardrum or developing a very painful inner ear infection. If you have a cold but feel fit and well, you must not fly unless you are able to clear your ears. As you climb, either in an aircraft or a car on a big hill, you feel the change in atmospheric pressure in your ears. The air pressure outside your eardrum has dropped and the air inside is belling the drum outwards. If the pressure difference becomes too great the drum will perforate or burst. This difference in pressure can be relieved by swallowing hard several times, by moving the jaw forwards and backwards, or by pinching the nose and pressurising it. The partial deafness caused by the difference in pressure bowing the drum should disappear. The inside of the eardrum is connected by the Eustachian Tubes to the back of the throat, and moving the jaw or pinching the nose and blowing helps the air to flow through the tubes to equalise the pressure. If you have a slight cold and are wondering whether you can safely fly, you should be able to clear your ears by either of these methods. There should be a distinctive 'click' from both ears if the tubes are clear. Do not fly on any account if you have even one ear blocked. Ears are delicate things and you really can damage them easily by flying with a cold. I once spent two months recovering from a flight with my ears badly blocked. It was in the war when there was, I suppose, a certain amount of malingering amongst pilots, and I had the misfortune to go sick with my ears absolutely blocked up with a cold. Perhaps rather untactfully, I said to the doctor that I could not possibly fly because my ears were completely blocked. With a typical Service-in-Wartime reaction, he scarcely examined me, gave me a bottle of medicine and ordered me off to fly. My protests only made things worse! Fortunately next day I was able to go home and see my own doctor, but the damage was done. I spent a very miserable time on sick leave, almost completely deaf, and was very lucky not to have any permanent damage.

Menstrual periods Anything which disturbs our judgement and our ability to make decisions is important where flying is concerned. It has recently been realised that some women drivers and pilots are particularly liable to have accidents when they have pre-menstrual tensions. Several women pilots have said that they can



3 Danger areas on a gliding site. Always look carefully all round before crossing open spaces where gliders may choose to land in emergency. Keep away from aircraft with their engines running.

notice their flying ability deteriorate during that period, whereas others have no problems.

It is probably wise for inexperienced pilots to stop flying solo at this critical time, and for others who know that they are affected, to limit their flying to tasks which do not require the utmost concentration. It would be wise, for example, to avoid cross-country or contest flying.

Women pilots are certainly not the only ones who have their off days. For

example, no one is fit to fly immediately after a flaming row, or if their business or personal problems are bad enough to prevent complete concentration on the flying. Distractions like these are the most common underlying reason for accidents and incidents with aircraft. Usually you are the only person who knows if you are fit to fly on a particular day, and if you are doubtful, fly with someone else rather than risk flying solo.

2

The Glider and Your First Flights

The glider and its controls	23	Changes in 'g' or loading	28
Sensations on your first flights	25	Sensations of sideslipping	32

The glider and its controls

The beginner will find it far easier to learn about the controls by going up in an aircraft and experimenting with them. The essential facts are illustrated on the following pages and should enable the reader who has no actual experience of flying to understand the rest of this book.

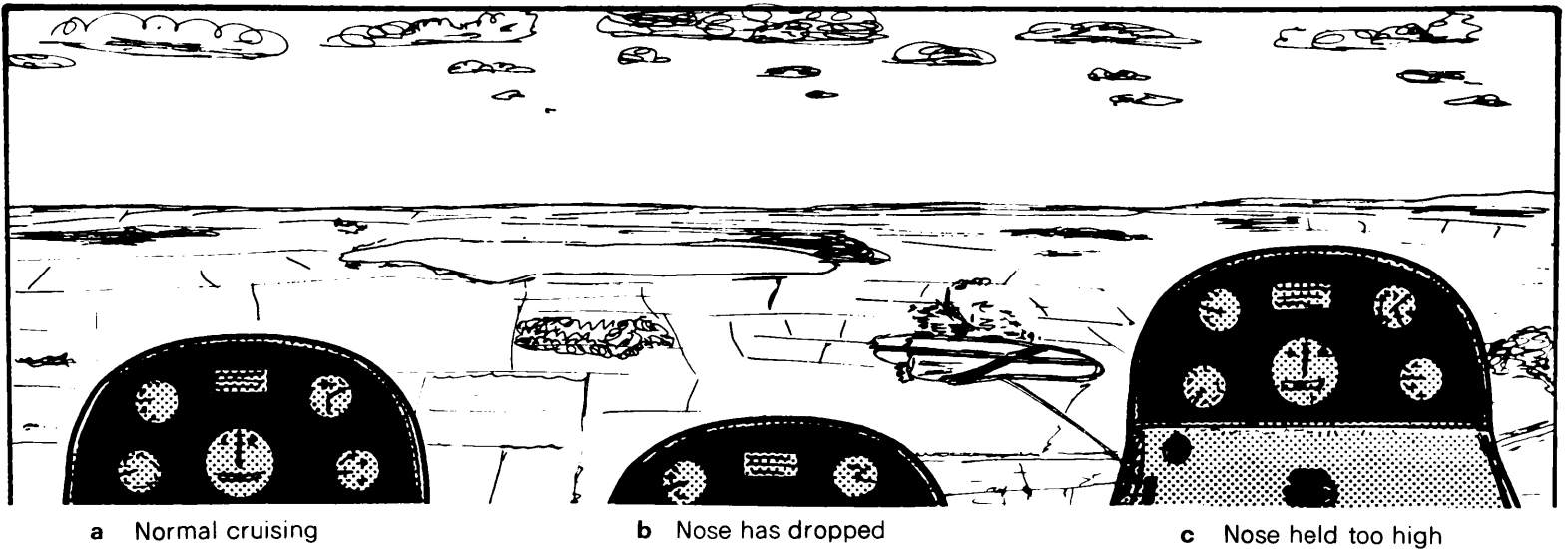
The controls of a glider are identical to the main controls of any powered aircraft. They consist of a control column, or stick, which moves the elevator and ailerons, and the rudder pedals which move the rudder.

In addition to the main flying controls, there is the airbrake operating lever, the elevator trim lever, the cable release knob, and, on some high performance machines, levers for retracting the main wheel and for operating the wing flaps.

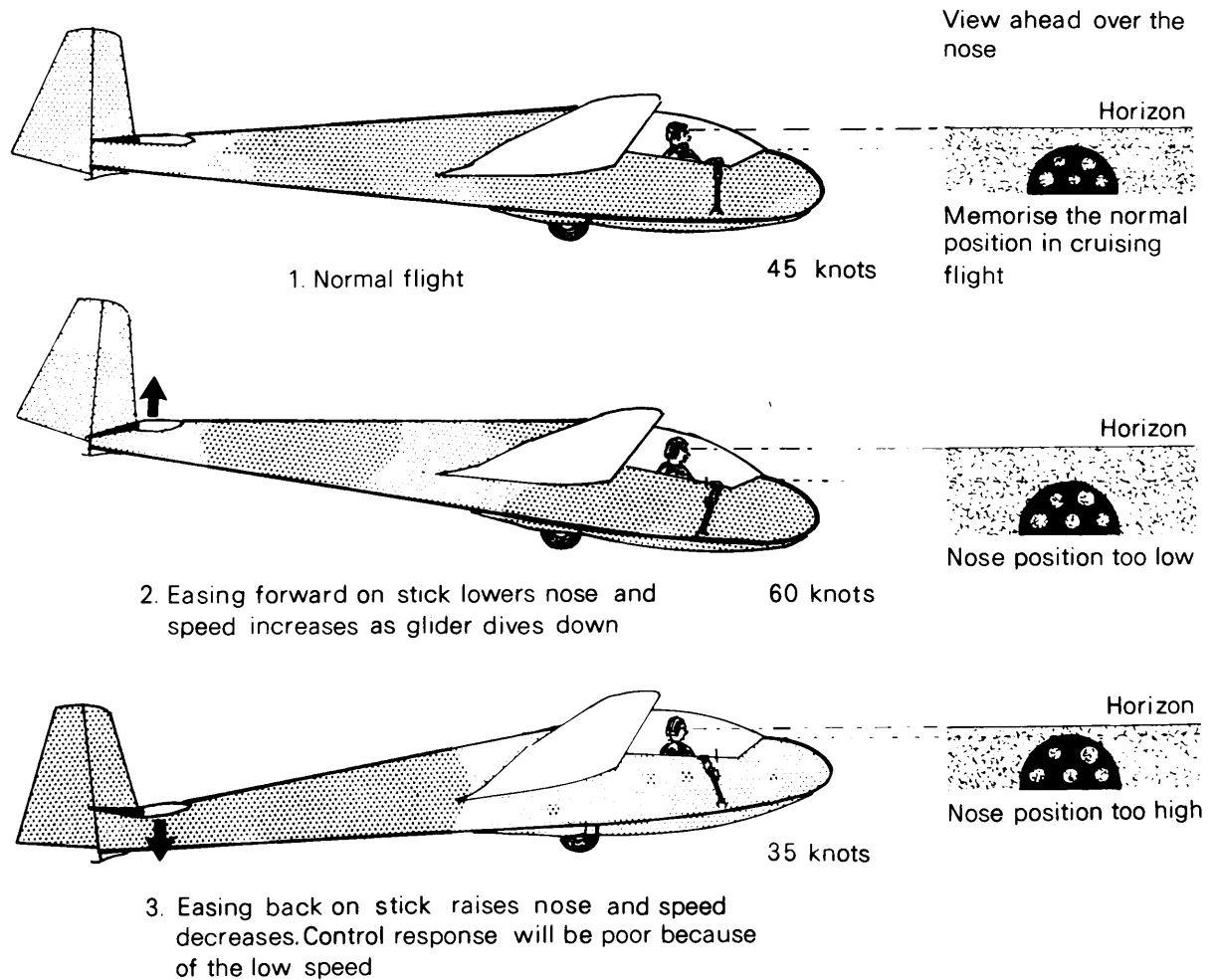
A glider instrument panel has the same basic instruments as any other aircraft but, of course, has no engine instruments. The main instruments are the Airspeed Indicator (known as the A.S.I.), the Altimeter, and the Variometer. The Variometer (vario) is a very sensitive instrument which shows the rate of climb or descent of the glider so that the pilot can find upcurrents and soar. Two typical cockpit layouts are illustrated in Plate 1.

In order to fly efficiently the glider must be held in the correct attitude so that it flies at its best gliding speed. On a clear day, the attitude can be easily judged by the positions of the nose in relation to the horizon ahead. If the nose is held a little too high, the glider will fly too slowly and it will lose height more quickly than normal. A nose-down attitude will also result in a greater loss of height but this time the glider will be diving down and flying at a much higher speed (Fig. 4).

The movements of the stick which produce these changes are more or less instinctive. You always move the stick the way you want the machine to go. Move forward to put the nose down, move back to raise the nose: stick to the left will start the glider rolling over into a bank to the left: in order to bring the wings level again you just lean the stick the way you want the glider to go. Nose up and down movements (as seen from the cockpit) are known as *pitching* movements. Sideways tipping movements are known as *rolling* or *banking* movements.



4 Watch the position of the nose. **a** The correct position must be memorised. The exact position will depend on the pilot's eye level and will vary according to his height and seat cushions. **b** The nose has dropped. This will result in increased airspeed and rate of descent. **c** The nose is being held too high. The airspeed will be low and the glider will be mushing down losing more height.



5 Nose up and down or pitching movements control the speed. *Move the stick the way you want the glider to go.*

It is important to realise that the size of the sideways movement of the stick controls the *rate* of roll and not the angle of bank. For example, a small movement to the left will start a gradual banking movement to the left which will continue to get steeper and steeper until it is stopped by a centralising movement of the stick. A larger movement to the left would produce a much higher rate of roll but again how steep the bank becomes will depend upon when the control is centralised. (In actual practice there is a tendency for the bank to become steeper during turns and, therefore, the stick has to be moved back just beyond the central position. In most gliders, because of this effect, the final position of the stick in, for example, a turn to the left, will be a little to the right of centre.)

When the rudder is applied, the nose of the glider swings, and the glider skids through the air sideways instead of turning. In fact, the rudder does very little to help the turn except to keep the fuselage of the aircraft in line with the airflow so that it presents the lowest frontal area all the time. Left rudder, that is left foot forward, makes the glider swing to the left. Centralising the rudder again will allow the nose to swing back to the original position. Movements of the aircraft like these are called *yawing* movements.

Sensations on your first flights

Unless you have already spent a considerable time flying as a passenger, you are likely to feel rather tense and nervous during your first few flights as a learner. This is perfectly normal and soon disappears.

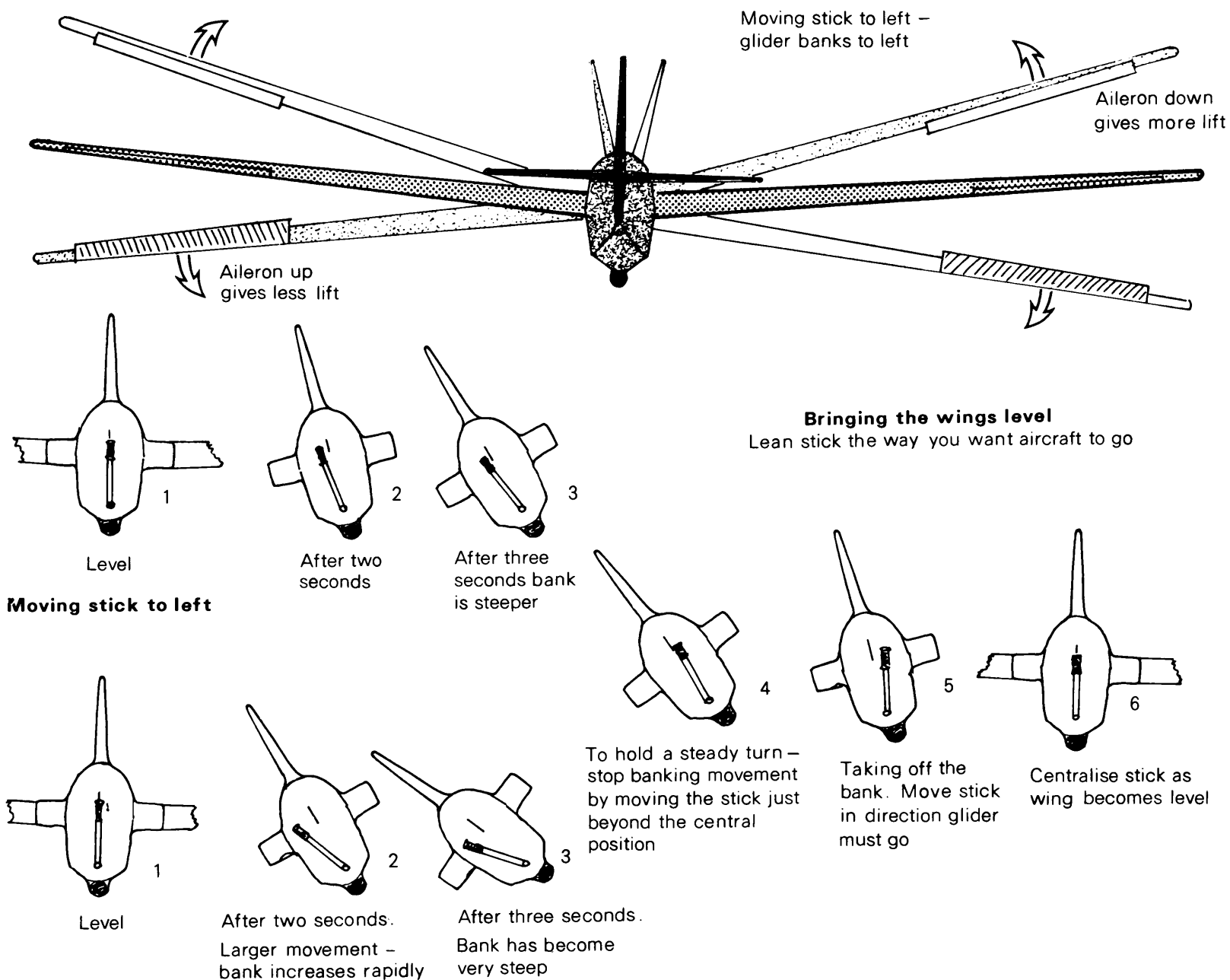
The controls of an aeroplane are not nearly as positive as the controls of a car and may at first feel as though they are not properly connected. They vary in effectiveness according to the flying speed, and at low speed the beginner may often wonder whether the aeroplane is still under control. Also, on many days the air has invisible bumps and potholes and it is difficult to be sure at first whether the aircraft has moved because of a bump or a movement on the controls made by the pilot. If possible, choose a day with a light wind and good visibility for a first flight.

Frequently these bumps are sufficiently powerful to delay the effect of a control movement for several seconds and occasionally a bump may coincide with a control movement so that at first the aircraft moves a little in the opposite direction. This is particularly disturbing to the beginner, who may think for a moment that he has made a wrong movement. Alternatively, a small control movement may be assisted by a bump so that an abnormally large change takes place.

Quite naturally, this kind of thing is rather worrying at first, and the aircraft seems a slightly uncontrollable, unwilling beast which threatens to run away out of control at any moment.

In fact, if you do not find it at all worrying to feel a little out of control there is something wrong with your nervous system and you should visit your doctor or give up the idea of learning to fly altogether.

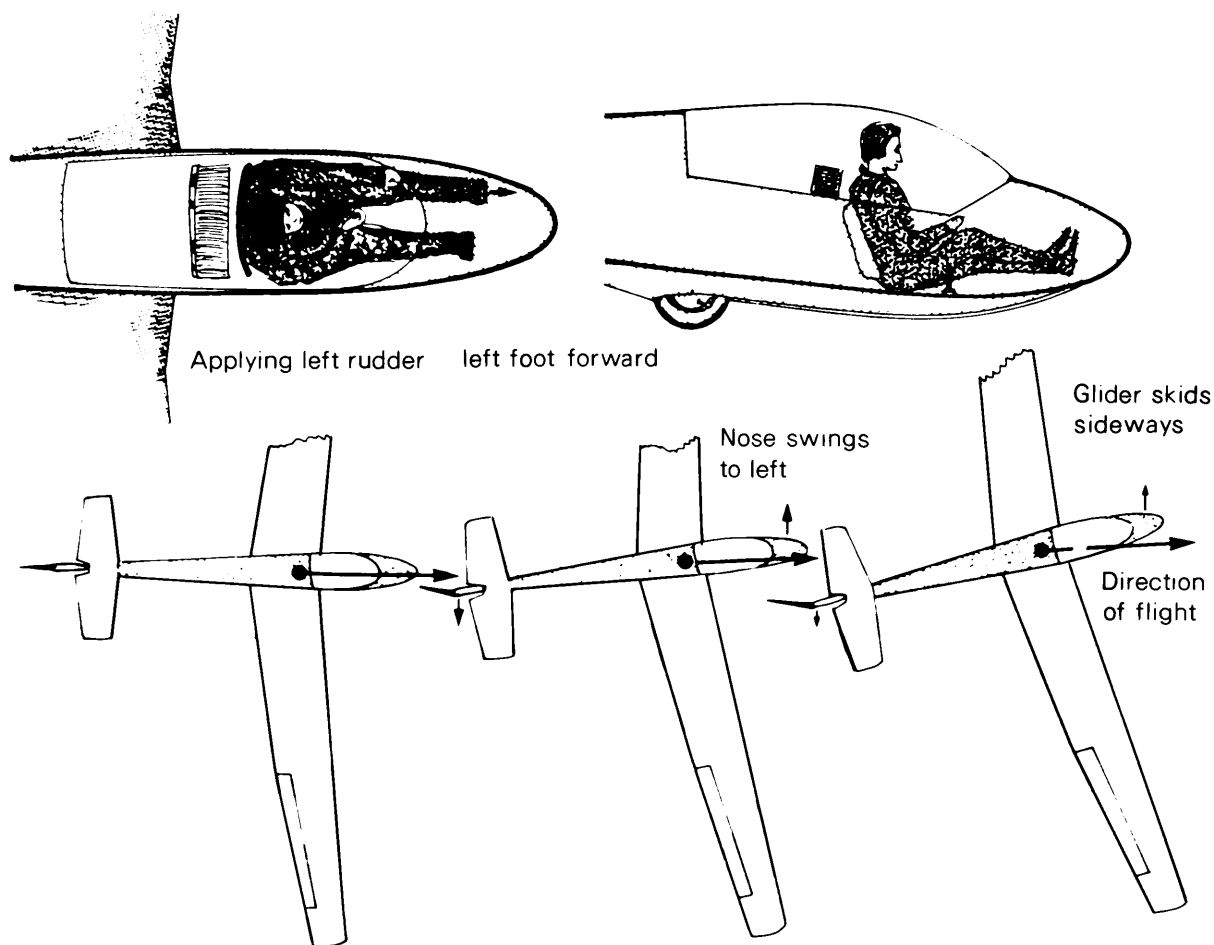
These fears will disappear as you gain experience and learn to respond quickly and to feel in harmony with the controls. Your confidence will then



6 The effect of sideways movements of the stick - banking or rolling. Note that for an accurate turn small rudder and elevator movements are also required. *Lean the stick the way you want the glider to go.*

have the sound foundation of experience and knowledge which is essential for your safety as a pilot.

In these early stages you will also experience some rather disturbing sensations which you had certainly not anticipated in your daydreams about flying. Some of these feelings are a milder version of the various thrill-makers at an amusement park. But whereas you expect that nasty feeling as you zoom over the top of the hump on the Big Dipper there is often little or no warning in a glider and, at first, no apparent reason for the feelings that occur from time to time in flight. Without some explanation these sensations



7 The effect of the rudder. Moving the left foot forward makes the nose swing to the left. However, after the initial swing, the nose stops swinging even if the rudder is kept on. The glider skids sideways through the air. When the rudder is centralised, the nose swings back almost to the original heading. Unlike the rudder on a boat, the rudder on an aircraft has little real turning effect.

can be very frightening and a few people dislike them so much that even one flight in a glider or small aircraft is one too many! This is a pity because, for the majority of beginners, these sensations are only felt on the very first few flights.

Of course a few people suffer from severe motion sickness and these people are unlikely to want to fly for pleasure. However, just because you have been seasick, or felt ill, in a car or boat it is no reason to expect to be upset in a glider. Whereas a boat has continual movements over which you have no control, there are only occasional bumps in the air on most days and you will learn to counteract them with the controls. If you are rather nervous about your reactions to flying don't be afraid to take a travel sickness pill before your first few flights. Then reduce the dose gradually and soon you will probably find it unnecessary to take anything at all. Most of these preparations seem to have very little adverse effect apart from leaving the mouth rather dry, but, as with all drugs and flying, you should obtain medical

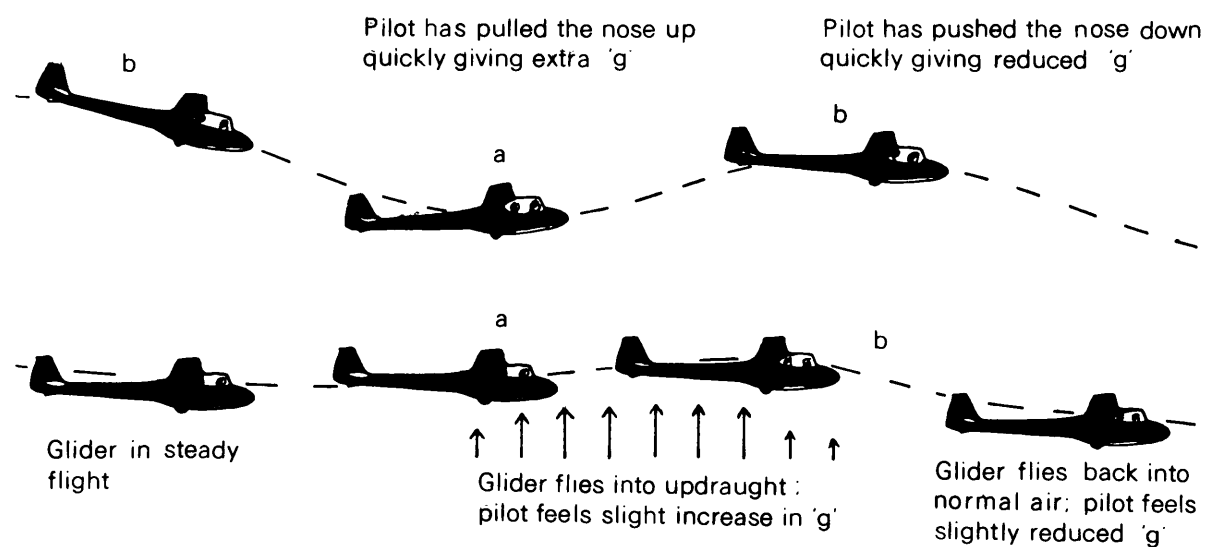
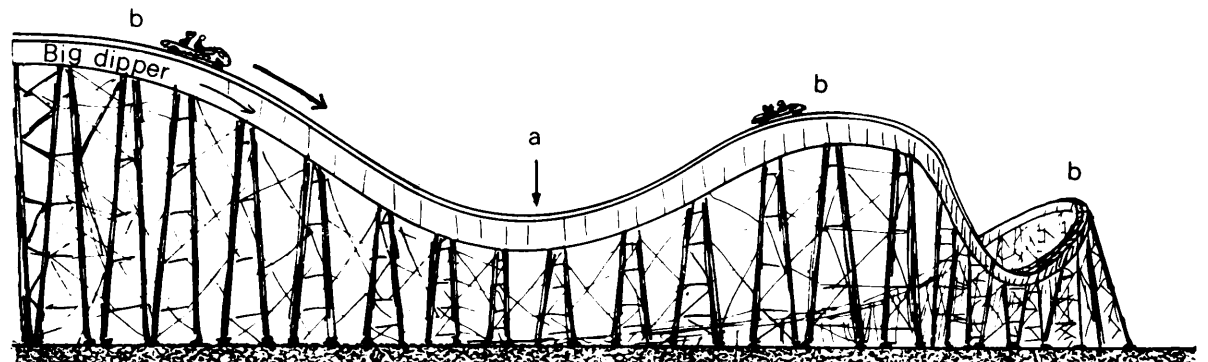
advice about which medicines are safe to take since many either tend to put you to sleep or impair your judgement and reactions.

The best safeguard is a better understanding of the sensations which occur so that they do not cause so much worry.

Changes in 'g' or loading

The force of gravity is acting on us all our lives from the moment we are conceived. It is such a normal part of life that it is only if you consciously think about its effects that you notice them. For example: sitting on a chair you can feel the pressure between your bottom and the seat; standing up you can feel the pressure between your feet and the ground. But because these effects of gravity are there all the time, it is only when you think about them that you are aware of them.

This loading of 1g, or gravity, may be temporarily affected by various accelerations. For example, on the Big Dipper at the fair (see Fig. 8) the loading is increased at point A as the car changes direction at the bottom of the slope. You can feel the extra pressure on the seat as the loading or 'g' is



8 Variations in 'g' during flight. These may be caused by the pilot moving the stick or by flying through turbulence.

Also by Derek Piggott

GLIDING

A Handbook on Soaring Flight

'Derek Piggott is without doubt one of the finest gliding instructors in the world. His book is therefore an important event and covers the ground he has set himself completely and with professional perfection. It includes everything that a glider pilot should know from the day he joins his club to the day he enters the élite. . . . This is a volume for the serious student and instructor, for anyone who wants to learn how to glide or to glide better. It does not pretend to propaganda, and contains no stirring descriptions of the fine flights which Derek has carried out on occasion. But it is obvious to the reader that he could not write such a book did he not love the teaching and practice of soaring flight.' *Sailplane and Gliding*

Adam and Charles Black
4, 5 & 6 Soho Square, London W1V 6AD

ISBN 0 7136 1578 8



‘Derek Piggott is without doubt one of the finest gliding instructors in the world.’

Sailplane and Gliding

The Wally Kahn/British Gliding Association eBook Library
is unable to obtain copyright approval to provide
the reader with the complete eBook.

By including a number of pages we have endeavoured
to provide you with the flavour and content of this book
so that you can decide whether or not to purchase a copy.

It may be that the Publisher and/or Author are intending
to print a further edition so we recommend you contact
the Publisher or Author before purchasing.

If there are no details provided in the sample
Search online to find a new or
second hand copy.

Addall, a book search and price
comparison web site at <http://www.addall.com> is very
good for gliding books.

**Copyright of this book sample and the book remains
that of the Publisher(s) and Author(s) shown in this
sample extract.**

**No use other than personal use should be made of
this document without written permission of all parties.**

They are not to be amended or used on other websites.