LOW-DOWN ON THE ALPS

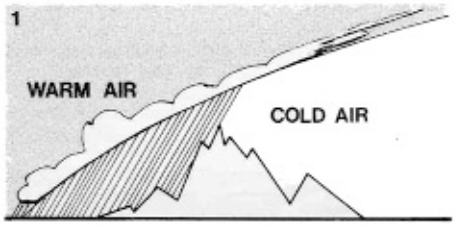
Most British pilots who glide in the Alps are self-taught and in the first of his articles on mountain flying William, who now lives in France, gives advice and information to help those flying abroad exploit the conditions

The editor has noticed that while there are substantial texts on how to exploit the Alps in German, French and Italian, almost nothing exists in English. Most British pilots who fly in the Alps are self-taught and therefore obliged to advance very cautiously. It shows in the way we fly, compared with the apparently devil-may-care approach of our French, German and Swiss friends. This is only an illusion, however: they are just as cautious as we are, but they have an enormous body of experience on which to base their decision-making. This experience is lodged with their instructors rich in Alpine hours and in the written word in magazines and books.

This short series of articles aims to help redress the balance in favour of British pilots.

PART I – PARADISE REVISITED

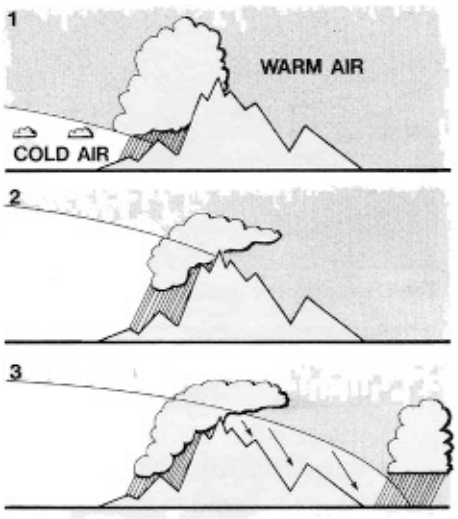
Why go? The first question is: why go all that way? What is so special about the Alps? As we know from our own experiences in the UK, even a small range of hills can act as a barrier to the movement of air masses and the fronts associated with their boundaries. The Alps present a formidable wall right across Europe and have a permanent effect on the routes taken by all anticyclones and depressions. Airmasses cannot pass or only succeed in doing so after a delay, and when they do pass, they are forced upwards. This uplift results in substantial modifications for the better in the characteristics of the airmass.



Passage of a warm front.

The fast moving cold front is stopped in its tracks and often deposits substantial precipitation on the ramparts of the Alps, so that when it passes the wall (up to 4000m high), it arrives the other side much drier. It also arrives much warmer, due to the compressing downward movement on the other side (the well known föhn effect). The slower moving warm front may also arrive on the other side eventually and when it does, the airmass will also be drier than before.

Anticyclonic airmasses on the plains surrounding the Alps are also blocked by the Alpine barrier. In short, the Alps form a massive barrier between the Mediterranean climate to the south and the rigours of the central European climate to the north. Within the area of the Alps themselves are mini climatic barriers that divide the area into six distinct zones, each with its own micro climate. These barriers coincide approximately with national frontiers, so we can give to the zones the names of the countries separated by them.



Passage of a cold front.

Jean – Claude Penaud photographed the lenticular over Mt Rose.

In 1975/76 I wrote in *S&G*, December-January issue, p264) about *"Les Enfants du Paradis"*, referring particularly to the southern Alps in France. Of the six zones this is probably the most reliable for the visitor with limited holiday time, but each zone has its peculiar advantages and disadvantages. They all have in common pure dry air, sloping rocks, lots of sunshine and plenty of lift of all types, so that each of the six zones is a paradise for the glider pilot. Local soaring and cross-country flights are possible all the year round and long distance flights are almost daily events from May to September. The real challenge is the cross-country flight which encompasses more than one zone. The newcomer to the Alps may, by chance, hit on a short period when such flights are easy, but in general they are difficult and best left to the more experienced.

Close to rock faces. A word of warning to the newcomer: the British pilot has a number of problems to overcome. The obvious ones are the cost and time to get there, the language, the different practices, and so on. But there is another less obvious problem: the pilot will be spending many hours very close to massive rock faces (how close we will discuss later) and the effect on many is FEAR! This is not confined to new-

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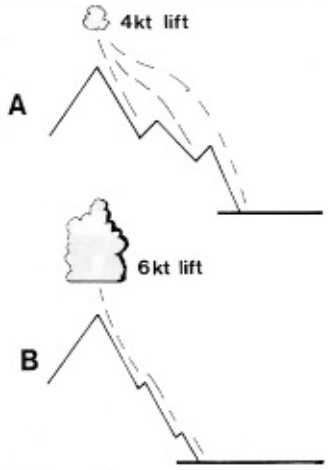


Profile of the mountain side. Mountain B is more favourable than mountain A.

comers: long experience attenuates the effect, but for some it never quite disappears. Perhaps this is a good thing, because a great respect for the mountains is essential.

My own experience may be of comfort to others: I find that on mountains I already know (*ie*, have soared more than once) the fear diminishes progressively, but sometimes, when I approach a large mountain for the first time, it comes back especially if my first approach is to the flank of the mountain rather than over the top. Most pilots find that the rewards are well worth the effort required to overcome the natural reluctance to approach a huge mountainside.

Ready-made solution. Fortunately there is a ready-made solution for the newcomer which goes a long way towards overcoming these problems and, at the same time, gives him immediate access to the vast pool of existing experience. I strongly recommend that he applies for a course at the French National Centre at St Auban. There he will spend two weeks flying, at first with a very experienced Alpine instructor in a Janus, and later in a single-seater glider under the "eye" of the same instructor. (Details are given in the box.)

There may be similar facilities in other countries, but I do not have details.

PART II – THERMODYNAMIC LIFT

Plainsmen who have already flown in the Alps will know that unfamiliar factors must be taken into account in searching for thermic lift and one of the most obvious of these is the daily variations in valley winds. This article glosses over the subject by presenting a simple diagram and noting that it is well covered by Wally Wallington in **Meteorology for Glider Pilots,** and, in any case, the same effects tend to occur in a small way in valleys anywhere. I would like to go straight on to review other factors affecting thermic lift in the Alps. They are numerous but quite logical and can be discussed separately. The trick is to weigh the influence of each factor, sometimes conflicting with each other, and to draw up quickly a balance of probabilities in favour of which route to take. (Just like on the plains, but the factors are different and so too is the nature of the lift.)

Position of the sun. In the morning east facing slopes are favoured and progressively, as the earth rotates, so the best slopes will be found facing south and then west.

Angle of the slope. The most favourable angle is 90° to the sun, so that morning and evening the steep slopes will work best, whereas around midday the 35-40° slopes are at the best angle to the sun's rays.

Length of the slope. Alpine thermals tend to hug the slopes, so that they are heated progressively as they rise in proximity to the warm rocks. This has two important results. First, the longer the sloping rock face from valley floor to summit, the stronger will be the thermal at the top. Secondly, the strength of the thermal will tend to increase as it rises, because the temperature difference between the heated air close to the mountain side and the valley air at the same level will increase as we go up.

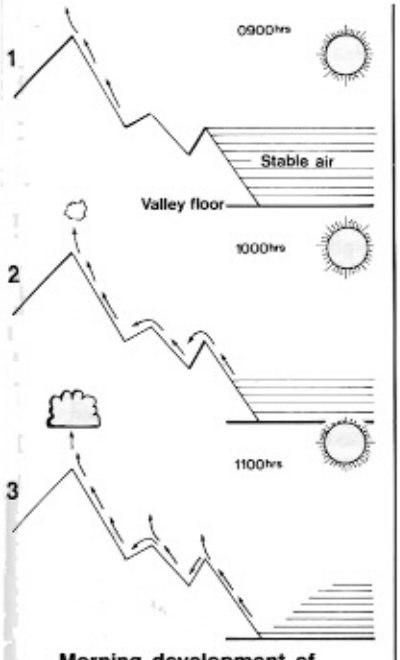
State of the airmass. All UK pilots know that air carrying mist and dust often seen over flat country in urban and industrial areas, especially in anticyclonic conditions, is very effective in reducing heating. Such air or stable maritime air from the Mediterranean or the Adriatic can be sucked in by the wind blowing up the valleys towards the high mountains. Fortunately, it can often be seen coming and can be avoided.

Percentage heat absorbed. The energy transmitted by radiation from the sun is not all stored by the surface. A significant part is reflected. Wally Wallington tells us that 40-90% will be reflected by snow, whereas only 10-15% will be reflected by darker surfaces such as wet soil or pine forest. Limestone granite and other rocks

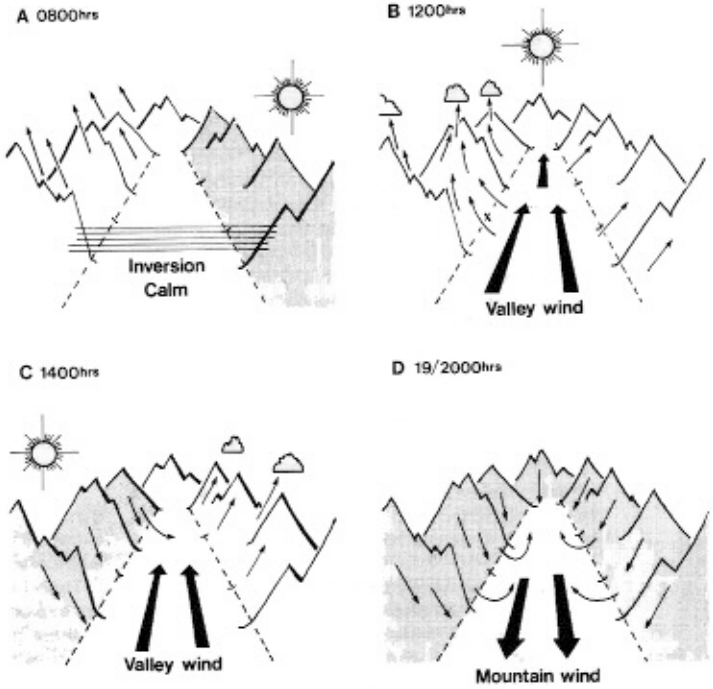
French National Centre at St Auban

- *courses last for two weeks*
- *they aim to teach mountain flying and cross-country techniques*
- *minimum requirements – 100hrs and checked out for cross-country flying by your CFI*

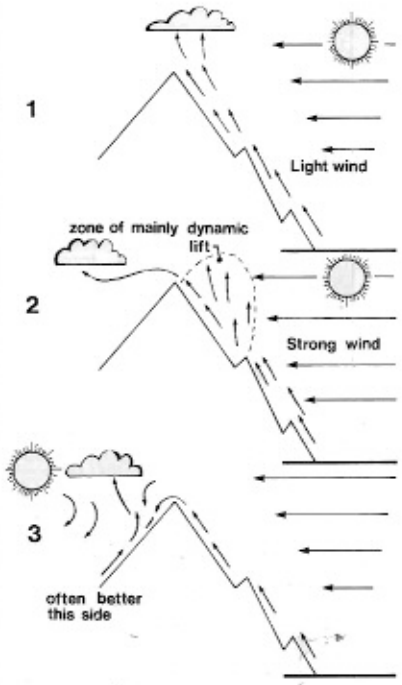
For details of dates, accommodation and charges write to the Centre National de Formation Aéronautique, 04600 St Auban sur Durance, France.



Morning development of thermodynamic lift on east facing slopes.



Valley and mountain wind circulation.



Sunny side or windy side.

found in the Alps are intermediate in this respect, with 15-30% reflected.

The high reflectivity (albedo) of snow explains partly why distance flying in the high mountains in the northerly zones is best between May and September, because during that period only the peaks higher than 2200m are snowcovered. The snowline will be higher in the southern zones and the good season longer.

Type of rock. To simplify Alpine geology, there are two categories of rock for the soaring pilot, the "good" and the "less good." The good are stratified rocks which have become distorted and eroded, often consisting of slate, shale and gneiss. They may be recognised by their gentler slopes littered with debris, their rounded peaks and enough soil cover lower down to encourage vegetation. They include certain limestones which are soft and friable, such as are found in the Dachstein near Zell-am-See and Nieder Oblarn.

The less good rocks are harder and smoother, composed of granite or hard calcareous deposits. They are recognised by their steep, bare escarpments and lack of vegetation. Typical examples are the granite mountains of Savoy, the Bernese Oberland and the imposing vertical rock face of the Dolomites.

Humidity of soil. Some Alpine slopes are covered with soil and the humidity of the soil will affect its heat capacity. The higher the humidity the better its capacity to store heat because of its improved conductivity, even allowing for some heat loss by evaporation of the water. Thermals will tend to start later over damp soil, but once started they will be more reliable, particularly during periods of cloud shadow. On the other hand, dry soil will give thermals earlier in the day.

Type of trees. Evergreens are much more favourable than deciduous trees. The logic is as follows:

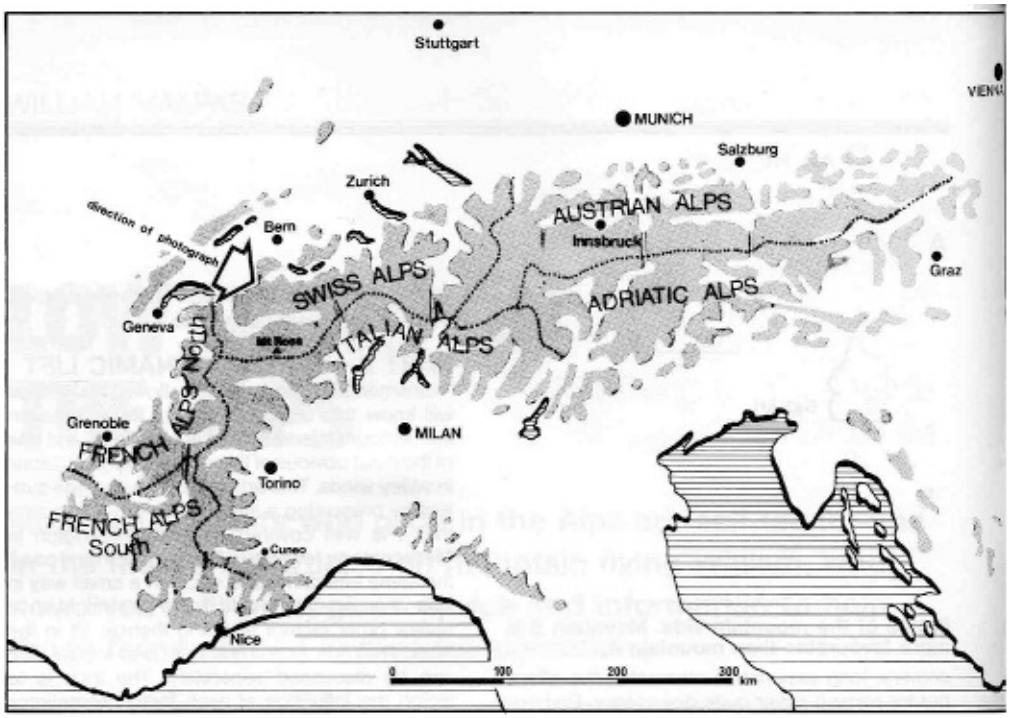
1. They are more open to the sun's rays, so the heat penetrates easily down to the soil.
2. The soil is damp and has a higher heat capacity.
3. Their albedo is less than that of the broad leaf deciduous trees.
4. There is considerably less loss of heat by evaporation of water vapour from leaves.

All this adds up to much more reliable thermal production from pine forests than from deciduous forests and when both types are working, the thermal strength will be greater over pine-covered slopes.

Tricky for a number of reasons

The southern edge of the Alps in the region of Varese is tricky for a number of reasons, including the presence of deciduous forests.

Make for the high ground, young man! How many times on the plains have we peered at the ground to determine where the higher ground lies. The same applies (in spades) in the Alps.



The area where the photograph on p66 was taken is marked on the map.

Other things being equal, the higher valleys and higher mountains will give better lift. The air is cleaner and drier, the insolation stronger, the thermals stronger and cloudbase higher over higher mountains.

Profile of the mountain side. A regular unbroken mountainside is better than one with a number of projecting ledges or other irregularities tending to push the rising air away from the mountainside. Although this "maverick" air usually rejoins the upward current close to the face higher up, it has lost time when it would otherwise have been close to the mountainside and warmed by it. This phenomenon can make a significant difference to the strength of the thermal at the top of the mountain and to the height of cloudbase.

Position of the mountain side. Quite apart from the position relative to the sun, the position of a rock face relative to the main valley system can have a substantial effect. In general, other things being equal, a face in a secondary valley will be better than one in a wide main valley. One exception would be the face well placed in a sharp bend in the main valley, and the spectacular example known to many British pilots is the magnificent face of the Eygliers standing alongside the airfield of St Crepin on the southern Alps. There the valley wind, constrained by a narrow venturi as it blows up the valley of the Durance river, hits the face of the Eygliers at right angles. Pilots can arrive at this privileged spot very low and will soon be climbing, slowly at first in what is probably mainly dynamic lift and later in strong thermodynamic lift, to 3000m. If, by some miracle, the Eygliers doesn't work, there is St Crepin to land on.

Normally, however, the faces giving directly on to the main valley will be more difficult to work low down than faces in secondary valleys, because the main valley airflow, up to heights of 1000m agl, will interfere with the heating of the rock faces and the air itself will be more stable.

Sunny side or windy side. Soaring over gently rolling country we often favour the sunny banks facing the wind. For the same reasons, in the Alps there is no problem when presented with a mountain side facing both the wind and the sun. What should we do, however, if presented with the choice between the wind on one side of the ridge and the sun on the other? The natural tendency for a pilot brought up on ridge soaring will be to go for the windy side. He will usually be mistaken – the golden rule in the Alps is to go for the sun (or if you prefer, go for the wind shadow thermal). If the wind is strong, the thermal may be very turbulent, may be detached from the slope before it reaches the top, will drift rapidly downwind and will be surrounded by heavy sink.

A word about the wind in the Alps during the afternoon of a good summer day: there are usually two – the valley wind (or anabatic wind, or *Hangaüfwinde*) which flows up the valley, operating up to heights of, say, 1000m above the valley floor; and quite separately, the gradient wind which is blowing over the tops of the mountains.

Well-reasoned choice. So far I have reviewed the principal factors in developing thermal lift in the Alps, often referred to as "thermodynamic" lift to distinguish it from purely dynamic lift (or hill lift). Thermodynamic lift is the type we use more than any other in the Alps durng the summer.

In practice decisions are often simple

The number of factors is large and their appreciation complex. Fortunately, in practice decisions are often simple. Sometimes there is only one way to go – only one mountain on our route. We must make the best use of what is there before deciding that we are high enough to press on to the next. Sometimes we stumble on lift and in gratitude concentrate on working it without wondering why it is there. However, often a clear choice must be made. A well-reasoned choice may decide whether we arrive at our destination; it will certainly make a difference in whether we get there sooner rather than later.

In another article I propose to touch on dynamic lift and wave (only briefly, because excellent English texts already exist) and on confluence and restitution in the Alps.

Then I will discuss how all these phenomena are exploited by experienced Alpine pilots. Many of them have contributed over the years to the ideas summarised in these articles, particularly Jochen von Kalckreuth to the theory and Roger Biagi to the practice.