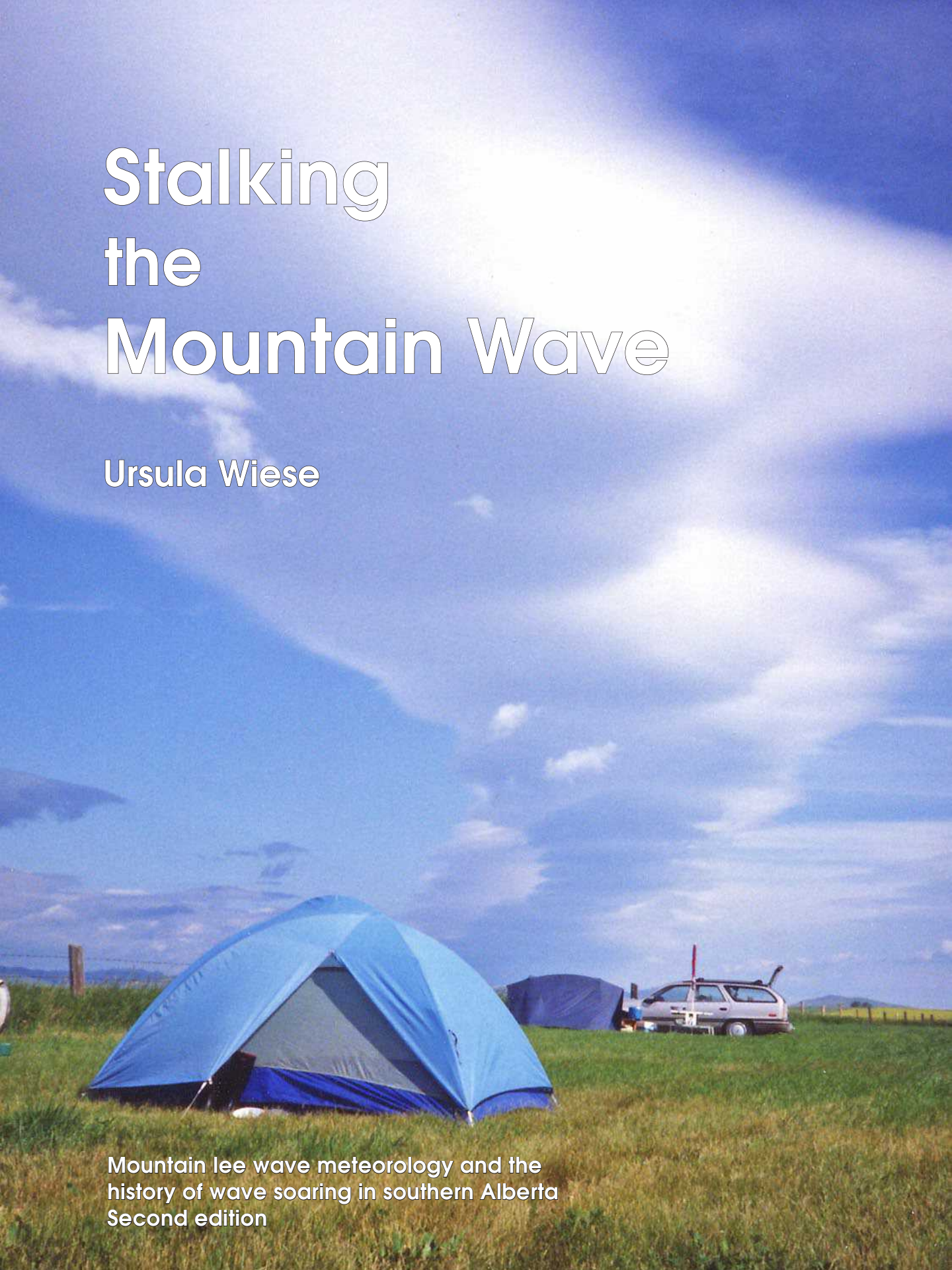
Stalking the Mountain Wave

Ursula Wiese



Mountain lee wave meteorology and the history of wave soaring in southern Alberta
Second edition

16 Nov 2020

Notes to this .pdf version of *Stalking the Mountain Wave*

As there will be no Third edition of the 1997 book (as I write, there are only two copies remaining of the 1000 that were printed), Ursula and I thought the content should not be lost to those pilots new to wave flying in general and Cowley in particular.

There are some small differences between this and the printed book – I did find some typos. The original *PageMaker* files of the book had no photographs incorporated. The "historical" photographs were no longer available so I had to scan the photos from the book pages with consequent unavoidable loss of quality regardless of the *PhotoShop* tweaking done to perk them up. Happily though, most of the "contemporary" photos remained on hand and they are now in this pdf copy in glorious colour. Photos on pages 28, 163, 179, and 217 are not identical to the originals but come from the same sequence of photos in each case and convey the same story. The pages 8/9 Livingstone Range panorama is new.

The record multiplace record flown on 6 Oct 2020 demanded that the story be added in Chapter 6, and a very good article on hypoxia that was in *Soaring* magazine is a good addition to Chapter 5 on safety. Lastly, I took the opportunity to update the Cowley Diamond climb/records list.

Enjoy the book. On screen, I recommend using 'facing pages'.

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Cover This magnificent lenticular cloud formed over the Cowley summer camp on the morning of 27 July 1991.

photo: Sylvain Larue

Dedication

A host of wives, friends, pilots, and visitors – as well as the main characters in this book, have had a hand in creating "Cowley". I wish to thank them with this book, a small contribution to honour their efforts.

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Preface

UNDER A STAR-BRIGHT SKY, when the logs glow and the northern lights dance and zing, the tales of the Great Wave come alive. There is the pilot's quest to lift its secret, the glory of achievement, the lobbying at provincial and federal governments in the name of soaring.

The revival of postwar soaring in Alberta started with the survival of a club and Alvie Cook, a rancher and farmer in Pincher Creek. Mr. Cook had his private airstrip on the outskirts of Pincher Creek, and from here pilots were invited to fly to the west to explore the mountain lee waves. These adventures were kept in a diary, *The Cook Book*. One day, the diary fell into my hands. It prompted me to compile the history, for we all ought to know of the evolution of this special airstrip and the airspace above it.

The former emergency airstrip fifteen kilometres north of the village of Cowley invited soaring pilots to land when conditions changed abruptly. Also, this little used airfield proved to be more convenient for tows into the waves. About a decade later, efforts were made to officially receive permission to fly from this federally owned airfield, which was maintained by the Province of Alberta for fire bombers. High altitude flight became normal, but airways and block airspace hindered climbs to diamond and record heights. The Ministry of Transport had to be approached for safety of glider pilot and commercial traffic.

I have used a lot of the original correspondence as witness to the facts. A lot of frustration and setbacks preceded each step to the seemingly easy success with the federal and provincial authorities. Please keep this in mind when you read the chapters.

In the eighties, the Cowley summer and fall camps seem to burst and lure hundreds of pilots to share the festivities of friendship, thermal, ridge and wave soaring. These camps are proud events of the Alberta Soaring Council, and most of the soaring tales here were written for *ASCent* (its newsletter) or *free flight* (the national journal). They attest to the glider pilot's heaven in the heart of Chinook Country.

Above all hovers the chinook arch — the *Great Wave*. This phenomenon has interested natives, laymen and scientists alike in the quest to lift its secret. Again a great wave begins to form as I think of the fine friends who have contributed to these pages. A three inch deep pile of original documents back up the historical facts. They moved out of the closets and basements of Klaus Stachow, Bruce Hea, Al Foster, Julien Audette, Harold Eley, Dick Mamini, George Dunbar, Peter Lester, Bill Riddell into my hands, along with photographs and slides. My husband Tony Burton was always around to encourage me, and he worked on the graphics, text editing and book design.

These are only a few of the soaring family, many more pilots offered ideas and helped out. Thank you all for your support and understanding — without you this book would not be in your hands today.

Ursula, 15 December 1987

Preface to the second edition

STALKING THE MOUNTAIN WAVE is back by popular demand, extending the history of Cowley and wave soaring events another ten years and adding more historical material that has come to light. The format of this edition has been enlarged, the content reorganized and a new chapter added on aeromedical matters, the design has been given a more artistic treatment, and more excellent photographs by our own pilots are included. Tony worked hard to have it done on time for the 25th Cowley summer camp. Bless his heart.

"This is not the end of the airfield story, of course. In the future it is hoped that the airport will be developed further, and there is the need for continual vigilance to ensure that the requirements of glider pilots are not overlooked by government programs. When problems need solving, a good problem solver will once again, we trust, come forward from amongst the soaring community." (from the 1st edition in 1987)

Forty years after "the small beginnings" and ten years after the first edition of this book, we can look back at an exploding development of wave knowledge by scientists and our own pilots, medical aspects with the help of our soaring doctors, ASC becoming operators of Cowley airfield, changing of airspace around us with a revisited approach to the Livingstone Block by one of our members, Bram Tilroe, who happens to be an air traffic controller, Klaus Stachow's dream of a national soaring site will become cast in bronze through the Soaring Association of Canada, and Steve Weinhold's lone dedication of a mountaintop cairn in his quest "to form a bond with these wave pioneers."

We have seen parched runways, we have waded through standing water at the flightline and got our fill of mosquito and grasshopper plagues. We have lived through heat reserved for other deserts, and cold with snow on the peaks in July. We have stood in awe of lightning all around us under menacing cumulonimbus clouds without a drop of rain falling while hail and destruction flattened ripened wheat fields on the other side of the hills.

We have had camps with a hundred pilots and their friends, and we welcome the same faces year after year — Cowley is a true Mecca to those of kindred spirit. We are part of the community around us, we have appeared on TV screens through local producers' interest and listened to fact and fancy on the radio in honour of the great Chinook. We have met poets and artists, and scientists and farmers on the way, folks from all corners of the globe. But most of all, our own enthusiastic pilots make all this happen. Safety is enshrined, but adversity is always around. We make our own merriment — there are Barry Bradley's Coyote pancakes, young Michael Morgan's bugle reveille just before the pilots' gathering on summer mornings, and Sheila Hea's feasts for the multitude. We see the grass grow again and a thousand wildflowers waving in the summer breeze. There is the Oldman Reservoir and its new landscape nestled amongst the old rocks whose description by Sid Marty was so kindly allowed to be reprinted here from his *Leaning on the Wind*. Sid lives at the foot of Centre Peak and lives, laughs, and cries with the wind. He is part of this very landscape and I'm grateful for his contribution. The geologic past is exposed in the rocks, and then comes our own tiny history of this small spot on Earth. We have come a long way — we have many miles to go.

Ursula, 15 February 1997

Doug Currie

Wave needs wind. Pincher Creek is one of the windiest places in Canada, and a pilot at Cook's field proves it!

Chapter 1

The Mountains
and their Winds

The Mountains
and their Winds

The Mountains and their Winds

The native people in southern Alberta had their own ideas about the warm winds that blew over the foothills and bare prairie between cold arctic days.

The high and smooth lenticulars invited many outdoor lovers to observe their formation and changes.

Glider pilots soared near the bare walls of the rocks to be lifted high above their peaks towards and into the stratosphere.

Scientists were challenged to understand the secret of these mountain winds.

THE SNOW EATER

Two tales from Blackfoot mythology

1

Chinook began when an Indian named Coyote took two slaves during a war and set them on each side of his house. The next morning he saw that one of his slaves had started to swell. Soon, the slave burst, destroying Coyote's house.

Coyote called on his medicine man for help. He was told the slave he captured was the West Wind. When winter came he could recapture the slave by setting a trap where he saw a bare spot on a snowy hillside. He did this and recaptured the slave. But once again the slave exploded.

This time the medicine man told Coyote he could not keep the slave. The West Wind lived in the hills. He came down when he pleased, and when he came the snow went away. If he had been killed, winter would never end.

2

One day the West Wind looked down on the earth and saw that it was covered with snow and it was so cold. He felt sorry for the people and the animals, so he asked Old Man Winter to make it warm so everyone wouldn't be so cold. But Old Man Winter refused and they started fighting.

West Wind started shooting arrows into the sky and was winning, so then it warmed up on earth and everything started melting. Old Man Winter then tried harder and he would start to win, and everything would turn cold and freeze again.

This kept on for some time, then West Wind finally won and that is when spring came. So from that time on every year during the winter we always have Chinooks.

The Creator Wind

Sid Marty*

OVER THE CASTELLATED CREST of the Rocky Mountains, the sky is a blue ribbon, its bottom sawtoothed with limestone ridges and towers; its upper band formed of a bow in the clouds, the bow curved as the planet, stretching from Peace River in northern Alberta some 680 miles to Sun River, Montana, stretching on to Denver. The arch is so sharply delineated for miles at a time that it gives the cloud a solidity it cannot possibly possess, as if this curved border were carved out of ivory instead of vapour.

This is the Chinook Arch, the totem of a famous transformer, a warm Pacific wind that brings temporary spring in the midst of winter to the high border country of Alberta and Montana, the western edge of the ancient Buffalo Ground.

Meteorologists classify this region as "part of the northern cool temperate belt", though there is nothing "temperate" about our climate that I can see.

Cresting the mountains at 10,000 to 14,000 feet and higher, on average the wind strikes forty-five or more days each winter on the foothills and prairie that lie at the mountain foot from Pincher Creek, Alberta south to Livingston, Montana, the area known to Montana meteorologists as the Northern Chinook Zone. The chinook zone stretches eastward from the mountain foot to an invisible boundary varying in width from approximately 180 to 240 miles. Where I live *[at the foot of Centre Peak of the Livingstone Range]*, we expect winds of 60 mph or higher at least once a month from November to February. And these winds mostly bring a whiteout of blowing, thawing snow, not a blackout of blowing dirt.

Environment Canada has clocked the chinook at Pincher Creek, Alberta, at 84.9 mph (136.6 km/h) and the maximum gust at 109.7 mph (176.5 km/h). Nobody who has lived in the Pincher Creek area (including this writer) believes those records either. They are too low. The wind in the nearby Crowsnest Pass, the wind tunnel of Canada, was once clocked at 135 mph (217 km/h) by the staff of the old Saratoga gas plant.

Despite its tropical effect on the Chinook Country psyche, the wind owes its origin to a low pressure system occurring off the Gulf of Alaska and a low pressure zone east of the Rockies. A cyclonic (counterclockwise) motion of air around the Alaska low eventually drives the southwest wind into Montana and Alberta. The Montana chinook expert Warren Harding, a former weather observer in Alaska, once told me that the Alaska low "throws off wind like a big wheel throwing off mud." Eventually this moist Pacific air begins rising up the west slope of the Coast Ranges. "By definition", Harding explained, "when a surface and upper ridge of high pressure approaches a mountain range, the lee side trough will start to form — that is, the pressure starts to fall on the east slope."

Air flows from areas of high pressure to areas of low pressure. The air rises and partially subsides several times, lifted orographically by the interior mountain ranges of the north-

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west before it rises for the final time up the west slope of the Rockies. The cooling effect as it rises causes a loss of moisture (water vapour) to precipitation when the dew point is reached, and that is why most of the precipitation will fall on the west side of the Rocky Mountains. (This is also why the eastern plain, in the "rain shadow" of the mountains, are so arid). The cooling effect of altitude rise is much greater in drier air, but in this wet air, the cooling is tempered by the principle of the latent heat of condensation. That is because energy from the sun (heat) was originally stored in the water vapour contained within that rising air. The air, drier now, subsides on the eastern side of the mountains, drawn into the trough of low pressure. As it plunges down, it is warmed further through compression, like the air in a bicycle pump. Since the air is drier, it gains heat at the dry adiabatic lapse rate of 5.5°F (3°C) per 1000 feet. There is a dramatic net gain in temperature from the windward to the leeward side of the Rockies *[due to the loss of moisture from the air]*.

Meanwhile, on the east side of the mountains, the snow covered plains, all unsuspecting of these physical forces, may be gripped by temperatures that are well below zero. So the warm air descends on this cold air mass like warm water on an ice cube. The variation between wind and surface temperatures accounts for the wild temperature swings during chinook conditions. There can be an eerie precision about the contact zone between chinook air and arctic air.

When Chinook comes calling, it brings a desert thirst along. It could vacuum the milk from a cow's udder, drink the coffee from your cup, suck the alcohol out of your shoe polish. This is not only a winter phenomenon. Although it is known as the Snow Eater, the chinook wind blows both winter and summer, and dries up the soil in both seasons.

Early explorers noted the phenomenon in their journals. Alexander Mackenzie of the North West Company was the first white man to cross the continent and reach the Pacific. On 29 December 1792, while wintering at Fort Fork on the Peace River, he notes, "the wind being at North-East, and the weather being cold and cloudy, a rumbling noise was heard in the air like distant thunder, when the sky cleared away in the South-West; from whence there blew a perfect hurricane, which lasted till eight. Soon after it commenced, the atmosphere became so warm that it dissolved all the snow on the ground; even the ice was covered with water, and had the same appearance as when it is breaking up in the spring. From eight to nine the weather became calm, but immediately after a wind arose from the North-East with equal violence, with clouds, rain, and hail, which continued through the night and till the evening of the next day, when it turned to snow."

What Mackenzie described in 1792 is the very same battle of winds, the same arid climatic conditions that Albertans are familiar with today.

This is not only a winter phenomenon. Although it is also known as the Snow Eater, the chinook wind blows both winter and summer, and it dries up the soil in both seasons. Everywhere you look in Chinook Country, you will see the marks of the wind upon the earth. It is there in the permanent lean of the aspen groves, those white tree trunks all leaning northward as living windvanes indicating the prevailing southwest winds. It is there as a current of energy wavering through the grain fields and through the sweep of remaining prairie grass. The wind keeps aspens, willows and rose bushes penned up in hollows behind the little

drumlin hills left behind by the Great Ice. Those that try to root themselves in the open it attacks, blasting the leaves with flung dirt, tearing off the new leaves. It will thaw out the roots in midwinter so the sap begins to run. Then the frost comes back with an arctic cold front, freezing the tender buds, injuring the roots and sometime killing the tree. Acres of conifers in Waterton National Park have had their green needles turned to a ruddy orange by this windburn. Trees killed by this process in winter are standing tinder for a summer lightning strike; the west wind waits to fan the strike into a forest fire.

No one knows how old the chinook is, but since it is a mountain wind, formed from air moving over an incline, it must have been conjured up from the sea when the mountains rose from the highlands ... The creative power of this wind as a transformer of landscapes. A geographer, Ronald L. Ives, ... writing in *Annals of the Association of American Geographers* (1950), suggested that the chinook wind, combined with the rain shadow effect of the mountains, created an ice-free corridor between the continental and cordilleran glaciers.

Looking at the distribution of loess (glacial silt) across the plains, and examining the fretting of rocks by the wind, Ives concluded, "Wind motion during much of the Pleistocene was in the same general direction as wind motion today." He found further evidence of ancient chinook winds in the patterns of ancient glaciation on the windward and leeward side of the mountains, patterns still found today, and consistent with chinook wind and rain shadow effects ...

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HOW DID THE OCEAN get up in the sky? The front ranges of the Rocky Mountains are known to Montanans and Albertans as "The East Slope". The first fur traders to set eyes upon them called them "the Shining Mountains"; the Blackfoot, in possession of this region before the Europeans arrived, called these mountains "the Backbone of the Earth". This rocky backbone joins together three countries on one continent.

The Rocky Mountains are sedimentary in structure, something that is obvious at first glance, because the rock is stratified, layered like wedding cake, the different strata are readily distinguished by the naked eye even at several miles' distance. These layers of sediments were deposited in vanished oceans, or in immense brackish swamps and freshwater lakes. Then, as now, the wind acted as a primal shifter of soil, scooping it up in one place and depositing it in aeolian dunes somewhere else. Much of the sediment came from the erosion of earlier land forms, the detritus eventually metamorphosing into mudstone, sandstone and shale.

What raised it up, from 70 to 55 million years ago, was tectonic activity in the earth's crust. According to one theory, mountain building here is a result of a collision between the North American plate and the Pacific plate. As the Pacific plate was driven inexorably under the North American plate, the west coast and adjacent plains of North America were uplifted in a wide highland. Eventually, vast amounts of molten magma, triggered originally by the collision of the plates, rose up through heavier formations nearer the surface and further raised the highland. Under tremendous pressure, upper sedimentary layers broke away downslope, and an entire skyline from British Columbia to California

answered ponderously to the call of gravity.

The front ranges of the Rockies were displaced along faults (fractures that allow masses of rock to slide past each other), such as the great Lewis Overthrust of Montana and Alberta. In some cases mountains are said to have moved as much as fifty miles east of the location where their sediments were first laid down. Older formations of limestone were pushed over younger sandstones to create bizarre rock sandwiches, reversed chronologies.

The foothills were formed at the same time under the same impetus, and being less lofty, reflect where the force subsided. Mountains and foothills form long ridges parallel with each other, running northwest and southeast. Topographically, the effect (to speak very generally) has been compared to shingles on a roof. From the Great Divide, the roof slopes gradually downward to the northeast. The butt ends of the shingles are the steeper east faces of the mountain ranges, such as the Livingstone Range and higher foothills; the formations subside eastward into the first prairie steppe, the western Alberta plains. The slope is hardly noticeable as one reaches the eastern plains, which lie at altitudes of 2000 to 3000 feet. In reality, deep valleys, containing streams and rivers such as the Columbia, run along those cordilleran faces. A few of the rivers, such as the Bow, the Oldman, Marias and Yellowstone, cut across the mountains at right angles to debouch on the plains.

The late R.J.W. Douglas (of the Geological Survey of Canada) shows how that older Paleozoic rock, riding upward along the Livingstone fault, has been pushed over the top of the younger formations of the Mesozoic, causing Mesozoic strata to the east to be pressurized and warped. Down on the Oldman River bottom not far to the north, I have seen convoluted writhings and foldings in the canyon walls so intense that both syncline and anticline may ripple through the strata within the length of a yard. This type of chronological displacement is what led geologists to label our region "the disturbed belt"...

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APPARENTLY it was a Euro-white who affixed an Indian name on this wind. The Chinook people, namesakes of the wind, dwelt in fur trade days near the mouth of the Columbia River. The name was said to have originated as a joke made about 1840 by a Mr. Birnie, a Hudson's Bay factor in Oregon. A warm northwest wind used to blow toward his fort from the camps of the Chinook Indians between Fort Ellice and Cape Disappointment. He called this wind "the chinook", and it is possible that the name arose not only from the warmth of the wind, but from its perfume, because the Chinook villages were fishing villages.

The tribes living in Chinook Country had their own names for the wind. To the North Peigan, for example, it was *`aisiksop`u*, the oily wind, though according to two white authors who lived with the Peigan in early Montana, it was known there as the "black wind". Either description seems credible: the wind first turned the ground greasy with mud and slush, but might later turn the air black with dust. The Peigan or Piikani, my closest Indian neighbours, seemed to attribute the wind to the work of the Blackfoot trickster/creator figure Napi, or Old Man. The expression was *Napiua aisiksopumstau* — "the Old Man makes the oily wind".

The creation of mountain lee waves

Tony Burton

AS WELL AS CAUSING CHINOOK WINDS, a strong transverse airflow over the Rocky Mountain ranges can create an organized flow pattern of waves and large scale eddies with strong updrafts and downdrafts associated with severe turbulence. Heat is gained through contraction due to increased air pressure. In very dry atmospheric conditions little or no clouds may be formed. The formation of mountain lee waves depends on several factors: the wind should be blowing from a direction within 60 to 90 degrees of a substantial ridge; its strength must increase with height and change little in direction (strong mountain waves are often associated with jet stream); a wind speed greater than 25 knots at the ridge crest is usually necessary and; lastly, there should be a marked stable layer, either isothermal or an inversion, with less stable air above and below, between the crest level and a few thousand feet above it.

The average (lee) wavelength in the troposphere is about ten kilometres, but much longer wavelengths do occur, for example the chinook arch. The wave amplitude is much harder to determine from meteorological observations. In general, the higher the mountain barrier and the stronger the wind, the greater is the resulting disturbance. But the most severe conditions occur when the natural frequency of the waves is tuned to the ground profile and conditions for wave motion are only just satisfied. This makes the prediction of wave amplitude uncertain.

Lenticular clouds provide the most unmistakable evidence of the presence of mountain lee waves. They form on the crests of standing waves. The air streams through them, with the clouds forming at their upwind edges and dissipating downwind. They may appear at several levels, sometimes resulting in what looks like a stack of inverted saucers. Lenticular clouds usually appear a few thousand feet above the mountain crests, but are also seen at any level up to the tropopause and even above.

Rotor or roll clouds at first glance appear to be harmless bands of ragged cumulus or stratocumulus parallel to and downwind of the ridge. On close inspection they are seen to be rotating about a horizontal axis. These rotor clouds are produced by the local breakdown of the flow into violent turbulence. They occur under the crests of strong waves beneath the stable layers associated with the waves. The strongest rotor normally forms in the first (or primary) wave downwind of the ridge and is, therefore, usually near or just above the level of the ridge crest. Cap clouds form on the ridge crest and strong surface winds, commonly found sweeping down the lee slopes, may extend them down the slope producing a cloud "waterfall", or "föhn wall".

Lenticular, rotor and cap clouds are not always visible, as the air may be too dry for them to form, even in strong wind conditions. Rotors give rise to the most severe turbulence to be found in the airflow over high ground. Sailplanes flying in rotor zones can experience accelerations of 2g to 4g, and occasionally higher. Flight in strong waves can

Margaret Simon

vary from smooth to severely turbulent, and the transition from smooth to bumpy flight can be abrupt, and sometimes violent.

Turbulence near jet streams is often greatly increased, both in extent and intensity. Strong vertical wind shears are often concentrated in a few stable layers just above and below the core of the jet stream. Distortion of these layers when the jet stream flows over high ground can produce a local breakdown of the airflow into turbulence. Usually, the cold side of a jet stream is more prone to turbulence, but mountain waves may be more pronounced on the warm side.

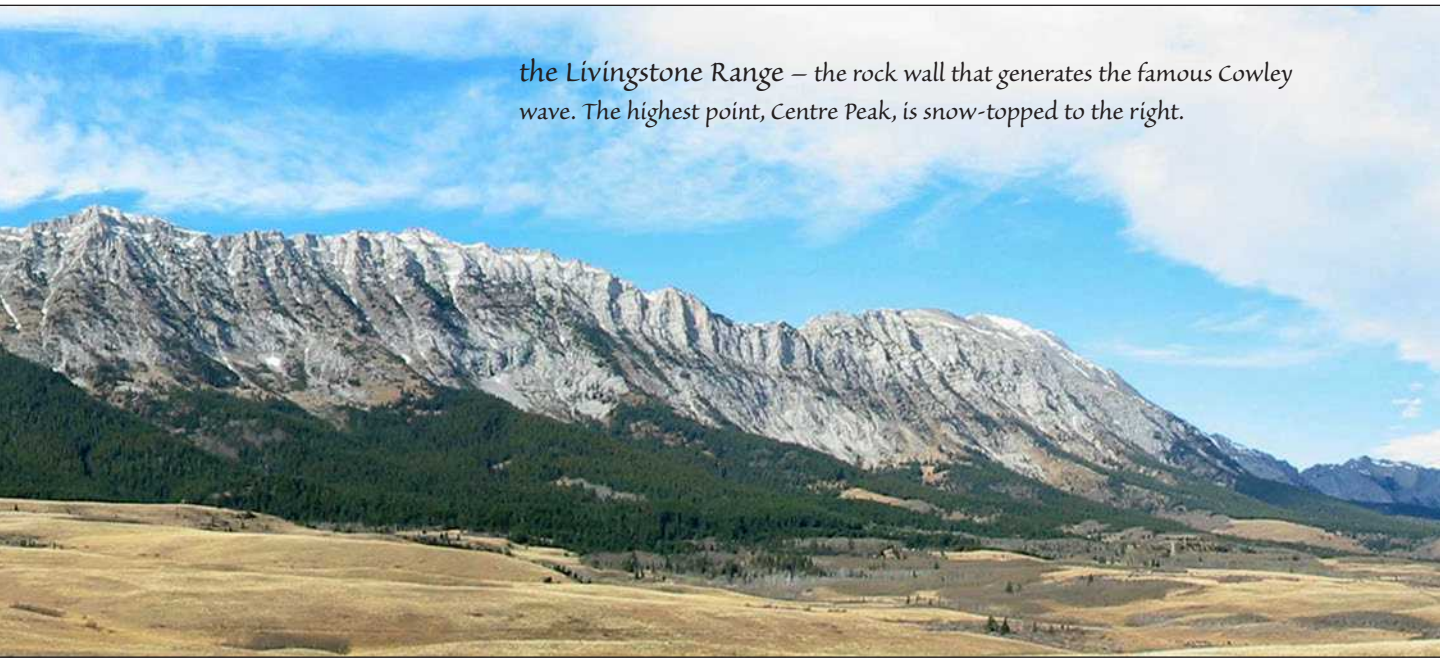
These conditions, common in southwestern Alberta, are the soaring pilot's delight.

Cowley — the heart of Chinook Country

Garnet Thomas & Tony Burton

THE TERRAIN of Chinook Country is magnificent, with a varied pattern of rocky peaks and striped grain fields. The Livingstone Range rises as a long, 4000 foot high sedimentary rock wall, fifteen kilometres west of the Cowley airfield. It stretches from the Crowsnest Pass, near the United States border at its southern end, eighteen miles north in an almost unbroken line up to the Oldman River Gap. This is the great wave generator, marked by 8364 foot Centre Peak in, naturally, the middle.

Two miles east of the field stand the old preglacial remnants of Alberta's former hillier contours, known as the Porcupine Hills. These knobbly mounds, pine studded on top, rise



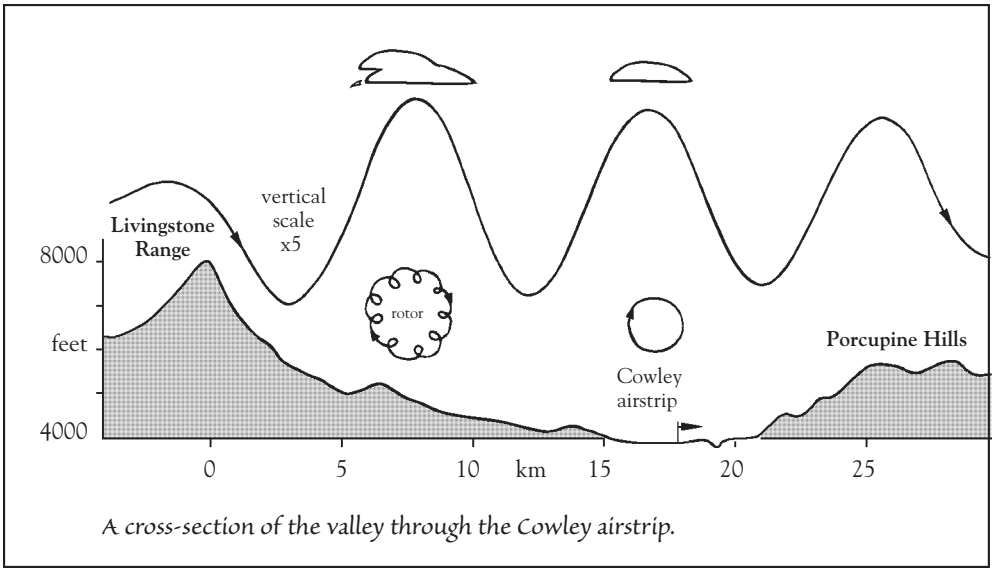
the Livingstone Range – the rock wall that generates the famous Cowley wave. The highest point, Centre Peak, is snow-topped to the right.

about 2000 feet above the field and parallel the Rockies. A wide and relatively flat valley at 4000 feet elevation lies between the mountains and the hills.

Cowley airfield is towards the south end of the valley and the prevailing westerlies blow over the Livingstone Range and create tremendous standing mountain lee waves. These are often marked with lenticular clouds, surfing over the arid land eastwards, their white ridges marking precisely each wave crest. The famous chinook arch is born over the Continental Divide and can stretch from horizon to horizon above the mountain chain, and extend downwind a hundred kilometres.

When flying at 20 to 30,000 feet, one realizes how abrupt the demarcation is between prairie and mountains. To the west, as far as one can see, lies chain after chain of mountain peaks, while to the east the prairie seemingly stretches away to infinity. The normal length of the Cowley wave places the tertiary wave above the Porcupine Hills. These hills seem to strengthen the secondary which will lie a couple of kilometres upwind of the airfield. The tow to the secondary from the Cowley airfield is therefore short with a forgiving and easily avoidable rotor. Because the field is so close, it is safe to release at a low altitude, 2000 feet above ground is not uncommon. Transitioning to the primary is straightforward, especially if one diverts to either end of the ridge where the wave diminishes.

There can be a much more severe rotor under the primary wave which may be influenced by small foothills right in the lee of the Livingstone Range. It is possible that these hills contribute to a separation of the airflow coming down the mountain slope, magnifying the turbulence under the primary. In any case, a 4000 foot tow to 8000 feet asl is necessary for safety, and it may be very difficult for the towplane to negotiate the rotor at all in strong wave conditions.



A cross-section of the valley through the Cowley airstrip.

Although the topography of the valley is well suited to the formation of three waves as shown in the diagram, if the upper winds are very strong the wavelength is longer and only two waves will form. If the airmass is too unstable, strong winds will just fill the valley with mechanical turbulence which produces exciting tows and an education in piloting and circuit flying. When the secondary is well-formed, access to the wave is generally non-turbulent and straightforward with a 2000 foot or lower tow just to the west of the airstrip. Sometimes the wave descends quite close to the ground and the secondary wave can be contacted at less than a 1000 feet. With no clean secondary at tow heights, a 4000 foot tow to the primary is made. To avoid the strongest part of the rotor, the tow generally proceeds straight west towards the lower southern end of the Range and, when abeam the rotor clouds, turns northwest towards Centre Peak until in the wave over the foothills.

Pilots in lower performance sailplanes must not lose the wave at the point of release or they will very quickly lose height in the rotor. Almost every wave camp has some pilots landing out in fields below the Range because they have not pushed far enough westward into the wave on release and have lost it. The airmass is usually dry, which helps keep canopies clear, and often the wave may not be marked by any lenticulars at all. There are no problems of wave "windows" closing in, and the visibility is generally superb.

The frequency of wave at Cowley

Tony Burton

IN 1976, Dr. Peter Lester, then working at the University of Calgary in the Kananaskis Environmental Centre, published a meteorological paper which gave a statistical analysis of twelve years of daylight wave cloud observations taken at the Pincher Creek weather sta-

tion. This data was collected by the weather station at the instigation of Julien Audette, a prominent soaring pilot from Regina, who anticipated that wave soaring prospects could be enhanced by a better knowledge of the occurrence of wave cloud over time. During the data collection program, observed wave cloud hours, total wave cloud hours, and the dominant wave cloud type were tabulated.

The local terrain is characterized by a major change in the orientation of the Continental Divide at the Crowsnest Pass, west of Pincher Creek. The mountains are oriented the normal northwest-southeast direction south of the Pass but north-south to the north of the Pass for some seventy kilometres. This feature, together with generally lower terrain along Highway 3, lead to a high frequency of very strong winds from the WSW and W directions out of the mountains. The wind summary for Pincher Creek is presented in the table on the next page, and it shows that the highest frequency of winds from these directions are found in February (63%) and October (69%).

Lester found that wave cloud was observed on an average of more than 141 days a year. This is a conservative number on actual mountain wave occurrence since observations were not taken at night and wave can exist with no wave cloud present.

Wave clouds may occur in any month, with a distinct maximum during the cooler months and a minimum in the summer. The more stable airmasses and stronger winds aloft in the cooler months are more favourable for lee waves, and October is by far the most favourable month. Not only does it have the highest frequency of occurrences of wave days (exceeding 50%), but it also shows the greatest number of consecutive wave days, the least number of consecutive non-wave days and the greatest number of wave cloud hours per wave day. The fall maximum is usually followed by secondary maximum in February. The same October/February maxima are also seen in the occurrence of strong westerly surface winds (see table).

The data showed that even the July/August minima of wave occurrence was still at about 30%, and this matches the average of three wave days out of ten often seen during the Cowley summer camps.

Although winter wave days had a greater period of wave hours than summer wave days, durations tended to be either quite long or short on a given day. Evidently this was the effect of the presence of synoptic disturbances in the winter which tended to mask any diurnal effects. Thus the waves would persist for nearly the entire day. In the summer, synoptic effects were weak and wave durations always tended to be short for any wave day.

In an average year, the probability of occurrence of a wave day decreases to less than 30% by July. Although this value may be small by Pincher Creek standards, it still implies that wave clouds will be observed every third or fourth day on average. Year to year variability is large. March and June are particularly variable months and may occasionally produce several long periods of extensive wave or non-wave activity. This behaviour is understandable since March is a springtime transition month. During June the synoptic storm track moves northward across the latitude of Pincher Creek, usually bringing the maximum precipitation for the year. As disturbances move in from the west, lee wave conditions occur with the intensification of the upper westerlies. Year to year variations depend on the exact location of the storm track and the speeds and intensities of the storms.

Wind Summary for Pincher Creek, Alberta
1961 – 1966 (Department of Transport, 1968)

Percentage frequency

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
N	*	*	1	1	1	1	1	1	1	*	*	*	1
NNE	*	1	1	1	2	1	1	1	1	*	*	*	1
NE	2	2	3	2	3	2	3	2	3	1	1	1	2
ENE	2	2	2	2	3	2	2	2	2	1	1	1	2
E	6	5	6	5	4	2	4	3	3	2	5	4	4
ESE	5	4	4	2	3	2	2	2	2	1	4	3	2
SE	3	2	3	3	3	3	3	2	3	2	3	4	3
SSE	1	1	1	2	2	2	2	1	1	1	1	1	1
S	1	1	3	3	2	2	3	2	2	2	2	2	2
SSW	1	1	1	2	2	2	2	2	2	1	1	1	1
SW	4	5	6	7	8	8	10	8	8	7	6	4	7
WSW	17	21	20	25	20	23	19	20	21	26	19	17	21
W	42	42	32	28	28	29	28	34	30	43	38	41	34
WNW	7	4	5	5	6	8	7	8	6	6	6	7	6
NW	1	1	1	2	3	3	2	2	2	1	1	1	2
NNW	*	*	1	1	2	1	1	*	1	*	*	*	1
CALM	8	8	10	9	8	9	10	10	12	6	12	13	9

Average wind speed in kilometres per hour (rounded)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
N	10	14	14	17	12	12	10	13	12	10	8	8	12
NNE	15	19	18	13	16	19	15	12	13	10	9	10	14
NE	12	11	13	13	12	12	10	11	11	9	14	10	11
ENE	12	13	13	11	12	12	11	10	11	12	13	11	12
E	10	10	10	10	10	9	9	9	9	10	10	9	10
ESE	11	11	10	10	11	12	10	11	8	10	10	10	10
SE	10	10	9	9	10	10	10	10	9	9	9	10	10
SSE	12	11	11	11	11	12	11	9	10	10	10	10	11
S	9	9	12	12	11	11	10	10	9	9	9	11	10
SSW	13	11	12	13	13	12	13	13	11	11	13	12	12
SW	22	18	18	17	19	16	16	17	16	20	20	20	18
WSW	38	37	30	32	28	26	22	25	26	33	32	36	30
W	38	35	28	27	25	23	21	22	24	31	31	34	28
WNW	21	19	16	15	15	16	16	14	15	18	19	22	17
NW	14	10	11	11	13	13	10	10	12	11	12	16	12
NNW	11	13	13	13	16	13	11	11	16	11	13	15	13

All directions

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
27	27	20	20	19	18	16	17	17	25	22	24	21

Maximum observed hourly speed — 137 km/h
Maximum observed gust speed — 177 km/h

Ground observations of the Chinook Arch

Norm Bruce

This article, which appeared in the June 1956 issue of free flight magazine, is interesting in its historical context, as these observations of the chinook arch were made just before pilots began wave soaring in southern Alberta.

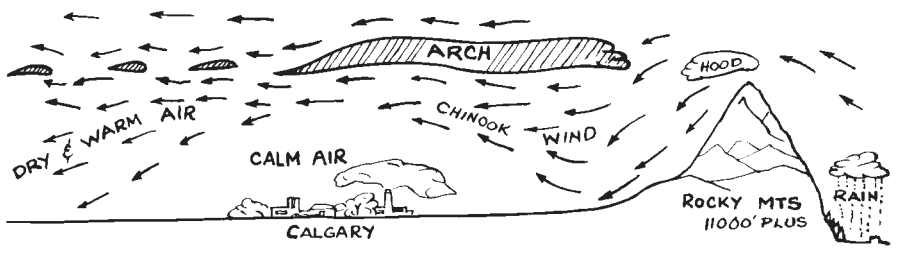
THE STUDY OF THE CHINOOK ARCH, coupled with its varied wave conditions, has a superb fascination. The observation and interpretation of cloud movements and formations requires unlimited time and patience from the observer. Thousands of western Canadians, who casually glance upward at the phenomenal arch, know that warm conditions are prevailing overhead, and that warm Pacific air is being fed into the void as the cold system moves out. Similar conditions exist in all countries where sea air masses pass over a mountain range. In western Canada, this wind is called the Chinook; in southwestern USA the Sierra Wave; in England the Helm; in Germany the Föhn.

Diagram 1 shows a cross section of our western topography, indicating the movement of warm air masses from the Pacific as they flow eastward across the Canadian Rockies. As the warm air moves upward to cross the high mountain range, much of its moisture is released in precipitation on the western slopes. The wind passes over the 11,000 foot peaks and begins to tumble, sometimes with great velocity, down the lee side. This is the entry of the warm chinook.

A great cloud pack hovers over the mountain range hour after hour like a low hood *[this is the cap cloud]*. Sometimes it is barely visible from Calgary, and its line often is mistaken for the peaks of the Rockies. More usually, the hood stretches for miles like a great canopy. Its edges may be firm, rounded and of gentle appearance. The hood may caress the peaks, or it may float in stationary majesty hundred of feet above them. The hood is almost always present when the chinook is blowing, being associated with the system.

Leaving the hood behind, the air mass continues to tumble down the mountainside and, during stable conditions, rebounds sharply upward for thousands of feet to the condensation level, where the chinook arch is born. This is simply a stationary cloud, so called because its frontal edge appears as an arch to an observer standing well back under the

Diagram 1



cloud. This great arch may extend for eighty miles, covering the whole of the sky to the eastern horizon, and may be of such great density that the sun is entirely obscured and only the diffusion of light rays give the earth a strange dullness under the vast cloud bank.

The chinook arch, like a great master, is versatile in its performance. It can blanket the entire sky, or it can dissipate, leaving only a single ribbon cloud, or a primary arch with several secondary arches, letting through the warm bright sunshine. The series of arches are, in fact, lenticulars. The blanket arch is often wavy in section, appearing as a series of joined lenticulars.

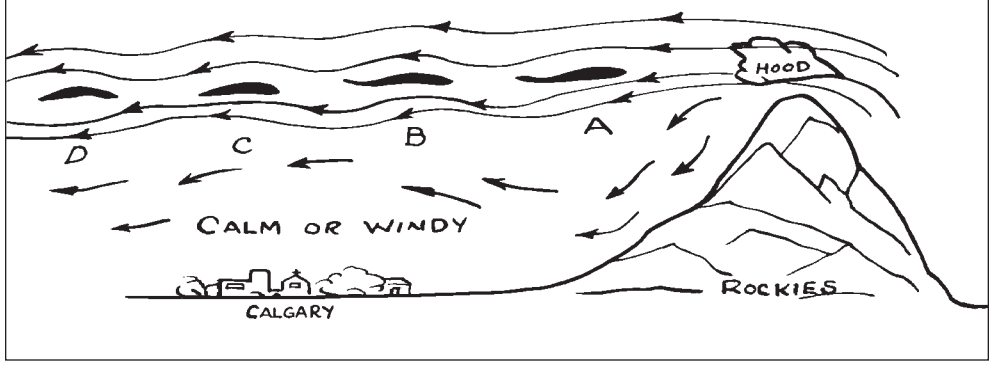
To the uninitiated, the blanket arch appears to be flat, dull and at no great height. In reality, its base may range from 8000 to 20,000 feet. The ribbon arch, however, can be found at levels far exceeding the 20,000 foot mark. The terms "blanket arch" and "ribbon arch" have been introduced to differentiate between the two conditions.

The blanket arch is usually found at much lower levels than the ribbon arch, and has a direct bearing on wave soaring conditions. Since the blanket arch may form a 10/10 cover, the glider pilot, once having reached the undulating waves, could become hopelessly lost, with no ground in sight at any time.

The ribbon arch, on the other hand, is simply a single long, narrow lenticular running parallel to the mountains, or a series of such lenticulars. Ribbon arches have the sectional shape of an airfoil and may vary in density, sometimes appearing as though formed of translucent crystals. The first ribbon arch of a series may be at any location from the western to the eastern horizon. The arches may be ranged in a series of parallel lines (A, B, C, D in Diagram 2) or a single ribbon arch may appear alone. All these combinations may be supplemented by cumulus, cumulonimbus and the whole cirrus family. This is particularly noticeable when a pressure system is moving in.

John Neilan, the well known British sailplane pilot and test pilot for Blackburn Aircraft, once told me how he and a fellow pilot maneuvered to the top of such a wave system in England. He flew on wave "A" of Diagram 2 while the other pilot remained over the wave "B". They were in sight of one another, flying in brilliant sunshine. No attempt was made for one to join the other, John said, due to the downcurrents between the waves; they had no intention of losing the experience that was theirs. John told how he did rolls,

Diagram 2



inverted flying, stalls, the whole bag of tricks. He claimed the lift was so strong and smooth that even a novice would have had little difficulty staying in it.

There is no definite pattern as to where the first wave may show. It varies from day to day, and will often shift in lazy fashion from ten miles back of the mountains to the eastern horizon. The chinook air mass, after rebounding, passes high over Calgary. Under the wave, Calgary experiences a calm and almost soothing atmosphere.

At Pincher Creek, and east of a line running north and south of Calgary, the chinook, at the bottom of its trough, is felt on the ground at velocities up to 70 mph. In Calgary's doldrums, however, the housewife who has her washing out to dry may be perturbed at the poor drying day. Such a day is also a great handicap to the glider pilot, who finds all his flights lacking the assistance of thermals. All he gets for his persistence is a long glide back to his trailer.

Nevertheless, there is a happier side. Another group of pilots, located either east or west of the doldrums, have the whole sky for a playground with the waves in their favour. In my opinion, the best soaring conditions exist near the mountains. Further east, these conditions appear again, but may be less intense. Cloud formations I have observed to the east indicate good soaring possibilities. The frequency is so varied that any pilot who can take an air tow may release in the wave system anywhere.

No charting of these areas has yet been done. All western pilots are grooming their sailplanes for use closer to the mountains, particularly in the Pincher Creek area. At least one good base for operations will be proved this summer... *[This is a reference to the Cu Nim Gliding Club flying from Cook's airstrip.]*

I had the good fortune to attend a lecture by a professor from Edmonton University, whose research into the magnitude of the chinook air stream was made by taking observations during flights in a Tiger Moth. At points west and southwest of Edmonton, he encountered the chinook stream with its great waves and high wind velocities. After weeks of observation, his last research attempt came to a sudden halt when he was forced to land miles out in deep snow.

It is the professor's theory that the arch is formed by an air stream that can be picked up by a glider pilot in the Calgary area at ten thousand feet or more. At this height, the glider pilot would be in the main chinook stream and could reach altitudes of thirty thousand feet and over.

Apparently, primary and secondary streams exist. I have seen as many as three chinook arches, each on different planes; the top wave with an arch, or lenticular, formed of ice crystals due to its tremendous height. The lowest arch was full bodied and all were arranged in steps, each overlapping the other, with the top one leading. The difference in height between the lowest and the uppermost lenticular would be between 20 and 25,000 feet.

During the summer of 1952, a ribbon-shaped arch formed close to the mountain range southwest of Calgary. I expected it to grow in length, width and breadth, to retreat eastward and to settle with its front directly over my observation point. To my amazement, this ribbon arch moved at terrific speed across the sky in a north by northeasterly direction. Arriving overhead, it began to fade, whereupon a second ribbon arch formed in the starting

place of the first. This raced along exactly as the first had done, and the whole procedure was repeated several times.

My boss, an outdoor man, took intense interest in this race of the arches and, with protractor and rule, we made a crude reading, calculating the speed of the arch at 50 to 55 mph over a distance of about 50 miles. At this time, ground wind was zero. My theory is that the ribbon arch formed on a wave crest possibly at 30,000 feet, but due to high wind velocities, it released from the invisible wave in much the same manner as whitecaps seen at sea or on a lake during windy days. The arch could have been formed from ice crystals, travelling downwind at a tremendous height for 50 miles before fading out. The highest upper wind velocity ever recorded was 186 mph at 24,000 feet over Lansing, Michigan. Our crude estimate seems to be within reason....

Checking through my five year sheaf of notes on arch system observations, it has been difficult to select examples ranging through the seasons. Instead, I have chosen several interesting cases that will prove more entertaining than cold facts. Some of these are supplemented by diagrams and by my own forecasts.

Chinook conditions, it should be pointed out, may occur during any month of the year and are not just winter phenomena, as many believe. However, the finest chinook arches are to be seen during fall and spring, or I should say, they seem to appear more often in their majestic beauty, possibly due to the position of the sun in relation to the cloud base at sunrise and sunset. The sun's rays can set into bold relief a cloud which, a few moments before, had been misty and barely visible.

December 29, 1950

0700 hours The sky was clear with a three-quarter moon. At 0745, the mountains could be dimly seen in the half light. The morning was clear. A cloud bank on the eastern horizon extended around to the north. An inversion at 100 feet was made evident by the smoke pall from Imperial Oil. The wind was from the west at 2 to 3 mph; temperature mild.

0820 The hood can now be seen over the mountains, white against a blue background. As the sun comes up, hazy orange clouds develop.

0945 Mist is showing to north and south. A high cirrus is now building. Its front is at ten degrees to the west. To the south and west, the arch is forming.

1100 The arch has taken the shape of a narrow ribbon from north to south. The mountains are hidden in haze. The arch is very low, and cirrus may be seen through the gap between the arch front and the mountains.

1200 The ribbon arch has grown, widening till its tail is almost overhead. It is still very low. The mountains are once again visible, with the hood resembling storm clouds. Standing waves appear to the south and to the northwest. To the south and very high,

cirrus is forming into a high arch. The inversion is still quite pronounced, as shown by smoke layers to the north.

1230 Due west, clouds tower darkly and, in front of them, scud and long rollers are forming. In this area, visibility is poor. Cloudlets are breaking away from the mountains to the southwest and the hood clouds are increasing in size. Visibility is good in this area, with the sun reflecting brightly from the cloud.

1345 A double arch has formed.

1430 The double arch has faded out and the hood clouds are drifting nearer.

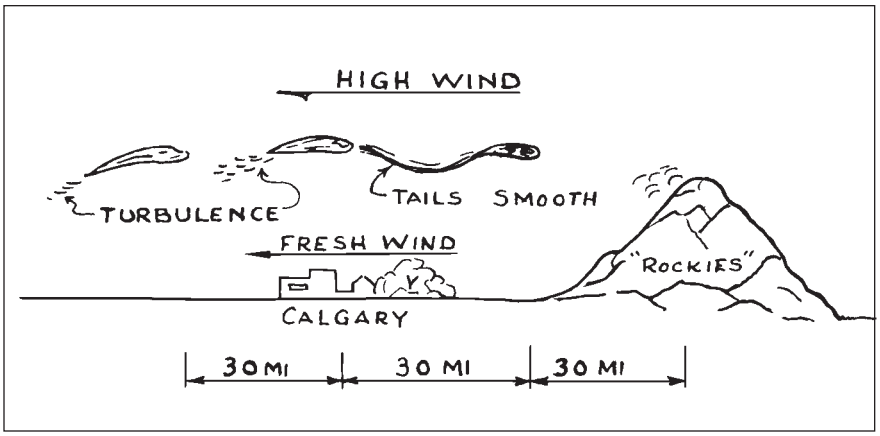
1530 The arch, reformed, provides 10/10 cover.

1600 The hood clouds are darker and bunched together. The mountain tops are shrouded and visibility is good. The last arch was slow to form, but has been one of the finest examples ever. It remained 'til dark.

March 25, 1951

At 0900 hours, the wind was strong and westerly. The arch front was almost directly overhead and a roll cloud, very much like a line squall, remained under, and separate from, the main arch front. This was in one position only, five or six miles away to the south.

Between 1300 and 1400 hours, the wind abated and the arch moved eastward, breaking up to leave a long roll cloud and a very thick standing wave to the southeast. These remained quite stable for one-and-a-half hours. Later, cloud streets formed to the northeast. Winds in the mountains were made apparent by mist streaming off the peaks and down the slopes. The air was warm and smooth, except during the afternoon when the breeze changed from south to west. After remaining westerly for a short time, it freshened to 10 to 12 mph and, at 1900 hours, suddenly became strong but quickly died out.



1952 – January 28. The arch had lenticulars at 30 mile intervals in the afternoon.

November 6, 1951

This arch was ready for me at 0715 hours. Out came the pad and pencil once more; ground visibility, very good; wind, nil; temperature, 30°F. At sunrise, five sets of lenticulars turned a rosy hue, easily distinguishable against the blue sky. As the sun rose, the tinting faded. The lenticulars became difficult to see, appearing as light overcast. This is often the case. Much of nature's aerial beauty, hidden in the chinook stream, need only be bathed in the rays of the rising or setting sun to paint a picture far beyond the skill of man.

Towards 0900 hours, the aerial blanket began to part. Later, blue sky was seen through the rift. This arch system is a perfect specimen; one of the most spectacular I have ever seen. Between 1100 and 2300, the arch front was an ever changing panorama of beauty. Its frontal edges puffed into a fluffy, soft texture like an inverted bowl of mist, then rolled back, stern, solid and straight-edged. Dark islands of lenticulars, smooth and stately, floated in front of, or underneath, the arch front. They were accompanied by others, less solid and with wispy edges. They materialized from thin air, or broke away from the main arch front to hover as sentinels. Often, they changed shape and faded away, or gathered little groups of other clouds to them, finally tiring and melting into the atmosphere.

The arch front will often dip down to caress the mountain peaks, or will race eastward at phenomenal speed, leaving blue sky in its wake. Before the bright sunshine pouring through the gap can be fully appreciated by earthly minions, another arch will grow and build into ribbon form, starting from where the first had played truant. Often, three or four arch waves will exist in parallel from south to north.

Today's arch system had all these qualities. It frolicked, and preened and pouted, lively as a kitten. As the sun dipped below the horizon, the waviness under the blanket stood out in bold relief and the arch, tiring of her antics, spread her cloak for eighty miles from east to west at 15,000 feet. By 2300 hours, she lay in quiet repose, gathering up her skirts for the night, 'til she appeared as a ribbon with the light of the moon revealing the softness of her sleeping beauty.

October 24, 1955

Last night, as the sun dropped below the horizon, the air became noticeably colder. I put on my sheepskin while working outside. The sky was overcast with a blanket arch that was firm and solid to the west along its front. At 2000 hours, the chinook came in and the temperature jumped to 61°F.

This morning, at 0630 hours, the arch was prominent but broken along its front and the blanket lay in long streets. A second wave cloud could be clearly seen above the mountain hood. The air was warm, with no wind and with only a slight haze in our area. By 0740 hours, the blanket had given way to lenticulars, and waves filled the whole area from horizon to horizon. Could this be an indication of changing wave frequency that would move the crest away from Calgary and bring in the trough where lay the high ground winds? Yep. At 1000 hours, the wind struck from the west with gale force and eight telephone poles went down in quick succession.

The Chinook Arch — a long wave

Tony Burton from papers written by Dr. Peter Lester, Dr. Bart Hicks, and Dr. Titus Mathews — University of Calgary

LESTER'S PAPER on Lee Wave Cloud Climatology mentions the chinook arch — the lenticular cloud capping a long wave — and its gigantic dimensions in southern Alberta and Montana. In size, definition, symmetry, and frequency, it seems to be unequalled anywhere on earth.

Several chinook wind studies suggest that a stable, westerly flow over the mountains of southern Alberta and northern Montana gives rise to leeside long wave disturbances with a length of 50 to 100 kilometres or longer. This is the chinook arch cloud. Apparently the large scale of this phenomenon is a unique combination of the overall width of the mountain barrier, its shape, size and orientation, and the climatological state of the westerlies. The highest barrier, the Continental Divide, forms a long, unbroken line perpendicular to the main flow. The "nearby" Pacific Ocean for moisture supply is probably critical for the frequent visible manifestation of the long wave motion.

To some extent the long waves resemble a hydraulic jump and may cause severe turbulence for aircraft in flight and extreme downslope surface winds. In chinook conditions, winds at altitude are not very strong. One characteristic of the long wave is the presence of an extensive lenticular cloud in its crest. As seen from the ground, this arch cloud appears as a single, broad altocumulus or cirrus lenticular (ACSL or CISL) wave cloud with a sharp upwind edge and large crosswind extent. The apparent curvature of the arch is due to its height and its great lateral extent.

If the western portion of the cloud is interpreted as being in the crest of a single long wave, then the broadness of the wave cloud is likely caused by the advection of the higher cirroform clouds eastward from the wave crest. Cirrus clouds, composed of ice crystals, tend to persist longer than water droplets or mixed clouds in areas of downward motion.

Some of the most interesting variations of the chinook arch cloud occur in the arch itself. Occasionally, when the chinook cloud is clearly visible with a well defined arch, a tilted structure is discerned. In these cases, the horizontal position of the arch is displaced slightly upstream in each higher cloud layer. The possible causes of this effect are several: height variations in wave phase, or amplitude, or a change in moisture content with height.

On some days, the arch is "clean", that is, it appears as the sharply defined upwind edge of the wave cloud. However, on other occasions, the arch is quite uneven. This latter state is apparently caused by the superposition of shorter lee waves on the long wave. This effect is not to be confused with the common occurrence of the much shorter billow clouds which are evidence of shear waves superimposed on wave clouds.

It will be seen that the synoptic requirements for the chinook arch are similar to those for the ordinary short lee waves and therefore it is not unusual for both wave types to coexist. This does not always happen. On many occasions, the shorter waves will occur

without the arch or will occur below the arch, but not in the arch itself. Specifically, four types of wave conditions as evidenced by clouds have been observed in southwestern Alberta: long waves alone; short waves alone; long and short waves superimposed; and long waves above, short waves below.

Another variation occurs when the cloud takes the form of a series of long streaking cirrus plumes along the mountains. This is considered evidence of long wave. The plumes apparently form above the highest peaks and persist far downstream due to their ice crystal composition. A variation of stratocumulus roll clouds at levels well below the arch was the occasional occurrence of a single roll cloud just below and along the western edge of the arch cloud. While the other lower roll clouds were associated with short waves, the upper roll cloud was apparently directly associated with the longer wave motion causing the arch. It is suspected that the amplitude of the long wave was larger when the upper roll cloud was present. More study is necessary to verify this hypothesis.

Synoptic factors were chosen on the basis of meteorological variables that are known to be correlated with lee wave and chinook occurrences. These include the sea level pressure gradient across the mountains, the wind above the mountain tops and the temperatures and stability of the layer of air above the peaks. Clearly, the sea level pressure gradient is weaker and the winds are more southwest for the arch cloud cases.

A possible explanation for these differences is the following: the chinook arch cloud is basically a predisturbance phenomenon. Thus there is a greater possibility for cold (high pressure) air to be in the lee of the mountain when the arch cloud first appears. This would result in a reduced or a reversed sea level pressure gradient across the mountains. The west/southwest wind directions for the arch cloud cases also support the predisturbance idea. Because of warmer air in the lee of the mountains during chinook conditions, air pressures in that area would be hydrostatically reduced, leading to a larger pressure gradient across the mountains and therefore higher surface winds.

On chinook days, the visibility is extremely clear and the sky displays a cool glowing blue. In the summer, these winds pass almost unnoticed, but during the frigid prairie winters, they provide important and welcome relief, turning drifting snow into running water and uncovering the prairie and foothills grass for stock and wildlife. Farmers don't like chinooks because they melt and evaporate snow, removing soil moisture (what little there is) and allowing topsoil to be blown away by winds which often exceed 100 km/h in southern Alberta — at Lethbridge, Environment Canada doesn't issue wind warnings until gusts exceed 120! But what may be disastrous to farmers can be the soaring pilot's delight. The chinook arch cloud has aroused the interest of a great number of scientists and a field study was expanded in 1986. This was a joint project of the University of Calgary and San José State University, using *Alcor,* the world's only pressurized sailplane. It was used to climb up in front of the arch to record atmospheric data.

The birth of the Chinook Arch Project

"Right now all there is is speculation", according to meteorologists speaking of the chinook arch in southern Alberta. Explorer David Thompson recorded in his 1787 expedition journal that he and his men couldn't believe the weather would be milder closer to the mountains. "But it was so. The cold of these lands decreased as much by going west as by going south." And, in 1792, Sir Alexander Mackenzie described his first chinook as "a perfect hurricane".

IN 1978, PROFESSOR Dr. Peter Lester, then at the University of Calgary, conceived a film, called *Chinook*, to give wide circulation in university meteorology and geography classes. Finally in 1985, a concentrated field study between the universities of San José, California and Calgary, Alberta began work to lift some secrets from the chinook arch.

In September 1985 Bob Said, then the editor of *SOARING* magazine in the USA wrote, "Few natural phenomena accessible to the human eye have the awesome immensity of the chinook arch, that vast, vaulting ribbon of cloud that crowns the high plains of Alberta just east of the Canadian Rockies when strong westerly winds, colliding with the ridged spine of the continent, leap upward in standing waves marked by a continuous band of lenticulars stretching from the northern to southern horizons. The lee waves, often stacked in layered strata beginning above 20,000 feet, themselves rise to unguessable height in air sometimes

Terry Burton

1987 – October 28. A classic chinook arch has formed. Photo at Claresholm airport.

so clear you can look at one end over Calgary and the other over central Montana. Last September I stood south of Pincher Creek and looked up at one. It was easily the grandest unbroken blade of living wave that I have seen ashore or aloft in 37 years of flying in North America and Asia. It couldn't have been lower than twenty thousand feet in its bottom layer and probably was closer to thirty thousand, and which I believe probably stretched from Jasper in the north to somewhere in the neighbourhood of Great Falls in the south, a span of no less than four hundred miles.

How high do such waves go? Research aircraft like the U-2 and YF-11 have reportedly encountered strong wave lift at altitudes above 60,000 feet in the jet stream flow to the east of the Sierra Nevada mountains along the California/Nevada border, and there has long been reason to suppose that something similar goes on high above the wheat fields of central and southern Alberta when big winds blow out of the west. It appears that the combination of an American research sailplane, a Canadian and an American university, a combination of public and private funding, and an international team of soaring and meteorology experts is about to shed a little light on the whole question ..."

✦ ✦ ✦

The Saturday of the 1983 Cowley wave camp was the day. The wind at ground level was light, not the usual 20 to 30 knots, and spectacular lenticulars were seen to form one on top of the other high above the field. The wave started by early morning and continued through darkness. Eight pilots will be claiming Diamond climbs and three their Gold climbs, with 28,000 feet being common. Lift was averaging 3 knots at this altitude with the temperature running at –38C. The high flight of the day was logged at 36,500 feet by Peter Masak. Unfortunately he didn't have a barograph with him to prove the potential Canadian record.

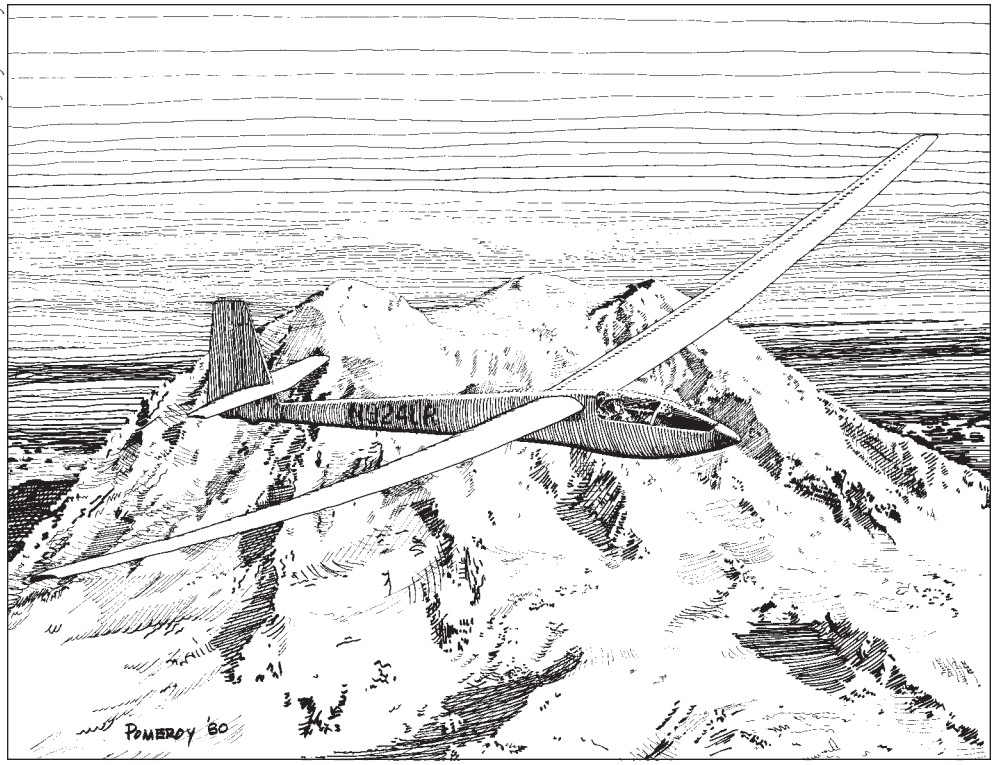
But this started a new program: the field study of the chinook arch by a glider pilot. Peter got the urge to make an attempt on Paul Bikle's 1961 world record height of 46,267 feet, and in his search to find a suitable sailplane, he met with Bob Lamson of Seattle in the hope of borrowing his "Alcor" for the flights. However, Bob preferred finding a scientific research project for which it could be used and soon the connection was made between Dr. Peter Lester, now of San José State, Dr. Titus Mathews of the University of Calgary, and Tony Burton, living just a long stone's throw away from Centre Peak in Claresholm....

1985 — Enter the Alcor

Tony Burton

ALCOR, a 20 metre experimental sailplane designed and built by Bob Lamson, a retired Boeing test pilot, is of composite fibreglass construction. It is built very strong and light (Lamson used a system of spruce ply cross-laminating and glass that was used in constructing the nose cones of the Polaris and Poseidon missiles), and is designed specifically to allow comfortable flight for extended periods of time at high altitude. Its unique features

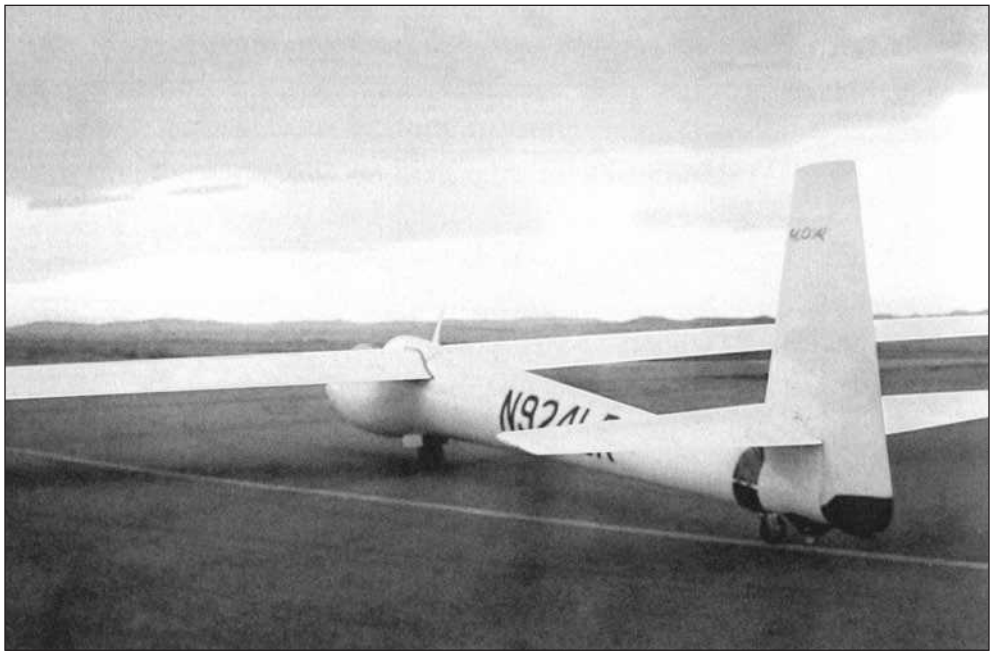
Jerry Pomeroy



are a cockpit which is capable of being pressurized by the breathing oxygen (the practical limit was the ability to maintain a canopy seal), a passive solar heater, and double layer canopy which can keep the cockpit as much as 40°C warmer than the outside air at altitude.

The Chinook Project was organized by Dr. Titus Mathews, head of the Physics Department at the University of Calgary and by Dr. Peter Lester, head of the Department of Meteorology at San José State University, California. Dr. Joachim Kuettner, famous for his early studies of mountain lee waves and still active in mountain meteorology and soaring, was an advisor to the project. I sort of fell into the job as a result of having all the four requirements for a program pilot: the free time to be available, considerable wave flying experience, a technical background, and relatively short — as no one taller than 5'9" can fit into the very cramped cockpit.

The Chinook Project sought to gain a better understanding of the long wave (the upper level 50 to 100 kilometre wide wave we see as the chinook arch cloud) and with the weather phenomena associated with it, such as clear air turbulence and surface wind storms. Southern Alberta was chosen as the study area because the chinook's occurrence is most frequent here. The goal was to record a cross section of the atmosphere at the latitude of Nanton (south of Calgary) using all available means during good chinook occurrences. Alcor was used to gather data at altitude in the area of the front edge of the chinook wave which we see as the western edge of the arch cloud. A chain of lower atmosphere data gathering instruments was also established in this area. This equipment had been developed by Dr. Paul MacCready's company, AeroVironment, in the form of acoustic devices (Sodars) which,



Tony Burton

1987 – Alcor is ready to launch west from Claresholm airport on 28 October. Towed into strong upper winds and weak wave at lower altitudes in the lee of the Porcupine Hills seen on the horizon, it wasn't possible to contact the Chinook Arch on this flight.

by both direct echo and Doppler measurement, detect minute tempera-ture changes in the lower 1000 metres of the atmosphere. These data give information on flow and turbulence mixing and on temperature structure in the air strata which forms the terrestrial boundary layer.

In early 1985, I worked with Bob Lamson and others to clear the way through the bureaucratic thicket to get Alcor into Canada and flying. Having a US-registered VFR experimental aircraft flying in Canadian IFR airspace pre-sented some customs, airspace, airworthiness and licensing prob-lems. With a lot of digging on our part, and good cooperation from the government agencies, the hurdles were overcome. Alcor arrived in Claresholm on May 27, 1985 after the appropri-ate Customs and Excise chapter and verse was found to allow both the sailplane and associ-ated project equipment to be imported duty and sales tax free. On May 30, the special flight permit arrived from MoT, and on May 31 the required airworthiness inspection was done at Claresholm by inspectors from Calgary just before members of the scientific team arrived to have a look. Now it could fly.

After some test flying in 1985 while project funding was secured by the University of Calgary and especially the Seattle-based Flight Research Institute, a whole year (August '85 to October '86) was spent modifying the aircraft and designing, building, and installing the data equipment. The first year-long phase of the airborne portion of the experiment (86/87) worked the bugs out of the operation: coordinating all the people, and the ground and air instrumentation, discovering the best way to use Alcor, and what data to gather. During the 87/88 season, on the forecast of a good chinook, the system was "turned on" to record a case study of what the atmosphere is doing. Alcor was launched to climb to the edge of the

chinook arch and hold station to record atmospheric data there. A secondary experiment on board Alcor collected selected air pollutants.

The Alcor was a unique looking sailplane, and interesting to fly. The wing was very flexible (much like the modern open class sailplanes) and on the ground the tips had a noticeable droop. In level flight the wings were curved upwards about two feet, and any change in wing loading by wind gusts, a pull-up, or turns would have the tips flapping in a most alarming manner — I preferred not to look! On two early flights, this wing flex was the cause of the spoilers locking closed as a result of the spoiler top plate jamming at the end. I had to pitch down to unload the wing before the spoilers would open — not recommended on short final. A little work with a file solved that quirk when the cause of the jamming was found.

Bob Lamson, the designer, was short in stature and built the cockpit small to minimize the volume that had to be pressurized. But he found it was too small even for himself and enlarged the space in the area of the instrument panel by slicing the fuselage open from the cockpit front to the nose, spreading the cockpit rail, and bonding in a wedge of new fuselage structure. The fix gave the cockpit side of the fuselage the noticeable 'Coke bottle' curve seen in early supersonic fighters.

However, the Alcor never was flown pressurized. Though the concept of pressurizing with the breathing oxygen was a brilliant and simple idea, leak tests showed that the canopy rail seal was not functioning properly. Since the Chinook Project did not require flight to altitudes so high that pressurization was desirable or required, I never spent time to fix the problem with the seal.

The ship was well designed for flying high in the cold. The doubled canopy both reduced heat loss and eliminated frosting from exhaled breath. There was also an airtight thick plexiglass 'window' which closed the space above the instrument panel and below the fixed front canopy which performed the same function. The only ventilation was a small duct opening on the instrument panel which was closed with a cork to maintain pressurization! As a result of all these features, the cockpit stayed well above freezing at altitude and thermal clothing wasn't required, but the cockpit temperature shot up on the ground when the canopy was sealed, so a quick launch was mandatory (the pilot being effectively sealed inside a solar collector). For non-wave flight, a single pane 'summer' canopy was used which had a standard side vent.

Project progress

Things always take longer than planned — it wasn't until the winter of 1986/87 that a series of test flights were made at High River to test the test equipment and sort out operational problems. Air Traffic Control personnel were most cooperative, and meetings resulted in the establishment of four blocks of airspace extending down the Rockies between the latitudes of Calgary and the Crowsnest Pass. On request, each block was opened as I approached it. The concentrated data gathering effort began in the fall of 1987.

The data collected was true airspeed (from a TAS computer), vertical speed, temperature, altitude (from the transponder encoder), heading (from a magnetic flux sensor), position

(from a Loran set), and airflow (through an air sampler). The sampler was turned on at altitude in order to collect specific air pollutants and measure their concentrations in the "clean" air. The university hoped to gather some information on the background levels of air pollution at high altitudes. The vertical speed was taken from a variometer specially modified by John Firth in Ottawa to minimize altitude error, had an electronic netto built into the instrument, and an internal "oven" to keep the critical components at a constant operating temperature.

All data was saved on a digital cassette tape recorder in the cockpit. Following a flight, this data was transferred onto a computer disk, then fed into a "quick look" program which displayed the data in graphical form to see if it all looked good before taking it to the University of Calgary for further analysis. *(This post-flight look at the data was done by Tony on a MacPlus loaned from the Physics Department.)*

The Loran was the biggest problem as southern Alberta is at the limit of coverage from the transmitters on the west coast. At times, position data was unavailable due to low signal strength, and this was a serious limitation on the experiment. Transponder replies recorded by the ATC radar at Calgary provided backup position information which was more accurate than the Loran. By the 1990s of course, GPS would have solved this problem easily, being more accurate, reliable, and easier to use as well as being smaller and less power-hungry.

Another serious limitation was the available 24V battery power, which limited full data gathering time to about two hours. For this reason, a backup 14V battery was also installed (inside the cockpit where it stayed warm) which ran essential instruments during tow, climb, and descent portions of the flight. The most serious consequence of this power limitation was that none of the load of scientific instrumentation could be turned on until well into the flight and at altitude in the wave. Then it was all powered up according to the long checklist and one could only hope that everything was working. Sometimes it wasn't, and a day's work and a good chinook was wasted.

The small cockpit size was deliberate in order to minimize the pressurized space, but it became a challenge to get all the additional instrumentation, switches and flashing lights into the space. Over the winter of 1985, I stripped out the original instrument panel and built a brand new one as large as space would permit with not a cubic inch going to waste. Even at that the Loran wouldn't fit anywhere. The solution was to split the set into two — the front display and controls were packaged into a small box which rested on my lap and the rest of the electronics went aft under the turtledeck.

As all this equipment was very much custom-designed and fit, Murphy's Law worked full time, and otherwise good flights produced spoiled data as a result of unforeseen incompatibilities in the equipment (and occasionally plain finger trouble by the pilot). For example, there really was a little red flashing "data rate" light on the panel which was a telltale that the data acquisition electronics was working. This black box hung up sometimes, meaning nothing was being recorded and the system had to be reset in the air.

The whole system, being "one-off", was distinctly user-unfriendly. The equipment fit inside the fuselage was so tight that stuff had to be removed in sequence — the data ac-

quisition unit had six different electrical connectors and three switches which had to be manipulated by feel. God help me if I dropped the jewellers screwdriver while locking the connectors, it would take an hour of disassembly to retrieve it!

From the pilot's perspective, the cockpit was extremely stuffed and the inflight workload fairly high — note the power-up and in-flight checklist requirements on pages 29 and 30, but there is no question that it was a fascinating project. In October 1987 my biggest hope was that the chinooks came at the same time as all the gear worked — at least enough times to make two years of preparation and all the money spent worth the scientific knowledge gained.

In the end, only a few good data flights were achieved and some useful data obtained — not enough to come to any meteorological conclusions, but enough to prove that the concept of using a glider as an instrument platform in the wave was sound. For Alcor, the organizational and operational constraints and limitations were too much. Such a study would have much better success with a two-place motorglider and today's technology.

Bob Lamson retired Alcor after this project, and it is now on display at the Boeing Museum of Flight in Seattle.

1987 — A chinook arch flight

THE MOST memorable flight occurred on 24 November 1987. A classic arch presented itself in the morning and after two of hours of preparation, Jerry Vesely towed me off west. There was no lift on the east side of the Porcupines so we continued climbing westward.

There was no underlying lee wave cloud in the Cowley valley, but there were cumulus clouds over the Porcupines which ended a bit to the north. They had some of that characteristic smoothness on top that indicated the presence of wave. By the time we reached the cumulus about 30 kilometres west of the airport, the tow had reached 10,500 feet and there were some bumps so I released to explore. If nothing was found there was ample height to return.

Thermals got me to cloudbase around 12,000 feet at which point I moved to the west edges of a clump of the clouds and sure enough, there was continual weak spotty wave lift up the sides which got steadily better. Above the east edge of the Porcupines was the distinct edge of the immense arch. Once well established in the wave, I flew north away from the cu in steady 4 knot lift. Looking back, the tops of the field of cumulus clearly defined the overlying wave. I called up Edmonton Centre and got the project block opened and proceeded north towards the Chain Lakes reservoir while edging west to test the limits of the lift. By the time I was south of the reservoir I was nearing the leading edge of the arch at 19,500 feet. What a sight — it was clear to the west, to the east the ground was dark in shadow, and above, the leading edge of the arch was a wall of irregular cloud layers which merged into a high layer of solid cirrus at about 30,000 feet.

As I reached the arch, I got busy turning all the equipment on and also going through the Loran checklist to get it initialized (this took a few minutes and was always touch and go

This photo of the Arch was taken south of the Chain Lakes and is looking south from an altitude of about 21,000 feet. The lower cumulus field over the Porcupines and into the Cowley valley is evident in the middle distance as is the wavy nature of the cumulus tops indicating the lower level lee wave. *Tony Burton*

as to whether it would pick up the signal and start showing position data). At 24,000 feet, which appeared to be halfway up the arch wall, I began running the wave and exploring its extent rather than concentrating on climbing. By moving a little westward, away from the local scallops and irregularities of the cloud, the true enormity of the cloud's structure opened up. The arch was built of many layers of cloud as minor variations in humidity with height dictated where condensation would begin, it was over 10,000 feet high, and it extended laterally as far as one could see south into Montana and north towards Rocky Mountain House!

The strength of the lift producing the arch varied close to the wall — it was generally about 3-400 feet per minute but would rise to 600 over areas where underlying mountain lee wave added to the vertical motion of the airmass. Speeding up to maintain level flight, I flew a lateral data collection run into the north block near Longview, then south again to Cowley. The controllers in the Area Control Centre were quite interested in the flight as usual (it certainly was a change of pace for them) as I maintained about 24,500 to 25,000 feet and was progressively cleared out of one airspace block and into another on the run.

Halfway down the run and south of the Chain Lakes area again, I turned west to test the east/west extent of the wave. The lift band of the average lee wave is roughly three kilometres wide. As the wavelength of the high altitude "long wave" or "gravity wave" which produces the arch is generally an order of magnitude longer than a lee wave, then the width

ALCOR checklists

PRE-FLIGHT CHECKS

1 Rig wingtips and perform normal DI.

2 Turn O_2 cylinder ON fully, refill if required.

3 Red switch on back of DAI unit ON (up).
Data Acquisition Interface - black box in fuselage

4 Install Air Pollution experiment (APE).

5 Data Recorder – load new cassette, run the entire tape thru on FF and REWIND for possible tape stretch.
- Baud rate switches #4 and #11 on back ON.
- Depress PLAY/RECORD buttons.
- Reconnect and install recorder.

6 Cockpit switch positions:

A/B master switch	A (primary power)
Voltmeter switch	24V (check backup by selecting 14V)
Volt/Amp switch	Volts
DATA RATE and DAI/TAS	OFF
LRN and VARIO	OFF
NETTO	ON
Transponder and VHF	OFF
RDR	ON (up)
APE	OFF (down)

7 VHF:
- turn ON and check stored frequencies.

8 Voice Recorder:
- install new cassette.
- depress REC/PLAY buttons, speak into headset and adjust volume until it starts on voice (not noise).
- ensure tape speed at “1/2”, then turn OFF.

9 Transponder:
- check code (no 77, 76, or 75 codes).
- turn to SBY, wait 40 secs for warmup.
- turn to TEST - REPLY light must flash if transponder ok.
- turn OFF until ready for launch to save pwr.
- Initial code selection to 1200.

10 Perform standard cockpit checks and O_2 system checks (see PRICE checklist).

POWER-UP PROCEDURE

1 Initialize Data Recorder
- Press and release RESET button on panel.
- Press and hold JOG button for 10 seconds (listen for sound of tape transport).

2 DAI/TAS to ON and DATA RATE to 1 second (LED should blink continuously - if not, turn unit OFF and ON again).
- In about 1 1/2 minutes, data recorder buffer will fill and tape will transport for a few seconds.
- DATA RATE to OFF until aircraft ready to launch (this is to stop unnecessary tape use).

NOTE If DUMP button pressed, data won’t transfer from DAI/TAS - repeat RESET and JOG sequence.

3 Initialize Loran:
- LRN switch ON.
- Wait for Loran to acquire station (flashing “w” lower right of display), then turn on Extended Range mode and initialize aircraft location. (see Loran checklist and Lat/Long list).
- select active leg for flight (page 14 of Loran checklist).

NOTE If Loran will not acquire stations, flight data will be severely limited, but system may acquire ok when airborne.

4 Voice Recorder - REC/PLAY buttons ON, stow, and record pertinent flight data.

5 DATA RATE to 10 secs, check that LED flashes in 10 seconds.

6 Vario to ON, range to x1 (vario will go off-scale for about one minute then read high for about 10 minutes until internal temp stabilizes).

Due to full power limitations of about two hours, turn off above equipment until at altitude and ready to record data.

ON LAUNCH:
Transponder to SBY

ALCOR checklists

DURING FLIGHT

1 Above preselected altitude, turn Air Pollution Experiment (APE) ON:
then OFF again on descent below it.

2 If IFR airspace is going to be entered:
- at 10,000 feet, transponder to ALT.
- contact Edmonton Centre on 128.7 MHz, requesting block to enter and ceiling, and transponder code.
- go to SBY on all code changes.
- request radar record of flight if planned.
- set altimeter to 29.92 on passing FL180.

REPEAT POWER-UP CHECKLIST WHEN READY TO RECORD FLIGHT DATA

3 Monitor DAI/TAS "tell-tale" light (unit will stop occasionally, ON/OFF switch must be cycled).

4 Select DATA RATE to speed consistent with rate of change of flight parameters (normal: 5). Press DATA DUMP button for unique events. Voice record events and changes of note.

5 Monitor 24V power - DAI/TAS will not function below 18 volts. On reaching low limit, perform steps 1 & 2 of power-down sequence, then switch Master to B (14V).

6 On completion of flight test, perform step 5.

7 For COMM FAILURE - Transponder to 7600 - descend to bottom of block (12,500 or 18,000) then code to 1200.

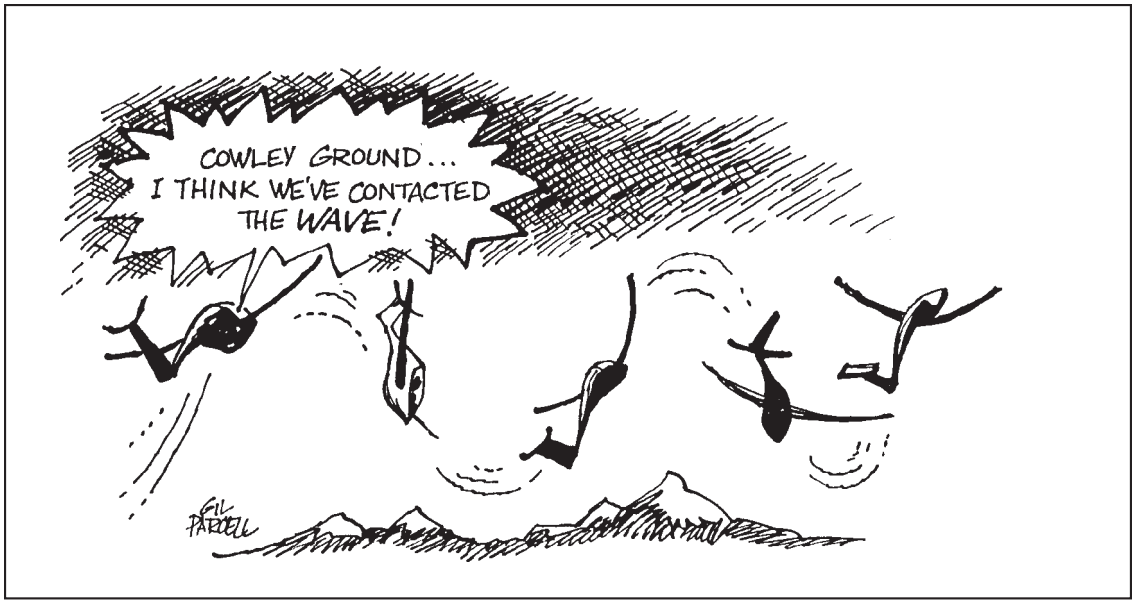
8 For XPDR FAILURE - Set Range/Bearing from Calgary radar on Loran display (WPT, select "RADAR", RAD/O).

9 For FLIGHT EMERGENCY - Transponder to 7700 (gives automatic radar record).

Edmonton Centre back-up	133.3 MHz
Lethbridge FSS	126.7 MHz
Calgary Terminal	116.7 MHz
Calgary Tower	119.4 MHz
ATIS	127.2 MHz

SHUT - DOWN

1	DAI/TAS	OFF
2	Press and release DUMP button (records last partial memory block to tape)	
3	Loran	OFF
4	Transponder	OFF
5	VHF	OFF
6	Vario	OFF
7	DATA RATE	OFF
8	14/24V	Centre (Off)
9	Master	Centre (Off)
10	Voice recorder remove and store cassette, check battery	STOP
11	Data recorder remove and store cassette	STOP
12	Air Pollution experiment remove experiment and store tubes, install fresh tubes, charge battery	
13	Place 24V battery on charge, and 14V if req'd	
14	Refill O_2 tank if required. Close O_2 tank.	
15	Switch on DAI box	OFF (down)



of useable lift could be up to 30 kilometres. Looking at the geometry on a piece of paper and experiencing it are two different things. Starting in close to the cloud wall over the east side of the valley, I pushed westwards for about 15 kilometres over towards the edge of the Highwood Range before the moderate lift petered out. Considering that a good portion of the lift band was within the arch cloud itself, the extent of the lift band appeared to be according to the book. An entire valley full of lift — this was certainly heaven for a wave pilot, one could as well be in a hot air balloon for all the worry about where to go to stay up.

By the time I had finished the run south towards Cowley, the battery power was starting to drop off rapidly, so it was time to shut down the data gathering equipment and switch over to the 14 volt gelcel battery for the remainder of the flight. I had been up about 2-3/4 hours by now and was descending out of the block. Thanking the Area Control Centre, I dropped below the arch and headed east under the arch and back into the relative gloom of the overcast, and landed back at Claresholm after a 3:10 hour flight that I will always remember.

Back home, I plugged the digital tape recorder into the Mac to download the data. Was it all there? The quick-look program said yes, which was the object of the exercise as far as the Physics Department at the University of Calgary was concerned, regardless of the beauty of the flight.

ROTOR WINDS

Tom Schollie

Rotor winds, I hate you,
You are no friend of mine.
You shake my plane,
You shake my frame,
You jar my very spine.

The only thing you're good for
And it's not much, I fear,
Is that when I'm tossing in your grasp
I know the WAVE is near.

I know that soon I'll leave you
For the peaceful, smooth ascent
And I'll soon forget
The bit of sweat
It cost me going through.

So you're nothing but a signpost,
"Rough Road" is what you say
But on the other side
Is the rising tide,
So I'll travel by your way.

I'll take your up,
I'll take your down,
And I'll take it like a slave
If you'll let me pass
To that air like glass
We call the "Cowley Wave".

1983

Chapter 2

The Early Years

The Early Years
The Early Years

The soaring fraternity of southern Alberta owes a great debt of gratitude to Mr. W.A. "Alvie" Cook of Pincher Creek, Alberta.

The survival of the Cu Nim Gliding Club of Calgary was at stake because they had no base of operations or airport to fly from.

With his usual generosity and good humour, Alvie Cook invited the club to fly from his private airstrip in Pincher Creek and build a hangar.

This beginning was to put southern Alberta on the map as Canada's premier wave soaring area.

In the early gliding days, the "biology" of the immense cloud was only guessed at, gathered from information that had come from California, or from Europe. During World War II, RCAF pilots stationed in Calgary had often encountered lift in the lee of the mountains which stopped as suddenly as it appeared. At times, great turbulence east of such lift had been found. The ranchers and farmers in the Crowsnest Pass area west of Pincher Creek and many pilots knew there was something going on near the bare walls of the mountains. This was a lure and a prod to their curiosity, yet the honour of exploring it would be reserved for glider pilots and their ships.

1950 — the beginning of a gliding club

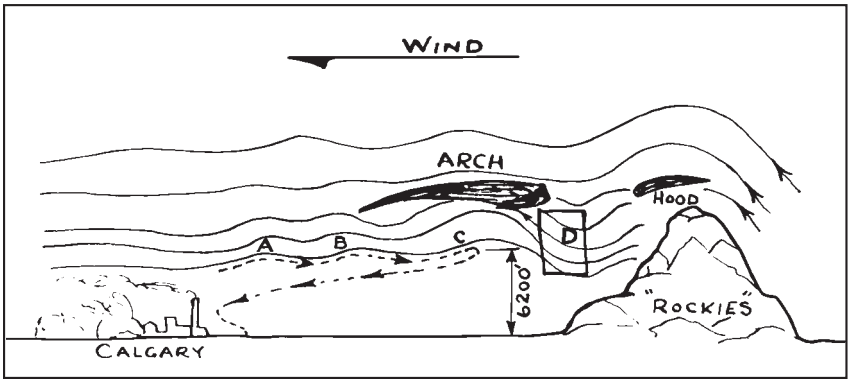
THE Calgary-based air force group of 10 Repair Depot (Ten R.D.) organized the RCAF Tenardee Gliding Club, but because of regulations, they could only have military people as members, or civilians working for the Department of National Defence. Therefore another small group pushed for the formation of a civilian gliding club — A.M. (Scotty) Scott, supported by Red Ockwell and Al Foster. They named the club Cu Nim.

The newly born RCAF Gliding Club, with S/L Gordy Brown, F/O "Buck" Buchanan, F/L Brian Murray, and S/L Bill Riddell invited Norm Bruce to take the post of instructor. As it was his nature, Norm dug up gliders from everywhere: here a ship of simple pod-and-boom wooden construction, there a TG-3A flat top (an 850 pound wartime trainer). It was repaired and improved with two small bubble canopies fitting the heads of instructor and student, which Bill blew in a special oven that was handy on the Base. This glider was named "Double Bubble" and her first flight was on October 28, 1950. The repairs were done with great enthusiasm, and the aviators did wonderful things to the old birds and antiquated equipment until they could again serve man's quest to fly like a bird. Their most special interest was given to the construction of a French design flying wing, the Fauvel AV-36, which became Canada's first approved homebuilt. The first one was flown on June 27, 1954. A video has been made from film taken during its construction and flights.

Norm Bruce, the "father of gliding in western Canada", was glider builder, instructor and advisor to the young gliding community in Calgary. A great amount of knowledge had been acquired during the pre-war years when he started gliding clubs around his hometown of Medicine Hat. However, his greatest interest was the chinook arch. He kept a diary on his cloud watch, which was printed in *free flight* magazine, June 1956, and which is reprinted in Chapter 1. At that time many assumptions of its structure were made, as knowledge of

mountain lee waves and the chinook arch was just growing. In January 1981, Norm's daughter Edleen Hubscher wrote, "The written word does not fully show how much my father knew. He lived gliding heart and soul." Bruce was made an honorary Life Member of the Soaring Association of Canada for his many contributions to the sport.

Norm writes, "To marry theory with practice, the first Canadian wave soaring attempt was made on November 12, 1950 by myself and Barney Pepper, member of the Tenardee Gliding Club. The start was from Calgary in a TG-3A, towed by a Cessna Crane. Unfortunately, the tug pilot was unfamiliar with the requirements necessary to pick up the wave. He did not leave the Calgary neighbourhood and the strong lift area was not reached. Strong winds were encountered, however with only a slight down-gradient, which served to increase the sinking speed of the heavy two-seater. Realizing that the tug pilot would not pull out to the lift area, I cut loose and turned the controls over to Barney, who took the craft directly over the centre of Calgary. At the peak of our flight, our rate of sink was 350 fpm against the TG-3A's normal sink of 250 fpm. At 300 feet, the chinook down-gradient levelled out and we resumed normal sink."



1951 — The second wave attempt by Norm Bruce and Bill Cameron ended in failure when the rope broke at 6200 feet.

The second arch flight attempt was made from Calgary on February 14, 1951 by myself and Bill Cameron, in the TG-3A. A beautiful arch had formed to the southwest, apparently about 30 miles from us, but which proved to be a greater distance away. The pilot had been instructed to tow us to the front of the arch and to climb steadily all the way out so that we could reach the lift area with maximum height *(see figure above)*.

Twenty miles out, the tug turned and flew parallel to the arch front on a southerly course. This kept us under the arch, about 15 miles from our objective. We were encountering strong, smooth winds. Once, we struck a few ripples, indicating we had passed through a trough. Our tug pilot had no rearward visibility and did a left hand turn to see if we were still on tow. We were, but not for long. A resultant slack in the towline, which snapped before I could ease it out, left us on our own, over very rough terrain and 20 miles from the field with only 6200 feet under us.

We sighted Calgary, a dark line on the snowy expanse below. Cameron took over, while I sat back, bemoaning our hard luck for a second time. When it appeared our flight was about to end in a reservoir a mile from the landing strip, we luckily, once again, dropped

out of the chinook stream into calm air at 1000 feet, coming out of the 45 degree headwind, our last glide saw us safely over the airfield.

After summarizing the findings of this second attempt on the arch, there is no doubt in my mind that we had picked the right conditions. We topped three crests, as shown in the figure at A, B, and C. These were only minor, due to our low altitude, and much below the deeper waves. If our towed flight had been to the boxed area D at 10,000 or 12,000 feet, our wave flight would have had a much happier ending. We suffered no discomfort from cold, and visibility was good at all times.

The first successful mountain wave flight, though on a small scale, was an impromptu affair. On May 4, 1952, Gordie Brown, a very active member of Tenardee, took off on aerotow from the RCAF station at Calgary and dropped his towline at 1755 hours. For 45 minutes he sat into wind and climbed to 10,300 feet. At 1900 hours he was down to 1500 feet and landed five minutes later.

Gordie Brown's flight was at first thought to have been due to thermal activity on account of the huge clouds above him. My theory, however is that, with the wind freshening just before the flight, a small low wave was set up, indicated by cloud formations in the area. To further this assumption, the flight ended only after the wind had abated. The temperature at 1900 hours was 49°F and the forecast low for the night was 25°F.

Both groups, Cu Nim and Tenardee, shared interests and the Currie Field aerodrome (the old RCAF airbase). Later, the Cu Nims flew from Airdrie with their Schweizer 1-19 and a winch. Then they moved to another old RCAF airfield at DeWinton, and after that to the High River airport in the distant countryside with an enlarged fleet, the Double Bubble and a Tiger Moth towplane. It was a hassle to move around, so they often stayed overnight only rolled into their sleeping bags, and endured the southern Alberta winds and snow. Flying was only modest at best, despite the enthusiasm and love for sky adventures."

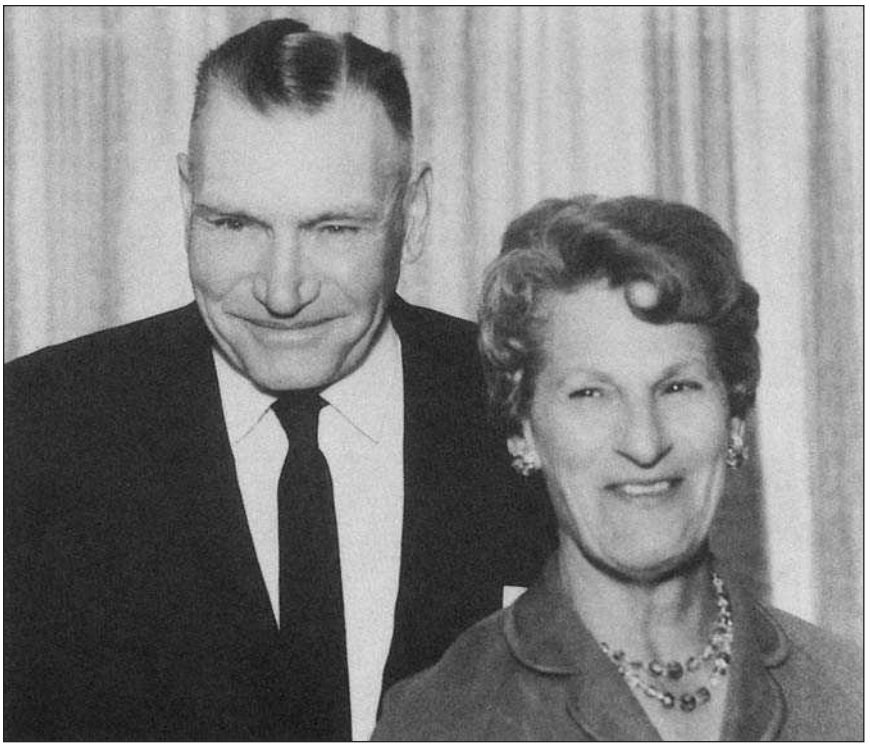
Al Foster remembers thirty years later: "In 1954, the Cu Nims had a meet at the old High River airport. This airport was historic because it had been a base for forest patrols in the thirties and a training base for the British Commonwealth Air Training Plan during WWII. At this time, a charming young lady glider pilot from Sweden, Lilli Erikson, came to meet us. She was visiting her friend Vera Strodl in Pincher Creek. Vera was an instructor at the Lethbridge Flying Club and had been a Ferry Command Pilot in England during the war. Lilli stayed a few days at High River and invited us to Pincher Creek to try the soaring conditions there; more specifically — the wave. Bill Riddell and Brian Murray of the Tenardee club had always advocated a move to Pincher Creek for better soaring conditions.

At this visit down in the Crowsnest Pass we met a unique man, a rugged individualistic western-type character by the name of Alvie Cook. He can only be described as a diamond in the rough. His parents were pioneer ranchers in the Pincher Creek area. About 1947, Alvie borrowed money from the Hutterites to buy a bulldozer and was in business. Starting out building roads and oil well sites, he expanded into a multi-million dollar construction business which his sons now carry on. Over the years he never changed. He always dressed the same with no ostentatious display of wealth, except that he had a tendency to like Packard and Lincoln cars."

1950 — Alvie Cook

Harold Eley and **Alan Foster**

ALVIE COOK lived about two miles northeast of Pincher Creek. Along with his rambling ranch style bungalow and beautiful yard, he used a grass runway behind his house (elevation 3640 feet), had built a substantial hangar and had installed a gas pump for his Cessna 180.



Alvie Cook with his wife, Laura.

During the second winter, while tied down outside his Quonset hut workshop, Cu Nim's Tiger Moth suffered damage to the upper wings. There was not much flying done in 1955, as the Cu Nims built a hangar. It was a great sight to see Alvie in his big mobile crane hoisting up a long beam that he loaned to us to span the 40 foot entrance to the hangar. It was quite a trick to maneuver the 55 foot wingspan of Double Bubble through a 40 foot door. Actually, the hangar was more ramshackle and not nearly of the quality of Alvie's own buildings. He also had a good tiedown cable, and it was not unusual to see this fully occupied by visiting gliders.

Alvie was a good host. One weekend he arranged a barbecue for the visitors. He had built a giant roasting oven of sheet metal which could cook maybe a hundred or so pounds of meat. He set up benches in the hangar and treated us to a real feed.

So there we were – camped in the basement. The early birds got a bedroom, but the majority just plunked down in the rumpus room. The shyer types took the prime location behind the bar, but the rest of us just laid out at random. It was wonderful to be warm and dry, sheltered from wind, and rain, and snow, and ready to go at a moment's notice. The happy hours under the Cooks' hospitality are still unforgotten – fond memories of old times. Until the early morning hours we would celebrate a fantastic day; go wandering off in theories about the wave and its companion cloud forms, dreaming about explorations and possibilities of the unknown – the Great Wave – discussing and evaluating news from the days past.

Bill Riddell writes in December 1983: "I had dreamed of doing the flight that Julien Audette did later; top a wave before a fast moving cold front, and plan to hit the plains when thermal activity begins. Who knew where one might land. The most daring thought was to select a jet stream pattern that could be approached from the wave and attempt to fly the core of the jet stream. There should be some dynamics that could be exploited if there were some way of sensing differentials …"

Alvie was always the last one to leave the party at night and the first one down to wake us up in the morning to get flying, because he knew that the conditions were good. He never flew a glider, although he did get his oldest son Rollie up in Double Bubble for a ride in 1955. The Cooks did have their own company aircraft flown by the sons, and this was the extent of Alvie's flying.

Alvie was a great believer in the wave, and an eternal optimist. "Eley", he would say, "there's lift over there at two thousand feet a minute, you better get out into it." After a while we found he was more often right than wrong. And he was a generous host; you bet! When we ran out of oxygen, he used to say, "Go fill your tank at the shop, that's what it's there for." And we did. And his basement; that was our home out there – imagine turning over half of your house to twenty avid glider types, but he did – no questions asked! The rest of the family was equally friendly. I never heard of a single complaint, although I'm sure we must have been a nuisance.

Discoveries were here to be made, but if it wasn't for Alvie Cook, we would not have left the warmth of our sleeping bags. We do owe a lot to the Cooks for the development of wave flying in the area. Without Alvie's assistance and encouragement, the activity would have been delayed a long time.

Alvie was predeceased by a son in the late fifties and more recently by Mrs. Cook. He had firm opinions and convictions, was a solid citizen and will be long remembered by those who knew him. With his death in January of 1986, we lost one of the pioneers of the Cowley Wave. The following obituary was printed in the Pincher Creek Echo:

> **COOK** — *Passed away Monday, January 6, 1986 at Pincher Creek, Alberta, W.A. (Alvie) Cook of Pincher Creek at the age of 79 years. Born and raised at Pincher Creek, Alvie spent his early years on the family farm and ranch. In the late 1940's he became active in the construction business with his sons and remained active until his health forced his retirement two years ago. Alvie was well known in flying circles,*

having organized the first flying club and airstrip in the Pincher Creek area. Soaring clubs from all over Canada and the USA congregated at "Cook's Airstrip" for their many competitions. Alvie will always be remembered for his unselfish generosity and many years of hard work for his family. His most enjoyable hobby was caring for his beautiful gardens. Alvie was predeceased by his wife Laura, a son Richard, his parents Mr. and Mrs. E.G. Cook and brothers, Bert and Jim. He is survived by four children, two sisters, … fourteen grandchildren, and four great-grandchildren …

1955 — Onset of the wave revolution

A FINE GROUP of men gathered in the early morning hours, their gliders rigged and patiently biding their time in the shadow of the wind. It was blowing strongly through the Pass and the roof of the hangar was a groaning toy in its path. "It will need some attention sometime", they thought, their noses constantly raised into the crisp air to sniff for something they were not quite sure of yet. An incoming Pacific airmass had been made known to them by the "Great White Weather Man" and the skies to the east had cleared early. The nearby rock cliffs began to release heat and the first veils of clouds played over their peaks. By 1030 cumulus were born off the sloping ground, but nothing appeared to indicate any wave. The men challenged the air with their wooden companions to remain airborne and soar with the eagles; however, only their spirits remained high that morning.

The midday break came and passed before the first signs of wave unfolded and the cumulus streeted across the wind. As the sun heated the ground in the troughs, convective cloud rose into the wave, and with it the first historic wave flight in the Canadian Rocky Mountains began. So reads Bill Riddell's diary of 26 June 1956:

1969 At 10 Repair Depot in Calgary, Bill Riddell was one of the first glider pilots flying at Cook's airstrip outside Pincher Creek. He started "The Cook Book", the log of early years flying, and built an AV-36 flying wing.

"A memorable flight. I had been to 11,000 in a wave the previous year, but this was a true lee wave flight. The weather conditions gave general cumulus in the area, but nothing that appeared to indicate waves, indeed we could not soar in the Pincher Creek area despite several attempts.

I towed up at 1311 and released in lift too far back from the wave front and had to land. At 1406, I towed in front of the Cowley Radio Range where contact was made and I released at 6500 asl. I found the convective cloud was well back in the wave and the best lift was one-half to one mile in front of the embedded convective cloud. This cloud was based at 10 or 12,000 and topped at 15 to 17,000 feet. I had climbed up in the second-

ary wave so I topped it at 18,000 and flew to the primary wave off the Livingstone Range. I made 20,000 and proceeded down to establish a low point on my barograph. I did this at 6600 feet over Lundbreck and went back to 20,200 feet in the primary wave.

Crossing from wave to wave cost only three to four thousand feet. By 1800 hours I was very cold and feeling the effects of anoxia, so I came in. The lenticulars were starting to form about this time and the convective cloud was dying out as the sun went down. The lenticulars appeared to be about 35,000 feet.

Later as Bob Cheston was up, the lenticular cloud formed an arch from horizon to horizon and deepened down to 12 to 15,000 feet. Oxygen equipment will be a necessity to prevent rash or inadvertent ascents beyond human tolerance. Three waves developed, the primary over the Livingstones, the secondary about centred over Happy Valley, and the third over the west edge of the Porcupine Hills. The lift was good, about 15 ft/sec in the best parts and 10 ft/sec average over wide areas."

Exhilarated and cold, Bill had landed, but he was unable to lift himself out of the cockpit, and when assisted by his friends, he could not feel his legs touching firm ground. Cook's oven was waiting to brown the bread for the evening meal, but his frozen limbs went into the fire instead, until the flames pumped blood and warmth back into them. Al Foster confirms, "I saw him sticking his feet into the fire!" Bill had made contact with the wave and his fascination with it had not left him until the bitter cold demanded descent. He had left the ground only lightly dressed for a summer thermal ride. There had been no oxygen on board, and the day had been busy and tiring. Unfortunately, the barograph quit at 18,000 feet and he was unable to get full credit for his flight. However, this was the beginning of wave flight in Canada.

Sitting near the fireside and with life returning slowly into his icy body, Bill came upon the idea to document all flights for those who would follow. Also, in these days, any information on meteorological conditions was valuable, and everybody wanted to be first to taste a lenticular. They named this first journal of wave flying *The Cook Book,* which is reproduced in Addendum I. It was the beginning of many explorations and discoveries of the Cowley Wave.

The nature of the roll cloud became better known, but often tows to the wave needed to go through great rotor turbulence. Most of them had been survived, even though gliders and towplanes stood straight up into the air or were thrown about, and many times a quick release was the only action possible before the pilot would lose entire control of his ship. Tows were long from Cook's field, sometimes 30 to 40 minutes; the pilot had to be in good condition, both physically and mentally, to outride the unexpected dangers of an innocent looking rotor cloud or clear air turbulence. Yet the challenge overruled, and more and more expeditions flew towards Centre Peak to research the wave phenomenon.

The era of discovery had come at last. When conditions for high flights looked good to our airmen and flights across the airways could be expected, they contacted Calgary tower by telephone, advising them of their activities; yet it remained quite a sporadic system. Radios in gliders were unheard of, and oxygen ..? Some pilots were able to secure war surplus oxygen equipment.

Some years went by, challenging the wave became more normal, but every flight revealed the many variations: rotor clouds, lift, sink, indistinct and difficult wave, very windy conditions … It had become clear that the morning and evening hours usually offered the best wave action.

Flying equipment improved: an LK-10 and more 1-26s were owned, as was Julien Audette's new 1-23G, ZDO. Pilots began using the secondary wave, picked up over Lundbreck Falls for shorter tows and smoother rotors. They could gain sufficient height, then traverse over the area of severe rotor and strong sink downwind of the primary wave to finally reach its smooth lift above Centre Peak. Six thousand feet could be lost in such a maneuver however, and a high airspeed "dive" was needed to battle the headwinds and the primary down.

Flying from Cook's field was a challenge. Pilots with various degrees of skill often launched on a first try in unknown equipment; power lines crossed the east end of the strip causing hazard to pilots and aircraft. The clubs had their own towpilots but just adjacent to Cook's strip lived Ted and Enet Jensen. Both were pilots, and both offered to tow in return for time on the Tiger Moth.

The knowledge of the wave and the caution with which this giant cloud had to be approached had grown immensely. It was a puzzle pieced together from many little parts which are captured in The Cook Book, in many letters and the reminiscings of many happy pilots.

The early wave camps

Harold Eley

IN 1957, two Regina members, Rusty Chapin and Bob Cheston, ventured west to try their luck with Bob's recently acquired Fauvel AV-36. They were more than successful and Bob's flight earned him a Canadian height gain record. After two short flights, he took off again from Cowley airstrip in his oxygen equipped ship, towed by Rusty in the Tiger Moth. Bob describes the flight *(from "Cloud Street", the Regina club bulletin)*:

"We took off at 5:50 pm and headed south along the road west of Cowley airport. We encountered fair lift for six or seven miles along this southerly tow. It seemed like wave lift, but we were still a long way from home strip, so I didn't like to release. We then went southeast toward Pincher. There was no lift until we got close to the town. I released at about 6500 and scratched around for more than half an hour. With some height to spare,

Bob Cheston

1957 – HRO, piloted by Bill Riddell, takes off at Cook's field. This French designed flying wing, the Fauvel AV-36, became Canada's first approved homebuilt. The "Fledermaus" (the Bat) was built by Bill and first flown on 27 June 1954.

I headed west to see what there was. About two miles west, there was lift, quite narrow, but it had some length to it running north to south. I worked it crab fashion for wave. It was difficult to stay in, but I was gaining. After I got to 8000, it seemed much easier to stay in and I was gaining faster. The higher I got, the easier it seemed. My position was gradually moving upwind with longer beats. As I neared cloudbase I shifted my position further west to be well clear of the cloud. The lift was smooth and steady except near cloudbase where I encountered slight turbulence. At 17,300 feet the lift was lessening. This was plenty of height for my Gold C gain – my real objective*. I was 2 or 3000 feet over the stationary cloud top. I drifted downwind over the cloud to explore the lift and it became less until directly over the cloud, where was none. I flew upwind again, had a look around and took pictures. My position was six or seven miles southwest of Pincher Creek. After this relaxation I decided to take on more height. Upwind the lift increased. The first time I had not been far enough upwind. This time I thought I would put it to 18,000 but before I finally left the lift the altimeter showed 19,300 feet and level with some thin wispy cloud. I decided to land, and set off downwind over the cloud top. Well clear, beyond the rear of the cloud, I applied flap brakes for the descent. After landing, Locke Robertson had time to make a flight in the same wave to around 12,000 feet before dark. It was an interesting flight and relatively easy compared to thermal flying."

Rusty's record flight began the next day with a tow by Ted Jensen and his Super Cruiser at 5:58 in the morning. He was not to land until nearly five hours later after a climb to 19,750 feet and a Canadian altitude record.

The AV-36 was towed due west of Cook's airstrip for eight miles but only normal lift was encountered. Remembering the slight wind shift overnight, Rusty pulled the towplane's tail

* *A Gold height gain is a climb of 3000 metres (about 9600 feet) above the low point of the flight after release. A Diamond climb is 5000 metres (about 16,400 feet).*

Doug Currie

1960 – Ralph White (the large fellow on the right) and his baby, Cu Nim's Tiger Moth.

Harold Eley

1958 – The crash of the Tiger Moth. The glider pilot got very high on the tow run, and the tug was pulled into the road at the east end of the strip, where it flipped over.

around in order to fly more towards the south. Weak lift was encountered over a triple ridge formation at 5500 feet but release was not made until 7500 feet was reached. After losing some height, Rusty relocated the wave and soon learned not to drift out the back side. At the end of his first climb he was at 18,700 feet and had moved back to 15 or 20 miles south-east of Pincher. He was able to move forward to contact the wave again at 12,800 over the triple ridge. This time he climbed to 19,750 and was about 15 to 20 miles straight south of Pincher. He then considered moving west to where the wave clouds were beckoning even higher, but a low oxygen supply dictated that he land. Rusty landed back at Cook's airstrip at 10:55, 4 hours and 57 minutes after takeoff from Cowley. He described it as a flight of a lifetime.

(Bob's and Rusty's flights covered a different portion of the wave than is used today. They were both south or southwest of Pincher Creek. Bill Riddell's flight was flown over the Porcupine Hills and the Livingstone Range.)

After the success of the previous year we were all anxious to try our luck. A summer camp was organized in 1958 by the Calgary club and I was not going to miss it.

The trip out that first time was more of a story than the actual flying. That trip took three days! I had my wife Elinor and two boys along, and the plan was to fly at Pincher Creek *[Cook's strip]* and camp at Waterton. Our CFI had entrusted me with the club's pride and joy, the Cinema II glider. I was somewhat surprised that Julien Audette had put such faith in a comparatively newcomer as myself, and it certainly gave me a good feeling. Little did he know what I was in for because I ran into a terrible windstorm on the highway at Herbert, Saskatchewan that almost destroyed everything. The glider swung out almost at right angles to the car, but I inched along and was able to get into a sheltered driveway. After a few hours we judged the wind had let up some so we continued to Swift Current, where we found our motel reservation had been cancelled. After another fifty miles we gave up and pitched our tent on an approach with the tent anchored to the car. At daybreak the wind was still strong but we pushed on to Medicine Hat, Alberta and took a motel for the day. The next day was fine and we arrived in Pincher Creek with no further adventure.

The same trip had been made somewhat later by Julien Audette and his 1-26. Bob Cheston, Norman and Doug Eley and the Fauvel AV-36 arrived shortly after I did. Both groups had missed the storm which I had fought so grimly.

That first trip to Pincher Creek and Cook's was somewhat disappointing because the wave failed to materialize but several good soaring flights were made in thermals. I remember well the Tiger Moth towplane. It was Ralph White's baby and he insisted on keeping it respectably clean. Climb rate was fairly slow, especially with a ham-handed pilot like me in the Cinema. However, with the use of thermals, tows were quite satisfactory. But the Moth was marginally sufficient to get the Cinema out of the field in light winds. In fact, after takeoff we deliberately dropped the glider down to allow the towplane to clear the fence, and then lifted ourselves over. This marginal rate of climb may in part have been responsible for the crash of the Tiger Moth later that same week. Bob's Fauvel was being flown by a somewhat inexperienced Calgary pilot. He got very high on the takeoff run and the tug was pulled into the road at the east end of the strip, where it turned over. Pilot Ralph White was injured, but fortunately recovered after a few days in the hospital. So ended my first trip to Pincher Creek. Wave flying experience would have to wait.

For one reason or another I did not go to Pincher Creek in 1959. However, in April of 1960 we were at it again. By this time, the Eleys had acquired Al Foster's 1-26 and we were anxious to give it a workout. As usual, the trip out was again a big fight against a nasty headwind. Norman, Wilbur and myself were proceeding with caution. As we passed a gas station at Gull Lake we were surprised to see Julien and his sons, Doug and Bob, standing by with their 1-26.

He came out to talk, and asked what we were doing in this terrible wind. He decided if we could go, so could he. But by the time we got to Medicine Hat, we had had enough

indeed! We pulled into the airport and we talked the terminal manager into allowing us to sleep on the waiting room floor. We bedded down thankfully, without air mattresses. Oh, my aching back!

At six o'clock the weather office reported light winds. We pressed on in a beautiful morning and arrived at Cooks about ten o'clock and were greeted by Harold Townsend and Ross Grady. Harold had flown the Auster over the hills from Calgary. Ken Collins then pulled in with the 1-26, and a short time later, Bruce Hea and Ralph White arrived with the 1-19.

Soon, all the machines were assembled, including the TG-3, Grady's LK, three 1-26s, and the 1-19. We had six machines in all. A few trial flights were made, but the day proved to be poor. The next day, Saturday, was bright and clear after a skiff of snow. Several two hour thermal flights were made.

Sunday was different. This was it! At five in the early morning hours whispering began in Cook's basement where we slept. A few hurried peeks out the window and a report from one brave soul who went out for a good look, convinced everybody that there was wave. By 5:30 everyone was on the strip. The three 1-26s were ready first and a flip of a coin decided the takeoff order: Collins, Wilbur Eley, Audette. By six o'clock the first machine was airborne. Tows with the Auster ranged up to thirty minutes and release heights from 1500 to 7500 above ground. By nine o'clock, all the machines were back on the ground. Wilbur had turned up missing until a phone call gave his position as ten miles southeast. He had been down to 7000 and back up to 13,000. Meanwhile he had drifted away from home base and landed near a friendly farmhouse where he collected a good hot breakfast. One air retrieve later every glider was back on the field.

By noon the wave form had changed. To the north lenticulars had built up in layers to 20,000 feet. These repeated in distinct units every ten miles and gave good indication of where the lift was. Wind on the ground was slightly south of west at 30 mph. Several gliders were towed aloft. Collins reported back with 20,500 feet, and Grady was next with 25,000. White went up in Collins' 1-26 and Townsend in the Audette/Jones 1-26. Finally it was my turn. I had some misgivings about the high winds but was strapped in with a full bottle of oxygen and a parachute. At first the tow was uneventful, but at about 5500, severe roughness made me wonder what I was doing there. Full control barely kept the glider from doing aerobatics on tow. The roughness continued all the way to the wave cloud. Finally, after 25 minutes and at 8500 indicated, the towplane waved me off—I was there!

In a minute or two the lift became startlingly smooth and at 9 m/s. In a short time I was at 12,000 and fumbling with my oxygen mask until I finally found the combination. I flew at 45 mph which kept me about one-half to one mile in front of the lenticular. I fixed my position in relation to a road and had no difficulty staying in the lift. Twice I had to circle back when I had moved too far forward. Climb rate was very good and though it gradually diminished it never got below 1 m/s. The second time around the short hand on the altimeter was unforgettable and it was a real thrill when the 20,000 mark was passed. My high point was 22,700; position in the lift was about 5 miles north of Lundbreck and a good 15 miles northwest of Cook's field. During the climb, the mountains seemed to be

only 5 or 10 miles ahead and it gave me some satisfaction to be looking down on them from 20,000 feet. After looking around a bit more and exploring over the top of the cloud I thought I'd better head down.

Navigation back was alarming as I had never been this high before and the perspective was all wrong. I didn't know where Pincher Creek had got to! I did a steep 360 and saw that Cook's field was practically right under me and a bit to the west. I was now at 18,000 and descent was difficult. Sink rates were only 2 m/s, even at 90 mph. Spoilers helped some, but losing all that height was a slow process. Below 10,000 I had to slow to 50 mph because of roughness and this made losing height even slower. I finally touched down after a flight of an hour and three quarters.

This day proved to be the most successful one to date for the Cowley Wave. I was pleased to have been a part and to have achieved my Gold climb. In all, five Gold climbs were attained by Julien Audette, Ken Collins, Ralph White, Ross Grady, and myself, Harold Eley.

The following year, 1961, Pincher Creek was again beckoning. After the success of 1960, we were at it again for the Easter weekend. In fact trips were made the first two weekends in April. They were becoming traditional, with a start about noon on the eve of the long weekend. We arrived at Pincher Creek a little after midnight. Motels were a luxury in those days, and in any case we had a standing invitation from Alvie Cook to sleep in his rumpus room. About one in the morning we were quietly blowing up air mattresses and rolling out sleeping bags to the occasional chorus of "shush … quiet" from the twenty or so bodies scattered around the floor like fallen warriors. Alberta and Saskatchewan clubs were well represented at the camp. From Regina and Saskatoon we had Julien's new 1-23, Bob Shirley's LK-10A, George Redzich's Fauvel, and the Eley 1-26. From Alberta was Ross Grady's LK "Creepee", Edmonton's TG-2, Kurt Weiss' Bergfalke, Calgary's TG-3 and 1-19 and a second Fauvel. We also had plenty of towplanes, two Austers, a Pacer and Regina's Super Cub.

On Friday, wave conditions were good except that overcast made it unusable for most of the day. However, Wilbur in the 1-26 and one other glider flew to 17,000 feet.

Saturday was my day for a Diamond climb! A chinook arch extended across the cloudy morning sky. By ten o'clock, much clearing had occurred and lenticulars began stacking in rows north and west of the field. Some initial flights were made with varying success; but conditions were improving. At 1130 I was buckled in, this time with my oxygen mask in place and away I went behind the Pacer. A tow of 12 minutes brought us under the leading edge of the secondary wave cloud. First we passed through an area of strong "down" but soon reached lift and I released. I continued forward at 60 mph until the best lift was obtained.

Our variometer is a vane type reading 0 to 10 m/s lift, and 0 to 10 m/s sink. It was a strange sight to see the hand right on past the 10 m/s mark on the climb side and around to the 8 mark on the sink scale. At this point the climb rate had to be nearly 2400 fpm. This terrific rate of climb continued on for four or five minutes, but the lift was so silky it was difficult to realize you were actually ascending. Lift gradually slackened and after 20,000 feet

Bob Cheston

1957 – A fine group of men gathered in front of the unfinished Cu Nim hangar at Cook's field; Al Foster, George Ryning, Frank Matthews, and John Robertson.

Bob Cheston

1957 – Rusty Chapin is ready to try a wave flight at Pincher Creek with Bob Cheston's recently acquired Fauvel AV-36.

Harold Eley

1962 – Gliders are rigged and patiently biding their time in the shadow of the wind. The "Weihe" heads the team at Cook's airfield.

it was down to 1 or 2 m/s. Several times I found myself backed out of the lift as I thought the wind was about 45 mph, when in reality it was more like 60. After searching around and experimenting with speeds I reached my peak height of 25,000 feet indicated.

The best wave seemed to be parallel to the Livingstones. This area of the mountains has a uniform ridge for a considerable length. The clouds on this day were of a strato-cumulus type and were capped by smooth lenticulars in the areas of good lift. Clouds were based at 8000 feet and topped out at 16,000 — both these heights are above ground. Clouds were about three miles front to back and sections were about five miles long and covered about one third of the sky. The mountains were often totally obscured. One of the beautiful things about climbing in the wave is the extreme smoothness. However, I was surprised to find that on proceeding down, the very strong "down" air between waves was equally smooth. Using the down air, I was soon at our alternate strip at the Cowley field. Many other good flights were made on that day. One of these was by Bob Shirley who also attained his Diamond with a climb to 26,000 feet. This was also the day that Julien made his record climbs to 31,000 feet by penetrating to the primary wave. Clearly, Cowley was becoming a reliable site for high altitude flight.

The next day, Sunday, produced only weak wave but Harold Townsend climbed to 14,000 feet. The rest of us headed home but the success of the previous day prompted us to leave our machines at Pincher Creek and return the following weekend. This time my brother Art and his son Arthur flew out, and Norman, Doug and myself drove. Unfortunately no wave occurred this time, so the trip was wasted.

Still undeterred, we ventured yet a third time in 1961 for the Thanksgiving weekend. Flying turned out to be phenomenal; Bob Shirley set a Canadian record for multiplace gliders with a height of 29,000 feet on the Thanksgiving Monday. His passenger was Percy Campbell. Ed McClanahan of Richland, Washington soared to 33,000 feet to establish a new height over Canadian soil by an American. Bob Cheston got a Diamond height with a flight to 25,400 feet. He could have climbed higher, but the altitude limit of his barograph forced him to leave lift of 1000 fpm. Wilbur Eley soared to 22,000 feet, but missed his Gold climb because of a high release. Other pilots making the long trek from Regina were Arthur Eley, Jim Laidlaw, Stan Day and Harold Townsend.

Enthusiasm for the Pincher Creek expeditions continued unabated in 1962. Julien and sons attended the pre-Easter and Easter camps as did several others, including George Red-zich of Saskatoon (AV-36), Bob Shirley of Moose Jaw (LK), Ed McClanahan of Washington (1-23), and Al Wilson of Seattle, Washington (Weihe). Calgary and Edmonton were also well represented. Julien's 375 mile distance record occurred on Easter Sunday, but we do not have reports of the success of our other entrants.

Regina members again attended the Thanksgiving wave camp in 1962. Information on this trip is sparse but I do know that Harold Townsend flew his new BG-12 to 26,000 feet and Wilbur Eley finally got his Gold height by reaching 23,400.

The following years were dry ones for our club; expeditions in 1963 and 1964 did not give us any wave. In 1965 we declined to go, but in 1966 our interest was once more piqued and we decided to have another try. This time we were again successful and Wilbur

attained his Diamond altitude at 25,900 feet. I got to 24,500 before attempting a short goal flight to Lethbridge. That flight was a bit interesting because I had to detour way to the south to avoid the cloud, and was then unable to penetrate back west to Lethbridge. So I landed short of the goal, but from the wrong direction!

The interest of the Eleys, and coincidentally the Regina and Saskatoon clubs, diminished after 1966, although we did attend the fall camps a few more times. Over the years, the Eleys have attended many camps and twelve different family members have been there. No fewer than six of us had a go at soaring in the area. This in itself has to be some kind of a record and an indication of our dedication to the sport. But an era had come to an end for us; the long trips have taken their toll. And everything is changing, no doubt for the better. Few of us would any longer bunk on a basement floor — motels have become a must. The wooden war surplus gliders have given way to modern fibreglass or metal ships. In the meantime, Cowley has been launched as a Diamond mine in the west … I wouldn't have missed it for the world.

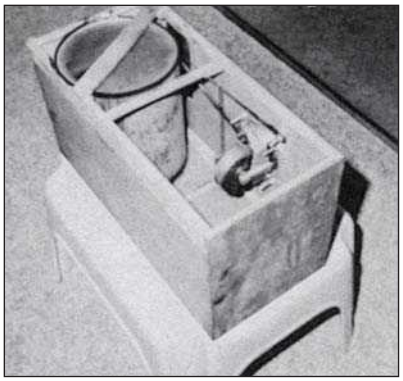
I would like to point out that we went to Pincher Creek and not Cowley in those first years. We based ourselves at Cook's field. The resulting tows were long and sometimes very rough. Three-quarters of an hour between tows wasn't unusual because of the time to go and return. Because of this, and fairly early on, perhaps 1961 or so, there was one faction who wished to set up operations at Cowley airstrip, while another group preferred the security of Cook's place. For a while operations were split and we would start at Cook's and land at Cowley. Some would come back for the night and others would stay over. Gradually, the movers overwhelmed the stayers and Cook's was abandoned. I'm not sure when the last glider tied down there, but it may have been about 1971.

Bob Cheston's homebuilt barograph

Harold Eley

IN 1955, BOB CHESTON needed a barograph, having just bought an AV-36 and looking forward to some good flights. He wasn't about to fork out another two hundred dollars for a store-bought Peravia or Winter. Why not build his own? After long and careful thought, he knew it could be done.

Fortunately, parts were easy to come by. For three dollars he was able to buy a surplus altimeter from Canadian Junk in Regina. This provided the bellows and rocker arm to which he attached a stylus. A five pound Roger's syrup can became the drum, five inches in diameter by six inches in height. This was driven by the works from an old alarm clock salvaged from the attic. Bob mounted everything in a box made from aircraft plywood, and he was in business. Kitchen aluminum foil was fixed to the drum with ordinary mucilage, and a burning candle was used to apply a coating of smoke. Later it was found that burning camphor was a better source.

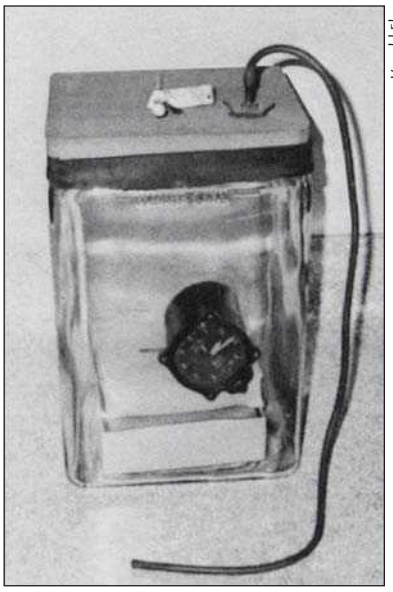


Harold Eley

1957 – The homemade barograph. Visible are the bellows and the clock-work operated syrup can drum (it had a 3 hour rotation).

During the climb the stylus traced a neat line in the smoke, but to make it permanent it had to be 'fixed'. Bob used a hand-pumped fly sprayer filled with diluted varnish to do the fixing. Today one would use the handy clear plastic spray bomb.

Bob also set up equipment to provide an unofficial calibration. The heart of this device was a large glass battery jar from an old farm power system. The barograph was placed inside the jar along with a reliable altimeter and the top was sealed with a wood cover. Vacuum was obtained by connecting the jar top to a car manifold, and the vacuum was controlled by a bleed valve. The foil trace could be compared to the altimeter readings by 'stepping' the vacuum.



Harold Eley

A battery jar that was modified into an altitude chamber to calibrate the barograph.

Although it was a bit unwieldy, the barograph was eminently successful. The "Cheston #1" worked well to a maximum height of 25,000 feet at a rotation rate of three hours. Secured behind the pilot's head in the Fauvel, Bob used it for all his cross-country flights as well as his record climb at Cowley in 1957 and his Diamond flight in 1961. Bob also loaned it to several others fortunate enough to record Gold and Diamond climbs. In every case the traces were good and, after official calibration, were fully acceptable to FAI. Today, this artifact decorates the mantle of Bob's home in Regina.

1960 – Perceptions from up front

Harold Townsend, from *The Cook Book*

AS A FIRST CLASS TOWPILOT, Harold Townsend of Regina shared with the glider pilots fun, excitement and discoveries. On April 15, 1960, he enriched *The Cook Book* with his observations and advice:

"As an introduction to the most successful wave flight expedition ever conducted at Pincher Creek, I am writing this preface from the viewpoint of a towpilot, with the hope that this may assist future pilots in more easily finding and utilizing the primary wave.

At 4:30 Sunday morning, April 17, skies were covered by a high overcast extending eastward from a sharply defined arch extending north and south over the Livingstone Range. Winds at the airstrip were light westerly, becoming variable in the next hour or two, swinging from west through north and remaining light, although by midmorning they became westerly at about 30 mph. First launches by airtow were underway to the west by 5:30. Immediately after takeoff, reasonably strong lift was encountered at about one thousand over the highway. At first it was felt this was the result of a steep wind gradient; however, as the lift persisted over a larger area, most flights eventually released in this area at between a thousand and two thousand feet. In the meantime, the arch was slowly moving eastward, with very well defined lenticular action showing up along its edge in the morning sun.

All sailplanes launched encountered strong lift over a large area extending across the wind from Pincher Creek to Pincher Station. However no one was able to reach altitudes higher than 12 to 14,000 feet msl. Conditions were smooth, and no difficulty was observed during aerotows at this state. By eleven o'clock most flights were down, with a general feeling of disappointment. By this time the arch had moved east of the strip still showing strong wave forms. Also, a classic lenticular had now formed high over Frank and another was working about 6 miles south of Cowley and just east and parallel to the Livingstone Range. Feeling this was an indication of the primary wave, I towed Ken Collins in the direction of Cowley in somewhat turbulent conditions. Penetration under the southern end of the lenticular east of the Livingstones (which put us just north of Cowley) proved to be extremely turbulent, however, upon reaching a point just upwind of the leading edge of the lenticular, we ran out of the turbulence into very smooth strong wave lift; this at about 7000 feet. Here Ken released and I returned to tow Ross Grady out to the same area. Again the same turbulence, although worse under the cloud. Ross hung on until about 6 to 8 miles north of Cowley where he too released in strong lift. All remaining flights followed the same routine with the resulting observations:

1 On this day, the primary wave was definitely close in to the mountains as described.
2 Although no roll cloud was evident, it is felt that flying on tow under the cloud placed us in the rotor area. It is strongly recommended that tows should be conducted well clear of the cloud (to the south) at relatively lower altitudes, which I believe would reduce the turbulent effect. Also, much higher height gains are, I'm sure, possible, as we were all towing to 7 or 9000 feet. A recommended practice would be to tow over at 1500 to 2000 feet west of the cloud, then climb by beating back and forth north-south until lift is encountered. Although this is surmising that the wave will be encountered in the same relative place, I feel this to be the case, because of the nature of the Livingstone Range."

✦ ✦ ✦

Altitude records had been flown in eastern Canada in exploration of convective cloud. When the wave in southern Alberta was discovered in the mid-fifties, flights without oxygen had been made to 20,000 feet. Now was the time for better preparation and equipment.

Julien Audette had his eye on records and was the keenest hunter of long and high

flights, and many times travelled the 450 miles from Regina to Pincher Creek, his 1-26, and later his 1-23G in tow. He constantly sought advice from the weather office in Edmonton. They gave him winds, directions, encroaching airmasses, temperatures as best they could, even though the wave was not well understood by them. Julien felt that "pilots must assimilate all the information they can obtain from a forecaster, and then use their own judgement and skill. This is the only way one can improve personal ability in assessing weather conditions." Julien was then most eager to report on the actual weather after he had returned to his hearth in Regina. The meteorologists greatly appreciated his after-the-fact reports as this information helped future forecasting.

Julien also had the fine ability to document his findings and to expand experience and knowledge in letters to his friends. 1 April 1961 arrived, the day of the annual wave hunt. For Julien, it meant a Canadian altitude record.

1961 – The first time through thirty thousand

Julien Audette

A PERSON CAN PLAN for an expedition such as we were attempting for weeks, but it always seems that one thing at least is missed. I felt my new Schweizer 1-23G was ready with all the holes plugged to keep the cold wind out, necessary instruments installed including electric turn and bank with battery; a frost shield thirteen inches by twenty inches, new Zep diluter demand high pressure oxygen system installed by Schweizer, and a parachute.

Keeping the body fit and warm is also one of the most important aspects of high altitude flying. I wore a suit of 100% Dacron lightweight insulated underwear covered by a flying suit. Air Force type overshoes went over my shoes, and a pair of woollen mitts completed my attire except for my headgear. When I unpacked the new oxygen mask at Pincher, the realization came that I had forgotten one of the most important items — a helmet. Fortunately, this was borrowed from George Redzich, and I was all set.

With a high pressure area covering the northwest United States and a low pressure area situated in northern British Columbia, 1 April 1961 dawned as a day suitable for wave soaring. Pincher Creek weather office reported AC lenticular type clouds from two in the morning to five in the afternoon with surface winds increasing throughout the night until dawn. Surface wind speeds are plotted from two in the morning until nine in the evening. I am indebted to Jeff Quine and his staff at the Regina weather office for their continued help in supplying me with this and other information. Now with a weather office in Pincher Creek, information is more readily available at the field.

By six on Saturday morning, the majority of the pilots were assembled at Cook's airstrip, and the first flight was made shortly thereafter. Conditions were changing rapidly, and although there was evidence of lenticulars, there also appeared to be too much cloud cover.

Doug Currie

1961 – Alvie Cook had built the hangar and installed a gas pump for his Cessna 180. Julien Audette's 1-23 is ready to tow to the wave.

My first takeoff was made at about 0830 and I was towed to about 8000 feet msl without signs of any lift whatsoever. This being my second flight in the 1-23G, I took the opportunity to feel the machine out.

After returning to the field, the cloud cover appeared to start breaking up, so another takeoff was made at ten after a discussion with Doug Currie, the Regina club towpilot. Doug was to tow me towards Cowley airport northwest of Cook's field, skirting to the south of the roll cloud which had developed below a lenticular in that area.

The tow was moderately rough until the vicinity of the roll cloud at which time it became quite turbulent. At about 6500 feet, strong up and down currents were encountered, and then fairly steady lift of 1000 to 1500 fpm. Release was made at about 7500 feet. Momentarily, I levelled off to establish a position on my Peravia barograph, still penetrating to the northwest. Suddenly, from mildly turbulent air, everything became dead quiet. The VSI came to life and in a flash it went from zero sink to the stop indicating 2000 fpm up with the altimeter winding at a fast rate. This rate of climb continued for several minutes and only started to slow down at about 17,000 feet. At 20,000, the rate of climb was about 3-400 fpm. By flying back and forth in this wave a maximum altitude of 22,500 was attained.

A huge beautiful lenticular five to six miles west of my position indicated the primary wave. Being unable to climb any higher in the secondary, a quick decision was made to try to penetrate the primary wave area, this lenticular being several thousand feet below me. Heading west at 90 mph, the downside of the primary wave was entered and the VSI, of course, went right over the pin indicating 2000 fpm down. I was amazed to find no turbulence of any kind while going from one wave to the other, either in the up or down. Approaching over the lenticular cloud, I had the feeling I wouldn't make it across the top, so immediately increased the speed to 100 mph while losing height madly. At 16,500 feet, about four-fifths of the way across the lenticular, and just skimming over the top, the

needle left the extreme down side of the VSI and started to climb. Immediately speed was reduced, and I was climbing at full indicated speed in the primary. My position was now 4 miles from the eastern edge of the Livingstone Range and 10 miles north of Burmis. This would be around 22 miles northwest of Cook's field. My speed was mostly in the 60 to 70 mph range and in a westerly heading to maintain position in the wave.

As I was attempting to obtain my Diamond, again I watched the altimeter climb quickly past 24,000 feet. By flying back and forth in an area slightly in front of the lenticular below me, I was able to locate the area of greatest lift. Passing 29,000, I glanced over my shoulder at my 8000 metre Peravia. It was indicating just under 7000 metres. I had set the start slightly below zero before takeoff to give me the highest altitude possible. Around 30,000 for some reason, I looked again. To my dismay, the Peravia had stopped indicating upwards. I then decided to take a few colour shots of my panel and altimeter with my 35 mm camera. At 31,000, I was still indicating 600 fpm up, with no sign of let-up.

Taking a picture of this altitude, I decided to return and start again. How much higher I could have gone I will never know, but I am sure it would have been several more thousand feet after comparing this ascent with my second flight a couple of hours later. The only discomfort I felt on this flight was being slightly cold in the behind as I had only taken a very thin sheet of foam rubber to sit on and the metal seat was just like a cake of ice! My body was quite comfortable otherwise. There is no doubt that a frost shield is a must for wave flying. It kept that area of the canopy completely clear. Several pictures were taken on the way down, and one of the altimeter after landing. This flight lasted one hour and 34 minutes. From the barograph trace, my rate of climb was as follows: first five minutes averaged 1706 fpm, first 19 minutes averaged 795 fpm. The rate of descent from secondary to primary in five minutes averaged 1312 fpm. The total gain from release to 31,000, including descent to primary, averaged 420 fpm.

The Great Falls 300 millibar (30,410 foot) temperature for 0600 MST was –46°C, or –50°F. The wind at 31,000 feet was recorded at 91 knots from 320, but I would estimate the wind at my altitude to be from straight west.

Discussing my first flight with Dave King *[SAC vice-president at the time]*, who was at Pincher, he suggested taking photographs of the altimeter. The altimeter was sealed by Dave*, I refueled the oxygen system and had a bite to eat. After discussion with towpilot Doug Currie, instrument pictures were taken on a new roll of film and takeoff was at 1350. During this flight a series of pictures were taken of the instruments on tow, off tow, at various altitudes, at maximum altitude, and then after landing.

Lenticulars still showing in the same area, the tow was made much like the previous flight. Doug kept the tow quite low and release was made in good lift at about 7000 feet msl. Again, the flight was quite rough even more so than the previous flight. Smooth wave lift was encountered by penetrating to the forward edge of the lenticular and a rapid ascent was again made passing the lenticular cloud at about 17,000 feet. We were now about 8 miles east of the Livingstone Range and 11 north of Lundbreck, about 20 miles NNW of

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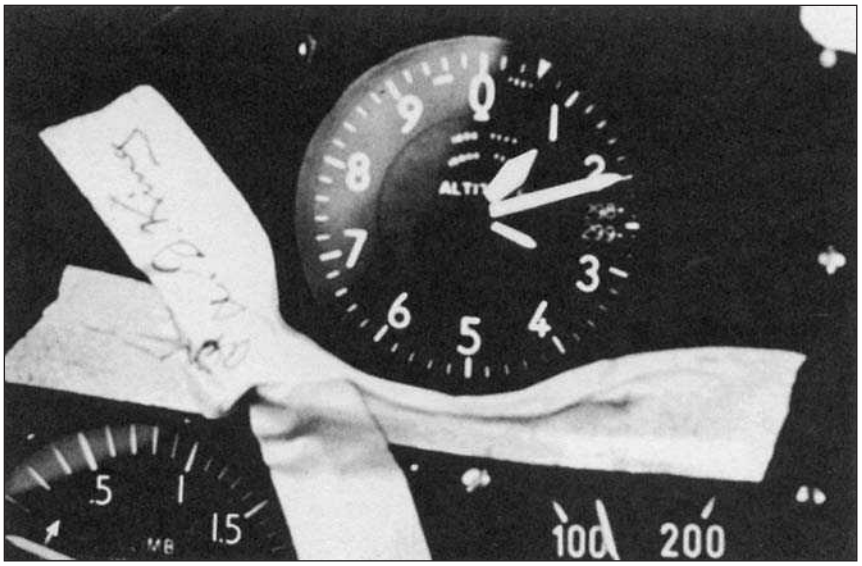
* *The procedure of sealing the altimeter and photographing the indicated altitude is no longer permitted.*

Julien Audette



1961 – A photo of the sealed altimeter was taken at the peak of the climb to prove the altitude record.

Cook's field at Pincher Creek. This appeared to be the primary wave area as there was no other cloud formation between us and the mountains. The lift area appeared to extend three to four miles north and south, windward of the lenticular, but only for a very short area east and west. A speed of 70 mph was required to maintain position until 25,000 or so, the area of lift became very small and a speed of 80 mph indicated was required, and this, of course, reduced the rate of climb. A climb rate of around 500 to 600 fpm was maintained to about 27,000 feet, then the rate reduced to about 200 to 400 fpm. Several times the area was explored to locate an area of greater lift, and when an area was found all I had to do was head into wind which was now about 15 degrees north of west. A road and river was of great help to keep me oriented into the lift area. Rate of climb was doubled by reducing speed to 60 mph, but eventually we drifted back too far and rate of ascent decreased, only by increasing speed to 80 and 90 was the lift increased again and a speed of 70 to 75 would keep us stationary.

A maximum altitude of 31,250 was finally attained and a photo taken at 31,200 indicated on the altimeter. This was about the maximum altitude that could be obtained considering the speed which was required to remain stationary. In any event, feeling slightly tired, but jubilant, I decided to return to the field. No attempt was made during the flight to penetrate further west. The barograph I could see had again acted in the same manner as the previous flight, and stopped indicating upwards at about 7000 metres.

Descending from this altitude takes a long time, but two hours and one minute after takeoff I landed at Cook's airstrip, the surface wind from the west now gusting to 65 mph. Flying under such conditions can be treacherous, and as everyone knows, this can only be accomplished by the help of many soaring enthusiasts. I would personally like to thank all who helped and particularly, president Ralph White of the Cu Nim club, and members of his club. The Cook hospitality, of course, is wonderful and deeply appreciated by everyone.

Final pictures of the instruments were taken after landing. Dave King took possession of this film, mailed it to Kodak in Toronto to be returned to him in Ottawa. The altimeter was removed and it, as well as the barograph, were sent to George Ryning of Calgary for calibration. I estimated my absolute height to be 31,200 and gain of height at 24,100 feet, both of course subject to correction after calibration and acceptance by the Soaring Association of Canada. *[The approved absolute altitude was 30,630 feet, and the approved gain of altitude was 23,320 feet.]*

The average rate of climb for the first 12 minutes of this flight was 985 fpm, while the complete gain of height averaged 370 fpm.

The Schweizer 1-23G flew better than I anticipated and except for stiffening of the aileron controls at maximum altitude (this was partially due to a considerable amount of grease being on the push-pull rods at the fairleads) it behaved perfectly. Needless to say, these two flights have been one of the greatest thrills of my life, and no one who has not experienced it can imagine the terrific quietness which prevails in the wave.

… The only comment I would like to make is that any pilot attempting this type of flying owes it to himself and to the sport to be prepared and to use proper and safe equipment. The winds and turbulence encountered can turn any flight into a catastrophe if the utmost caution is not exercised.

1961 — Advancing into the stratosphere

Ed McClanahan

AN INVITATION from Julien Audette to members of our local soaring club to participate in a wave expedition to Pincher Creek was a temptation too great to be denied. The Regina and Calgary clubs were sponsoring the camp 7-9 October 1961; just one more flying before the winter doldrums set in.

Despite the 470 mile journey, the odds of three wave days out of five for October quoted by Julien seemed ample. Rudy and Mary Ann Allemann decided to take their Ka6CR; and Molly, Kathy, Tina and myself our 1-23H. Jim "Ace" Hard offered his service as crew which was immediately accepted.

We began our journey northeastward amidst a dust storm which turned to rain as we neared Spokane, Washington. We crossed the border and cleared Customs with relative ease; however, the Canadian officer's gloomy report of a blizzard raging in Crowsnest Pass left us a bit uneasy, but this also meant the wind was blowing — hooray. We crossed the Crowsnest Pass shortly after midnight and found it snowing quite heavily with six inches on the ground, and yes, a wind was blowing about 15 mph from the northeast. We located our motel about two o'clock in the morning and found our Canadian cohorts waiting for us with quite an adequate supply of the Pride of Canada. Their first words were something to the effect that you might as well join us and succumb to hypoxia the easy way, for there will be no wave flying until Monday. So we did.

Saturday morning a haggard Rudy and Mary Ann greeted us. They, in contrast, spent the wee hours of the morning extricating their car and trailer from a buffalo wallow encountered on a "shortcut" to the airport. Later, Joe Robertson and Frank Woodward from Seattle made their muddy appearance with a similar tale. The rest of the day was spent shopping and harassing the local weather office. Low clouds with occasional snow flurries persisted throughout the afternoon. The weatherman predicted it would clear late Sunday afternoon with a fifty-fifty chance for wave conditions on Monday.

Sunday we awoke early to find the air crystal clear and very still. After breakfast an almost imperceptible wind from the west was noticed and a small dot of a cumulus cloud appeared on the eastern slope of the Livingstone Range 18 miles west of us. Such a tiny cloud might easily be overlooked as a spurious event but its true significance was betrayed by long banners of snow being swept from the summits of the more prominent peaks.

An hour later a cloud fall developed over the range and the now enlarged rotor cloud was crowned with a well-formed lenticular. Cook's field suddenly was alive with pilots and crews assembling gliders, filling their oxygen tanks and fueling tow-planes. The Canadians are indeed fortunate in having a patron such as Mr. Cook who opens his spacious home and convenient airstrip to glider pilots on these occasions.

By noon, all ships were assembled but the warm wind creating our wave had melted the snow which had covered the runway and turned the latter into a sea of mud. A close inspection revealed that it was drying fast. A muddy patch between the assembly area and the end of the runway was bridged with planks to forestall wheel clogging on the sailplanes which was inevitable on takeoff. Harold Townsend slithered off first in a 1-26. The 2400 foot runway didn't appear any too long. The towplane was back in 40 minutes. The wave was working fine but the air was quite turbulent.

Doug Currie

This is Ed McClanahan of Washington. An invitation from Julien to participate in the wave expedition to Pincher Creek was a temptation too great to be denied.

I was next with Molly and "Ace" Hard tugging on the wing tips and Rudy keeping the tail low. Once airborne I missed the familiar sound of the spinning main wheel. Doug Currie, the towpilot, had taken "Doc" Laidlaw along as co-pilot to increase the latter's wave towing experience and to admire the golden quaking aspen against their snowy background.

To reach the lift zone we towed through a small gap in the Porcupine Hills after failing to climb over them. Now we were just below the base of the rotor cloud which rose vertically for over a mile and in front of us the föhn wall was spilling down the Livingstone Range. The scene was awesome, beautiful, humbling. The Sunday drive through the country was over. Without warning, the Super Cub plunged earthward nose first; seconds later my camera was dislodged from between my legs, smashing the largest clear vision panel. Mud was liberally splattered about the cockpit and canopy. Then I grew heavy all over as we

were catapulted upward. Later the barograph showed a solid trace 2000 feet high and three minutes wide for this segment of the flight. The game of brickbat between glider and towplane ended on a sustained bounce to 7000, as I released and climbed at 2000 fpm to 12,000 feet before losing the lift. My vision was very limited as a result of cracking the major frost shield, and the smeared mud didn't help. It took an hour and a half to find the smooth wave lift which then took me to 21,500 feet.

The sun was beginning to sink behind the mountains when I started my search for Pincher Creek. During the day much of the snow over the countryside at lower elevations had melted and it now presented an entirely different picture to me. While I could make out the lights of several small towns, which one was Pincher Creek? Molly and Julien were giving me directions over the radio to no avail. It was growing darker by the minute and I had to make a choice; luckily it was the correct one. I located the field by the lights from the many automobiles which were placed on the end of the runway. At this time only Harold Townsend had landed achieving the highest altitude of 25,000 feet. It is significant that the altitude obtained by each of us roughly approximated our takeoff order. All the ships were securely tied down for the night except Allemann's; Rudy and Mary Ann had to return to Richland.

Monday's flight was almost an anticlimax to Sunday's. Activities at the airport started with the removal of each glider's main wheel to remove the accumulation of mud. I replaced the broken frost shield and topped my oxygen bottle. Takeoff for me was at eleven. I was towed upwind of the secondary roll cloud where I released at 7200 feet about 3 miles north of Cowley. I climbed at 500 fpm in relatively smooth lift to 12,000 feet. At this point, either I couldn't work the lift properly, or the lift just wasn't strong in this layer. At any rate, the climb to 22,000 was a tedious one at something like 170 fpm and it was pretty obvious I wasn't going to get much higher in the secondary wave. I had been watching the lenticular formed by the primary wave and when it looked well enough developed I felt I could no longer delay to gamble a penetration upwind. Julien's advice of having 25,000 feet before attempting this kept ringing in my ears. I recalled he had lost 6000 feet in the process and this had also been my experience in wave conditions at Wenatchee, Washington last September.

Having made the observation that the southern flank of the primary lenticular coincided with the mouth of the canyon leading into Crowsnest Pass, I decided to detour around the southern flank hoping to find less sink. I flew at 120 mph, what seemed an eternity, until the variometer showed I was climbing at 200 fpm. Imagine my delight when slowing down to 45 brought the rate of climb to 450 fpm. I lost only 3000 feet in going from the secondary to the primary, and it was sheer relief that I wasn't going to renew my acquaintance with the rotor below me. I climbed at 450 fpm under the lenticular, crabbing at 45 mph, first to the northwest than to the southwest over an area about eight miles long. My rate of climb increased to about 600 fpm at 24,000 and I continued to climb to 33,000 at this rate. By this time I had climbed above in front of the very well developed lenticular cloud, only to find another less well defined lenticular cloud above at about 40,000 feet, and slightly ahead of me.

At this point my mind was more concerned about whether I was getting enough oxygen rather than staying in the best lift, and my calculated rate of climb decreased to 150 fpm. Except for my feet which were pretty cold I was quite comfortable. My movie camera on the other hand failed to operate even though I had kept it under my arm since takeoff. The frost shields worked quite well as clear vision panels. Some frost developed on the exterior of the canopy and wings but hardly enough to affect the performance of the ship.

As I started my descent it was terribly tempting to head east towards Regina but this was forgotten as I became slightly nauseated from the exertion required to open the dive brakes which had not been lubricated properly. This was my first indication of lack of oxygen. Fortunately the feeling passed as soon as I relaxed. When down to 24,000 feet I tried a loop at 110 mph, and for the second time I felt the effects of the high altitude. I would like to have explored conditions to the south but I had the long drive to Richland to consider.

There wasn't time to discuss each other's flight in detail since most of us had long journeys ahead. The results as I remember them told through chattering teeth were:

- Bob Shirley and his passenger to 20,000 feet in an LK to claim a new Canadian two-seat record;
- Kurt Weiss in his Bergfalke "Himmelhund" to 27,000 feet, saving his record flight for a later date because his canopy had cracked;
- Bob Cheston in his AV-36 to 25,500 feet;
- Frank Woodward in his Ka6CR, handicapped by a low oxygen tank, to 18,500 feet;
- Wilbur Eley in his 1-26 to 18,000 feet.

The total: three Gold C and three Diamond altitudes.

"… Judging from the ink marks on the aluminum drum I was at least to 34,000 feet. The top line on my barograph calibrated this spring is 33,000 feet. Harold probably told you I abandoned good lift of 200 to 400 fpm indicated because I had exceeded the altitude range of my oxygen equipment. I wasn't low on oxygen, I still had 700 psi in my tank. The oxygen cylinder we used at Cook's field for refilling wasn't full, consequently I had only been able to put 1500 psi in my tank Monday morning. I should point out one advantage the Reginans have over us Westerners, for dessert after earning their Diamond altitude, they can glide home to complete their badge."

In an answering letter, Julien Audette commented: "… I noticed in attempting your loop you increased your airspeed to 110 mph. You realize that at that altitude and temperature correction, you were probably doing 140 to 150 mph! …"

1962 — Canadian Diamond #1 completed

JULIEN AUDETTE BELIEVED that he had a good chance for a Diamond distance if he could get an early start (0900 CST) from Pincher Creek some day when there were strong waves extending a hundred miles or more beyond the mountains. When the wave came to an end, he hoped to glide a long way, and then make use of thermals that should be starting. In this way he intended to land east of Regina in the late afternoon and thus set a new distance record.

Julien had become a real student of the jet stream and the 300 millibar map, reading (though not understanding the mathematics) all he could find on the jet stream and mountain waves in the meteorological technical journals and magazines dating back for ten years. Julien believed that he stood his best chance of setting a new record if he had complete cooperation from the meteorological branch. He also believed that a pilot does not know much about the atmosphere until he learns to soar. If he would request a special evening forecast on the very few occasions during the summer when conditions would be just right for a distance flight the next day, there was always a possibility that other glider pilots in Alberta would watch for the same conditions.

Another winter had gone by and preparation for high altitude flying was feverishly underway. Julien's son Bob had also taken to the soaring skies and made his 5 hour Silver C duration flight, only to be rejected by the Official Observer (his father). Julien refused because it was "just five hours without margin", and he did not want to be accused of favouring his son. Bob received his driver's licence on his 16th birthday and was now fully equipped and ready to crew at his dad's command. No summer jobs like his brother or his friends — he had to be on standby. Bob remembers that he followed his dad like a puppy-dog — and losing his duration claim always rankled him.

Easter weekend 1962 came, with Julien and his 1-23G again on the road to Pincher Creek from Regina. This time a long cross-country flight was planned. He badly wanted to break the record cross-country flights flown the previous five years by Charles Yeates in the east.

The weather reports in his pocket and his son Bob as retrieve crew anxiously waiting on standby, April 22, 1962 presented itself as a good day for such an undertaking. In *The Cook Book*, Julien wrote:

"… From dawn to about 0730 Sunday morning the sky was full of lenticulars with no one in the air. These all dissipated except for a couple which persisted 20 to 25 miles northeast of Cook's strip. No one seemed anxious to try an expensive tow to explore the area, so I volunteered to tow off as long as I would get preference on a future tow if I returned unsuccessful. I declared Indian Head, Saskatchewan as a goal and briefed Bob when to leave to retrieve downwind, if I didn't return by a certain time.

After having discussed with towpilot Doug Currie the area to explore, takeoff was made at 0947 MST behind the Super Cub. While proceeding about ten miles west of the field,

two small lenticulars which looked like a primary and secondary started to develop just east of the Livingstone Range NNW of our position. Doug struck a course for this area. Slightly turbulent lift was contacted at about 8500 feet, after maintaining a fairly constant rate of climb of 500 to 600 fpm. Release was made 18 minutes after takeoff at 9500 feet, one mile west and four miles north of Cowley airport.

A low of 9400 feet was established. A slow climb in front of the secondary lenticular was made to 20,540 feet in 25 minutes, giving an average rate of climb of 316 fpm. Both primary and secondary lenticulars had dissipated by this time. I would estimate the wind to be from the WNW at 25 to 30 mph. Seeing two lenticulars still active east of my position, an easterly course was set, after losing about 1500 feet. Lift was again felt ahead of the lenticular, about 8 miles northwest of Fort Macleod. The lift was quite smooth, but with a low rate of climb averaging 313 fpm to a maximum altitude of 27,300 feet. At this height lift was still 300 to 400 fpm, but a solid overcast was reached. I decided to discontinue the climb, and set course for my goal 73 minutes after release. My average rate of climb from release to maximum altitude was 244 fpm. I was not to see the rate of climb indicators in the climb area again for 91 minutes, during which time I lost 19,600 feet [gliding down] to 7700 feet msl. This averages out to 226 fpm.

A few scattered cu in the area indicated that thermals were present. The first one brought me back up to 11,000 near the Alberta-Saskatchewan border. Several lenticulars were noticed north of my course, and I made the mistake of heading in that direction; and the first thing I knew I was down to 4000 feet, which was less than 2000 feet over Maple Creek, Saskatchewan. Fifteen or 20 anxious minutes were spent just hanging on until a reasonable thermal gave me a lift to 10,000 feet; two more thermals took me past Swift Current and finally past my Diamond distance. Another good one gave me hope of breaking the existing Canadian distance record held by Charles Yeates of 332 miles, but hope soon faded as I descended to less than 1500 feet above a very hilly area near Parkbeg with no landing fields for miles around. Continuing on course in the hope of stretching my glide far enough to reach a suitable landing area, I ran into another dry thermal, which I gingerly worked up to about 7500 feet. This was my last real lift and my final glide carried me to a landing alongside No.1 Highway, 10 miles east of Moose Jaw, about 30 miles short of Regina, for a total distance of 395 miles from release point, 7 hours and 55 minutes after takeoff. The distance had been reduced to 374.5 miles to adjust for height loss from release to landing ....

My average ground speed from release to landing was 51.8 mph and from maximum height to landing 58 mph. The upper winds were not any more than 20 to 25 mph, and even less at low altitudes.

Apparently, after I took off, and when Doug returned, considerable discussion took place amongst all the pilots at the field and the consensus of opinion was that conditions were not suitable and that I would soon be back. So everyone dismantled their sailplanes and set course for home by car and trailer. My crew were undaunted, and I'm pleased I did not fail them."

1963 — Tragedy strikes

Julien Audette

SAFER WAVE FLYING was evolving at a rising pace, yet the experimenting was not free of tragedy; Julien Audette writes on April 18, 1963 to Paul Schweizer:

"Both Friday and Saturday the air was extremely turbulent due to cooler air below 12,000 feet, forming cumulus with waves above that height. Saturday in particular was extremely turbulent and this was on the day that Larry Huber from Calgary, who had just moved down from Edmonton a year ago, made a flight in his Fauvel AV-36 around one o'clock. He had taken off from Cowley, without a parachute as he had loaned his to another Edmonton member. I was over the exact spot at that time flying at about 15 or 16,000 but did not see the accident happen, and did not know about it until I landed some three hours later. Apparently, after a great wave flight, Larry made one loop at about 1500 feet above ground. Coming out of the loop, he flattened out, then nosed down to increase speed to attempt another loop. When pulling up to start the second loop, his machine blew up and completely came apart in small pieces. I am sure that he must have run into a thermal or extremely turbulent air on his pull up which overstressed the machine. Cockpit, wings, everything came apart around him and he came down by himself, still strapped to the seat.

This type of accident is very unnecessary and can only make the public think that gliding and soaring are dangerous. Most of us realize the dangers associated with wave flying due to turbulence near mountains, and therefore the utmost caution must be taken in regard to overspeeding and overcontrolling the sailplane. This type of accident again proves the value of the strength built into Schweizer sailplanes and I wish there was some way to instill into the pilots who own and fly types of lesser strength to use the utmost caution when flying in turbulent air. But pilots are human beings and do not wish to be told and take any comments as 'sour grapes'."

Curiosity and cross-country adventure

Ursula Wiese

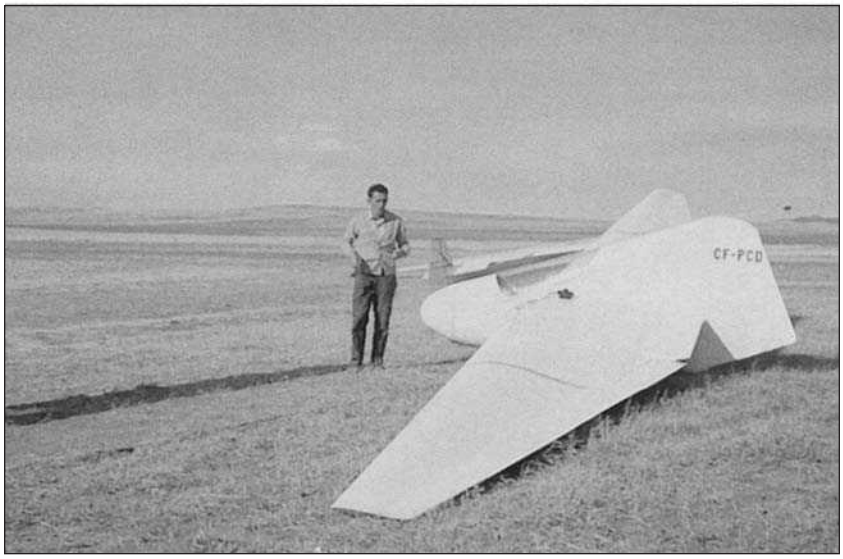
BILL AND RUTH Thudium remember their experience in Pincher Creek with enthusiasm. Bill had joined the Cu Nims in 1954 after immigrating from Germany with a lot of glider flight experience under his belt. Not only had he ridge-soared five hours in the Grunau Baby, but he also flew and landed troop gliders during WWII. He built a BG-12 (RCU) in his Calgary basement and many times soared with her to heights of 29,000 feet starting from Cook's field.

Bill recalls his first wave flight years back in Germany while on a glider training flight fully loaded with ten people. There had been no turbulence on tow and after release he

Bill Thudium

1965 – Bill Thudium built this BG-12 in his Calgary basement and many times soared with her above spectacular lee waves to heights of 29,000 feet. Photo is taken at Cowley.

Bill Thudium



1965 – Mike Kiss of Calgary likes to build and modify his birds. This modified AV-36 shows a streamlined canopy design from nose to fuselage. It took a small pilot to fly the sleek looking ship.

noticed a very smooth and steady climb. "I didn't know this type of lift, but I tacked in the two kilometre lift band for a 1000 metre gain. Back on the ground my instructors thought I had flown the 'long wave' which had come off a low hill near our airbase in the northern part of Germany."

Meanwhile much experience was gained in flying his BG-12 in the smooth wave. In 1966 he ventured west from 29,000 feet to the Kananaskis road, to Frank Slide and Coleman, fighting the wind and 2 m/s sink. After this unforgettable view and considerable loss of height he turned back and cleared Centre Peak by 3000 feet.

Despite his many flights in Canada and abroad, he had never been in the rotor, although those who encountered these violent clouds had come back with the message to avoid

them by all means. Bill's curiosity finally led him into the core. He is still frightened, as he remembers, "The wings were cracking and dangerously whipping up and down. I quickly escaped … unhurt."

On August 20, 1966 he tried a cross-country flight from 28,000 feet gained in the primary and headed east in 100 mph westerlies. But he found only a few bubbles of convective lift near Lethbridge, and he had to land at Bow Island.

Ruth, his faithful wife and crew, told me that she got her driver's licence especially for retrieving! She remembers this call of duty on the way to Bow Island, "The road into Pincher Creek lies crosswind and I was crawling along, when I suddenly noticed in the mirror the monster trailer pushing ninety degrees sideways towards the ditch on the other side of the road; it was just a little toy in nature's blowing air. Barely in time had I been able to avoid disaster and finally met my pilot safe and sound, almost flying downwind on Highway 3 with the monstrous load."

Bill Thudium

1966 – A weather office had been located at the west end of the Cowley airfield. It was later moved to Pincher Creek, and the small brick building on the left is now the only remaining original structure in place.

1971 — 400 km out and return in a super wave

Dick Mamini

ON 3 OCTOBER 1971, I took off for an unforgettable first flight over the Rocky Mountains to Exshaw and back in my HP-14, CF-ALT. It began from a car launch at my cabin at Lee Lake, near Burmis. It should be noted that at the time this flight was made the unofficial policy of the Ministry of Transport was, "We know that you glider guys fly around Pincher Creek but we don't want to hear about it." During 1971, I flew almost exclusively by car launch from a field across from Lee Lake. Quite often André Dumestre would come down and fly with me and on at least one occasion he flew down from Black Diamond, had to land, stayed overnight, was launched the next day and flew back to Black Diamond.

In 1971, I had 125 hours of flying from the car launch and my average flight was over four hours including the occasional day when it took two or three launches to stick. This was quite rare though as usually it only took one launch to get established on the prominent ridge which was downwind of the launch site. To keep my average up there were many days that I flew eight, nine or ten hours.

There were also a few days when getting off the ridge was difficult. One day in particular I spent over four hours on the ridge before a thermal came along and boosted us into the wave. Again this was quite rare as it was usually amazingly easy to transition from car launch to ridge lift to thermal lift to mountain wave. All of these launches were made with only one person to drive the car, usually my wife Gail, and a bale of straw to hold the wing up.

The flight on October 3, 1971 was by far the easiest transition to the wave and went like this, "Take up slack — easy does it — stop". At this point Gail would get out of the car and check that the rope was not tangled and was properly reefed. By the way, the car was out of sight of the glider due to the uneven terrain. "Okay, I'm ready" — "Okay hit it — slower — slower — faster — etc, etc — okay I'm off". The usual launch was about 600 feet for the HP-14 which did not have a cg hook. (André would get about 800 to 1000 feet with the cg hook in the Libelle). After release the usual procedure was to make a quick 180 and head for the ridge to look for ridge lift. However, on this day I noticed we were climbing and I simply did a sort of "S" and headed into the wind; we were in the wave from 600 feet! As I climbed I flew north to get into better wave north of Highway 3.

Normally I would have to stop in a good patch to make it over the bad patch downwind of the Crowsnest Pass, but not this day; we just kept going up and up, and because I was a little short on oxygen I kept flying faster and faster to stay low. But despite the 150 mph we just kept on climbing and heading north. I finally went on oxygen and made the decision that when the [oxygen pressure gauge] needle got into the "pie" that I would head down. Well we were now close to Spray Lakes having run along the leading edge of a huge chinook arch and I decided to turn at Exshaw because I was already into the pie. The run into the cement plant at Exshaw actually cost a few thousand feet where we made the first turn since the "S" at launch. On the return trip we had a quartering tailwind and I flew as fast as possible to stay down.

I was now well into the pie and therefore moved into the down part of the wave and kept pouring on the coal. The elapsed time for the return trip was extremely fast with the high altitude true airspeed and the tailwind component. After the flight I calculated the ground speed, using the barograph to establish time, and an aeronautical chart for the distance between Exshaw and Cowley where we finished the long let down; average ground speed was in the 250 mph range! I figured that there was a few more breaths of oxygen left so we re-entered the wave west of Cowley (the barograph trace appeared to go backwards). At about 18,000 feet I broke off, wound down the flaps and went home. Without a doubt this day produced the best wave conditions that I have ever experienced.

Tony Burton

1992 Dick Mamini waits to launch to the cu nim in the background on an interesting day at the Summer camp.

Chapter 3

Getting Cowley

Getting Cowley

Getting Cowley

Tows from Cook's field into the wave were long and rough, and when conditions changed drastically, pilots were forced to land. Cowley airstrip was almost beneath. The proximity of the wave over the Livingstone Range from the Cowley field was attractive; transition to the primary wave from less turbulent ascents in the secondary or the tertiary almost overhead this strip was very inviting . . .
. . . but it would call for leaving a warm basement and the Cooks' hospitality.

Once we started using Cowley, the flow of visiting pilots became overwhelming. The ancient outhouse could no longer handle the demand and there was no running water for the many campers. The uncut grass caused some spectacular groundloops. The runway markers were of heavy metal with high stakes sticking out. Tiedown cables were in short supply for the increasing arrival of club fleets and all the private gliders. The usual maintenance of the strip by Lands and Forests suddenly ceased . . .
It was time to see about these matters.

The early history of the Cowley airfield

Ed Murphy

IN THE SPRING OF 1938 the federal government saw fit to establish a radio range station and an emergency landing field north of the village of Cowley, part of the "Trans-Canada Airway", which was a continuous chain of primary, secondary, and tertiary airfields set up across the country to serve early aviation. The Cowley airfield served aircraft which might get into trouble trying to negotiate the Crowsnest Pass in heavy weather, high winds, or the "turbulence". This was in the days before high altitude, pressurized passenger comfort, when aeroplanes flew between the Rockies, not over them. The radio range station was built about one mile northwest of the village of Cowley. There were four 120 foot towers erected, as well as the required radio equipment. Today there is one small tower to assist air traffic. This installation is serviced from the Lethbridge airport. The aircraft kept on course from a beam broadcast from here that tied into Lethbridge and Kimberley, BC. Weather reports and required radio communication were transmitted from here.

The airfield was built about 3-1/2 miles north of the range station. One hundred and eighty acres of land were required for this project. Two runways were leveled, their directions were SW-NE and NW-SE forming an **X** across a little more than a quarter section of land. The perimeter of these runways were lit with electric lights, three hundred feet apart, mounted on orange cones for day markers. On each side of each light a metal marker about two feet wide and twelve feet long was placed and painted international orange.

In the winter, evergreen trees about four feet high were tied to these markers and lit, so the runway boundaries could be seen in the snow. At the extreme west of the intersection of these runways was a very high powered forty foot high rotating beacon. This beacon flash, with the proper weather conditions, could be seen for fifty miles. The field lights and the beacon were turned on one minute before sundown and turned off one minute after sunrise by a Swiss-built time clock. It automatically compensated for the difference in the length of the day for this part of the world.

When this station first opened in 1938, the buildings consisted of two dwellings, an office building with radio and weather observing equipment, a small tractor and a two car garage combined. A deep well of 400 feet was in the basement of the office, also a 500 gallon water pressure tank with water lines to the houses. These three buildings were fully plumbed with water lines, septic tanks and a disposal field.

However, problems arose with this system. First the well went dry, and water had to be hauled and dumped into the 500 gallon tank and pressurized with an air compressor. In the fall of 1944, a well was drilled some three thousand feet west and a bit north of the buildings on top of a small hill which resulted in a gravity water system. A 10,000 gallon reservoir, pump and pumphouse were built where the well was drilled. A red light was placed atop of the pumphouse to indicate when water was being pumped. This system worked very well

for two years, but then the well went dry. It really wasn't so bad, because of the reservoir. A 2000 gallon water tank was fitted onto a two ton Marmon Harrington four-wheel drive truck. It was loaded with a gas-engined water pump from a creek or river, then dumped into the reservoir. The aerodrome keeper had this job to do.

After hauling water like this for about six years, a water line was extended about 2000 feet to Todd Creek. A pumphouse and a water intake were built to pump to the reservoir on the hill. The sewage disposal field gave problems because the gumbo soil would not absorb excessive water. There were three different types of fields put in, but they soon became waterlogged and quit functioning. To overcome this problem, a sewage effluent sump was built about five hundred feet south of the houses. A high capacity, high pressure pump was installed to empty about 500 gallons of effluent per minute which was directed into the air and was turned into mist. It solved the sewage disposal problem.

Another problem here, as well as all of rural Alberta at the time, were the all-weather roads. There was practically no maintenance. So between the snow and snow drifts and mud rolling up on wheels, it was quite difficult to do the required driving. I should mention that, when the buildings were first erected, a horse barn was also built to house a horse. When the roads were impassable, a radio operator could ride the horse to the range station to rectify a problem (ha ha). Needless to say, there never was a horse in this barn. An RD 6 Caterpillar was used to pull snow rollers on the runways. They didn't have a bulldozer, but often when the roads were impassable for normal travel, the Cat was used to haul groceries, mail or even travel to the range for repair work.

In the fall of 1944, the government high-graded and gravelled the road from Cowley to the airport buildings. This was the first gravelled road in the Municipal District of Pincher Creek. After the war, to overcome road problems, a bulldozer with a cab was acquired, as well as a tractor-drawn grader, a Bombardier that carried eight people, a power wagon, a Marmon Harrington four-wheel drive, and a good sized Sicard snow blower.

When operations began in 1939, there were two houses and an office. The aerodrome keeper lived on the ground level of this office. He was responsible for the maintenance of the runway lights, beacon light, rolling snow, mowing grass, painting day markers, erecting evergreens, hauling water and general maintenance. The plan was to have two married radio operators — each to live in a house and supply room and board to an unmarried radio operator. In the spring of 1948, a fire destroyed the office building which included the airport keeper's quarters. After the fire, temporary buildings and equipment were set up. Then a new office and a house for the airport keeper were built. A duplex residence, a bungalow and the two original houses became good living quarters. Now the plan was to have all married personnel. The normal staff was the senior operator, called the officer-in-charge (O/C) and three junior operators. All personnel were civilians. The O/C worked day shift Monday through Friday, and the two juniors worked afternoons and graveyard shifts. There was always one operator on days off. A roving relief operator came in for vacation replacements. The radio operators were trained in radio but when they came to Cowley, they were also weather observers. Temperature, wind and cloud conditions were observed every hour and broadcast every half hour. They also had to monitor the Lethbridge and Kimberley trans-

missions. They received calls from aircraft requesting weather and other information.

In 1943 the north-south runway was built. It was 6200 feet long and when built, was the longest runway on the North American continent excluding Newfoundland. The purpose of this runway was to refuel American aircraft flying north. It was never used as such or for any other reason.

The grass on all runways and the surrounding area had to be mowed and removed each summer. It was given to nearby farmers to do. We had a regular haying camp there for several years. From 1940 to 1946 we had the contract to haul water to supply the airport needs.

A power line was run from a mile south of Cowley to the airport. The last half mile was underground and in wet conditions caused problems. Overhead teletype and telephone lines were installed, also the last half mile being underground.

Cowley airport was built as an emergency landing field and I know of at least six people's lives it probably saved:

- During the war, a student pilot and instructor from the No.7 Service Flying Training School at Fort Macleod became lost in an unexpected fog. They saw the beacon and landed on a muddy runway in the middle of the night. What a surprise to see the hills at dawn!
- Another case was in the fall of 1945 when four Americans in a single motor aircraft left Great Falls, Montana bound for Kalispell, about 150 miles northwest near the Rockies. They ran into a terrific headwind and almost became motionless in the air. With about an hour gas left and probably over Waterton Lakes, they noticed the flashing beacon. They didn't know where they were or the location of the beacon. They were surprised that they were in Canada when they landed at the Cowley airport.
- There was yet another life saving incident. A young rancher became ill with appendicitis. The roads were impassable, so the Bombardier was dispatched to his rescue and he was taken to the Pincher Creek hospital.
- In several cases the airport vehicles were used to transport maternity patients.

After the road improvements, all weather travel equipment, unlimited water supply, good sewage disposal, and good housing, the powers decided that the emergency landing field and weather station were no longer needed. Everything was closed in 1961. The houses were moved to Pincher Creek and a weather station started there. Then a weather station moved to the airport at Pincher Station in 1976.

Getting the use of Cowley airstrip

Ursula Wiese

AFTER 1961 this airstrip would be a facility for fire bombers. Other than occasional use by the fire bombers, Cowley airstrip was left to hay farmers and gophers. Tows from Cook's airfield into the waves were long and rough, and when conditions changed drastically, pilots were forced to land "elsewhere" if Pincher Creek was out of reach. The airfield north of the village of Cowley thus quietly invited safe landings, and air or car retrieves would be easy

too. Cowley airstrip was the perfect site to operate from. However, there was some uncertainty amongst the group of glider pilots as to whom one should approach for permission to use the strip. So they took a chance to tow from there and land again. Most of the time the gate was open; when it was locked they simply lifted it off its hinges and walked in. At day's end, everything was put into place before they trailered the ships back to Cook's field.

The new spot was wonderful. Launches to the wave were made in 10 to 15 minutes and "going home" was always within easy reach. Thoughts became stronger to transfer all equipment to this fine field. Suddenly one day, the gate was locked, the hinges welded, and a small sign said:

TRESPASSING PROHIBITED
Department of Lands and Forests
The District Manager

The soil in southern Alberta is dry and hard, even growing grass for hay is slow and sparse. If the fragile grass surface is damaged it takes years to heal the wounds. Such had been the case, and here Dick Mamini tells his story:

"This was the main reason we were kicked off Cowley, as some inconsiderate glider pilots used their cars to tow gliders down the strip when conditions were very wet and muddy. This left deep ruts on and adjacent to the main east-west runway. The water bomber owners refused to use the Cowley strip in this condition and insisted that they would have to fly from Lethbridge in the event of a fire. Of course, this would be expensive and the District Superintendent was under a lot of pressure. Naturally, he was furious and claimed that it had almost cost him his job. (In those days the Alberta government did worry about wasting money.) I personally made several trips to Coleman to talk to the Superintendent. Eventually it led to us being allowed to use the long north-south runway with a whole bunch of restrictions such as NO CARS ON THE FIELD. I reasoned that if we could get our nose in the door and could show that we were responsible people, we would eventually get back on the eastwest runway; and this did finally happen."

On July 22, 1969 Dick wrote the following letter to the Edmonton, Red Deer, and Calgary gliding clubs, with a copy to Mr. Longworth, the Superintendent of the Crowsnest Forest District:

"Gentlemen:

During our wave camp at Cowley I had the opportunity of meeting Mr. Longworth, Superintendent of the Crowsnest Forest District, who outlined the conditions to which we must adhere when operating from the Cowley Forestry Airstrip:

1 First of all, permission to fly there must be obtained from Mr. Longworth at P. O. Box 270 in Blairmore; not from the Edmonton office.

2 In the future, the only access to the field will be through a gate in the southeast corner of the field and no automobile traffic is to traverse any runway at any time. This rule will eliminate all winch and auto-towing.
3 The two runways in the form of an **X** are now completely out of bounds and all soaring activity must take place at the south end of the long N-S runway.
4 There seems to be adequate space for across-the-field (ie. east-west) takeoffs and landings; however, I recommend the Alberta Soaring Council approach Mr. Longworth to see if he would allow a farmer to take off some rather long hay which is growing in places.

Gordon *[Prest, the ESC VP and CFI],* as you might have guessed, these restrictions resulted from our foolish use of the field last fall during wet weather. Apparently, the Alberta Soaring Council's offer to repair damages was not transmitted from the Edmonton office to Mr. Longworth as he had no knowledge of such an offer. It is also likely that further damage was done this spring retrieving an emergency landing victim. No winching took place this spring. I believe we must ensure that every Alberta soaring pilot is made aware of these restrictions so that we do not further jeopardize our use of the Cowley airstrip and in this regard, would you please inform all ESC, CNGC, and RDSA members in writing."

Recently, Dick commented, "This letter was written only for the purpose of appeasing Mr. Longworth and to try and keep our foot in the door at Cowley. It was obvious to everyone that the section of the field he was offering us was unsuitable for most wind conditions and I believe Barry Bradley and myself were the only ones to actually fly from this section of the field. As I recall, we had a north wind on the day we flew, also the north-south runway was not in bad shape in those days, so we were able to fly. After this day of flying with Barry, I had another meeting with Mr. Longworth, who in the intervening month or so had cooled down somewhat. As I recall, he allowed us to use the extreme east end of runway 27 provided we stayed off the intersection of the two runways and the cars were restricted to a 25 foot radius sector inside the gate. All glider movements were to be made with man (woman?) power. Of course, this was just the area we usually used and most people were now satisfied. The other restriction was that in the event of a fire when the field was needed, we would vacate it immediately."

1970 — An idea goes political

THE SITUATION was clearly an unsatisfactory and unhappy one. One fall evening in 1970 with the general complaints being aired, one of the pilots, Klaus Stachow, a custom tailor from Calgary, decided it was time to fight City Hall. "If I can help it, this will be our glider-port and no more harassment", he proclaimed. "Said and done", according to an old German proverb. For Klaus it meant action, starting with the job of determining where to start. Also he had the rare notion that the purpose of a government is to work for the people, not vice versa. The strip was government land, therefore "our" land.

Believing in his rights as a citizen, he was busy thinking what to do when fate intervened in the form of his friend Roy Farran coming into his shop. Roy explained that he was running for the Conservative Party in the McKnight Constituency and that some signatures from well-known businessmen were urgently needed to attest that Roy was a trustworthy and honourable man to run for election. Klaus jumped right into the deal, offering him all the assistance possible – he would even vote for the Conservative Party, if only Roy would help him with "his" gliderport once the elections were over. The future MLA was told that there was great need of this airstrip for Alberta's soaring fraternity and the sport of silent flight in Canada, and that he was the man who ought to assist in achieving the fulfilment of this plan. The deal was sealed with a handshake.

Klaus Stachow

1971/73 – A foot in the door

NOT ONLY did Roy Farran get elected, the Conservatives won by a landslide! Klaus moved into the executive office of the McKnight Constituency; he became known to those who govern the province, and especially to those who disposed of Crown land. Parties, business meetings, and lobbying were the path along which he hoped to find success. He exchanged friendly handshakes with ministers, always ready to talk about his passion and the beauty of the sport, always with an enthusiastic glimmer in the eyes; his arms would move in great gestures to accentuate his words. The stubborn dream of "his" gliderport was always present, and many a bureaucrat's ear was bent.

Step by step Klaus met and convinced men and women in every government department who could influence the disposition of the airfield, preparing the ground for a formal written request. There were sleepless nights spent deciding how to fulfil the dream, and more than a year passed before his first brief was ready for the Honourable Horst A. Schmid, Minister of Culture, Youth and Recreation.

"I made quite sure that my proposal would harvest a "yes". I hated to waste time for briefs that would not be successful", Klaus stated.

Calgary, November 18, 1971

"Our brief meeting and conversation in Calgary at the German Businessmen and Professionals Association gave me hope concerning the problems and future of the soaring sport in Alberta. At a meeting of our Calgary soaring club, the club authorized me to prepare this brief and to inform you of our concerns.

Our club, the Calgary Cu Nim Gliding Club, consists of about forty active members.

We have a two seater training glider and a towplane. About ten members of our club own private gliders. We do not own any permanent operation field, we depend upon the good will of some farmers and ranchers who let us fly off their fields or meadows.

This letter is at least ten to fifteen years overdue. It took us years to be able to develop this sport in Alberta as it is today, but finally we came to the realization that we must turn to the government for help. There are a number of reasons why. First, soaring is unfortunately not very familiar with the public with enough financial resources and enthusiasm to make it really go and grow. Second, we think that with government help, this sport could grow more rapidly, more safely, and be more available to our future young generation. The time has come to act NOW! Many young people have come to us and asked, "How can we get started in soaring?" Young private pilots who lost interest in power flying would like to take up soaring, as most of them find it is the only answer to continuing flying as a sport. It is statistically proven that a power pilot after he receives his licence, three to four years later loses interest in the initial challenge of flying. In soaring, the challenge lasts a lifetime.

At present with our equipment, we cannot accommodate and fulfil all these requests and interests, as it is not economically feasible without a permanent and properly located field.

Our soaring fraternity in Alberta has to be credited with a big breakthrough in the accomplishment of this great sport of powerless flight. Let it be recorded here. After the federal government terminated the active flying of the Air Cadet League of Canada, a handful of dedicated soaring enthusiasts in our province saw a possible setback in this progressive young men's organization. As a result, soaring was successfully introduced to the ACLC. This introduction was done completely out of private initiative and club equipment through the joint efforts of the three gliding clubs in Alberta: Edmonton, Red Deer and Calgary.

Today, five years later, the Air Cadet League of Canada has every summer, for two months, soaring camps from coast to coast. We are proud it all started in Alberta. We began something, now we have the responsibility to carry on. Every summer, the Air Cadet League brings a few cadets up to glider pilot standards and another group to an almost pilot standard. After the summer soaring camps, these young men have no possibility to continue their efforts in flying. Here is where government support is necessary. With this support, these and hundreds, perhaps later, thousands of young people will have the opportunity of experiencing this exciting precision sport of powerless flight.

Through personal experience, I have found soaring requires dedication, responsibility, camaraderie and leadership, qualities necessary to build youth to become men of tomorrow.

We in Alberta are very fortunate to be geographically located to give this sport a great future. If we ask for help, this does not mean we need constant support from the government; this is self-supporting, just as any other flying club. Power flying clubs and training schools have very expensive airports, paid for and maintained by the government. We are citizens of equal status and ask for equally proportioned rights! What we need to continue effectively is a permanent field, maybe a grant for a hangar and training equipment. I can assure you, if we are able to create a soaring centre in southern Alberta, it will prove in five years as a fast growing recreational flying sport. It could create a new, growing business for the

province also. It is clean and nonpolluting and a lifetime lasting challenge. For Alberta, as well as for Canada as a whole, it could develop as a great ambassador abroad, since the sport is both national and international in scope.

At present in Europe and the USA, the respective governments realized the importance of this sport, consequently, they support it generously where needed. By now, I'm sure you are aware of the great educational aspect for young people as well as the recreational possibilities soaring offers, and while we still have the old, experienced and enthusiastic people around who are willing to offer their own time and knowledge, it is necessary to act NOW.

We ask you to give serious consideration to this brief on behalf of our gliding fraternity and young people of Alberta. We sincerely hope you will express your views on these matters and look forward to your reply and further discussion."

1972 — An almost immediate reply from the Minister's pen offered this sound proposal:

"Thank you very much for your letter of November 18th, 1971 in which you outlined in detail the beneficial aspects of soaring as a leisure activity and explained the need for assistance to enable the Cu Nim Gliding Club to establish a permanent field. Certainly the sport has tremendous potential for contributing to the development of youth and the enjoyment of life by all Albertans. The Calgary Cu Nim Gliding Club has done a wonderful job to date and I hope you continue to strive for future development of soaring in Alberta and Canada.

Letters such as yours provide me with up-to-date information on the present status of soaring and therefore are received with gratitude.

As you may be aware, the Recreation Branch of the Department of Culture, Youth and Recreation is presently relating to approximately sixty amateur sport associations in Alberta, and one of these is the Alberta Soaring Council. The assistance available from the Recreation Branch takes various forms such as administrative, financial, leadership development and loan services. We feel that through these forms of assistance we can endorse and support, at the provincial level, a multitude of recreational activities in the belief that such activities have a great contribution to make to the quality of life in Alberta.

In an attempt to ensure the maximum benefit throughout Alberta and over a wide range of interests and pursuits, the financial assistance available is channelled through grant structures and related to planned budget allocations. Such a program cannot then include provision for large individual grants such as would be required to assist the Cu Nim Gliding Club in establishing a permanent soaring field.

However, in addition to assistance to provincial sport groups, we provide assistance including facility development for local participation. This is done through municipal governments who are asked, through their Parks and Recreation Departments, to establish priorities in the area of facility development once in each five years.

With this in mind, I would suggest that you contact the Calgary Parks and Recreation Department with respect to the needs you have. I am sure you understand that the city will have to take your request into consideration, along with those of many other associations,

and with due regard for the number of participating members. You should present, therefore, a well-documented brief asking for their consideration and support in the establishment of the facilities you require.

Those of us in Alberta who are concerned with the future development of amateur sport in Alberta are hoping that Sport Alberta, a federation of Alberta amateur sport governing bodies, and of which the Alberta Soaring Council is a member, will contribute to the establishment of a solid financial base for amateur sport in Alberta. Perhaps such an organization will, through provision of a method of solicitations of the public, of private business and of Government funds, enable a great new growth of amateur sport in Alberta in the near future.

Upon checking with the Department of Lands and Forests, I determined that a Miscellaneous Land Use Lease can be obtained through that Department. In order to obtain such a lease your club would have to determine what government land in the Calgary area would be suitable for locating a soaring airfield and is available for lease. The records of such land are apparently in Edmonton at the Department of Lands and Forests, Natural Resources Building … By leasing suitable land for an airfield, your club could of course avoid the high cost of purchasing such land and thus free funds for development of equipment and facilities at the site.

While there is undoubtedly much to be done in the development of amateur sport in Alberta, I am confident that in cooperation with local governments and with associations such as the Alberta Soaring Council, we are making good progress and that we can look forward to further growth in the next few years.

Thank you once again for an extremely enlightening letter. We sincerely hope that you and the rest of the Cu Nim membership keep up your good work for an exciting and very worthwhile sport."

signed, **Horst A. Schmid**
Minister of Culture, Youth and Recreation

Thus started Phase II. As stated in the previous letter, the government indeed offers assistance to amateur sport organizations — if one only knows how to deal with it. As many volunteers will agree, the road to this "know how" is like a maze, designed to discourage most attempts. Scrambling out of such seemingly hopeless situations requires perseverance, a crocodile's skin, and stubbornness. I am sure many give up in midstream.

Also, governments prefer to deal with organizations rather than individuals, and the time had come for the Alberta Soaring Council to carry on if any further gain was to be achieved. Still wanting to continue, but without impediment, at the ASC annual general meeting in 1972, Klaus requested to be transformed from a "private person" to the "Chairman of the ASC Development Committee". From now on, his lobbying was "official" at government level. The "promised land" was still much discussed and argued about until another letter was ready to be delivered to the Honourable Dr. Allan Warrack, Minister of Lands and Forests:

October 25, 1972

"As chairman of the Alberta Soaring Council Development Committee, I have been asked to present to you a matter of most urgent concern to the soaring sport in Alberta.

The Alberta Soaring Council is the official body representing all soaring clubs in Alberta, and what is needed most urgently is a properly located airfield for the development of a permanent and official soaring site in Alberta.

This is the reason we seek your help, and we hope you will be able to assist us in our big task by making available to us some government land through a long term lease.

Most suitable for soaring in Alberta is the Pincher Creek area. The Department of Lands and Forests owns an airfield five miles north of the Town of Cowley which would best suit our purpose. We would like to obtain a long term lease on this airfield from your Department.

We are well aware of the purpose of this field; however, to our knowledge very little active use has been made of this field in the past years, and therefore, we see no problem of interference.

Our request for this specific piece of land has definite reasons:

1 We in Alberta are very fortunate to have such a fantastic geographical area where the soaring sport has a great future. The Livingstone mountain range is already known in Canada as a great producer of the "mountain wave" phenomenon where climbing to altitudes of thirty and forty thousand feet is possible. It is an untapped source for altitude flying; all we have to do is develop it.
2 The valley between the Livingstone Range and the Porcupine Hills produces very strong thermal conditions (rapidly rising hot air which radiates from the black farm fields).
3 With the Porcupine Hills on the east side of the valley and the winds in this area almost eternally from the west, we make use of the oldest type of soaring, the "ridge soaring".

In addition, the flat terrain around the airfield presents an added very important safety feature. In support of our request we wish to present the following information:

The desire to establish a permanent soaring centre comes out of the overwhelming requests from young people from all walks of life. This is a normal reaction as this sport is increasing all over the world with great support from the respective governments. We, who already know the great experience of powerless flight, feel it is our duty and responsibility to act now, and we know with your support we will not fail to give our young science and flying minded young people what they desire and deserve.

Through personal experience we have found soaring requires dedication, responsibility, camaraderie, and leadership; all qualities necessary for our youth of today to become men of tomorrow.

The Alberta Soaring Council has been instrumental in the successful introduction of soaring into the Air Cadet League of Canada training program. This introduction was effected entirely out of private initiative and with club equipment through the joint efforts of the three gliding clubs in Alberta: Edmonton, Red Deer and Calgary.

DEPARTMENT OF LANDS AND FORESTS
ALBERTA
OFFICE OF THE MINISTER

Edmonton, Alberta
January 11, 1973

Mr. Klaus S. Stachow
Chairman
Alberta Soaring Centre Development Committee
826 - 16th Avenue N.W.
Calgary 41, Alberta

Dear Mr. Stachow

Thank you for your letter of December 30th regarding the use of the Cowley airstrip as a glider-port.

The Alberta Department of Lands and Forests herewith grants the Alberta Soaring Council the prime use of Cowley airstrip as a glider-port. Should the airstrip be needed for a fire bombing operation it may be necessary to occasionally restrict gliding at certain times. For example, no bomber operations were conducted at Cowley during 1972 and a glider restriction would not have been necessary.

Because the airstrip belongs to the Federal government it will not be possible for Alberta to grant permanent tenure however there is no known reason why the use should not continue in the future. If buildings are desired a sub-lease of the actual building site will be granted by the province.

I understand that an application for air space reservation has already been presented by the Alberta Soaring Council to the Ministry of Transport. It is therefore not intended to discuss the matter with them at this time other than to forward a copy of this letter which shows approval to the glider-port proposal.

Please contact Mr. R. G. Steele, Director of Forestry, for any further administrative assistance you will require with your worthwhile project.

Yours truly

Dr. Allan A. Warrack, P.Ag.
MINISTER OF LANDS AND FORESTS

With government assistance the Alberta Soaring Council intends to set up and develop a glider pilot training school, which we are certain will develop as a fast growing recreational flying sport. We can see a new flow of tourists to southern Alberta from all over Canada and northern USA, and additional revenue for our economy. Soaring will do for Alberta what snowmobiling has done for Quebec, the only difference being that soaring is clean and nonpolluting, and a lifetime lasting challenge. For Alberta as well as for Canada as a

whole it could function as a great ambassador abroad, since this sport is both national and international in scope.

We wish to make you aware of the great educational aspect which this type of sport offers to our young people in addition to the recreational and economical possibilities. While we still have the older experienced and enthusiastic generation around who are willing to offer their own time and knowledge, it is necessary to act now.

Your serious consideration of our request is appreciated, and we will gladly supply any further information necessary for an approval."

This letter was supported by a memo from MLA Roy Farran to the Minister:

"... this is an exciting use of another natural resource – the air wave near the Crowsnest Pass which has implications for tourism, recreation and industry …"

The Minister's reply on November 17, 1972 asked for more information, more work, more paper:

"I regret the delay in replying to your letter of October 25, 1972. It was first necessary to investigate the status of the land on which the Cowley airstrip is located.

The lands are owned by the Federal Crown with administration and control transferred to the Alberta Department of Lands and Forests for purposes of a public airport. The lands, buildings and facilities are to be returned to the Federal Crown when no longer used for this purpose.

The Department of Lands and Forests has no objection in principle to the proposal of the Council to use the strip for a soaring centre and I suggest that we try to make an arrangement whereby the use is authorized by agreement with this Department with the approval of the Ministry of Transport. In this regard I would appreciate receiving from you details of the facilities and structures that you would require so that I can approach the Federal Ministry."

signed, **Dr. Allan A. Warrack P. Ag.**
Minister of Lands and Forests

1973 – We've got it!

AS COULD BE EXPECTED, Klaus delivered. And soon, in the midst of the winter on 11 January 1973, a letter left Edmonton for the Chairman of the Alberta Soaring Council Development Committee (on opposite page):

At last, "Cowley Gliderport" was born – a dream had become reality. Now, practical use of the field and buildings had to be agreed upon. George Dunbar, ASC Secretary, confirms on July 15, 1973 to J. Hereford, Department of Lands and Forests in Blairmore:

"Bruce Hea (ASC president) and I were very pleased to be able to meet with you on Saturday, and discuss the details concerning our coming soaring camp at Cowley airfield. This letter is to thank you for your assistance, and to confirm the items which were discussed. Our notes on the topics discussed are:

1 Our use of the field during this period (July 28 to August 6) will be possible only if it is not required for fire bombing. The Department of Lands and Forests shall have first priority to the use of the field, if they require it.

2 Cars, trucks, or other vehicles will not be permitted on the runways at any time. Cars going from the area of the buildings to the flying area (by the NE-SW runway) will go through the main gate, down the road, enter the field by the gate in the north fence, and drive along the fence to the end of the runway. The tiedown area may be used for gliders, provided it is not in use for Department aircraft.

3 We placed our lock on the chain on the main gate, but we understand that during the next week or so you will relock this gate with the two locks linked together in such a manner that the gate may be opened by unlocking either one of the two locks.

4 The Alberta Soaring Council will be permitted to use the smaller building on the field, and the Council will be responsible for the contents of the building. We understand that you will arrange to have the building unlocked for us (preferably on the first day of the camp, Saturday, July 28). There may possibly be one of our members present earlier than this, on Friday, if you should happen to be there then. We would welcome a visit from you at any time during our operations, but particularly at the end of the camp, to check the contents of the building, and to relock the door.

5 We may use the telephone in this building, providing, of course, that no charges are made to that number for either long distance or collect calls.

6 VHF radio frequency of 122.9 is normally monitored by the Department, and could be used to relay a message in case of an emergency.

7 We will warn all participants about proper supervision of children on the field, and also about proper housekeeping procedures. Specifically, all garbage will be collected and removed to an appropriate place; there will be no open fires, or smoking outside cars or trailers; the cement slab near the buildings may be used for barbecues, but in all areas particular care will be taken (because of the dryness of the grass) to prevent fires.

8 We will prepare a list of general rules for the camp, to be distributed to all attending, and will send you a copy as soon as they are available. This list will include the above points, plus other notes on our flying procedures, etc.

I trust that the above correctly summarizes our discussion on Saturday. Please let me know if there are any disagreements about the above, or if you have any further points that should be added …"

1973 — The first Cowley summer camp

George Dunbar

GLIDER PILOTS in Alberta and Saskatchewan were excited and the first Cowley summer camp was to be celebrated. George Dunbar overheated his typewriter inviting everybody to the "fun" camp, including the Honourable Dr. Allan Warrack and the Honourable Horst Schmid. After this unforgettable great event, George writes for *free flight*:

"The first Cowley summer soaring camp was a great success however you measure it: lots of thermals and chances for thermal flight; wave on occasion for higher altitudes, to show it can be done; and lots of fine weather for either soaring or just plain vacationing. This was our first official use of the field since the Department of Lands and Forests gave the Alberta Soaring Council permission to use it as a provincial wave soaring site. Soaring was possible on all ten days of the camp, with the wave also putting in an appearance to justify our belief that it does occur during the summer too.

On August 4 we were surprised to see a strange towplane and glider over the field. This turned out to be the L-19 and 2-33 from the Air Cadet Camp at Penhold, flown down by four instructors, and followed on Sunday by a busload of some 35 cadets. We were also pleased to have a number of other visitors, including Mr. Horst Schmid, and Mr. J. Hoover, Regional Procedures Officer for the Ministry of Transport, Jim Baxter of the Gatineau Gliding Club (near Ottawa); and splitting the honours for being farthest from home, George Ryning, now of Zambia, South Africa, and Peter Brookman, Australia.

The weather for most of the camp was very hot and sunny, and the swimming hole on the Oldman River gave some welcome relief. Each day thermals started first over the mountains and the Porcupine Hills to the northeast, and then moved together over the Cowley area. Larry Riegert and John Erkelens (CFB Cold Lake) went to 15,300 feet in their Bergfalke III on a checkout ride, and then Jim Anderson followed in the same glider to get his Silver C height, with a comfortable margin of thousand or so metres.

During the second weekend, a front moved through and the previous hot sunny weather was displaced by a strong west wind, which seemed more natural for the Pincher Creek — Cowley area. We awoke Sunday morning to a sky full of lenticulars, and the first pilots began reporting 15,000 to 20,000 feet and up. Three flights were made to between 24,000 and 28,000 feet before the cumulus took over; Chester Zwarych registered a Diamond height gain in the 2-33.

Everyone was sorry to pack up and leave on Monday, but all had enjoyed a pleasant and relaxing soaring holiday, and are looking forward to the next such occasion."

Larry Riegert

1973 – a Cowley Summer Camp portrait

Bottom row l to r: Mike Bradley, Alan Brockwell, Carla Bradley, Kathy Hea, Barry Bradley. Second row: Jim and Marg Anderson, unknown, David Bradley, Norm Ronaasen, Sheila Hea, Freddy Pentelski. Upper row: Monty Williams, Toni Czervenka-Williams, unknown, Morris Engler, John Erkelens, Bruce Hea, Ella Bradley, George Dunbar.

Others attending the 1973 Camp who are not in the photograph are:

Mr. J. Hoover, Regional Procedures Officer, Ministry of Transport
Jim Baxter, Gatineau Gliding Club, Ottawa, Ontario
Peter Brookman, Australia
Alan Olson, Smith Falls, Ontario
Capt. Larry Riegert, CFB Cold Lake
Jean Ronaasen, CFB Cold Lake, Alberta
Lt. R. Sasces, CFB Penhold
Capt. Patrick Gropp, CFB Penhold
Capt. Chester Zwarych, CFB Penhold
Capt. Ian McLean, CFB Penhold
Louise and Garth Schieb, Calgary, Alberta
Clive Beddoe, Calgary, Alberta
Hal Cook, Cardston, Alberta
Richard (Dick) and Gail Mamini, Edmonton, Alberta
Grace Dunbar, Calgary, Alberta

1975 — Release of federal tenure to the province

BRUCE HEA, as President of the Alberta Soaring Council, volunteered to look after the campsite and to ensure that runways were again safe to use, and the many campers could enjoy a holiday at Cowley. On April 10, 1975 he mailed a letter to Mr. C. Bachand of the Special Lands Use Branch in Edmonton:

"... During the past two seasons, under the auspices of the Alberta Soaring Council (a non-profit Alberta registered society), there has been a substantial increase in flying activity at the Cowley airport — well over a thousand aircraft movements during the 1974 season alone. We expect it will grow. Inevitably, certain less than desirable situations are apparent:

1 A single tiny outhouse (a relic from the 30s?) is overfull and in its present condition should be condemned as a health hazard — and preferably be replaced. During our latest summer camp we had an average of 50 people overnight camping for ten consecutive days: men, women, and children. Our need is apparent.

2 Although our flying activity has, so far, been confined to the latter part of July and later in the season, the runways were uncut and hazardous to light aircraft as at July 27, 1974. Two spectacular groundloops occurred, fortunately with only minor damage. The potential for disaster was very high. Subsequent cutting did take place but the work done seemed less than adequate or timely for runway standards.

The above items are the primary hazards to health and safety. Secondary hazards relate to nonfrangible runway markers, a fenced and unused mud pit bordering and adjacent to a runway, and an inadequate windsock mounting. Beyond minimum improvements lies the question of provision for people. We are all familiar with roadside camps for tourists. Should there be a minimum campground facility for what are essentially air tourists? We have had substantial numbers of visitors from other provinces and other countries …"

This simple reminder uncovered a dismaying state of affairs. The reply from Lands and Forests dated April 18, 1975 read:

"… The Forest Service has found the runway at Cowley to be unsatisfactory for the conduct of water bombing operations and consequently we have relocated our operation at the Lethbridge airport. It has been our intention to rebuild and repave the runways at Cowley, but now it appears more likely that we will enter into cooperative arrangements with the Town of Pincher Creek and the Municipality to build a new airport in the immediate vicinity of Pincher Creek … The Forest Service will be returning control of the Cowley airstrip to the [federal] Ministry of Transport."

These words from "above" struck like a bombshell. What was going on now? Was the

provincial government about to disregard the granted use of the Cowley airstrip? The January 11, 1973 letter to Klaus Stachow stating, "… because the airfield belongs to the Federal Government it will not be possible for Alberta to grant permanent tenure …" suddenly hovered deadly over the barely settled down Cowley soaring activities. It seemed almost certain that once the Crown repossessed Cowley it would probably be sold for farm use. Haste was crucial and any action might already be too late. Bruce rushed a letter to [now] Solicitor General, Roy Farran:

"… I do not feel it is the intention of this government to so conveniently circumvent responsibility to the needs of Albertans ... The glider clubs are a major user of Cowley airfield. The weather phenomena dictating a requirement for an emergency field at this location will always continue. … Glider pilots fill the Lundbreck hotel in October (wave camp season). Last year Pincher Creek motels had to hang out the "no vacancy" signs after we arrived. We shop for services in Cowley village (and elsewhere) …"

Remembrance of a humble start as an MLA five years ago came alive, and the many special meetings with his tutor Klaus Stachow. Roy Farran knew of the authorization for use of the Cowley airstrip for sailplanes, he had learned about the unique geographical conditions for mountain waves, he believed in the growing sport, and the tourist attractions. His memo to various ministers accompanied Bruce's letter as a last big outcry on our behalf:

"… Alberta can be the gliding capital of North America. If encouraged, it could lead to an industry (glider manufacture), records … small towns benefit from the activities … Alberta should retain title to the strip and not turn it over to the [federal] Ministry of Transport and should declare it an official glider-drome, and we should help the sport and industry to develop there and elsewhere in the province."

Despite this internal memo on behalf of glider pilots, T.J. Walker, MLA, Airport Advisory Committee, replied on June 13, 1975:

"… and whilst it looks unlikely that the Cowley airport will be upgraded at this time, should a proper facility be initiated at Pincher Creek, I can see no reason why the gliding *club* should not use it for gliding as well as for powered aircraft."

This response was as bad as the letter of Lands and Forests, and a firm reply left Bruce's typewriter on June 24, 1975:

"… Please note that as President of the Alberta Soaring Council I speak for all the major gliding clubs of Alberta, and for all glider pilots – not for a club. … Glider pilots have flown and explored this unique area for more than twenty years. The primary wave exists just east of the Livingstone Range (west of Cowley airport). We have an airspace reservation arduously negotiated with the Federal Ministry over a period of two years. All problems

have been solved including the diversion of commercial jets to the south (HL500 alternative) if and when required. Reservation is possible to 45,000 feet asl. This map also depicts the primary wave area. That portion of the reservation to the east of 114 degrees West was added to provide for a let-down area for the many flights above 25,000 feet asl.

The suddenly advised decision of Lands and Forests to abandon Cowley is a destructive threat to a growing sport and growing tourism. Cowley is a unique gliding Mecca. Last year at Cowley more than a thousand aircraft movements (that's more than Banff airport!) were recorded by glider pilots. On a Sunday in October, this writer counted 25 aircraft and over 100 people — all this in a primitive and essentially remote area without facilities. We do not wish its exclusive use. It is used by other aircraft and is an emergency field at the point where weather phenomena might require its use. But we would hope that our additional intensive use would justify Alberta administration as a provincial air tourist airport area.

Its grass runways are adequate. We applaud the maintenance of its agricultural value as a hayfield. However, we strongly desire that it be contracted to be cut not later than the 18th of July in order to accommodate our summer camp and to keep the runways safe for use. The airport should meet health standards for outdoor toilets. Our summer camp of more than fifty persons per night includes women and children. There should be two toilets of tourist standard, properly located at some distance from the two small buildings remaining. These buildings, although locked, are our shelter from wind and shade from the sun. Other improvements, hopefully, will be made but these are the two urgent concerns.

Cowley airport should not be viewed in isolation. It is a part of a total growing activity. The 1975 national soaring championships are at Claresholm. Many Canadians from other provinces will take the opportunity to visit Cowley and some will remain for the summer camp. Cowley is known worldwide to the gliding community. It helps to explain why this writer has entertained visitors from the USA, the United Kingdom, Australia, Europe, Africa, and Japan (complete with interpreter!). Mostly, I have to apologize for the lack of facilities. As they say in the tourist industry, "Let's do it!" If you don't have a policy to cover it, let's make a new policy. Alberta is richly diverse in its physical attributes and its people. With a little help and cooperation we'll make it better than ever, the best in Canada …"

A summer went by, hot, undecided, with a bleak outlook for the wave camps. Finally, on October 6, 1975, a letter arrived from the Deputy Premier and Minister of Transportation, Hugh M. Horner, (on next page):

It is beyond doubt that the change in the status of Cowley to a provincially maintained campsite and gliding airfield was the vital move which stabilized our gains, since before that, pilots only had "permission to use".

✦ ✦ ✦

The initial request to upgrade the campsite was pulled out again. The provincial Airport Development office, headed by Don Brownridge, suggested the establishment of a new campsite according to the Ministry of Transport directive. It was proposed to locate it

TRANSPORTATION

320 Legislative Building
Edmonton, Alberta, Canada T5K 2B6

Office of
the Minister

October 6, 1975

Mr. Bruce M. Hea
President
Alberta Soaring Council
1528 - 23rd Street, N.W.
CALGARY, Alberta
T2N 2P5

Dear Mr. Hea:

Re: Cowley Airfield

This letter refers to yours of June 24th, 1975, addressed to Dr. John Walker, MLA - MacLeod, and previous correspondence concerning the use of Cowley.

I am pleased to advise you that use of the Cowley Airfield as a base for gliding and soaring operations by member clubs of your Council has been approved by both Federal and Provincial authorities. Also, I have instructed my officials to establish a campsite with the essential amenities (on or adjacent to the airfield property), for use by club members during their visits to Cowley.

I do regret the delay in pulling things together and getting back to you; however, I believe this was explained in a recent telephone conversation between yourself and Mr, Don Brownridge of my Department.

Good luck to all your members!

Yours sincerely,

Hugh M. Horner, M.D.
Deputy Premier
Minister of Transportation

at the farthest southeast corner of the airfield away from the tiedowns and present buildings – safe for people – but inconvenient and unsafe for all the aircraft which require evening babysitting. In brief – unacceptable.

Quick action for another, more convenient plan had to be worked out before the Airport Development office began anything, thus preventing later changes. Bruce didn't waste

any time and travelled to Banff to meet Don Brownridge. His mission was to explain the needs of the pilots, the location of the runways, and hazardous areas. Again, Brownridge was very amenable to these suggestions and soon the campsite appeared while the runway hazards disappeared.

At last, the Cowley campground now had water, a kitchen, tables, garbage barrels, wood for fires, and privies—all maintained by the Department of Transportation. Brownridge writes in his letter to Bruce on October 28, 1975:

"… As mentioned to you in our brief discussion at Banff, there are a few factors which make this location ... unique as far as our campsites are concerned:

1 It is being provided for a specific group, which we have never done before.
2 We would not recommend that it be used for public use, because glider operations could be hampered by an influx of tourists to the site. For this reason, we would suggest that it not be even shown on the highway map as we do on other sites.
3 We have not in the past provided campsites on land not owned by the Provincial Government; however, control and administration of this land has been transferred to this department by the Federal Crown. The federal Ministry of Transport considers the site to be excellent for glider operations and they have no objections to its use for this purpose …"

ASC installed a telephone, and a new "two holer" outhouse was built by members of the Cold Lake Soaring Club, which Larry Riegert puts on record:

"The Cool Pool Stool" was erected during the week's lull between the '75 Nationals and the start of the summer camp. For pilots and ground crew, the week was a welcome relief of no flying but boredom quickly set in and it was decided by the Cold Lakers to improve the existing poor excuse for a latrine. Dave Jacobs, Ron Sarich and I were the builders, with the remaining Cold Lakers pitching in to criticize and later to paint. It was designed to meet the requirements of both sexes in a back-to-back configuration, and was built over an open manhole cover to some underground sewer which didn't seem to go anywhere, but provided unlimited volume without the need to ever move the "Stool" again. Despite the rigorous design criteria, the magnificent structure fell prey to the west winds, and that fall had to be braced from a possible recurrence by unsightly 2x4s."

Many people visited the airfield; mostly those in the quest for Diamond badges. Some were plainly curious what Cowley was all about, but Alan Brockwell was special—at one time he "belonged" to Cowley. Larry remembers:

"Alan Brockwell lived down in the valley of the Oldman River below the airfield, a couple of hundred yards from his brother and family. Being a bit senile, he was basically ignored by his relatives. At first sound of a towplane, he would walk up the long steep road from the valley and onto the airfield where he would spend the whole day just being around

people. His store-bought teeth were loose and they would continually chatter. He would be fed throughout the day, although he never asked for anything, and stayed with us for supper and the campfire. We were careful not to give him any alcoholic beverages, since we weren't sure how he'd react. At ten o'clock at night, he would slowly walk back home, always refusing any ride. He'd be back before breakfast the next day, ready to go again, always helping where he could to push gliders or to clean up. Alan became an accepted sight at Cowley, as much so as Centre Peak itself."

In the search for more Cowley history, ASC files revealed a letter from Ton Diening, President ASC, dated February 10, 1979, addressed to the Honourable Dr. Hugh M. Horner:

"On behalf of the Alberta Soaring Council, I wish to formally acknowledge and thank you and your departmental staff for the many improvements and continual support of the Cowley airport. The addition of the picnic shelter with a big firewood stove and the water cistern are greatly appreciated. Not only will this quench our thirst in summer and allow water ballast for our gliders, it facilitates camping and cooking for those staying at the airfield. The cleanup of the hazardous areas made life easier for the pilots and their gliders without an undue increase in blood pressure and heartbeat. Parents feel relieved that their small children are not likely to get into these areas. The cutting of the runways and the maintenance of the roadways have greatly improved the condition of this field, which is unique in Canada for its wave soaring potential. The approach taken by you and your department with close coordination of Energy and Natural Resources, and Recreation, Parks and Wildlife have indicated the thoughtfulness and dedication of the Alberta government to ensure the viability and success of this unique facility.

You may be interested to know that both the summer and fall camps attracted more than 25 aircraft including crews from Winnipeg, Vancouver, and northern California. The number of "support crew" such as wives, sweethearts, and children ran in excess of 150. The number of aircraft movements was in excess of two thousand. Cowley is now established and promises continual growth. Cowley and the new Pincher Creek airports complement one another. During our camps, our towplanes and visiting aircraft fly to the Pincher Creek airport for fuel. Local pilots use Cowley for a practise landing area, and for a place to picnic. It has an unknown but real value as an emergency airfield.

On behalf of the Alberta Soaring Council, I would like to extend an invitation to you, your colleagues, and your staff to meet with us at a time and place of your choosing in order to be exposed to this great sport called Soaring. Why not set a date now? Again thank you for the continuing support and cooperation."

✦ ✦ ✦

The grass was cut on schedule again. The rigid runway markers remained, but the big fenced pit at the edge of one runway was filled in. The windsock flew again, the time for peace and tales and songs had come back; for when the logs glow, flames leap up and my eyes follow their dancing smoke, higher and higher into the dark night, where a star-

spangled sky spreads over a small group of pilots from the corners of the earth. Many of them hope to experience their first wave flight over the Livingstone Range, or dream about their Gold or Diamond height gains.

1982 — The big 10th camp

Derek Ryder

1982 CAME AND GAVE US GOOD CAUSE to celebrate the Tenth Summer Camp as an expression of the tremendous amount of work done by the small band of pilots you have read about in this book.

This summer camp was the perfect one: sun for ten straight days on the hills, and at 27,000 feet, sun creating monster 10 knot thermals over the mountains from Calgary to deep in Montana. We counted 180 friends with 104 pilots, 35 private sailplanes, eight club gliders, and four towplanes.

Cowley was a worrisome overnight retrieve after learning that the downed pilot could not contact us because the phone at the airfield would not ring. Cowley was blue wave on the last two days with Diamond climbs into the Livingstone Block — opened in one-half

1982 — Bruno Schrein is sitting in the front of the Blanik as people prepare to lift the 1-26's wing off the canopy. Surprisingly little damage was done.

Walter Mueller

hour after a request to Calgary ATC. What cooperation! Cowley was fantastic organization from Tony Burton, Ken Palmer, Bruce Hea, and a multitude of others. Cowley was Hal Werneburg's cross-country school, a first time try to continue in the years to come. Cowley was Ursula's *Story of Cowley*, the first, shorter version of this book, sponsored by the Alberta Soaring Council and presented to every pilot there. Cowley was Grande Prairie's Blanik "mating" with Cu Nim's 1-26 at very low speed and even lower altitude (both had landed together without seeing each other). Cowley was over a thousand kilometres of cross-country flying by one new pilot in day after day of six and seven hour flights. Cowley was the football games, the soccer games, the evening fires, the northern lights. Cowley was the kids, the dogs, the dinosaur dig, trips to Waterton Park and the Frank Slide. Cowley was 30 degree days and 10 degree nights, "Coyote" pancakes on the flightline, popcorn and more parties at the fire. Even in the rougher times it was perfect. Fantastic views of towering, building thunderstorms – menacing on the horizon.

This summer camp featured a great anniversary banquet which jammed the Turtle Mountain Inn to the rafters. Provincial officials and all the oldtimers that could be found were invited, and many attended:

Alvie Cook – He would have liked to attend, but he was suffering from emphysema in Pincher Creek. When Julien met with Alvie after the banquet, he put Mr. Cook into a car and brought him out to the airstrip.

Horst Schmid – Minister of State for Economic Development [formerly Minister of Culture, Youth and Recreation], who had attended the first official camp in 1972.

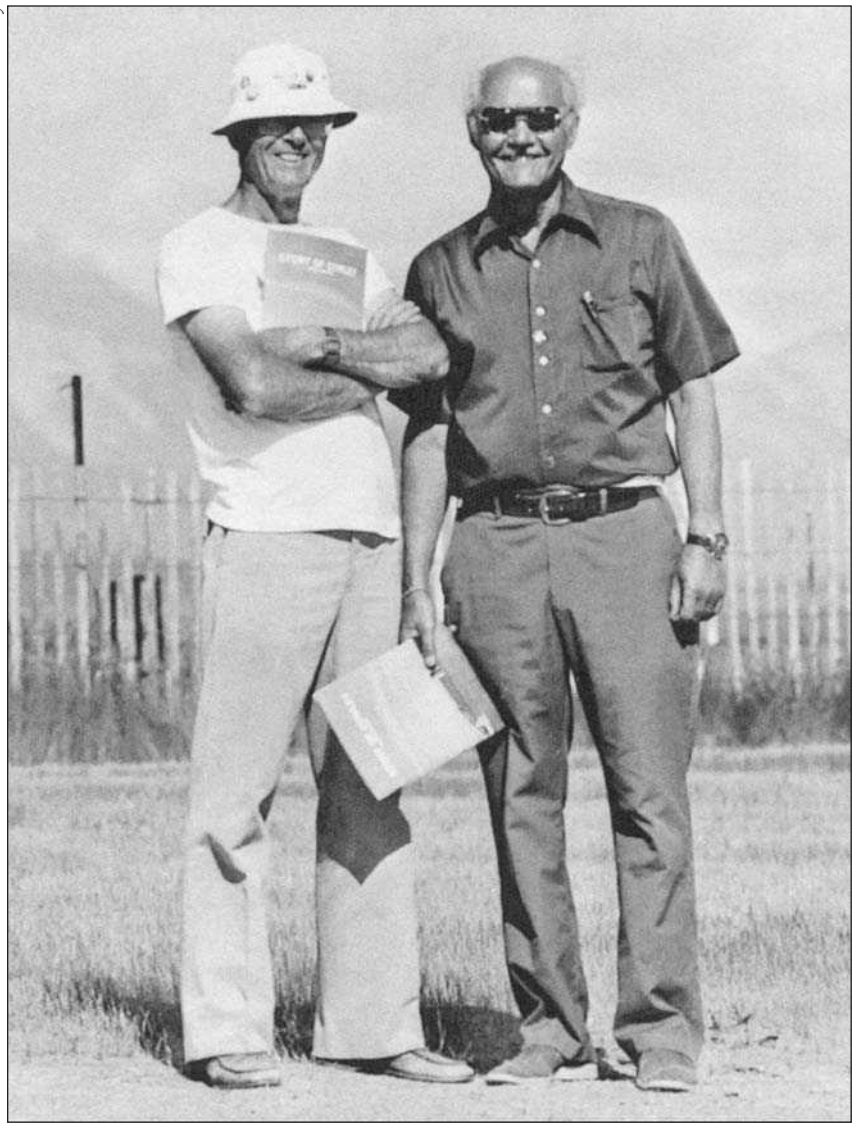
Tom Watt – Director of Aviation, Alberta Transportation (attending for the Minister). Mr. Watt is an oldtime pilot, and responsible for airport development. He was much involved in the set-up of the campsite and maintaining and improving it. He received the premier Canadian aviation honour in 1986, the McKee Trophy.

Roy Farran – Chairman Alberta Racing Commission [originally MLA for McKnight Constituency, then Alberta Solicitor General]. Following his invitation to the banquet, he replies on 13 July to ASC president, Mike Apps:

"I'm devastated. I would so much have liked to be there, especially since you promised me a ride in a glider. It would also have been good to see Bruce Hea and Klaus Stachow again. Unfortunately on 31 July, I am already booked to open the first race meet in Grande Prairie's new racetrack. Perhaps you could read the following message to the banquet:

I regret deeply that I am unable to attend the Alberta Soaring Council function in Blairmore. I count it as a positive achievement for Alberta that, thanks to representation by the Alberta Soaring Council and individuals like Klaus Stachow and Bruce Hea, the Alberta government saw fit to designate the Cowley airstrip as a gliderport. The unique air conditions in the Crowsnest Pass make it one of the best centres in the world for the sport. I have long thought that soaring is a sport with huge potential for our youth – a challenging

Robert Barry



1982 – On the left is Bruce Hea, our walking memory, the altitude gain and absolute record holder in 1981, preserver of the Cowley airfield and airspace when ASC president, and always a silent volunteer.

On the right is Julien Audette, Canadian Diamond badge #1, at one time the holder of all the Canadian records, a member of the Saskatchewan Hall of Fame, recipient of the FAI Paul Tissandier Diploma, and the only Canadian to earn the Soaring Society of America's Barringer Trophy (in 1958). He was inducted into Canada's Aviation Hall of Fame in 1989.

exercise which provided an outlet for adventurous spirit at reasonable cost. Since building character is the most important part of education, I congratulate the Alberta Soaring Council on its efforts to interest your youth in gliders. I'm also proud that so many records have been set by veteran Alberta soaring pilots. Congratulations on your tenth birthday."

Our governmental guests enjoyed this feast tremendously. It aroused their spirit again to improve "our" Cowley even more, and the following October wave camp offered additional tiedown cables and a flag pole. A new outdoor toilet was available the next summer, and the Cool Pool Stool is now history.

Special Certificates were awarded at the dinner to four of our pioneers:

Julien Audette — flying his 1-23, CF-ZDO from Cook's field, set two Canadian records. Until his illness in 1985, he was a very active pilot in his Regina club. Cancer finally took his life on 28 October, 1986.
Klaus Stachow — began to fly from Cook's field in the early 60s. He was instrumental in establishing the former emergency airstrip into the Cowley gliderport.
Dick Mamini — was specially recognized for his pioneering flights to Golden from Black Diamond on August 3, 1969 with his HP-14, CF-ALT, built by himself; from Cowley to Mt Assiniboine and back via the Great Divide on August 4, 1974 in his ASW-12; and from Invermere to Black Diamond on August 6, 1979 in his ASW-12.
Bruce Hea — for his continuous effort in keeping Cowley airstrip in good condition and for bringing the Livingstone Block airspace to its present bounds.

The Stachow wave trophy

TO HELP MAKE the 10th Summer Camp a very special occasion, Klaus Stachow commissioned a trophy to recognize excellence in high altitude flight. Designed by Tony Burton, the twenty inch high trophy features a small pewter sailplane suspended in a solid block of plastic shaped to represent a classic mountain wave scene. Klaus donated the funds required to have the trophy crafted, and the result is a truly fine work of art. At the banquet, Mike Apps presented it for the first time and it was accepted on behalf of the Soaring Association of Canada by its president, Russ Flint. The trophy has plaques on each side of the base.

> On the left is engraved: *"Established 1982 on the 10th anniversary of the Province of Alberta granting the Cowley airfield to the Alberta Soaring Council for the primary use of the sport and science of soaring. Klaus S. Stachow, one of the pioneers of mountain wave soaring in the Cowley area, was the architect of the proposal to establish the Cowley airfield as a permanent soaring site."*
>
> On the right is engraved: *"Awarded annually by the Soaring Association of Canada to the soaring pilot having the highest altitude flight in Canada. The trophy symbolizes the unique tranquility and beauty of high altitude wave flight."*

The trophy goes to the pilot having the highest flight of the year exceeding a 5000 m gain.

1994 — Handover of Cowley to ASC

Ursula Wiese

FOR TEN MORE YEARS we were pampered by Alberta Transportation & Utilities. We got another outhouse for the southeast campers in "Mount Royal", firewood was waiting in the bin, and the general cleanup of refuse was done before we arrived for the summer camps, and

The Stachow Wave trophy

a couple of new picnic tables and fire pits appeared over the winter one year.

We didn't need to worry about this behind-the-scenes work, but rumblings of funding cuts were passed along by Bill Odland, the Pincher Creek airport manager who looked after the upkeep of Cowley airfield and campground. Since Bruce Hea was always keeping an ear to the wind — chatting with the farmers who dropped in to reminisce, or Bill Odland who would do for us what he could, Bruce was reinstated as Cowley Development chairman. Yes, he liked his job and did it very well.

The rumours of big funding cuts increased. It was happening everywhere in the province, as the government of the day finally tried to get a grip on the huge deficit, let alone the debt that had accumulated from the government spending during the previous lush years. In February '94, Jerry Mulder from the new club in Red Deer warned us that all airports in the province would be privatized. Some ears at our annual general meeting began to burn when the message finally sunk in. Bruce was informed and he turned quickly to the powers to be by phone, followed by a letter to Mr. Harvey Alton, Deputy Minister of Alberta Transportation & Utilities on March 28, 1994:

"The Alberta Soaring Council (ASC) is aware of a general review of Alberta airports and related cost structures.

For many years we have explored and exploited this superb gliding area. It has become a tourist event attracting visitors both national and international. It is a world class mountain wave soaring area.

In a letter of October 6, 1975, the Honourable Hugh M. Horner, Deputy Premier and Minister of Transportation for Alberta, granted the ASC (representing all Alberta gliding clubs) the use of Cowley airfield. We wish to continue this use in the foreseeable future.

In particular, we would like to be consulted as to the outlook for Cowley airfield. We trust you would consider some form of lease agreement wherein the ASC, as primary user, would control this facility. We also would be pleased to discuss operating costs."

Coincidentally, Marty Slater, ASC president, received the following letter from Mr. Alton which was written the same day!:

"As part of the three-year business plan for Alberta Transportation & Utilities, a review of all airports and airstrips maintained by this department is under way.

One noteworthy item is our maintenance funding including mowing, water hauling and firewood for the Cowley airstrip. Given the majority of users of the Cowley airstrip use the facility for soaring purposes, our funding should be directed to the public use of the Pincher Creek Airport. Therefore, we propose to suspend this funding for the Cowley airstrip in the 1994/95 fiscal year, as of April 1, 1994.

We realize the importance of the airstrip and surrounding property is vital to soaring not only to Alberta but to the many visitors who benefit from the airstrip operation. Staff from Alberta Transportation & Utilities will assist Council in changing the land reservation over to your organization through the Public Lands Division.

We are aware that the property should be held for future use as an aerodrome only for your organization and the benefit of soaring in general.

I trust you can appreciate our support in spirit for soaring in Alberta; however, we are now concentrating on the business we should be in to meet Albertan's needs for public airports."

signed, **Harvey M. Alton**, Deputy Minister

Well, things happened fast now. Bruce and Marty met with Mr. Waters on 13 April to "discuss the Cowley Airport" – actually to learn about the options available to us. "For us it was a very productive meeting and certainly assisted in clarifying the Council's role with respect to future operations at Cowley … ASC proposes to enter into an agreement with the Government of Alberta ... to become the operator and have unrestricted access to Cowley airfield." (M. Slater 21 April 1994).

What now – we always wanted the airfield, but shrank from the high cost of maintenance and volunteer manpower. There were the other users to consider also: the Air Cadets flew regularly twice a year from there, and the radio control modellers had made Cowley airstrip their home as well. Access was open to anyone who cared to drive in.

In the end we had no choice but to jump in with both feet – Marty signed the ten year lease for $10 – smiling. Of course we can do it. The agreement (reproduced on the next page) was signed on 11 August 1994, effective 1 April 1994.

Bruce made a list of things to be done: "reroofing and painting of buildings, improved venting of toilets, gravelling of roads, restoration of picnic tables, additional benches etc." He contacted his long time Cowley acquaintance James W. (Jim) Parker, "that in return for farming privileges he would mow the grass, supply firewood, remove garbage, and in 1995 begin full restoration of runway 11 as well as fertilize the intersection and 200 feet south on 11." All sealed with a handshake. Lee Coates arrived with shakes and paint, and Barry Bradley donated the use of his generator to sand the old paint. Then just about everybody at the field got onto the roofs or painted when the flying was slow. As Bruce said in his last report as Chairman of the Cowley Development: "I am optimistic that we who cherished the idea that we might some day 'own' Cowley will volunteer our labour and skills to do the job. And how! A very talented and willing group of volunteers completed many urgent projects – those remaining will be done in due course." We delivered.

This is not the end of the airfield story, of course. In the future it is hoped that the airport will be developed further, and there is the need for continual vigilance to ensure that the requirements of glider pilots are not overlooked by government programs. When problems need solving, a good problem solver will once again, we trust, come forward from amongst the soaring community.

AGREEMENT

Made this 11th day of August, A.D. 1994.

BETWEEN; ALBERTA SOARING COUNCIL
a body corporate located in the Town of Claresholm,
in the Province of Alberta
(hereinafter referred to as "Alberta Soaring Council")

of the First Part,

— and —

HER MAJESTY THE QUEEN IN RIGHT OF
THE PROVINCE OF ALBERTA, as represented herein
by the Minister of Transportation and Utilities
(hereinafter referred to as "the Minister")

of the Second Part,

WHEREAS the Alberta Soaring Council is desirous of obtaining a licence permitting it the use of the Cowley Airstrip located in N.W.4, N.E.8 and W1/2 9-8-1-W5th and as shown on Schedule "A";

AND WHEREAS the Minister is desirous of granting the requested licence;

THEREFORE, in consideration of the mutual covenants contained herein, the parties hereto agree to the following:

1) The Minister hereby grants to the Alberta Soaring Council a licence to use the Cowley Airstrip, (hereinafter referred to as "the Airstrip"), located in N.W. 4, N.E. 8 and W1/2 9-8-1-W5th for a ten (10) year term commencing 1st April, 1994 for the sum of $10.00, the receipt of which is hereby acknowledged;

2) Alberta Soaring Council agrees to maintain the Airstrip on a seasonal basis;

3) Alberta Soaring Council shall, at its own expense and without limiting its liabilities or obligations herein, provide and maintain, for the duration of this licence, the following insurances with insurers licensed in Alberta and in forms and amounts acceptable to the Minister:

(a) Comprehensive General Liability in an amount not less than $1,000,000.00 inclusive per occurrence against bodily injury, personal injury, and property damage including loss of use thereof. Such insurance shall include but not be limited to Broad Form Property Damage Liability, Owners and Contractors Protective Liability, and Employees as Additional Insureds;

(b) Aircraft Liability for all aircraft owned, operated or licensed in the name of Alberta Soaring Council in an amount not less than $2,000,000.00 per occurrence and including passenger hazard liability where applicable;

(c) Aviation Premises and Operations Liability in an amount not less than $2,000,000.00 per occurrence covering the liability of Alberta Soaring Council arising out of its use, operation and maintenance of the Airstrip. Such insurance shall extend to include Products and Completed Operations Liability.

4) Each of the required insurances shall contain the following:

(a) Coverage for liability assumed under written contract adequate to cover the indemnification provisions of this licence;

(b) Thirty day advance written notice to the Minister of material change, cancellation or intent to lapse.

5) Alberta Soaring Council shall provide the Minister with evidence of all required insurance prior to the commencement of its operations under this licence, and shall promptly provide the Minister a certified copy of each policy. Such evidence and certified copies of renewal and/or replacement copies shall be provided throughout the term of this licence:

6) Alberta Soaring Council agrees that they shall not engage in the refuelling or maintenance of any aircraft other than those owned and/or operated by them without the prior written approval of the Minister. Should the Minister agree to Alberta Soaring Council engaging in the above mentioned activities, the Minister shall have the right to expand and/or alter any insurance requirements as is deemed necessary;

7) Either party may terminate this licence at any time by providing at least one year written notice;

8) This licence may be assigned by Alberta Soaring Council only on the prior written consent of the Minister;

9) Alberta Soaring Council shall not be entitled to file any encumbrances whatsoever against the Airstrip lands with respect to this licence;

10) Alberta Soaring Council shall indemnify and hold harmless the Minister, his employees and agents from and against any and all claims, demands, actions and costs whatsoever that may arise out of Alberta Soaring Council performance of this Agreement or by reason of any matter or thing done, permitted or omitted to be done, by Alberta Soaring Council, its agents or employees;

11) The Minister shall indemnify and hold harmless Alberta Soaring Council, its employees and agents from and against any and all claims, demands, actions and costs whatsoever that may arise out of the Minister's performance of this Agreement or by reason of any matter or thing done, permitted or omitted to be done, by the Minister, his agents or employees;

12) The serving of any notice to the within parties may be effected either personally or by mailing the same,by registered mail, to the parties at the following addresses

a) ALBERTA SOARING COUNCIL
Box 1916, CLARESHOLM, Alberta T0L 0T0

Any notice served by mail shall be deemed to have been served on the third business day following the date of posting;

12) This agreement shall enure to the benefit of, and be binding upon, each of the parties hereto and their personal representatives, successors, administrators and assigns.

IN WITNESS WHEREOF the parties have hereunto set their hands and seals as of the day and year first written:

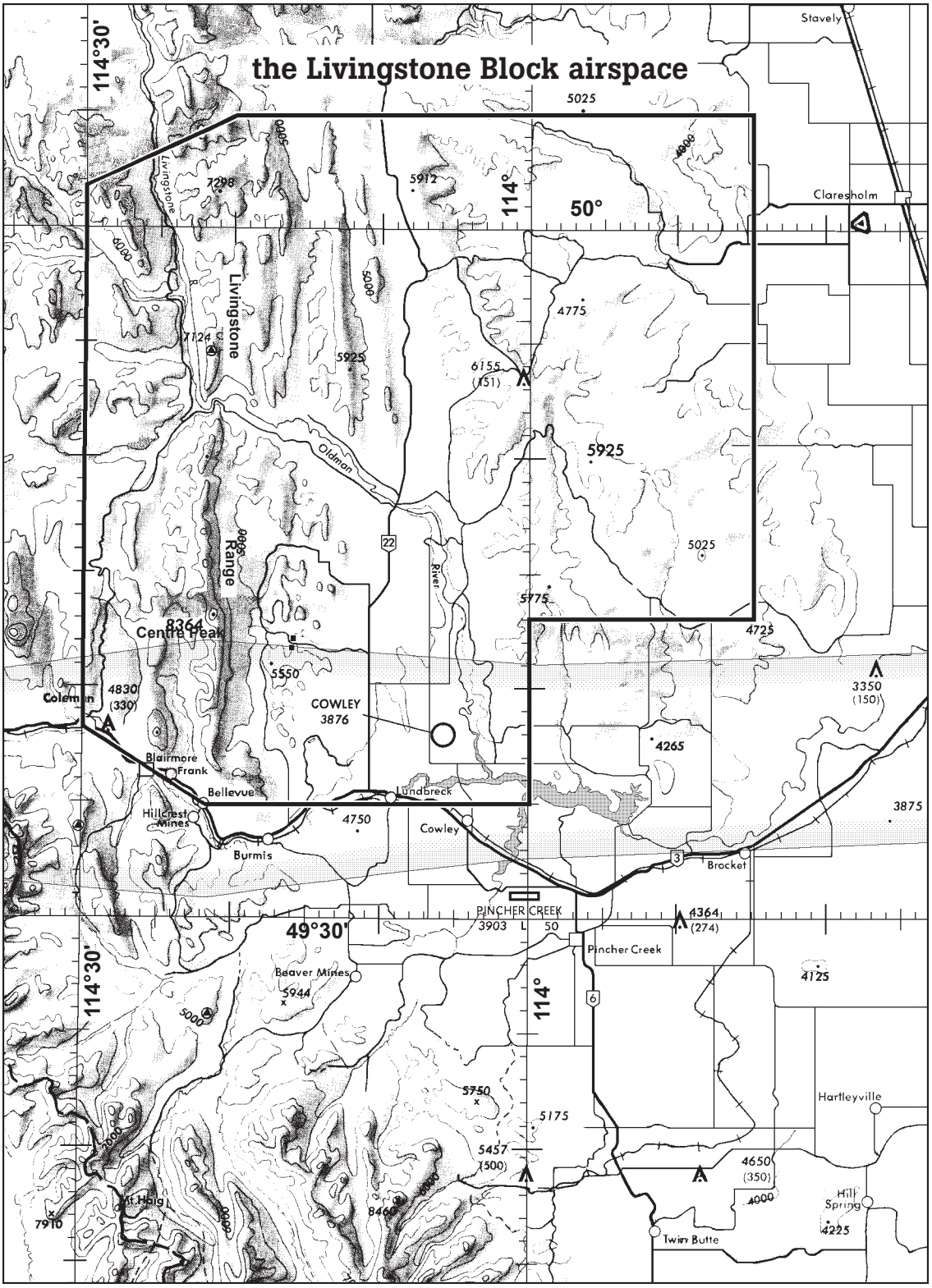
ALBERTA SOARING COUNCIL

Per M.J. Slater, President

Per Ursula Wiese, Secretary

EXECUTED BY HER MAJESTY THE QUEEN, IN RIGHT OF THE PROVINCE OF ALBERTA, AS REPRESENTED BY THE MINISTER OF TRANSPORTATION AND UTILITIES BY:

Per


the Livingstone Block airspace
114°30'
114°
50°
49°30'
Stavely
Claresholm
Livingstone
Range
Oldman
River
Centre Peak
8364
COWLEY
3876
Coleman
4830
(330)
Blairmore
Frank
Bellevue
Hillcrest
Mines
Burmis
Lundbreck
Cowley
Bracket
PINCHER CREEK
3903
L 50
Pincher Creek
4364
(274)
Beaver Mines
5944
Mt. Haig
7910
8466
5457
(500)
5750
5175
4650
(350)
Hartleyville
Hill
Spring
4225
Twin Butte
4125
3875
4265
4725
4775
5025
5925
5912
7298
7124
6155
(151)
5550
4750
3350
(150)

Chapter 4

The Airspace

The Airspace

The Airspace

"We know that you glider guys fly around Pincher Creek, but we don't want to hear about it."

MoT was aware of the powerless flights into the southern Alberta stratosphere and pilots' concern grew along with the increased number of altitude flights. To connect to the wave, either secondary or primary, or descend from it, the airways HL500 and V300, running east-west over Highway 3, and Blue 14 running north-south over Cowley, were crossed. Radio equipment was now available on the market, and the safe transit of man and glider was at stake. It became obvious that MoT had to be informed of the wave flights as jet traffic escalated.

Talk, reasoning, discussions continued, voices for safety and legitimacy became louder lest soaring activity in Canada become jeopardized.

The Soaring Association of Canada was very fortunate to have Dave Tustin of the Winnipeg Gliding Club on the Board as Zone Director; as a licensed air traffic controller, he also served as Chairman of the Airspace Committee of SAC. At the same time, David Marsden of the Edmonton Soaring Club presided over our national organization, so "airspace in southern Alberta" was on the agenda.

Dave Tustin had the idea that MoT would grant us airspace for high altitude flying without requirement for radio or other locator equipment if only the initiative was taken. Dave's proposal to legalize the wave activities was well received and greatly supported by the SAC President. Dave stated in 1982: "Without this incentive and the opportunity to present this concept to MoT, we may not today be flying the 'high skies'." So the ball began to roll …

1972 — Tentative agreement for a Livingstone Block airspace reservation

AN INITIAL PROBE by Dave brought this first response by Flight Standards and Regulations on January 6, 1972:

"... In answer to your specific question regarding waiving of the provisions of certain Air Navigation Orders, we can only advise that Air Navigation Orders are legislative documents, and any provision for waivers is normally contained in the Order. For example, the Positive Control Zone Order provides for aircraft without radios to operate in the Zone under certain conditions, after prior arrangements are made. Where good cause can be shown, Air Navigation Orders can be amended to accommodate the needs of the majority of airspace users. However, it is not likely that soaring operations would be permitted in the Block Air Space or in the area control airspace above Flight Level 230, if two way air/ ground communications between the glider and the appropriate air traffic control unit were not maintained during the flight.

On the other hand, if gliders are VHF equipped, an airspace reservation is distinctly feasible, particularly if the area is within a radar environment. Such an airspace reservation would permit unrestricted operation within the lateral and vertical dimensions of the area for a particular time period.

This Headquarters would be interested in examining your brief …"

signed, **J.M. West**
for Chief, Flight Standards and Regulations Division Civil Aviation Branch

Dave contacted several pilots who flew in Pincher Creek to hear about their ideas on the possible airspace boundaries around the Livingstone Range area. The Cu Nims were the most active group, more specific questions were invited on February 20, 1972:

"… I received a phone call from Chem LeCheminant a week ago concerning his findings with respect to the 'high altitude airspace situation'. I can say with certainty that Chem was very happy with his reception. As far as MoT is concerned it would seem that they are willing to proceed with implementation of airspace reservations for gliders as soon as we give them the necessary dimensions for the required area. It would seem that our initial airspace request should be no larger than mentioned below, which would give wave pilots the necessary area to search for the strongest lift. If individual pilots wished to explore the wave outside of the 'reservation', they would at least know by the maximum altitude granted by ATC, at what altitudes the enroute aircraft were operating.

I would hope that after the 'reservation' becomes a reality, we would be able to enlarge it if we saw the need. Once the program has commenced, it will be handled by the local ATC facility — in your case Calgary Terminal Control. Speaking as a controller, it doesn't make any difference how large a reservation is, provided all the traffic is going over the top, and I strongly suspect that this will be the case at Pincher Creek. But if we ask MoT for half of Alberta, we are likely to be told to go fly our kites. So in your submission to me, keep this fact in mind. MoT has asked me to expedite my input to their committee so that they will be able to peruse the brief and perhaps have their comments back to me prior to the time when I will be in Ottawa on April 25 to May 4, 1972.

What has been the feelings of the Cu Nim pilots to this proposal? I would hope they see that we have an opportunity here to reverse the insidious trend of ever increasing control of our airspace.

Here is an area that I would propose; let me know what you think of it: 114°00' to 114°20'W; 49°35' to 49°55'N. These coordinates all have corresponding landmarks which should make it reasonably easy to stay within the reservation …"

A most interesting dialogue on paper ensued from Cu Nim to Dave Tustin:

March 9, 1972 "... Don Skinner *[the Cu Nim president]* brought up your letter re high altitude airspace at a recent club meeting, and it was also discussed at a later meeting of four of our members (George Blunden, Bruce Gowans, Bruce Hea and myself) who volunteered to organize and present some of our thoughts. There are a number of specific points we would like to bring out:

1 Our first thought was to question the need for additional restrictions. Although you note that Chem had a good reception at MoT, most of our pilots would have been just as happy if the subject had never been brought up. However, I must admit we can't stress this point; first, because now it has been raised, and second, we should not/cannot expect either SAC or MoT to continually look the other way where operations against the rules may be involved.

2 We all disagree with your suggestion that we ask now for a minimum reservation, with the hope of enlarging it if necessary. We just don't believe this is a practical course, especially when dealing with the government! On the other hand we must be reasonable. We suggest that we should outline a practical system, giving thought to future needs and possible developments that might affect us.

3 Your outline of a reservation area would be satisfactory for the pilots who wish only to make a diamond climb. But once a pilot gets his diamond, what is he to do next? We feel strongly that he must have the possibility of utilizing wave lift for cross-country flights. There are three major possibilities:

— Long cross-country flights may be made along the … mountains,

— Out-and-return flights of world record calibre are possible, eg. Cowley to Jasper and return, [and] zig-zag flights are promising, such as Cowley to Banff or Exshaw and return to Cowley, where an altitude of 30,000 plus is reached, followed by a downwind coast to Saskatchewan.

4 Because of the above, we would strongly oppose any suggestion of reducing what is now available to us. By this we refer mainly to the right to go up to 23,000 feet when off airways, and up to 12,500 or 9500 within airways (depending on whether you are west or east of the 114th meridian).

We can see no reason that it should be suggested that the level of 12,500 be lowered. No one is going to fly IFR below 12,500 anywhere near the mountains, and (particularly in wave conditions) light aircraft normally keep clear of the areas we look for, whether they are IFR or VFR.

5 Similarly, we trust that there is no possibility of lowering the height of 23,000 available off airways. MoT is a regulatory agency which responds to the requirements of its major "clients", but we do not believe any lowering of block airspace can be justified on any reasonable basis. Since the gliding movement is a minority, we feel that our wishes should be proclaimed to prevent any possible encroachment.

We are not aware of any "incidents" in the past that would indicate the need for a change. We would also point out that potential problem areas should be carefully defined and consideration given to the specific locations involved, ie. why put blanket restrictions on a million square miles of territory because of a possible conflict in a specific approach zone which may be only a few square miles in area?

Regulations are normally prepared on the basis of the best judgement of those involved. We suggest that there should be proper statistical studies of the probabilities involved, with a realistic assessment of an acceptable level of probability of an "incident". Certainly the only way to be 100.00 percent sure that accidents will never happen is to completely ban all flying!

Attached is a copy of an article from the English magazine, *Sailplane & Gliding*, Feb 1963, in which an attempt is made to do this. It is found that a collision between an airliner and a glider should be expected only once in several thousand years. We do not suggest that the results mentioned in the above article could be applied to Canadian conditions. We believe the density of both airliners and gliders would be much greater in the United Kingdom than

in Canada. Further, we do not believe proper allowance has been made for present practices of restricting IFR flights to block airspace, airways, specific approach areas, etc. However, we do believe the suggested approach has merit.

6 With respect to a high altitude reservation or corridor, to be made available for wave flights when requested from ATC Calgary, we agree with this basic idea. We have observed in the past that most high altitude traffic seems to be north of Cowley, and we feel this could readily be directed either north or south of the suggested reserved area.

We suggest a minor extension in the size of the area, namely 114°00' to 114°30', and 49°35' to 50°00'. On the west this makes it possible to penetrate over the Livingstone Range either to use the primary wave, or waves from the ranges to the west. The extension to the north provides additional opportunities and greater distances along the range.

7 We further suggest that airway Blue 14, from Calgary to Cowley, should be cancelled. We feel it goes nowhere, no one uses it, and it has no purpose. There are no airport or IFR facilities at Cowley, as a destination. The only result of this airway is to lower the altitude restriction over the easterly part of the proposed reservation to 9500 feet rather than 23,000 feet.

8 Finally, the above comments pertain primarily to Cu Nim operations. The Livingstone Range is a unique feature and we are also favoured there with weather conditions that consistently produce waves. This is almost certainly a combination that exists nowhere else in Canada, and every effort should be exerted to develop it into the Canadian high altitude soaring site.

However, we do not suggest our submissions should be limited to this one area. Our club has had contact and experience with wave in other areas, such as west and southwest from Calgary, and around Waterton Park. Other areas are known to exist west of Red Deer or east of Jasper. We believe the Edmonton club and/or the Alberta Soaring Council should be contacted about these latter areas.

In summary, we feel strongly that present altitude regulations should not be made more restrictive; that a high altitude reservation should be set aside; and that the use of wave for cross-country flights should be kept in mind.

Thanks for the opportunity of presenting our thoughts. In some cases I feel we have answered questions which were not asked specifically, but this seems the appropriate time to put forward all our thoughts on this subject."

signed, **George Dunbar**

Dave Tustin to George Dunbar on March 13, 1972

"Thank you very much for your letter. This type of information is exactly what I have been in need of to make our presentation to MoT as complete as it can be. I can certainly understand the general feelings of the Cu Nim pilots to this project, however, the point that

sustains me is the time when they will attempt to lower the positive control altitudes for one reason or another. Referring to your comments on making Pincher Creek into the wave site of Canada, which incidentally I wholeheartedly endorse, if the site becomes more and more popular — and it will — it is the responsibility of all soaring pilots to ensure that the wave operation is as safe as it can be, not only from an operational standpoint but also in the legal vein, and that brings us to the present endeavour.

Actually we have not talked officially to MoT with respect to the wave operation so we haven't lost anything. All that has been discussed is the block airspace. The idea was to feel them out with something that we could give away without losing an operation. According to correspondence from MoT (of which you have copies), all has gone well, and I feel confident that given a good briefing on what our requirements are, MoT will treat us fairly. Keep in mind that I will have statistics on the daily traffic in the Pincher Creek area so they won't be able to 'snow' me. Simply put, the project is either valid or not, depending on your point of view as to whether there is a possibility that a sailplane will be seen and an in-flight incident filed with ATC. I think there is. I wouldn't want to have to go to Black Forest [Colorado] for my diamond. Sure, you guys have the most to lose but to my way of thinking, you also have the most to gain with the implementation of a legal operation.

I will modify the 'reservation area' as you suggest. With respect to the cross-country flights, I will include this type of flight requirement in the brief and see what comes out of it. I will have to put more thought to this, as right now I don't have any concrete idea as to how it should be approached. Calgary normally isn't that busy not to give good service to a cross-country pilot, provided that a position report was available and assuming that the flight would be VFR for the better part of the flight at least. In the worst instance I will attempt to get permission to cross airways in the block airspace.

Just what Mr. Dodd had in mind for implementation of further lowering of the positive control floor is not known at this time, but I will investigate this situation when I am in Ottawa. I agree with you in that there has to be pressure applied to MoT for them to even consider instituting further restrictions to general aviation. Where does it come from? Obviously the airlines, and predominantly Air Canada. SAC needs eloquent spokesmen in Ottawa to blunt this one sided view and put our special needs and the uniqueness of our sport across to MoT. The only reason for further restrictions that I can think of at the moment is the INS that all the new long range airliners are now equipped with.

The idea that all that airspace is tied up for the occasional or never use of a few aircraft doesn't sit well with me and the least we can do is to yell loud and long. The removal of an airway is usually an impossible task, but we will throw it at MoT and see what the reaction is. Perhaps we can get them to do a survey to find out how frequently, or infrequently in this case, the airway is utilized. Is there some reason why you use this airspace? If it is used regularly for wave flying, perhaps we should expand the 'reservation' to take it in.

On re-reading your paragraph (7), last sentence, I am somehow not able to comprehend what your point is. When our 'reservation' is approved, it will encompass all controlled airspace within the reservation, that means if the reservation encompasses an airway, then the base of the reservation will be 9500 asl or 12,500 asl, depending on whether the airway

is east or west of 114 degrees West. If the first positive controlled airspace is the Southern Control Area, then the base will be FL230. The maximum or top of the reservation altitude will be dependent on current or anticipated IFR traffic in the reservation area. It could be FL250 or unlimited. On looking at the map, I see that our proposed reservation does cover part of Blue 14 — no problem …

Have you people had any experience with long range VHF communications? It would be interesting and perhaps even necessary to know just what sort of range the average VHF radio is capable of. Can Bruce Hea help out here? Can you see any problems with radio reception in the reservation area?

Prior to this project going to MoT, it is in for a thorough airing at the SAC Annual General Meeting. I sincerely hope that approval is forthcoming so that we can get on with the organization."

signed, **Dave Tustin**

Bruce Hea to Dave Tustin March 18, 1972

"George Dunbar sent me a copy of your letter of March 13 regarding your question on radio communication to Calgary from Pincher Creek area.

Reception is excellent at altitude. Of the sets in current use (Bertea, Bayside, Genave, Radair), the Radair is the only one about which I would be uncertain as to its ability to contact Calgary. To be in continuous radio contact at oxygen altitudes would involve the technical problem of radio equipped oxygen masks. At the present time, once we go on oxygen, we usually respond to our ground stations with coded clicks! We have on a number of occasions talked on 123.3 ground-to-air and vice versa from Calgary to Pincher Creek using only our little Baysides and Berteas, while at 12 or 14,000 asl.

However, if I might interpret our collective thoughts, we would like to have our reservation so that diamond climbs could be made without radio contact to Calgary. Above FL230 (or perhaps FL250) it might be necessary to request by radio airspace prior to entering it for record height attempts or record flight attempts. They do this at Black Forest and other designated areas in the USA.

I have enclosed my recent copy of *Towline* with an account of Carl Herold's 535 mile flight initiated from the wave. You can follow his flight on any decent USA map. Note carefully that on the same day, Dick Cook acquired the Canadian free distance record *[724 km]*. What irony if we should be forced to go to another country to try to break such a record! Within the last two years or so you can also find in *SOARING* an account of Peter Neugard's flight in the wave from near Lake Tahoe to the Mexican border.

These flights are rare in about the same way as attempts to climb Mount Everest are rare. But I think we need to fight like hell to preserve the right to try such flights and for the same reason, because it is there.

… I am left wondering if it is not already true that regulations presently in force require that flights above FL230 asl require IFR ratings and complete IFR instrumentation, a physi-

cal impossibility in small panels like the Libelle. Thus we can never meet legal requirements unless special and specific exemptions are made (which I doubt will ever happen)."

signed, **Bruce M. Hea**

Meetings with MoT followed and much correspondence changed hands. Klaus Stachow's lobbying on the political scene for the Cowley gliderport was by now well underway and first fruitful traces of his work could be noticed. Only the common goal, "height records achieved by Canadians in their own country, and long distance record flights being started from high altitudes, or coasting along the Rocky Mountain chain or downwind into Saskatchewan …" pushed pilots to endure the times of doubt, and wait and hope a little.

In April of 1972 Dave travelled to Ottawa to attend an ATC conference, carrying the much awaited and excellent brief on the nature of the "Livingstone Block Airspace Reservation" for the MoT officials. Initially, Air Traffic Services and Air Regulations personnel had a total lack of understanding for this cause when Dave discussed the requirements for wave reservations. Fortunately, the Edmonton Regional Office had a representative at the conference who would be directly involved if the wave operation was to be legalized, and Dave was able to explain SAC's rationale. Joe Hoover, the Edmonton man, indeed was enthusiastic and understood the logic in this request.

A summer went by, departmental wheels both in Ottawa and Edmonton for airspace reservation ground on at a measured pace. Then the first breakthrough came; on September 15, 1972, Dave received from Ottawa "tentative arrangements" for an airspace reservation over Centre Peak, subject to an evaluation test on Thanksgiving weekend 1972. This agreement reads:

"As this is the first time that airspace has been reserved for this type of activity, any arrangements made should be considered tentative, and subject to evaluation after this soaring session. The Regional Controller, Civil Aviation of the Western Region, Edmonton, Alberta has been advised of your proposed exercise, and referring to our meeting here with Mr. Hoover, you would provide that office with further details as to the dates, hours of operations, and the number of flights involved.

The area to be provided is bounded by the following coordinates: [Gap] 50°00'N–114°00'W, [Porcupines] 50°00'N–114°30'W, [Porcupines] 49°35'N–114°30'W, [Pass] 49°35'N–114°00'W, excluding the airspace within this area between 9500 feet and FL230 on airways Blue14, Green 1 and V300, which is block airspace, wherein rules for flight in the block airspace apply as covered in Air Navigation Order, Series V, No. 15.

The provision of an airspace reservation depends on the operational requirements of all users of the airspace concerned. Providing your requirements are clearly explained to the Western Regional Office, every effort will be made to accommodate this exercise.

Separation between gliders is the responsibility of your Association, and all flights must remain in VFR weather conditions. It is regretted that the question of cross-country and

cloud soaring has not been considered at this time, as any decisions on this aspect will depend largely on an evaluation of this trial."

signed, **R.L. Bolduc**
Chief, Flight Standards and Regulations Division, Civil Aviation Branch

So far, coordination between SAC and MoT was a problem, with letters travelling between Winnipeg, Calgary and Edmonton. Just in time, when last minute coordination was badly needed before the Thanksgiving exercise, Dick Mamini, an experienced and enthusiastic Cowley pilot with world contest flights in his logbook, became employed by MoT in Edmonton. On behalf of SAC, he took on Dave's task of dealing with the Edmonton Regional Office directly under the official name of "SAC Livingstone Airspace Coordinator". The face-to-face contact with MoT greatly speeded up the work.

Dick, in a letter to the Region ATC on October 4, 1972, confirmed the preceding details of the airspace experiment to avoid misunderstanding and added:

"… It is hoped the results of this operation will be evaluated with the objective of setting up workable procedures for the safe and efficient utilization of this airspace. The unique combination of topographical features and meteorological conditions which exist in the Livingstone area are ideally suited to the development of mountain waves. Also, it is desirable to vector commercial aircraft around areas of known mountain wave activity to avoid severe CAT (clear air turbulence) which is often associated with this phenomenon. Therefore, it would seem to be to the mutual benefit of both sport aviation and the commercial carriers to work on this problem."

1972 *– Dick Mamini, an enthusiastic pilot who was on the world contest team in 1972 and 1974. At first, planning of the block airspace between SAC and MoT was a problem. Just in time, he was employed by MoT in Edmonton and took over the discussion and letter writing.*

October 5, 1972 Western Region to Dick Mamini:

"Reference is made to your letter of October 4, 1972 on the above subject. We are taking action to reserve the airspace as requested. This notification will be published in the form of a NOTAM on October 6 and will be effective during the specified times (October 7, 8, 9 between the hours of 0800 MDT and 1930 MDT).

We wish to emphasize that the airspace reservation will apply from above FL230 up to and including FL290. Gliding is not permitted within the block airspace.

If for any reason this exercise is cancelled or discontinued, you are requested to contact the Air Traffic Control Shift Supervisor, Calgary Terminal Control Unit, either by telephone or radio and request that the reservation be cancelled.

We concur with your proposed plan to evaluate air/ground communications and have advised Calgary Terminal accordingly.

All pilots participating in these activities should be thoroughly briefed on their responsibility to maintain separation from other gliders, to remain clear of the block airspace, and to remain within the lateral and vertical limits of the reservation.

It is requested that an activity summary be forwarded to this office subsequent to this event so that it can be used as a basis for justification of future airspace requests."

signed, **H.J. Taylor**
Regional Controller Civil Aviation

Thanksgiving weekend 1972 came. It was a super day and the wave gave its best, challenging pilots higher than the agreed FL290, and the temptation was great … Dick's report on this weekend was received favourably by the Canadian Air Transportation Administration. It reads in part:

"… on Sunday October 8, 1972, a climb to FL290 was made by the writer observing strictly the defined boundaries of the allotted airspace. I will briefly describe the flight, which was quite typical for the area, and comment on some factors which should be considered in formulating any permanent procedures for sailplane operations in this area …

Initial Climb

Release from the towplane was made about 1500 feet agl under B14. Thermals were used to climb to 9500 feet msl at which time it was necessary to penetrate west to get away from B14 and under V300. The secondary wave was contacted clear of B14 (to the west) and the climb continued to 12,500 feet msl under V300 (west of 114°W). Crabbing north to get clear of V300, a 100 knot IAS penetration run was made to the primary. Sink was recorded at 2 to 3000 fpm until the rising portion of the primary wave was contacted where we recorded about 3000 fpm climb maximum, dropping off to about 1500 fpm at 13,000 feet msl. We were now well situated in the wave, although north of the best part which extended into the "bulge" in V300.

Although we were able to thread our way through the rather complex pattern of airways with varying bases on this particular day, occasionally the standing waves form with a long wavelength, and the secondary wave forms under or in the way of B14.

Gaining access to the primary wave from 9500 feet msl would be impossible under these circumstances as you would be driven into the ground before you got there. As it was, starting from 12,000 feet msl and quite a bit closer to the primary wave it still cost close to 5000 feet of altitude, and the foothills west of Cowley rise quite rapidly to 5000 feet msl.

With the rate of sink experienced we were about fifty seconds away from a landing when lift was encountered.

The point I am making is that the present rules force the glider pilot to take an unnecessary risk just to stay out of the B14 airway. During my eight years and about 300 hours of flying in and around this area I have only seen one aircraft actually using the B14 airway, and that was three years ago.

FL290 Limit

From the soaring point of view the limit to FL290 is totally unacceptable and if this limit continues in effect it will tend to kill the sport in Canada and force Canadians to seek Canadian records in the USA. In fact, the existing Canadian record is held by a Canadian who travelled to Colorado specifically for that purpose. When you consider there are only a few hours in the entire year when conditions are suitable for this high altitude soaring activity, it does not seem unreasonable for us to ask for a vertical block system similar to that in the FAA Agreement.

The two pilots who reached FL290 on October 8th both reported 600 to 800 fpm at that altitude. Putting it another way, they were probably only 10 to 15 minutes away from the Canadian altitude records, both absolute and achieved climb. During the roughly two hours we were above FL230 there were only two eastbound jets observed (clearly visible by their contrails). Both jets were well south of our position … "

Dick concluded the letter with emphasis on eliminating the risk of accident resulting from the low altitude approaches into the foothills west of Cowley required to avoid B14 airspace, and that problem should be considered as part of the overall study.

Dave Tustin writes to Dick Mamini on October 22, 1972:

"I was very pleased to see that you were able to assist us in the implementation of the Livingstone Block Airspace Reservation. Please keep me informed as to how the operation went on Thanksgiving or as to when it is rescheduled. As far as I am concerned, you are in a much more favourable position to sell our requirements to the Edmonton office once the results of the first 'meet' are known. If it is agreeable to you, please carry on. Initially I was met with a total lack of understanding and sympathy for our cause when I first discussed our requirements for wave reservations with Joe Hoover, however I am sure now that he is on our side. Keep in mind though that he operates 'from the book'.

When I was gathering information from Cu Nim on the Cowley area, the suggestion was received that we attempt to have Blue 14 from Calgary to Cowley cancelled. I have discussed this idea with Calgary controllers and gather that use of this airway is very in-frequent. Joe Hoover knows of our feelings here but told me the last time I talked to him that he hadn't done anything to clarify the question as yet. You might bring up the topic again and suggest that a survey be made to ascertain whether or not the airway is serving a valid function for protection of IFR aircraft above 12,500 asl or just creating a roadblock for no reason to climbing sailplanes."

1973 — The waiver is written

IT WAS JUST IN THE PREVIOUS YEAR that the use-permit for Cowley airstrip had been awarded to the Alberta Soaring Council. Therefore a safe and workable utilization of airspace above Cowley was of vital concern. Winter 1973 was a busy one. The "tentative agreement" became a permanent one, with an open waiver to permit high altitude soaring flight up to FL450 within the positive controlled airspace bounded by a revised set of co-ordinates. For sake of convenience we suggested this airspace be referred to as the Livingstone Block, to take effect on mutual agreement between the Association and MoT Western Region, with altitude limits to be set locally by Calgary ATC.

However, negotiations continued in order to remove some MoT restrictions facing wave pilots who would use the airspace, such as the requirement for radios above FL230. MoT agreed to extend the ceiling of uncontrolled airspace from FL230 to FL290 within the reserved airspace. This would allow the majority of wave flights and everyone going for diamond altitude climbs to fly without the necessity of radio contact with Calgary ATC. A clear benefit to both sides, but requirements for record attempts within the Livingstone Block above FL290 had to be worked out. "Air Regulations" still insisted on transponders above FL290 for separation of traffic. We were blessed by having Dick Mamini right in the arena of action. As well as having to convince MoT of the technical merit of the proposals, there were also certain personal prejudices to overcome: in particular, there was a gentleman in the "Airways" division who was convinced that glider pilots cannot navigate and were incapable of staying within the prescribed zones. He was also much concerned about high altitude indoctrination training. ATC was initially the only MoT division completely favourable to glider pilots and their activities, and cooperation was offered.

ATC finally took the continued pleas to heart that airway Blue 14 posed a hazard to safe ascents and descents to and from the wave. Therefore Calgary Terminal Control Unit conducted a three month survey of aircraft using airway B14.

On February 15, 1973 Dick Mamini writes to SAC, ASC, Cu Nim, and Dave Tustin:

"As a result of the last round of letters with MoT some very encouraging things have happened:

A survey was started on the use of Blue 14. Results: no traffic at all in December and only one flight in January. It has been indicated by the "Airways" people that this is far below the level necessary to justify keeping this airway open and if this trend continues the airway will be cancelled. Also, consideration is being given to the "bulge" in V300.

A letter was prepared for Mr. Taylor's signature which was very encouraging. Briefly it read (past tense) as follows:

- The existing coordinates of the "Livingstone Block" would remain the same (excluding the block airspace of the airways of course, ie. same as trial period last fall).
- Flights to FL290 would be allowed, NORDO.

- Flights above FL290 and up to FL450 would be allowed with two-way radio and positive control by Air Traffic Control.
- Distance flights outside the Livingstone Block would be allowed provided the sailplane carried a transponder and could communicate effectively with ATC.
- An agreement would be signed between SAC/ASC and MoT.

Now, we couldn't ask for much more than that and the letter was generated by "Air Traffic Control". However, before signature, a letter of this type must pass through "Air Regulations" and "Airways". It seems that over the years we have made some enemies in the latter two Departments and they shot the whole thing down. Therefore, we are back to square one and we must start a little PR work … again."

"The removal of an airway is usually an impossible task, but we will throw it at MoT and see what the reaction is." *(Tustin, March 3, 1972)* One year later, effective May 24, 1973, airway Blue 14 was decommissioned (after a use study was done). This, of course, greatly simplified safe flights within the Livingstone Block. A major step in the airspace negotiations had been accomplished.

The official notification of the B14 survey read:
"February 28, 1973 Only one flight was recorded … and it would therefore appear that this airway is little used."

It was a fruitful winter, and when spring time neared, on May 15, 1973 a letter from H. J. Taylor, Regional Controller Civil Aviation, left Edmonton for the SAC Livingstone Airspace Coordinator:

"… We are pleased to inform you that this Region has obtained a waiver of the appropriate Air Regulations in order to permit high altitude soaring within the Livingstone Block up to and including FL450 but excluding the block airspace provided the following conditions are complied with:

(a) Sailplanes operating above FL290 to be equipped with a functioning two way radio capable of maintaining communication with the Calgary Terminal Control Unit;
(b) No flight shall be made above FL290 unless authorized by ATC;
(c) In the event of two-way radio communication failure, the sailplane shall immediately vacate its flight level and descent to below FL290. Alternate communication failure procedures will be specified by ATC when considered necessary.
(d) Each sailplane shall be responsible for maintaining VFR flight and maintaining adequate separation from other sailplanes within the Livingstone Block;
(e) ATC reserves the right to limit the number of flights approved above FL290;
(f) No sailplane flight permitted in the block airspace;
(g) Additional conditions set by ATC are complied with.

For the purpose of this waiver, the Livingstone Block is defined as that airspace from above FL230 up to and including FL450 bounded by the following coordinates: … *[Note: the co-ordinates listed were revised January 17, 1974 and re-revised and finalized on August 11, 1975.]*

With reference to item (f) of the preceding paragraph, please note that airway B14 will be decommissioned effective May 24, 1972; consequently you will be concerned with the block airspace on airways G1 and V300 only. Further note that west of 114°00'W the block airspace extends from 12,500 msl up to and including FL230. Soaring is not permitted in this airspace.

We place the onus fully on your Association to ensure the competency of your pilots to remain within the defined airspace and to determine correctly their altitude of flight. We cannot overemphasize the importance of gliders not penetrating airspace above FL290 unless specifically approved by ATC since there may be overflying IFR traffic at FL310 or higher.

The administration of the Livingstone Block will be carried out by the Calgary Terminal Control Unit and our intention is that all communication regarding the use of this airspace will eventually be carried out directly with the Chief of that ATC unit. In the interim, however, would you please advise this office of your tentative schedule for use of this air-space and to what extent you may wish utilization of altitudes above FL290.

It would appear that several technical aspects require careful resolution prior to initiating any significant soaring activity. Some of these are as follows:

1 Use and accuracy of altimetry;
2 Communication with Air Traffic Control, prior to, during and following soaring activity;
3 High altitude indoctrination of glider pilots;
4 Communication failure procedures;
5 Advance notification to ATC – NOTAM action and traffic advisory;
6 Appropriate emergency procedures;
7 Development of an ATC/Soaring Association letter of agreement …"

Dick Mamini writes on May 15, 1973 to ASC and SAC:

"This initial agreement went through several evolutionary phases and at one time required transponders for all sailplanes above FL230. As you can see there is now significant improvement and in my opinion this is a reasonable proposition for all concerned."

On June 12, 1973 Dick replies to the Canadian Air Transportation Administration in Edmonton:

"Reference is made to your letter dated May 15, 1973 with regard to a waiver of the appropriate Air Regulations in order to permit high altitude soaring within the Livingstone Block …

Altimetry All sailplanes that I am aware of carry 50,000 or 60,000 foot sensitive altimeters. Position errors are not significant due to static source location and the velocities are relatively low. Over the past eight years I have calibrated many barographs and I am authorized by the Association to carry out this work. In my experience the maximum error recorded was in the order of 200 feet. That is the difference between the pilot's reported altitude and what was actually recorded on the recording type barograph. I am confident that errors of this magnitude are acceptable for an operation of this type. In any event, the Association will ensure that suitable altimeters are carried in all sailplanes attempting high altitude flights at sanctioned meets.

Communication Radio communication shall be in accordance with paragraph (a) of your letter.

High altitude indoctrination Thirteen members of the Edmonton Soaring Club attended a day long HAI course at Cold Lake on May 2, 1973. Groups from Calgary and Edmonton have previously taken the course in past years and another course is scheduled for this fall.

Communication failure procedure This shall be in accordance with paragraph (e) of your letter.

Advance notification It is proposed that the Association will contact Calgary ATC not later than 10 hours prior to the start of flying, ie. the previous evening. This should give plenty of time for jet traffic flight planning and will avoid unnecessary and perhaps unused reservation of the airspace. Further, it is proposed that on a continuing basis the then current President of the Alberta Soaring Council will be the contact man who will conduct all liaison with MoT.

Emergency procedures Any malfunction of equipment necessary to the safe continuation of the flight shall of course result in the pilot immediately discontinuing his climb and descending as follows:

1 Below FL290 in the event of radio failure.
2 Below 12,500 feet msl in the event of oxygen equipment malfunction.
3 Landing if required.

Letter of agreement It is proposed that a meeting to formalize outstanding items be scheduled for later this summer and that an agenda be prepared by WCA so that the Association will be prepared to adequately cover the points of concern. The present plans of the Association are to have a flying meet at Cowley airstrip during the period of July 28 through August 6, 1973. Please accept this letter as an official request for use of the Livingstone Block during that period."

Dick was finally able to sit back and enjoy what he had fought for—the airspace reservation for glider pilots in southern Alberta. The precedent for a Canadian airspace reservation

for glider pilots had been set in a reasonable time, and the door was now open for more and easier negotiations. ATC requested a meeting regarding further use of the Cowley airspace and Bruce Hea as President of ASC took on the task of more discussions to finalize the airspace reservation for glider pilots. On July 23, 1973 an additional letter with confirmation of the operating procedures followed:

"… 1 The President, Alberta Soaring Council, will be responsible for coordinating the use of the Livingstone Block with the Unit Chief, Calgary Terminal Control Unit. Calgary Terminal will activate the Livingstone Block by means of a Class I Notam which will be issued about twelve hours ahead of activation time. In the event that use of the airspace is not required for the duration of the Notam'd period, the Soaring Council representative will inform Calgary TCU. Subsequent action will be taken to cancel the Notam.

2 Normal air/ground communication shall be carried out on 124.8 MHz with 119.3 MHz as a backup frequency. "Calgary Terminal" is to be used when calling Calgary Air Traffic Control*. Gliders are to be referred to as "sailplane" followed by the three alpha-numeric codes (see 1973 Flight Information Manual 6–3 or ATC Procedures Notam 14/72).

3 Aircraft planning to attempt flight above FL290 are to contact Calgary Terminal (ATC) prior to reaching FL290 and advise their intentions. Request approval up to FL330 until "time" (Greenwich Mean Time). The response from ATC will be contingent on the current and anticipated traffic situation. A revision to a given time block may be requested and will be approved by ATC whenever possible. Pilots should be clear of the airspace above FL290 at the termination of the time block specified. ATC shall be advised accordingly.

4 In the event of loss of communication with ATC, aircraft which have received approval to penetrate or are in airspace above FL290, are to terminate their flight and inform ATC as soon as possible of this action. If this information can be relayed to ATC it will not be necessary for the flight to land. Aircraft are to continuously monitor the air/ground communication frequency used during flight above FL290.

5 Flight following service will be the responsibility of the Soaring Council representative and will be assisted by ATC to the fullest extent possible.

6 Radio and time checks will be provided by ATC on request.

7 Position reports, when required, are to be given in relation to the following geographical features:

THE GAP — (north portion — west) Where the Oldman River and a secondary road cross the break in the Livingstone Range.

CENTRE PEAK — (centre portion — west) The highest peak in the Livingstone Range, generally capped by snow.

THE PASS — (south portion — west) Crowsnest Pass, the general area of Coleman/Blairmore.

PORCUPINE HILLS — (centre portion — east) This will be used to indicate when an aircraft is close to the eastern boundary of the Block.

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* *the Terminal Control Unit was moved to Nisku in 1984 and current frequencies have changed.*

It is expected that pilots and controllers will be conversant with these geographical locations. The preceding instructions are intended to provide guidance for the July 28 to August 6 activity. From the experience gained during this period, we anticipate that revisions will likely be necessary …"

signed, **J.W. McClure**
Regional Manager, Air Traffic Services

Livingstone Block boundary changes

1973 THE SUMMER CAMP EXERCISE had taken place and the Livingstone Block boundaries as approved by MoT in May 1973 proved to be unmanageable for sailplanes descending from the wave as especially strong westerly winds could make landings at Cowley airstrip impossible. The Block needed expansion. As outlined in both ministerial grants for use for Cowley airstrip and the airspace overhead, the Alberta Soaring Council would be the coordinator between the soaring fraternity and the government for smooth operations. On October 19, 1973 Bruce Hea composed a letter to J.W. McClure in Edmonton, reporting on both the summer camp and the fall wave camp, held October 5 to 8, 1973:

"… As President, Alberta Soaring Council, I have been responsible for coordinating soaring activities in the Livingstone Block with the Unit Chief, Calgary Terminal Control Unit. This letter constitutes my report on these activities. It also includes certain additional information, recommendations and comment, as a result of subjecting our activity to critical analysis during this trial period.

… Much study and thought has been given to the size and location of the Block itself — to satisfy our apparent needs but not to exceed them. The original Block dimensions are small when one considers that straight gliding flight from 29,000 asl could easily exceed 150 miles! The original Block was selected as a known wave climb area containing both primary and secondary waves. Conversely, very little thought was given to descent. The entire western half cannot be used for descent. The V300 airway cannot be used for descent between 23,000 and 12,500. Of the remaining area the up-portion of the secondary wave cannot be used for descent thus the available descent area is far too limited. The area is replete with outstandingly large geographical reference points while engaged in climb, facing generally west, with a relative ground speed approaching zero. But, when turning away to the east ground speed may exceed 250 mph and the eastern boundary quickly penetrated while still above 23,000. To turn south too soon may result in entering the airway between 23,000 and 12,500.

An obvious solution is to add 15 minutes of longitude to the eastern boundary beginning just north of V300 and extending to the northern edge. This also emphasizes Claresholm as an alternate airport. Because Claresholm is right on 50 degrees, it is recommended that the northern Block boundary be extended from 2 minutes to 5 minutes, by definition excluding

any part of V305E. To facilitate possible vectoring and to add a better geographical reference, the southwest corner should be cut off by a line running from Bellevue to Coleman."

1974 MoT responded with slightly modified coordinates on 17 January 1974:

"… We are pleased to advise that authority has been granted to permit the Alberta Soaring Council to continue high altitude soaring within the area known as the Livingstone Block [followed by the new coordinates]. You are reminded that the Standards and Conditions for conducting high altitude soaring within the Livingstone Block, issued May 15, 1973 and July 23, 1973 still apply."

1975 Two seasons now were flown under the agreement of January 1974. More meetings between MoT and ASC had taken place highlighting extension of the airspace boundaries to the north and staying completely free of the airways. The revision was confirmed on August 11, with the following changes:

"… A waiver of the appropriate Air Regulations has been granted in order to permit high altitude soaring within the Livingstone Block up to and including FL450, but excluding the block airspace. Coordinates [of block] are:

49°35'N 114°00'W to 49°35'N 114°22'W to
49°38'N 114°30'W to 50°02'N 114°30'W to
50°05'N 114°20'W to 50°05'N 113°45'W to
49°43'N 113°45'W to 49°43'N 114°00'W to point of beginning.

This area extends upwards from 18,000 asl to whatever flight level is coordinated with Calgary TCU. Notam action will be taken by this unit specifying period and altitude/flight levels being utilized. Requests may be made by individual sailplanes for flights above the flight level specified and these can be approved traffic permitting. Normally a continuous block above FL290 will not be requested. Such flights will be on an individual request basis …

Sailplanes planning to attempt flight above FL290 will contact Calgary TCU prior to reaching FL290 and advise their intentions. Request approval up to FL _____ until _____ GMT. ATC will approve or disapprove under the following conditions:

approve	when no IFR traffic is in the designated airspace.
delay approval	if airspace is occupied but is expected to be vacated after a short period of time.
disapprove when	• an abnormal volume of IFR traffic would make approval impractical for efficient control of other traffic; • indication that poor R/T, or poor response to clearances could jeopardize safety.

Once the airspace has been assigned to the sailplane, the appropriate separation standard will be applied to other traffic. In the application of lateral separation, flight on the 075 radial of the Cranbrook VOR via the 235 radial of the Lethbridge VOR will provide sufficient separation from the Block for east-west traffic on HL500. A revision to a given time block will be approved whenever possible. Pilots have been advised that ATC expects that a flight will be clear of the airspace above FL290 at the termination of the time block specified. The Council has requested traffic information be provided when sailplanes are operating above FL290. This service will be provided to the extent possible. Pilots have been instructed to report leaving FL290 on climb and descent."

signed, **C.W.P. Currie**, Unit Chief

1993 — The block is chopped a thousand

IN 1993, ASC accepted having the top of the block lowered from FL290 to FL280. This opened up some airways for the Area Control Centre without affecting glider pilots significantly. Bram Tilroe, who works at the ACC, explains:

1 Above FL290 we have to use 2000 foot vertical separation, therefore the next useable flight level on the high level airway over Cowley would be FL310 (a westbound altitude) and the first eastbound level would be FL330.
2 By lowering the top of the Block to FL280 we can use FL290 eastbound, gaining another altitude. This became more important with a lot of turboprops and some jets like the Citation and the BAE-146 which can barely make FL310. This way we get these aircraft over the Rocks and above Cowley without the penalty of a major reroute.
3 It was also felt that this would not penalize the soaring community much and has a major benefit for normal air traffic. Historically there was not all that much use above FL280 by sailplanes and a 1000 feet loss to them gives ATC a 4000 foot gain.

1996 — Flight following passes into ASC's hands

Marty Slater, ASC president

THE EFFORTS of Dick Mamini, Dave Tustin, Bruce Hea and others in getting the airspace established has been well documented. ASC has a waiver to operate under Visual Flight Rules without a transponder in their own block of Class F airspace which is cutout of the Class A airspace. As part of the process, ASC regularly signed an agreement with air traffic control as to the terms and conditions for making the space available, who the contacts were, what the radio frequencies were, and the format for Notams.

In developing the 1996 agreement renewal, we were fortunate when a member of the

Central Alberta Gliding Club, Bram Tilroe, who is an air traffic controller and terminal operations specialist at the Edmonton Area Control Centre, took on the agreement renewal as his own project.

In our discussions Bram kept mentioning the idea he had to see if they would agree to not having any radio contact with us. Our part of the bargain would be to take responsibility for the "flight following" function that Edmonton Area Control Centre provided. The ACC would effectively sterilize this airspace block to whatever altitude we requested for our exclusive use. This would mean that people flying at Cowley would now only talk to "Cowley Ground" instead of Edmonton Centre.

To understand how this might be possible you have to understand how things are changing in the high level flight routing environment. Now computer generated tracks are used for the most efficient track for the airliners. So if they know well ahead of time to avoid the Cowley soaring area up to a flight level of say 45,000 feet, they plan the track accordingly and there is really no need for the sailplanes to talk to Edmonton Centre any more — a much less intimidating prospect for many of us.

However, it now puts the responsibility on our shoulders to ensure flight following is maintained with sailplanes flying in the airspace reserved for our use during the approved period and within the approved altitudes. So, at the risk of sounding melodramatic, this is our opportunity to demonstrate our capability to responsibly manage this agreement. When anyone contemplates or is flying above FL280, we will have to have an individual on the ground dedicated to monitoring all FL280+ flights. It will still be the pilot's responsibility to get below FL280 promptly if radio contact with Cowley Ground cannot be maintained!

Our attitude should be no different than before. We should still treat these high altitude flights with the professionalism and preparation that they demand. The only thing that has changed is you are talking to Cowley Ground instead of Edmonton Centre. If problems ensue or pilots take advantage of the situation, we will quickly lose this privilege. And you can be sure that all subsequent agreements will require transponders and radios with 25 MHz spacing. So it really is up to us! 'Nuff said.

An interesting sideline to this story is the Grande Prairie block airspace which had existed for many years but was used very little. As part of negotiating the new agreement, we were asked if ASC could also take responsibility for this block so they would just have one contact point for all soaring airspace in Alberta. After talking to the Grande Prairie Soaring Society they agreed. Transport Canada also said, "Oh, by the way, does it have to be continuous or can we make it occasional?" (the same as Cowley has always been!) So for all the years this airspace had been designated, they had been routing traffic around it!

For the Grande Prairie people it must also be remembered that the same responsibilities existing for the Livingstone Block will also apply to them.

In conclusion, the past two years have seen ASC take on some major responsibilities. At the same time, however, we are assured of our use of the Cowley airstrip and we have simplified our operation in the airspace above. After having worked with many ASC members as we took on these new responsibilities, I'm confident we will have no problems shouldering the load.

The airspace operations change from ATC's viewpoint

Bram Tilroe, Shift Manager, Area Control Centre

THE FOLLOWING COMMENTS are provided as background to the revised airspace agreements with ASC and Transport Canada which took place between November, 1995 and resulted in the signing of an agreement on April 1, 1996.

It is the policy of Transport Canada to regularly renew and review agreements it has with airspace users who have special needs. I became involved in the present agreement in my capacity as Air Traffic Controller and Terminal Operations Specialist in the Edmonton Area Control Centre. My background as an active aviator and aircraft owner and, more recently, as a glider pilot with the Cadet program allows me to look at these agreements with the perspective of a user as well as a provider of our services. These varied and related experiences strengthen my endeavours to come up with a balanced approach in order to satisfy both the user and the provider.

When I examined the agreements which were up for renewal, I consulted Rick Martin of Transport Canada Air Navigation Requirements, as it is this department's responsibility to designate airspace, whereas ATC operates it for the user. Both agreements were examined and we approached Marty Slater, president of ASC, to have both the Grande Prairie and Livingstone agreements come under the ASC and be made similar to facilitate use by both the user and provider.

A number of concerns of the gliding community and ATC, which were either on record or resulted in discussions with Marty, were looked at, namely:

- frequencies and 25 MHz spacing,
- use of hand held radios and oxygen requirements,
- flight following responsibilities,
- airspace classification,
- transponder and mode C requirements.

After much discussion with ATC control staff it became apparent that they did not want to be responsible for flight following sailplane operations unless they were equipped with transponders and proper radios. The new ATC sector altitude splits would also mean that 25 MHz is a must and frequency changes and inter-sector coordination would be too cumbersome for both sides. It was therefore decided to propose a highly simplified agreement and present it to ASC. This met with reserved enthusiasm and, once the alternatives were explained, was readily accepted by ASC members.

The new agreement is very simple, when ASC wants to use the Livingstone or Grande Prairie blocks, they call the Shift Manager at the Edmonton Area Control Centre 12 hours

in advance and request activation of the block to Flight Level 280. ATC will issue a Notam and sterilize the airspace for the date and times requested. If it becomes apparent that wave conditions exist or will develop to allow flight above FL280, ASC will again contact the Shift Manager at ACC at least two hours prior to sailplanes going above FL 280 and request a vertical extension to the block (eg. request above FL280 to FL350 until 2400Z). The ASC may then operate any number of sailplanes up to that altitude but must keep track of them. They must call the shift manager when all sailplanes have vacated the area or if the extension is no longer required.

This agreement makes the ASC responsible for their own operation in Class F airspace which has been cut out of Class A airspace with this agreement, and gives the soaring community the freedom to explore the mountain wave. The ASC must renew the agreement periodically, review any changes and discuss areas of mutual concern. This cooperative effort between the user and the provider of airspace will ensure that special operations, such as the mountain wave soaring, can be accommodated safely to the benefit of all users.

AGREEMENT BETWEEN EDMONTON AREA CONTROL CENTRE AND THE ALBERTA SOARING COUNCIL

A. PURPOSE

A.1 To define the responsibilities and establish operating procedures within the Cowley soaring area CYA201(S) and the Grande Prairie soaring area (CYA215(S).

B. DESCRIPTION OF AIRSPACE

B.1 CYA201(S) and CYA215(S) are defined as that Class F airspace from 18,000 feet asl to a flight level specified by NOTAM (ocnl daylight) as described in the Designated Airspace Handbook (TP1820). The rules for Class G airspace apply when the area is active.

C. PROCEDURES

C.1 The President of the Alberta Soaring Council or an approved appointee will be responsible for coordinating the activation of CYA201(S) and CYA215(S) with the Shift Manager, Edmonton Area Control Centre (ACC).

C.2 Edmonton ACC will activate either area by arranging for Class 1 NOTAM action at least twelve (12) hours ahead of activation time. This NOTAM will be formatted as in Appendix 1 and will be normally limited to flight level 280.

C.3 Each sailplane is responsible for maintaining VFR flight and for maintaining separation from other sailplanes within CYA201(S) or CYA215(S). Flight following service will be the responsibility of the Alberta Soaring Council.

C.4 Sailplanes maneuvering so as to enter CYA201(S) shall do so in Class E and/or Class G airspace so as to remain clear of Class B airspace in the vicinity of Victor 300 and the Lethbridge Control Area Extension. Sailplanes maneuvering so as to enter CYA215(S)

shall do so in Class E and/or Class G airspace so as to remain clear of Class B airspace in the vicinity of Victor 349 airway and the Grande Prairie Control Area extension at altitudes above 12,500 feet asl, ie. Class B airspace.

C.5 A Soaring Council representative will inform the Edmonton ACC Shift Manager when CYA201(S) and/or CYA215(S) will not be in use for an extended period of time due, for example, to unsatisfactory weather conditions.

D. PROCEDURES ABOVE FLIGHT LEVEL 280

D.1 Sailplanes planning flight above flight level 280 will use the following procedures:

(a) coordinate with the President of the Alberta Soaring Council or an approved appointee to activate either CYA201(S) and/or CYA215(S) above FL280.

(b) ASC will then contact the Shift Manager, Edmonton Area Control Centre (ACC) @ (403) 890-8397 at least two hours prior to the expected time to climb above FL280 and request a vertical extension to the Alert area, stating the time required above FL280 (eg. request activation of CYA201 above FL280 to FL350 until 2400Z).

(c) ASC will call the Shift Manager if the extension is no longer required. It will be the responsibility of ASC to ensure that sailplanes do not enter the altitude extension prior to and vacate the area prior to the time agreed on with the ACC.

D.2 Edmonton ACC will approve, disapprove or modify these requests and agree to specific altitude and time limitations, under the following conditions:

(a) Approve — when no IFR traffic is in the alert area;

(b) Delay approval — if the area is occupied, but is expected to be vacated after a short period of time;

(c) Disapprove — when an abnormal volume of IFR traffic would make approval impractical.

D.3 When the ACC approves the requested altitude and time, ASC may operate freely in the airspace with one or more sailplanes. Radio contact with ATC is not required nor will ATC accept responsibility for flight following service.

D.4 ASC will provide the Shift Manager with a contact person and telephone number who must be reachable while the area is active above FL280.

signed **R.G. Harris**
M. Slater

1994 – Mike Glatiotis of Calgary's Cu Nim Gliding Club, bundled up and non-hypoxic at about 20,000 feet in the Cowley wave in his Standard Cirrus.

Chapter 5

The Safety Aspects
of Wave Flight

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of Wave Flight

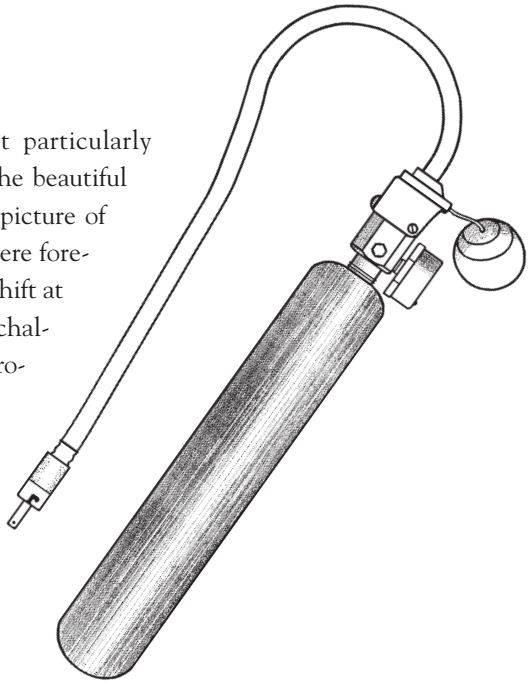
The Safety Aspects of Wave Flight

The human body is not designed to operate above 16,000 feet for any length of time, and altitudes above about 25,000 feet should be considered hazardous and unhealthy territory for the unpressurized pilot.

There are many physiological effects of flight at altitude which must be understood and compensated for in order for the pilot to be safe.

1992 — Bailed out by the bailout bottle

Jay Poscente



THE FAMOUS Cowley wave was not particularly strong this day, nor was it marked by the beautiful lenticular clouds that often help form a visual picture of the smooth bands of lift. High altitude winds were forecast at over 100 mph and a 40 to 50 degree windshift at 20,000 feet further complicated the climb. The challenging but erratic two hour ascent in rotor and broken wave generated a barogram that looked more like a thermal flight than that of a wave climb.

The lift topped out at about 25,000 feet ruling out any record attempts, so I decided a bit of wave cross-country might be fun. I had neglected monitoring my oxygen pressure during the difficult last half of the climb as my gauge is mounted inconveniently on the regulator behind my head. I looked back to check the pressure and my heart stopped. "ZERO! … DOES THAT GAUGE SAY ZERO?!" Three panicky breaths later, the bottle was completely empty, the blinker stopped blinking, and my mask was suffocating me. Anxious to breathe, I pulled the mask from my face. The next nine minutes seemed more like an hour.

In a hurry to descend, I initiated a quick 180 degree turn towards the sinking side of the wave but found the controls frozen nearly solid by the –35C temperature. The resulting high speed uncoordinated turn was quite unnerving. "Don't panic. Breathe deeply and slowly," I told myself. "Dive in the lee of the wave, get the oxygen mask back on your face, then activate your bailout bottle," (a tiny emergency oxygen bottle designed for military pilots so they can bailout at high altitudes).

Unfortunately, maneuvering into the descending side of an invisible wave with stiff controls while trying to maintain constant speed in the steepest dive I had ever experienced proved challenging. Add the complication of trying to free and lower a frozen landing gear (to increase drag) while holding open powerful dive brakes that want to close at high speed, and I found myself postponing the task of replacing my oxygen mask. I was already down to 22,000 feet and thought, "perhaps diving at this rate I will have enough time to make it down without emergency oxygen."

Then, hypoxia set in.

It did not creep up on me with the "subtle feeling of wellbeing" I had read about. It hit me like a bag of hammers and it was frightening. Heart pounding, ears ringing, tunnel

vision, head spinning and tingling all hit at once and hit hard. I was flying at the edge of my frozen bird's performance envelope and felt I could pass out at any moment.

I fumbled with my oxygen mask and banged my knuckles as I reached to activate the bailout bottle strapped to my thigh. "Wonderful," I thought. "There go my motor skills!" Craving a rush of oxygen to clear my head, I yanked repeatedly on the little bottle's activation cable, but nothing happened. My mask was suffocating me again. It was like trying to draw a breath from an empty pop bottle. I moved my mask off to the side of my face and gasped at the rarefied air. A sickening feeling of helplessness welled over me. I was losing consciousness and there were no more options. All I could do was dive at the Livingstone Range and wait. Time stood still.

I vaguely remember noticing the airspeed approach 100 knots (somewhere near redline for this altitude) and thought, "Slow it down or you will break the glider." I must have flown through a band of moist air because a layer of frost formed on the canopy and wings. I remember peering through the ice streaked canopy to see how close to the ground I was getting. I also remember the deep feeling of disappointment at seeing the mountain peaks still two miles below.

Now resigned to my predicament, a sense of calm settled in. I felt numb, like I was dreaming, and watched curiously as the tunnel vision tightened and as colours faded to greys. For lack of any other options, I gave the bailout bottle another try. Expecting my oxygen mask to suffocate me again, I took a deep breath and held it before fumbling with my mask and bailout bottle. As I was holding my breath, mask in place, I noticed pressure building in the mask. Fear turned to elation!

I tried desperately to get a deep breath, but it was like trying to breathe through a tiny straw. Again, I yanked at the activation cable thinking it was only partially open, but there was still no rush of oxygen, just enough to get a mouthful every few seconds. Enough, I suppose, to stay conscious for the seven to ten minutes that these 22 cubic inch bottles are designed to deliver.

With my heart pounding, trying to match my breathing to the torturously slow rate of oxygen flow was nearly impossible. But the pure oxygen quickly cleared the harshest symptoms of the hypoxia. Thoughts began racing through my mind. I remember suddenly realizing just how very dizzy and cold I was. I got angry with myself for having neglected my oxygen pressure gauge on the way up, but was relieved to realize that at this point, I was probably going to make it back down, in one piece.

Again, I caught the airspeed approaching redline, only this time I was approaching a nasty looking rotor cloud! Sobered by images of my frozen fibreglass sailplane breaking to pieces in violent rotor at 100+ knots, I pulled out of the dive as gently as I could. "I've made it," I thought! "I can wait at this altitude for my ship and brains to thaw out."

It took me a couple of minutes to realize, however, that I was still at thirteen thousand feet, bailout bottle now empty, and still starving for oxygen. It was a quick dive to ten thousand feet. Mercifully, I was spared any dealings with rotor and was able to establish a holding pattern in light wave lift for about twenty minutes while my glider and I thawed slowly at +2°C. The phrase, "You can breathe easier now", took on a whole new meaning!

Everything seemed to be going fine until I found myself snapping out of a daydream in strong sink. I wasn't sure if I had recuperated enough to attempt a high wind landing yet but I was sure that I was in heavy sink and would definitely be on the ground somewhere soon, ready or not.

I headed for the Cowley airstrip, reviewing my circuit procedures and landing checks over and over, concentrating heavily all the way in. Despite the high winds, it may have been one of my best circuits ever and I was so happy to touch down safely that I forgot who was driving and promptly botched the roll out! I sat motionless in the glider for awhile savouring the profound feeling of relief and contemplating how fortunate I was to be there with no damage to plane or pilot.

I am not proud of this avoidable adventure. It was the result of my neglecting an instrument important to the safety of the flight. However, research and the luxury of hindsight have allowed me to make a few safety related observations that should be shared with other high fliers.

Observations:

- SCUBA training taught me that the deeper you go underwater (increasing pressure), the more air you use with each breath. I had assumed that the higher you fly (decreasing pressure), the less bottled oxygen you would use with each breath. Wrong! In fact, the higher you fly with a diluter demand regulator, the more oxygen you draw from your tank with each breath. Breathing through an oxygen mask at 10,000 feet, your regulator mixes mostly outside air with a small amount of bottled oxygen. By 32,000 feet, most regulators are automatically supplying 100% bottled oxygen to your mask.

I had been monitoring the oxygen pressure during the early stages of this climb and based on the slow rate of oxygen depletion at moderate altitudes, I had assumed there was at least an hour more capacity than turned out to be the case at higher altitudes.

- There are those who would say I was not extremely high at 25,000 feet. The chart says you should have up to five minutes of "Time of Useful Consciousness" (TUC) without supplemental oxygen at this altitude. But what if you don't realize that your oxygen supply has been deteriorating for awhile? I believe this is what happened on my flight. I had less than one minute from the time I discovered the trouble until I developed substantial physiological difficulties.

"Blinkers" (oxygen flow indicators) blink shut while oxygen is flowing through the regulator. My blinker was trying to tell me that something was wrong for about 15 minutes before I ran completely out of oxygen. When the pressure got low, my blinker only closed briefly at the beginning of each breath rather than its usual practise of staying closed throughout each inhalation. I probably was not getting enough oxygen this whole time and was becoming increasingly hypoxic without realizing it.

I failed to notice three signs of deteriorating judgement during the last 15 minutes of my oxygen supply. I saw the blinker's subtle change in behaviour but for some reason I shrugged it off without further investigation. Then, I decided to fly cross-country despite ridiculously high winds, no flight plan and no retrieve crew. Finally, I have no idea why I took off my mask

when my oxygen ran out. It would have made more sense to immediately activate the bailout bottle. These events all occurred prior to my having noticed any sign of hypoxia.

- Descending is a rather poor emergency procedure for high altitude oxygen system failures. During an emergency descent, you are not recovering during the dive, your condition continues to deteriorate, albeit at a decreasing rate until you are below 10,000 feet. Above 20,000 the problem compounds rapidly. The higher you are when the problem occurs, the less time of useful consciousness you have and the farther you have to dive, your hypoxic condition worsening the whole time you are above 10,000 feet.

Furthermore, your rate of descent is a big unknown. Will you be able to locate and stay in the lee of an invisible wave once hypoxic and diving? You could be diving in lift. I was flying a Mini-Nimbus which has extremely effective dive brakes. My barograph recorded this very steep descent at a fairly steady 2000 feet per minute. I thought I was in the lee of the wave but will never know. The 50 degree windshear somewhere around 20,000 feet confused the shape of the wave and the vario is useless diving at high rates.

After I discovered the problem and after the dive was established, it took an additional six minutes to descend to 13,000 feet. What if I did not have a bailout bottle? What if I had been at 28,000 feet where a healthy military pilot has about 90 seconds before passing out without supplemental oxygen? A lot of pilots at this year's wave camp achieved 28,000 feet and higher.

How fast can your glider descend? What is its redline at various high altitudes with dive brakes fully open? From what maximum altitude can you survive an emergency descent without oxygen assuming what vertical speed? At what altitude will one bailout bottle not have enough capacity for you to survive the descent? At what altitude should you abandon ship and free fall to a safe altitude and will your face and eyes be protected against terminal velocity at –40C?

- Prior to this episode, I had encountered a rather widespread cavalier attitude towards bailout bottles. The day after my misadventure, I was happy to see considerably more attention being given to these convenient little life savers on the Cowley flightline. I hope this article will inspire a few more pilots to carry bailout bottles on all wave flights and to thoroughly understand how they work.
- When you use an instrument only a few flights a year, as is often the case with oxygen instruments, you have to make a conscious effort to alter your normal instrument scanning habits.
- There is no rush of oxygen when a bailout bottle is activated. About a 20 pound tug on the green ball activates a low volume free flow of oxygen that decreases in both volume and pressure over the seven to ten minutes it takes to deplete the bottle. Try breathing through a one-eighth inch drinking straw or one of those coffee stir sticks that look like a squished straw for a few minutes to get the idea.
- My experience with hypoxia was not what I expected. Since everyone reacts differently, anyone intending to fly wave should seriously consider taking an altitude chamber ride. Your local department of aviation medicine can steer you in the right direction. Hypoxia, like a low level spin, is best recognized in its incipient stages.

1995 — How can you talk and breathe at the same time?

Todd Benko

… I HAVE THE DIAMOND in sight with 4 knots lift and it seems only inches remain to be gained. Soon reaching 27,000 feet, I have it. I decide to take this elevator to the top floor which means calling for a clearance above 28,000 feet. I look around the cockpit and locate my little piece of paper that has the appropriate frequencies written on it. Now, just how do I use the handheld radio through the oxygen mask? I try a transmission with the mask on. No way. I remove my glove and mask and broadcast. "Edmonton Centre, this is glider X-ray Quebec Lima." No reply. I wait a few seconds while taking a couple of breaths from the mask. I try again, still with no reply. Not wanting to risk hypoxia by having the mask off too long, I decide to change to the backup frequency. Finally making contact with the controller, he requests I change back to the primary frequency. Still no contact is made, but I can hear other aircraft communicating on frequency.

As my altimeter steadily approaches FL280, I ask any aircraft reading my transmission to act as a relay, getting no response from them either. Finally, as I level off at 28,000 I am able to re-establish contact with the controller on the backup frequency and ask to go higher. He responds, "Do you have a transponder?"

My little cockpit comprises a single seat, no heat, no power, no motor, bottled oxygen, a handheld radio and enough clothing to venture out into a –40 degree blizzard. I reply, "Negative". A somewhat pregnant pause occurs, undoubtedly due to a miniconference developing around the radar scopes. Finally the controller returns and clears me to no higher than flight level 330. I read back my clearance, "No higher than flight level 330", and I put the radio down.

It is only now that I realize something has changed. The sound of the air over and around the canopy appears different. The sharpness of the hissing is almost gone and is getting more muffled. I quickly realize that hypoxia might be setting in. I put on my oxygen mask and select 100% oxygen. I also realize that the outer limits of my peripheral vision seemed to be fuzzy, however this clears up within thirty seconds on oxygen. A couple of minutes later my hearing returns to normal and I select the oxygen to normal operation. All the pauses with the controller caused me to lose track of how long I was off the mask. When I tighten the mask, I find that the ear muffs in the cloth helmet prevent me from clearly hearing anything on the radio. Later proving to be a less than ideal decision, I elect to turn the radio off in case the battery is getting weak. I did not remember that I had to remain in radio contact with the controller at all times above FL280.

I put the glove back on my freezing hand and eventually top out at 28,700 feet, and I inform the controller as I drop below flight level 280. The controller questions if I heard his calls. I am sharply chastised after I tell him I had turned the radio off. I sheepishly apologize for my sin and proceed with my descent. Finally landing back at the field, I was exhilarated! Only as I sat back later did I slowly realize what I had endured, learned and achieved.

A trip to Cowley — worst case scenario

Rick Zabrodski, MD

YOUR LONG TIME FRIEND who lives on the west coast near Victoria is coming out to fly your glider at the summer camp at Cowley at your invitation. He has never flown at Cowley before and never flown any higher than 12,500 asl.

"Big Bob" when he arrives is bigger than when you saw him last. You note when you meet him at the airport that he is still smoking two packs a day and when you mention this he tells you that you sound like his doctor who sees him regularly during the winter months when Bob gets recurrent bronchitis every 6 weeks. In fact Bob is just recovering from such an infection and has cut down to one pack a day! Being the tough guy he always has been though, this didn't stop him from donating a pint of blood yesterday at the donor clinic held at his office.

You drive down to Cowley and, because its dry and summer, Big Bob's hay fever starts to act up. He's sneezing and getting red eyes so he picks up some antihistamines when you stop for the beer. Both of you have a great evening together recalling past adventures and near misses as aviators and after polishing off the 12 beers go to bed at 3 am.

You both wake at 7 am with the tent flapping in the wind. A front has come in and there are lennies over Centre Peak in August! This is Bob's big opportunity to get his first Diamond! No time for breakfast (just three quick cigarettes), you quickly untether the glider and Bob climbs in. It's warm outside and summer so he is wearing a cotton shirt and shorts. Your bailout bottle is at home (you forgot it), but you are not worried because you have never needed it anyway. You tell Bob to keep an eye on the blinker and to worry if it stops blinking.

As Bob takes off behind the towplane your partner comes up to you and asks if you filled up the oxygen because there was only 500 pounds left last night after his flight. You hadn't noticed this because the gauge is mounted just behind the headrest and was obscured by the barograph that Bob had installed. You try to call Bob on the radio but he has forgotten to turn it on, probably because your mask doesn't have a microphone in it so he wasn't planning on talking to anybody anyway.

The ASC safety officer who just found out that your friend was flying today comes over to insure that Bob's medical and licence are current. Are they? Well, at least you explained the Livingstone Block procedures including altimeter adjustments and use of airspace, didn't you? I guess not, because another glider who is holding at flight level 280 because of upper commercial traffic just saw your glider go up beside him, nearly hitting him as if he wasn't there! Now he reports that your glider is 4000 feet higher now and still climbing despite –40°C temperatures.

Bob might very well not get back to the ground in one piece. If someone had given HIM a Daily Inspection, he would surely have been grounded on medical factors alone.

Hypoxia and the respiratory process

Rick Zabrodski, MD

RESPIRATION is the process by which living organisms exchange gases with the environment. In human beings, this means providing oxygen and removing carbon dioxide from the cells of the body. For this to occur we require sufficient oxygen concentration to be brought to the lungs via ventilation (breathing). Once at the lung tissue level these gases must diffuse across a membrane and then be transported via blood (hemoglobin) and diffuse again to the tissues. Finally, the oxygen must be utilized within the cell to produce the energy necessary to sustain life.

Hypoxia occurs when one or several steps just mentioned are disrupted to the point when oxygen deficiency occurs at the cellular level. *Brain cells with their uniquely high oxygen demand are most susceptible to low oxygen pressure*. Hypoxia can be classified into four types:

Hypoxic hypoxia — This is a deficiency in oxygen at the lung tissue level due to a decrease in oxygen partial pressure (altitude induced hypoxia) or a decrease in effective gas exchange in the lung (eg. collapse of one lung).

Hypemic hypoxia — This can occur even with normal lung function and occurs when the transport of oxygen by hemoglobin is impaired. This occurs with anemia (decreased hemoglobin) or impairment of its function by carbon monoxide. CO levels are 6 to 7 times higher in smokers. Three cigarettes in 30 minutes puts your 'sea level' at 8000 feet and can seriously impair night vision.

Stagnant hypoxia — This is any condition causing a reduction in blood flow, especially to the brain. Clothing that is too tight, 'g' forces, changes in body posture, extreme environmental temperatures as well as certain medical conditions and drugs can all lead to this problem.

Histotoxic hypoxia — This refers to metabolic disorders that interfere with the cells ability to utilize oxygen. Cyanide works at this level as do many toxins. However drugs can also have a significant impact including our old friend, ethyl alcohol.

It must be emphasized that these effects are additive. Thus an out of shape, overweight, tired, smoking pilot who had a few beers with his antihistamine last night who goes flying without breakfast after donating blood may find himself suffering from hypoxia much sooner than what we would expect from a young, healthy, well rested and well fed pilot on whom the data for hypoxia has been derived.

Stages of Hypoxia

Stage	Altitude (ft) breathing air	Altitude (ft) breathing 100% O_2
Indifferent	0–10,000	34,000–39,000
Compensatory	10,000–15,000	39,000–42,500
Disturbance	15,000–20,000	42,500–45,000
Critical	20,000–25,000	45,000–46,000

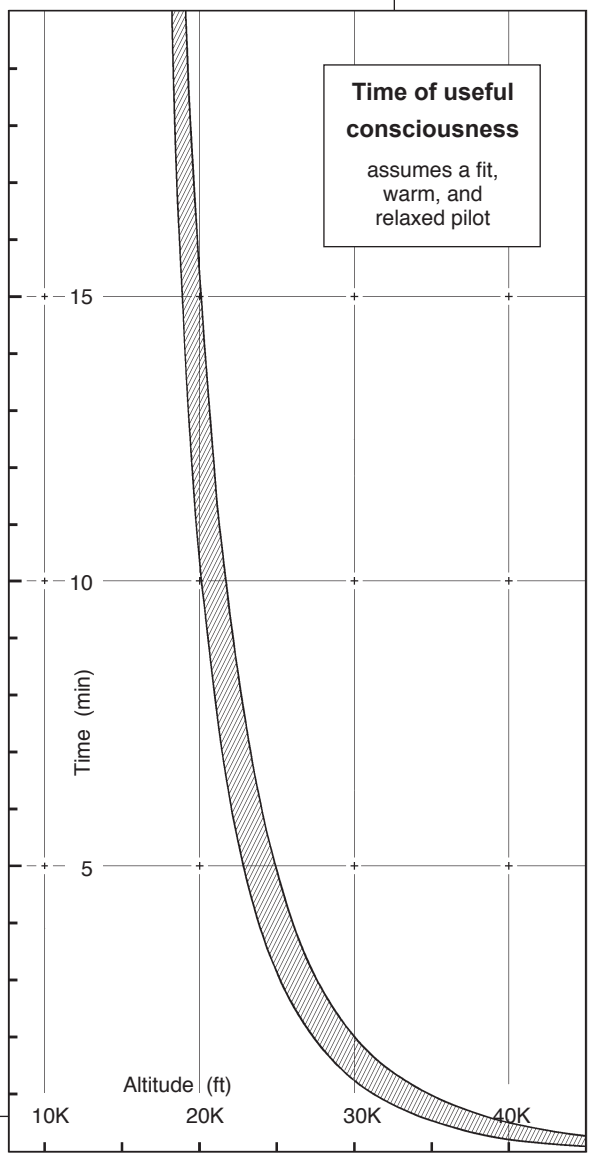
Use of a tightly fitting mask delivering 30 mm Hg pressure and 100% oxygen will give a safe altitude limit of 42,500 feet corresponding to the indifferent/compensatory stage. Pressures greater than 30 mm Hg are not tolerated unless a counterpressure garment is worn.

Indifferent 10-30% reduction in visual sensitivity. Slight increase in respiratory and heart rate with impaired performance of new tasks.

Compensatory More pronounced change in respiration and heart rate provide some protection against hypoxia for a period of time. Drowsiness, decreased judgement and memory occur. Difficulty with discrete motor movements.

Disturbance Within 30 minutes symptoms such as air hunger, headache, somnolence, dizziness, euphoria and fatigue may develop. Thinking becomes slow and unreliable, memory faulty, and motor performance is severely impaired. Loss of peripheral field vision occurs (tunnel vision).

Critical Mental confusion within minutes followed by incapacitation with loss of consciousness, followed rapidly by death.



Guidelines for the Prevention of Hypoxia in High Altitude Flight

If in doubt, go to 100% oxygen – still in doubt? – use your bailout bottle!

Know your symptoms. Ideally, experience hypoxia in an altitude chamber to understand how you react. A possible alternative might be a dual flight in wave with an instructor observing your flying while off oxygen.

Know your body. If you smoke, quit. Preferably no alcohol within 48 hours. Don't fly if you are sick or on medication (including nonprescription drugs) without your doctor's okay. Get a good rest and eat something before flying.

Know your glider and equipment. Make sure it all works. Consider a warning or backup system and understand the limitations of your oxygen system. They are not all the same!

Know your environment. You must dress prepared for the cold but also be comfortable in clothes that are not too tight and allow the normal operation of controls in an already cramped cockpit. How easy and how fast could you bail out if you had a midair collision at 20,000 feet?

Know the limits. A conservative pilot not worried about breaking the world record should fly assuming his oxygen system will fail and that his altimeter may be underestimating his real altitude by as much as 2000 feet. With this in mind, assuming rapid recognition of a malfunction and immediate descent, I would recommend flights not to exceed 28,000 feet to insure a safe return.

Know the very real risks. If break records you must, then consider doing it together with another pilot, in two ships or, even better, in a two-seater. Carry two completely independent oxygen systems and a bailout bottle. They will both be the positive pressure diluter demand type systems in good shape. Shave your beard and moustache and make sure your mask gives a good seal. This means a tight fit so that you must make an effort to exhale. A radio that works at –40° is essential and you need a microphone in your mask. Having radio contact with somebody monitoring your progress would be desirable. You should have some short mental or motor task to perform at set altitudes and be ready to abort the attempt if you experience any difficulty performing these tasks. Finally, anything beyond 44,000 feet will be courting your early demise. If you really need to go that high, get a space suit!

Hypoxic signs and symptoms are enhanced by several factors: altitude, time spent at altitude, rapid rate of ascent (or loss of oxygen supply), extreme environmental temperature, and self-imposed stresses such as fatigue, alcohol consumption, tobacco products, certain medications and inadequate nutrition.

A lecture on breathing

Don Clarke, MD
from *free flight*, 1974

When he wrote this article, Don Clarke was a glider pilot and professor of Physiology at the University of Toronto.

FOR SOARING PILOTS, hypoxia is something to be avoided. Put on your mask, watch the blinker, and that's about all there is to it! A knowledge of how to avoid hypoxia is all we usually need, however, there are interesting facets to the way that the body gets oxygen, and I would like to discuss the process of oxygen delivery to the tissues of the body.

Why do we need oxygen? The oxidation of food yields energy for muscular action, for nerve and brain activity, glandular secretion, growth, maintenance of body temperature, and so forth. This oxidation process must take place within the cells of the body, and in order to do this, adequate oxygen must be delivered to, and used by, the cells. If these processes of delivery and utilization do not take place, then the tissues of the body, and especially the brain, cease to function. The two processes of delivery and utilization must be kept in mind; later I will return to a consideration of the latter. Meanwhile, let us deal with the process of delivery.

The first step must be to get the air into the lungs. Air passes from the nose or the mouth into the trachea, and thence through branches (the bronchi) into microscopic sacs (the alveoli) and from the alveoli into the blood stream. Normally the lungs are expanded and held against the interior of the chest wall by forces of surface tension. Note that they are not attached to the chest wall by tissue structures. As we inhale, the chest wall moves upward and outward, the diaphragm moves down, the lung tissues follow this movement and in the course of expansion cause a drop in pressure inside the lung. Atmospheric air moves into this low pressure region. When we exhale, the weight of the rib cage, some muscular forces, and the natural elastic tendency of the lung tissues to collapse, decreases the volume of the chest cavity and air is forced out. The muscular motions are under nervous control influenced by a variety of factors, such as the concentration of oxygen and carbon dioxide in the inspired air, voluntary effort, pain, excitement, fear, etc. Normally we breath in and out about a half litre of air. With a maximum effort of inspiration and expiration, we can move about 4 to 5 litres of air in and out of the lungs with each breath. This extra capacity is used during exercise, or perhaps in special situations, such as coughing.

The whole process of delivery must result in supplying the interior tissues of the body with adequate oxygen. It turns out that one measure of adequacy is the partial pressure of the oxygen at the tissues. This partial pressure of oxygen should be 100 mm of mercury (Hg). If it is less than this, the possibility of hypoxia exists. The term "partial pressure" refers to the pressure exerted by a particular gas in a mixture of gases. For a given total pressure of a gaseous mixture, the lower the percentage of a given gas in the mixtures, the lower will be its partial pressure.

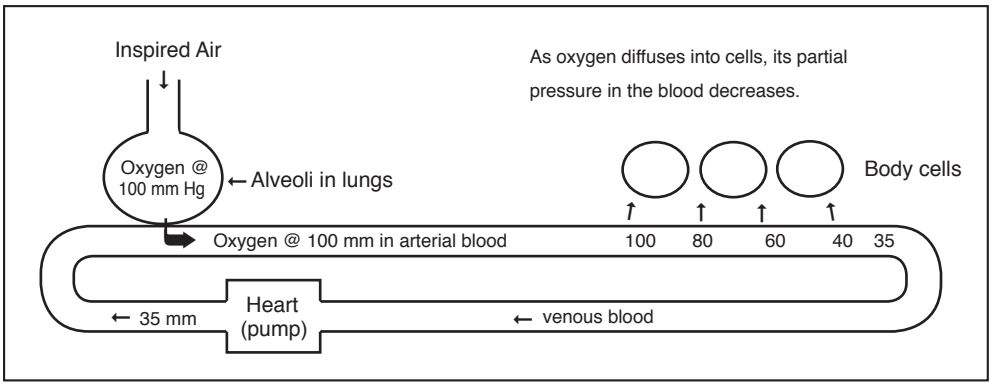
Obviously, to prevent hypoxia the air we inhale must have a sufficiently high partial pressure of oxygen. The partial pressure of oxygen at sea level in a normal atmosphere is 760 x 21% = about 160 mm Hg. When we inhale, some of the oxygen and nitrogen molecules are "displaced" by excess carbon dioxide and the water vapour in the saturated atmosphere of the lungs; as a result, the partial pressure of oxygen in the lungs is reduced to about 100 mm Hg. Rapid equilibrium takes place in the lungs between the partial pressures of the gases in the lungs and the partial pressures of gases in solution in the blood leaving the lungs. Oxygen moves from the alveoli into the blood. Carbon dioxide moves from the blood into the lungs for subsequent removal.

In any situation in which the partial pressure of oxygen in the gases inhaled is less than 160 mm Hg, there will be a reduced partial pressure of the oxygen in the blood leaving the lungs. Such a condition exists when we soar to high altitudes. The composition of the air we breathe is the same as at sea level, but there is a gradual reduction in the partial pressure of the oxygen in the lungs and thus in the blood stream. To some extent we can counter this by increasing the concentration and thus the partial pressure of the oxygen in the inspired air, but notice that a limit is reached here too. In anything but a pressure demand system, oxygen delivered to a face mask can never be delivered at more than the pressure of the surrounding atmosphere. This means that at about 34,000 feet 100% oxygen must be breathed. So if we fly higher, we are risking hypoxia. Note that simply breathing more deeply does not alter the partial pressure of oxygen, so it accomplishes very little (except perhaps to cause hyperventilation).

Bearing in mind that the usual volume of each breath is about half a litre, let us consider a rather artificial and extreme situation. Imagine yourself breathing in and out of a tube of 0.5 litre volume, with one end attached to your nose and the other end open to the air. Obviously the act of breathing will just move a "slug" of air back and forth in the tube. Neglecting the very small amount of mixing, no new air will be introduced and you will suffocate, even though the act of breathing is entirely unrestricted. The region in which no exchange of gases takes place, or "dead space", has been increased in this simple experiment. On more practical terms, we note that the design of face masks and breathing systems must take account of any increase in dead space and mask leaks which are introduced by the system to ensure that normal breathing is maintained. (It is for this reason that oxygen systems deliver 100% oxygen at about 32,000 rather than 34,000 feet.)

All of the above comments have referred to the process of getting oxygen into the lungs, where it can contact the blood stream. Next I will deal with the carriage of oxygen by the blood stream to the tissues.

The alveolar sacs are so constructed that normally the blood in the vessels is separated from the air by a very thin membrane, and thus oxygen can diffuse rapidly from the alveoli into the blood. Now a gas in solution in a liquid may be shown to have a partial pressure, just as if it were in a mixture of gases. This partial pressure may be looked upon as a measure of the tendency of the gas molecules to escape from the liquid. The oxygen in the alveoli diffuses into the blood arriving at the alveoli until a near equilibrium condition is reached, ie. the partial pressure of the oxygen in the blood leaving the lungs is about the same as

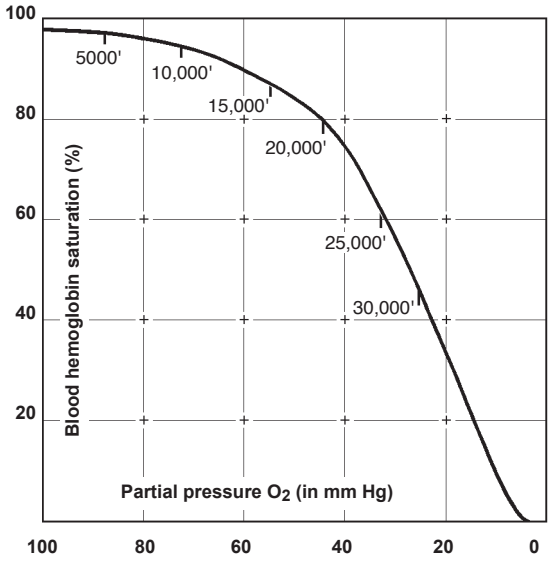


that in the gas in the alveoli, or about 95–100 mm Hg. As the blood circulates to the tissues which lack oxygen, the gas diffuses from the blood to the tissues, for they have a low partial pressure of oxygen in their vicinity. Thus in effect the oxygen moves from a region of high partial pressure (the blood) to a region of low partial pressure (the tissues) just as any gas goes from a high pressure region to a low pressure region.

A common example of the movement of a gas from a region of high pressure in a liquid to a region of lower pressure in a gas is seen when we open a bottle of a soft drink or beer. The carbon dioxide has a high partial pressure in the liquid, and as long as the bottle is capped, it has the same high pressure in the gas space above the liquid. But when we open the bottle, the gas pressure in the space above the liquid drops to atmospheric, and there is now a tendency of the dissolved gases to escape from the liquid. We see this as bubbles of gas. Somewhat the same thing occurs in the tissues, insofar as the movement of oxygen molecules from the blood to the cells are concerned, except of course that the movement takes place entirely in a liquid medium, and there are no bubbles. But the idea of the movement of the molecules of the gas under some sort of pressure difference is the same in both cases. The gas moves from a region of high pressure to a region of lower pressure, and the tissues are regions of low oxygen pressure because they are using up the oxygen molecules, and thus reducing their concentration, or pressure.

However the movement of oxygen in and out of the blood is not a simple process of solution and escape of a gas. The presence of a red pigment, hemoglobin, in the red cells of the blood radically alters the oxygen carrying properties of the watery solution that is blood plasma. These small round cells with a thinned out part in the centre — kind of like a doughnut without a hole — exist only to carry hemoglobin and not allow it to escape into the blood stream. Hemoglobin combines very avidly with oxygen and is absolutely necessary in order that all of the oxygen which we need can be carried in the blood. We may show the extent of this combination or binding by a curve in which the extent of binding is plotted against the partial pressure of oxygen to which the cell is exposed (see graph overleaf). Obviously, the higher the partial pressure of oxygen, the greater the binding. With zero partial pressure, or no oxygen, there is no binding. Notice though, that there is a saturation point. Above a partial pressure of 100 mm Hg of oxygen, there is little additional binding of oxygen — the hemoglobin is carrying just about all of the oxygen it

can. As the partial pressure in the alveoli falls, the amount of oxygen which is carried by the hemoglobin also falls, but note that the reduction in carrying capacity is not proportional to the drop in oxygen partial pressure. At first, as the pressure is reduced, there is very little reduction in the carriage of oxygen, but then there is a rather abrupt drop. Translating this curve into terms which are of more immediate interest to us, we can say that at an altitude of about 10,000 feet, the hemoglobin is still about 95% saturated. Not too bad. At 20,000 feet it can still carry about 80% of its normal capacity, but the curve is now shifting rapidly, for at 23,000 feet the blood will only be carrying about two thirds of its capacity. At 28,000 the blood is only operating at about 50% of "full scale".



If we consider this binding curve only, it does seem as if we should be able to go to fairly high altitudes – eg. 20,000 feet, without too many problems, for there would appear to be enough oxygen reserve in the hemoglobin to allow for our needs. In fact this is not so, for the partial pressure of oxygen rapidly decreases with altitude, and this reduction means that normal metabolic reactions cannot occur. Other changes, especially in the circulation, tend to increase the magnitude of the oxygen deficit. The brain is especially sensitive to these changes, and it is here that most of the trouble in hypoxia occurs. If we go to 10–15,000 feet, compensating changes occur in respiration and circulation, so in most individuals little effect is noted. However, in the range from 15–20,000 feet, compensatory reactions begin to be inadequate, and there is generally a degradation of mental processes and loss of critical judgement, muscular control and finally of consciousness.

Note again that deep breathing will not markedly alter the partial pressure of oxygen in the lungs, so it does little to alleviate the hypoxia at altitude. (I am disregarding some small compensatory changes which do take place.*) The only way to carry more oxygen is to inhale oxygen at a higher partial pressure – ie. from a suitable system. The main points I would like to make in this article are:

1 Oxygen is carried from the lungs to the body cells in combination with hemoglobin.
2 By virtue of the peculiar properties of this combination, we can carry sufficient oxygen to the tissues up to a certain altitude. After that, changes take place rapidly. Be warned!

To round out the story, it perhaps should be noted that the effect of carbon monoxide, found in cigarette smoke as well as in engine exhaust, is to reduce the oxygen carrying capacity of the hemoglobin. It is a very powerful poison in this respect. Further, though the

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* *Breathing rate does increase naturally with reduced oxygen pressure which lowers the carbon dioxide in the blood. This makes the blood more acidic which allows the hemoglobin to become more saturated with oxygen.*

blood may carry adequate oxygen to the cells, there is no guarantee that the cells can use it. Some agents, notably cyanide, interfere with the ability of the tissues to use the oxygen transported to them, and hypoxia ensues just as certainly as if oxygen had been cut off.

The arithmetic of oxygen

Tony Burton

THE SEA LEVEL PRESSURE of the "Standard Atmosphere" is 760 mm (29.92 inches) of Hg, or 101.32 kilopascals (1013.2 mb). The composition of the atmosphere by volume is 78% nitrogen, 21% oxygen, and 1% other gases. Total air pressure reduces with altitude, and "standard" atmospheric pressure is:

1/2 of sea level at 17,970 feet,

1/4 of sea level at 33,780 feet, and

1/8 at 48,235 feet.

The body cannot store oxygen, and if it is withheld from the brain, unconsciousness will follow in about 20 seconds. A person can function with a reduced supply but at reduced efficiency. Above 10,000 feet one must breathe additional oxygen mixed with the air for normal needs. By 34,000 feet pure oxygen is required, and above that it must be delivered to the lungs under pressure. The ceiling for the unprotected body is about 48,000 feet as the high differential pressure of oxygen forced into the lungs will then expand them to the point where these overinflated "balloons" begin squeezing the heart. Above this altitude a pilot must wear a partial or full pressure suit to survive.

Let's do some arithmetic: at 34,000 feet, atmospheric pressure is 187.5 mm Hg, and gas pressure in the lungs from the air will be 100 mm Hg, which is the sea level value. This means that all the pressure in the mask must come from O_2 — you must breathe 100% O_2. At 39,000 feet, atmospheric pressure is 148 mm Hg and O_2 pressure is 63 mm Hg. This is the partial pressure of atmospheric O_2 near 10,000 feet, so above 39,000 feet we need oxygen delivered under positive pressure to maintain an adequate supply. Above 45,000 feet the oxygen pressure is less than the venous blood return O_2 pressure at those altitudes, so the transport of lung oxygen into the blood will cease. Only positive pressure in the mask will keep you alive.

Respiratory Gas Pressures (mm Hg)

	ambient		lung		
Altitude	P_{atmos}	O_2	O_2	CO_2	H_2O
0	759.97	159.21	103.0	40.0	47.0
5,000	632.46	132.50	81.0	37.4	47.0
10,000	522.73	109.51	61.2	35.0	47.0
15,000	429.01	89.88	45.0	32.0	47.0
20,000	349.50	73.22	34.3	29.4	47.0
25,000	282.45	59.17	30.4	27.0	47.0
pilot breathing 100% oxygen					
34,000	187.51	187.51	100	40	47.0
39,000	148.08	148.08	63	36	47.0
42,000	128.27	128.27	48	33	47.0
45,000	111.25	111.25	34	30	47.0

Table from p93, *Fundamentals of Aerospace Medicine* by Roy L DeHart

Other hazards of low pressure

THERE ARE A LOT MORE SPACES within the body that contain air and other gases besides the lungs, so trapped gases have effects which can be severe. At 34,000 feet for example, with only a quarter the sea level pressure, the volume of any gas in the body will expand four times (if it can).

Air is contained in the ears and sinuses and normally will have free exit to the outside and will escape when it expands. On descent, no trouble will be experienced with the sinuses unless you are suffering from a bad cold or sinusitis. However the exit from the ear through the eustachian tube acts much like a one way valve. This tube can be opened by yawning, swallowing, or moving the jaw from side to side. This should be done routinely and often on descent since a large, rapid pressure change within the ear can cause vertigo. If these movements don't work, hold the nose and mouth closed and blow. This "valsalva" maneuver pressurizes the air tract and forces the eustachian tube open. This can be done with your mask on. If the ears remain blocked or are painful after landing, see a doctor. If you have been on oxygen for a considerable time, it may be necessary to clear the ears once or twice during the first hour after landing.

The pilot should *never* contemplate high altitude flight with any symptoms of a head cold. The resultant tissue inflammation may make it difficult or impossible to clear the ears on descent. This could result in a rupture of the eardrum, or, if equalization is forced with the valsalva maneuver, it could push infection into the ear from the eustachian tube.

A high altitude flight can trigger the unfortunate clue that you have an abscess in a tooth. The trapped gas pressing on the tooth nerve will cause severe pain which can only be stopped by descending again.

Accumulation of gas in the digestive tract is normal due to digestion and swallowed air. During ascent this gas will normally escape by passing flatus or belching. Problems can arise if pockets of gas in the gut remain trapped. This can cause cramping pains or even difficulty in breathing if the expanded gas presses on the diaphragm. These can be treated by holding altitude while loosening the seat belt, wriggling around, belching, etc. until gas is passed either direction. If this doesn't work — descend. If you are considering a high flight, don't eat gas producing foods such as pears, beans, cabbage or take aerated drinks before flight. Don't eat too fast as this will increase the amount of swallowed air, and don't eat too much.

By now you will appreciate that the human body is designed to work pretty well on the ground and is increasingly uncomfortable with the prospect of operating at high altitude.

Once above about 25,000 feet, you are putting yourself at rapidly increasing risk, so you must be fit, healthy, and sure of your cockpit survival gear. Above 28,000 feet at the top of the Livingstone Block, you are definitely in "crocodile country" and you should be there only because you have planned and are prepared for it, have a backup for an unserviceable oxygen system, and are going for a record. You don't need to be this high for a Diamond and the view is just as great a mile lower down.

Decompression sickness in high altitude glider flight

Robert W Weien and **Peter M Harmer**

IN MY CASUAL DISCUSSIONS with glider pilots about decompression sickness (DCS), the response ranges from mild confusion to total ignorance. In this article we will try to unravel the confusion and remedy the ignorance, but one fact to start off with is that DCS is not hypoxia or lack of oxygen. Flying at altitudes above, say, 15,000 feet is full of danger to catch the unwary and can be divided into four areas:

1 *Hypoxia,* a lack of oxygen to the brain.
2 *Trapped gas,* which expands within the body with increasing height and is only unpleasant when it gets vented. Voids (sinuses and inner ear) within the head may not equalize pressure on descent and cause pain.

Incident report A pilot was flying a wave cross-country and had been at high altitude for about four hours when he was suddenly attacked by a searing headache. The pain was of such ferocity that he could no longer really concentrate on flying the sailplane, but through the discomfort he thought it best to get on to the ground before something disastrous happened. During the descent the pain eased a little and he managed to fly to his home airfield. Once on the ground the headache had gone but the pilot felt completely drained of enthusiasm for anything, except for going to bed for a long sleep. This he did, but on waking next morning he found one arm numb and devoid of any sensation. The pilot, thinking that this was getting a little serious, decided to go to his doctor to get things sorted out. The doctor diagnosed a transient ischemic attack (stroke), and immediately grounded him! It took the luckless pilot three years to convince the medical and licensing authorities that this was a wrong diagnosis and that he should be allowed to continue flying. He is flying again and representing his country at world championships.

What was the real reason for this pilot's incapacitation? All the evidence available suggests that he suffered an attack of decompression sickness. It was quite obvious that with time the pilot has totally recovered, but a course of recompression therapy on the day of the event would have ensured a speedier result and he would have been able to be flying again 48 hours after the event. It is hardly surprising that the doctor did not diagnose decompression sickness, as I doubt if he had even heard of the problem, except perhaps in association with divers rather than fliers, let alone seen a case before this one.

3 *Cold,* which has been written about before but basically prepare for it by wearing many thin layers of clothing. However warm it is on the airfield, it is always cold at altitude.
4 *DCS,* which we covered in a paper we gave at the OSTIV Congress held at Borlänge, Sweden in 1993 and is reproduced here from *Technical Soaring*.

High altitude glider operations possess the potential for causing DCS as a consequence of the altitude reached and the time spent at those altitudes. The risk, and therefore the incidence, should be higher in glider pilots than in military pilots, because of the general lack of preventative measures taken in soaring. This paper discusses DCS in general, the risk in glider operations, and briefly describes a study which attempted to establish the incidence of DCS in the gliding community.

DCS is the medical condition which occurs as a result of the reduction in ambient barometric pressure to such a degree that inert gas dissolved in the blood and tissues comes out of solution and forms bubbles. It is most commonly associated with diving but also occurs in the aviation environment.

Physiology of DCS

The fluids in the body contain inert gases, in quantities consistent with Henry's Law. This states that the amount of gas that will dissolve in a liquid at a given temperature is directly proportional to the partial pressure of that gas over the liquid. All gases are absorbed and eliminated according to this law, but most gases are either metabolically active or have a partial pressure too low to be of significance. The inert gas of primary interest in DCS is nitrogen, since it constitutes 79% of the atmosphere. It is not metabolized, thus it is absorbed and eliminated from the tissues and body fluids passively. The body tends towards saturation with nitrogen, so a diver absorbs additional nitrogen when breathing underwater under high pressure. When the diver returns to sea level pressures, the excess nitrogen must be eliminated. Nitrogen is absorbed and eliminated through the lungs, and further dissemination through the circulatory system. Different tissues have different rates of absorption and elimination, complicating the issue of predicting total body nitrogen levels. This area has been extensively researched, primarily in the diving environment, as part of dive decompression table development.

When a body has been at sea level for a prolonged period (days), it is saturated with nitrogen. An ascent to higher altitude (lower pressure) results in supersaturation, and the body begins to off-gas the excess nitrogen. The degree of supersaturation necessary for bubbles to form is defined by the "critical supersaturation ratio":

$$CSR = P_{N2} / P_B$$

in which P_{N2} is the partial pressure of nitrogen at the equilibrated altitude, and P_B is the total barometric pressure at the altitude of interest. In aviation we are rarely concerned with mixed gases (used in diving), so only air (79% nitrogen, 20.9% oxygen) is considered here. For air the CSR is 1.58.

When a reduction in pressure is made which exceeds this level then DCS becomes possible. For those equilibrated to sea level pressures (760 mmHg), this occurs at about 18,500 feet. The CSR threshold is based on the assumption that the linear ascent threshold well known in the diving community extends into the altitude realm. Recent USA studies indicate that the altitude threshold may actually be considerably lower. Nonetheless, 18,500 feet can be used as a rule of thumb in describing the potential threshold of onset.

Clinical features of DCS

Once bubbles form, they can have a variety of effects ranging from simple joint pain through to death. The degree of symptoms and their location depend on the number of bubbles and where they travel after they have formed. Bubbles cause symptoms through two basic mechanisms, mechanical effects and surface activity effects.

Mechanical effects are those which occur as a result of the physical presence of the bubble. These include obstruction of blood vessels and tissue distortion or disruption. When a vessel is obstructed the flow of blood downstream in that vessel is restricted or eliminated, resulting in symptoms of tissue hypoxia. Tissue changes can be caused by the expansion of gas bubbles through the effect of Boyle's Law which states that as ambient pressure is reduced, a bubble will expand, and exert force on the surrounding tissues.

Surface activity effects are those resulting from the body's active response to a foreign body. The surface of a bubble is viewed as a foreign body and several systems respond to it as such, including the complement cascade and platelets.

Common presentations of altitude DCS include joint pains (called the "bends"), skin symptoms (often itching), neurologic symptoms (headaches, numbness, or paralysis) and respiratory symptoms (shortness of breath, substantial chest pains). A number of factors which influence the onset of DCS have been noted. These include:

Exercise Physical exercise, especially during or in the hours immediately after an altitude exposure, increases the likelihood of DCS.

Cold Low temperatures increase the risk of DCS, probably due to vasoconstriction resulting in poor perfusion of peripheral areas (poor circulation). This, in turn, leads to incomplete clearing of nitrogen from the poorly perfused tissues.

Age Increasing age increases risk.

Obesity Fat is a long "half-time" tissue, that is, it absorbs and eliminates nitrogen over a much longer time than "fast" tissues, such as blood. This leads to localized areas of increased off-gassing gradient where bubbles can form.

Dehydration Leads to reduced circulating blood volume and poor perfusion, and can result in incomplete clearing of excess nitrogen.

Injury Inflammation associated with an injury is a common site for symptoms.

Flying after diving If one has participated in diving activities and absorbed extra nitrogen, this increases the total need for nitrogen elimination and lowers the altitude at which the CSR will be exceeded.

Gender Females are at significantly higher risk of DCS than males.

The onset of symptoms is usually rapid. Approximately half the cases occur while at altitude or in the first hour after return to ground level in altitude chamber runs. The initial symptom occurs within 12 hours in 86% of cases and within 24 hours in 97%. DCS responds well to correct treatment. Recompression therapy in a hyperbaric (diving) chamber is the standard treatment: in a recent ten year review of the USAF's experience with altitude DCS, 98.5% had complete resolution. In the absence of a hyperbaric chamber, or until a patient can be transported to one, 100% oxygen should be breathed (this treatment is not as effective, however).

Prevention of DCS

The rate of DCS can be reduced through preventative measures. If 100% oxygen is breathed then nitrogen is cleared from the system in a process termed denitrogenation. This is somewhat of a misnomer, however, since denitrogenation results only in partial elimination of nitrogen from the body. The longer the course of denitrogenation, the higher the threshold for DCS. Symptoms are also less likely to be severe. The Royal Air Force uses a thirty minute denitrogenation schedule before ascent for altitude training above 30,000 feet. How big a problem is DCS in aviation? Estimates of incidence are usually made from records of military altitude chamber training. A number of these have been published in recent years. The range is approximately 0.5 to 3 cases per 1000 exposures.

Potential for DCS in gliding

The potential for DCS in high altitude glider flight is great, for a number of reasons:

- the altitudes reached are high enough for DCS to occur. Flights above 25,000 feet are common.
- no preventative measures are taken against DCS. Wave pilots typically do not don their oxygen masks until at 10,000 feet or above.
- oxygen systems in gliders are not standardized, and so may not provide 100% oxygen. Denitrogenation may not occur, even when the mask is in place.
- there is no method to alert pilots with predisposing factors to allow them to reduce their risk.

The incidence of DCS in high altitude glider operations would therefore be expected to be higher than that experienced in military aviation. We have not been able to find any reported cases of DCS among glider pilots in the medical literature, or in gliding publications, or via informal inquiries at several gliding sites known for wave prior to writing this paper. But subsequently, several cases, including the one heading this article, have come to our attention although not always directly from the pilot concerned.

DCS incidence study

The Centre for Human Sciences of the Defence Research Agency (formerly the RAF Institute of Aviation Medicine) at Farnborough began a study to establish the incidence of DCS in glider pilots during the wave season 1993–1994, comprising a questionnaire based survey of pilots returning from wave flights.

The two possible outcomes could have shown:

1 The anecdotal evidence is correct and DCS occurs much less frequently in the gliding population than in military aviation. This would be a surprising result, and would require further investigation of glider flight profiles to determine the reason. If true, then lessons learned could be applied to military aviation.

2 Glider pilots have an incidence of DCS as high or higher than military experience would suggest. This is the most likely outcome, and could be used as a basis for communicating DCS prevention techniques to wave flying pilots in an effort to enhance safety.

Conclusion

DCS is a likely side effect of high altitude glider operations, but is a risk which can be minimized through the use of proper preventative techniques. There was a study (1993–94) to determine the size of the DCS problem in gliding but unfortunately, for many and varied reasons, it floundered fairly early on and long before any statistically correct sample had been reached. The idea behind this study was *not* to gain evidence to put any sort of restriction on altitude flying — I enjoy it as much as anyone — but to gain an insight into a previously unmentioned problem to enhance the safety of our sport.

However, what I would now like to try is for pilots having read this article who think they could have suffered from DCS, to let me know — any personal details will be kept confidential. I believe there are many pilots who have suffered from mild DCS and have just thought that the joint pain was due to the cold, cramped cockpit and the headache to a heavy session the night before. Mild symptoms will invariably disappear on descent and will possibly be forgotten in the wild storytelling that evening.

Could anyone who has had any strange symptoms or sensations, which cannot truly be put down to hypoxia or anxiety, during or after a flight to above 10,000 feet please write giving details to:

Peter Harmer, Aeromedicine and Neurosciences,
Centre for Human Sciences, Defence Research Agency,
Farnborough, Hants GU14 6TD

What to do at Cowley?

There have been no reported cases of DCS in pilots flying the wave at Cowley. Alberta pilots being acclimated to a living altitude of 2–3000 feet asl is a positive factor; however, as the conclusion suggests, mild cases of DCS may have occurred which were not realized as being such. Probably the best on-site preventative, especially for pilots who are contemplating climbs above 28,000 feet for record or trophy attempts, would be for them to be strapped in and prebreathing 100% oxygen for up to a half hour prior to launch. Also, don't repeat a high climb the same day — this significantly increases the risk of DCS.

Hypoxia, hyperventilation, and oxygen systems

how each can kill you ... or not

a shortened version of article in the August 2018 SOARING

Dr. Daniel Johnson

LET'S OUTLINE THE PITFALLS OF ALTITUDE by repeatedly asking the famous sardonic question about seemingly straightforward things, *"What could possibly go wrong?"*

- Many pilots don't understand how to use oxygen.
- Pilots fail to test the actual effectiveness of their system with an oximeter. Your body did not read the manual. The designed results are probably not your results.
- Oxygen use at low altitude will prevent fatigue and stupid mistakes, that is, mistakes that you wouldn't make when your brain is at peak performance.

We want to avoid impairment, not only incapacitation (that leads to funerals). The rapid ascent of aircraft may bring pilots quickly to altitudes where hypoxia occurs. Many pilots have observed that subtle hypoxia causes noticeable loss of acuity, motivation, or alertness. Several hours of high altitude thermal or wave flying may create mild persistent hypoxia, with troublesome impairing symptoms that may linger for many hours. Pilots may not immediately recover from inattention, fatigue, demotivation, headache, etc. after full oxygen supplementation in the air or back on the ground. We may have persistent symptoms like troubled sleep, fatigue, weakness, headache, or lassitude up to 24 hours. Hypoxia is not merely like a car without fuel, it's like a car with contaminated fuel.

We recommend a zero-hypoxia goal to maintain a comfortable flying experience and peak performance.

The pilot who wants peak performance, say yourself, will benefit from using supplemental oxygen at altitudes much lower than required by regulation. (Current O_2 use regulations are based on 70-year-old science and ancient US airline practice.) A good practice is to turn the oxygen on prior to takeoff, regardless of altitude. Everyone past middle age, and anyone who's overweight (which is most of us now) should always use oxygen beginning at 5-7000 feet.

The *Mountain High* EDS oxygen system is discussed because it is very commonly used, it's attractive to glider pilots for its ingenious design, effectiveness, and great efficiency, saving up to 75% compared to a constant flow device. Yet it is complex, and not difficult to misuse or mismanage. It must be used thoughtfully, after learning how our bodies acquire oxygen, and how the EDS system is intended to work. It is not plug-and-play.

Jean-Marie Clément and Dr. Heini Schaffner began in 2008 to study the effectiveness of their own EDS system in use, which unveiled the actual oxygen output in their laboratory and in a hypobaric chamber. The results are detailed in the book, Dancing with the

Wind. Such study is important, for it allows us to understand the actual performance of a device as well as the designed performance. They went from the laboratory to the glider, where they carefully studied peripheral oxygen saturation during actual wave flights up to 28,000 feet. They found several important limitations in EDS performance and use, recognizing that deviations from expected performance could be manufacturing variability, but usually are due to neglecting maintenance, free-lancing pressure reducers or tubing, or personal characteristics.

Why are we writing about high-altitude breathing?

It's not the amount of oxygen in air that matters – it's the pressure, specifically the pressure in the lungs' air exchange sacs, the alveoli, that drives gas flow. The atmosphere is 21% oxygen at all altitudes – oxygen pressure decreases with altitude and along with that, the ability of red blood cells to absorb it. Each gas exerts its own pressure in the alveoli in proportion to the content – so oxygen itself exerts a pressure equal to 21% of total atmospheric pressure (and nitrogen 78%). It's the "partial pressure" of oxygen in your lungs' alveoli – ppO_2 – that keeps you alive.

Carbon dioxide partial pressure is just as important as that of oxygen, which few realize. Low pCO_2 cuts oxygen delivery to your brain in two ways: its drop causes the brain's blood vessels to constrict and decrease flow by up to half, and its drop hinders the release of oxygen from red blood cells to your tissues. A pCO_2 of less than 20 mm Hg in the lungs at 100% O_2 will make you feel hungry for air and mentally clouded, and wrongly worried about what's wrong with your oxygen system.

This CO_2 deficit in the flight levels that may cause air hunger and other symptoms can feel like hypoxia. The medical term for this state of CO_2 deficit is called "hyperventilation" – an unfortunate term – it's simply overventilation – breathing more deeply or rapidly than required for proper CO_2 pressure in the blood and tissues.

Ventilation (breathing) "blows off" carbon dioxide, which is necessary for proper acid-base balance and nerve/muscle function. Increased ventilation may also result from emotional response: delight, fear, anxiety; but the symptoms are themselves frightening and this worsens over-breathing.

Note that the blood oxygen saturation (%Sat O_2) of air drops rapidly with altitude – which needs to be above ~90%. The only way to increase the alveolar pressure of oxygen with altitude is to increase the proportion of oxygen, up to 100%.

Three steps in oxygen use

1 Ventilation! We exhale CO_2 produced through metabolism of glucose and oxygen, and we inhale oxygen (along with nitrogen). Both the depth and rate of breathing are important. Air hunger, and respiration, is regulated by the CO_2 content of the blood and the blood's acidity. Only when hypoxia is severe does it influence breathing rate, and hypoxia does not cause air hunger.

What could possibly go wrong? Although breathing is automatic, we stop breathing for a time during any distracting event. (Attention and respiratory control share a spot in the

midbrain.) Interrupted breathing can tip us into hypoxia if our supplementation is borderline.

Between 8-18,000 feet we subtly overbreathe in response to decreased oxygen pressure; this reduces CO_2, and the respiratory center, driven chiefly by CO_2, briefly shuts down breathing. This can tip us into an unconscious cycle of hypoxia with roughly half-minute intervals in which we alternate between over- and underbreathing, called periodic respiration. Above 18,000 feet, the low oxygen pressure stimulates ventilation more strongly, overcoming periodic respiration – but we still pause breathing when focusing attention and increase breathing when alarmed.

The EDS system will skip every other puff of oxygen if the respiratory rate is fast (ie. it does not give a puff if "requested" too soon). This skipping is a clue to the pilot that we are overventilating. Our response should be to consciously slow breathing, for example by counting between breaths to five or six, slowly, out loud, to cause slow exhalation. This will be quickly effective if done as soon as we notice mild hyperventilation.

Carbon dioxide partial pressure within the air sacs of the lungs is as important as that of oxygen. As the atmospheric pressure decreases in climb, there occurs a natural overventilation in response to the decreased partial pressure of oxygen, resulting in decreased CO_2 in the body. We may breathe either more deeply or rapidly than is necessary to maintain the blood's proper acid-base balance. It is automatic and unconscious. Individuals are very different in the degree to which this occurs – and because this is unconscious, we can't at first know whether it's happening.

First there is increased depth of respiration and later increased rate. This overventilation of our lungs blows off carbon dioxide. A reduced CO_2 pressure causes the blood vessels of the brain to constrict and red cells to hold back oxygen – causing brain hypoxia even if your finger oximeter is happy.

Abrupt overventilation that brings blood pCO_2 from the normal 40 mm Hg down to 20 mm Hg (easy to do in a few minutes) will result in a 60% decrease in cerebral blood flow, with a long recovery time. This also causes the blood pH to become alkaline, causing what amounts to "static" in our peripheral nervous system, with numbness and tingling, especially of the mouth and fingers. As this continues, severe cramping of feet and hands may occur.

Ironically, if we feel short of breath, we are overventilating. If we are tingly or getting cramps we are hyperventilating, so s-l-o-w d-o-w-n until you feel better. Count out loud to five or six between each breath, and you'll feel better in just a couple of minutes; however, bear in mind that it may take twenty minutes of consciously slowing your breathing to fully correct the acid-base abnormality and recover brain blood flow.

Why so long? There are about 120 litres of CO_2 in the body, with complex dynamics. This is a lot to replace, and it must be produced by our own metabolism, so spontaneous recovery from hypocarbia of 10-20 mm Hg takes more time than for hypoxia, and it may take several hours to recover fully from severe hyperventilation. We recommend that you descend immediately and terminate the flight promptly if you experience significant symptoms of hyperventilation.

2 Red blood cell oxygen absorption and release This straightforward process has many interesting complexities detailed in physiology textbooks.

What could go wrong? Various diseases of the lung hinder oxygen from diffusing across the membranes of the alveoli or capillaries. Anemia involves having too few wheelbarrows to carry the bricks, resulting in "tissue hypoxia" – oxygen-starved brain cells – even with normal oxygen inhalation. Also, acid-base disturbance of the blood (from severe exercise, infection, or hyperventilation, etc.) may hinder oxygen absorption in the lung or release in the tissues.

3 Circulation The red cells have to travel from lung to periphery and back.

What could go wrong? We soaring pilots are mostly old. (Military medical aviation research has historically classified 'old' as 'over 40'.) The most common disease among us is atherosclerosis, cholesterol deposits in arteries that may retard blood flow. In the leg, this risks frostbite; in the brain, this risks stroke and poor oxygen delivery.

Dehydration reduces blood volume and thus g-tolerance, which reduces blood flow to the brain; cardiac and blood pressure medications also affect circulation and g-tolerance. In the worst case, pulling g's in steep turns or turbulence can cause unconsciousness.

The upshot of Clément and Schaffner's work is that you must test the effectiveness of any oxygen system you use by wearing an oximeter. Oxygen is not plug-and-play! Buy the book and read the chapter!

The EDS system is efficient and effective up to about 20,000 feet. If you expect to fly above that, you must have an independent backup system and have a sound understanding of high-altitude physiology. Great care is necessary. The EDS system is designed to do the right things – but it is not a stupidity antidote. It must be thoroughly understood in order to be used safely. All delivery systems are machines and must be respectfully used and maintained in order to be reliable. No machine adapts itself to your uniqueness.

Altitude is dangerous because our body does not have an oxygen detector: we don't hunger or thirst for oxygen, we just get stupid, and when we get stupid, our brain's stupid-detector breaks, so we must monitor our oxygen status.

Monitor supply Above 20,000, you must be able to easily see and read the pressure gauge of the oxygen cylinder. If you can't read the gauge, you must have a proxy, such as a perfectly reliable pressure warning with a safe margin.

Monitor function Oxygen flow gauges are readily available and can be mounted in sight. The EDS system nasal puff with each breath is reassuring, though the fact of a puff is not a guarantee that its duration or flow rate is sufficient, nor is a 600 psi gauge reading assurance that the flow is what you need.

Monitor effect There are two ways to monitor the effectiveness of our oxygen delivery: brain function and oximeters.

It is straightforward, when in stable undistracted flight, to repeatedly perform some mildly challenging mental task such as calculating reciprocal compass/runway headings, recalling radio frequencies or ICAO abbreviations or other memorized lists. You will not notice impairment unless you are consciously testing yourself. Harken to warnings about your function from others who are listening to your transmissions, and have brief repeated conversations

with ground personnel who can then pick up abnormal thinking or speech.

Finger oximeters are available and widely used to measure peripheral oxygen saturation. Like any measuring device, they are not perfectly reliable. They are useful, but are prone to error: cold fingers, movement, sunlight, and more, are important. And just because a number is displayed does not guarantee it's accurate – and just because your finger has a good oxygen supply does not mean your brain does because of the natural altitude-induced hyperventilation. Assume that your oximeter is reading at least 2 points high.

Every digital measuring device shows definite numbers. This display precision deceives us about accuracy. Cheap fingertip oximeters show a "standard" reading while waiting for a valid signal, without giving a clue that it's in waiting mode.

Oxygen delivery

The remainder of this essay is focused on some specific aspects of the *Mountain High* Electronic Delivery System, which will provide sufficient flows for healthy lean people. Yet it does not know your medical status, is not artificially intelligent, nor can it read your mind – you have to provide the intelligence!

A constant flow system wastes most of the oxygen; EDS pulses what's needed when we inhale. EDS detects the small drop in pressure within the nostrils as a breath begins and gives a little puff of oxygen at 15 L/min for up to a half second, depending on pressure altitude.

What could go wrong here?

Oxygen supply If the cylinder is empty, nothing helps. (Who has put the aircraft away without closing the valve?) Beginning a flight with a cylinder other than full is suitable only to prevent low altitude mild hypoxia. An EDS produces less than maximal flow when the cylinder is <600 psi.

Power EDS single-place units are battery powered with 2 AA alkaline batteries (3 AAs for two-place units) and will operate for ~100 hours with a fresh set of alkaline batteries under normal operation. Batteries should be replaced at least annually. The newer two-place EDS units have optional external power.

What could go wrong here? Obviously, dead batteries will yield no action. Weak batteries are worse, because they may die when they're most needed in flight.

- There are three low-battery levels specifically calibrated for alkaline cells. A timely warning is not given using lithium cells because of their final abrupt voltage drop.
- Wave flying. Alkaline batteries perform poorly below -20°C. Lithium batteries may still have some life at -40. But if you plan to fly in a cockpit that is below zero with EDS, buy the two-place O2D2-G2 system and plug it into the glider's power with its USB adapter.

Regulator The EDS must be used with its own regulator or an inline stepdown regulator-equalizer combination to provide the pressures for which the EDS delivery unit is designed. Note that in-oxygen flow drops off significantly below 600 psi. This may be fine for low altitudes, but for flights above about 13,000 feet, the bottle really should be full at takeoff to ensure adequate reserve.

Tubing *Mountain High* supplies tubing of proper material, length, and diameter.

What could go wrong with tubing?! When two pilots each have an EDS unit (O2D1) supplied from one tank, the tubing to each EDS unit must be exactly the same length, or the pilot with the shorter tubing will steal flow if they inhale simultaneously, and only one EDS O2D1 can be serviced with the standard 4 mm tubing, no more than 1.5 m from the regulator. The best way to service two O2D1 units in a two-place aircraft is for each to have its own tube, of identical length and diameter, from the regulator, using MH 'Y' split kits to attach them to the one regulator as close to the outlet fitting as possible. You should use 6 mm dia. tubing with the O2D2 at distances up to and over one metre.

How about borrowing an oxygen cannula from your uncle with lung disease who's on oxygen? No – EDS requires stiff tubing so that the subtle pressure drop of inspiration is accurately transmitted. The soft medical cannulas are made for use in clinical environments for a short period of time. Also, medical pulse-conserving oxygen dispensers are calibrated to a particular cannula, are flow-regulated, and are designed for a patient sitting upright. EDS units are built and calibrated for proper delivery while using MH tubing. If you change the tubing, you'll change the flow.

Cannula orientation The flat tab rests on your philtrum (that narrow vertical groove in the middle of the lip). The prongs should follow the curve of the nasal channels. If the tab points up, the prongs' opening may touch the inside of your nose and hinder detection of the inspiratory pressure drop and the EDS will miss many of your breathing events, increasing the chance for hypoxia, and it will become uncomfortable.

Preflight check Think about the effect of head movement on the tubing. After placing the prongs in your nostrils, put the selector switch on 'N', ensure that normal quiet inhalations trigger a puff (may occur with alternate breaths on the ground), then turn your head fully from side to side, and up and down, to ensure that this does not dislodge the nasal prongs.

YOU

What could possibly go wrong with me? Clément and Schaffner discovered that many typical pilot activities interrupt breathing and can cause transient severe hypoxia. First, any event that strongly focuses pilot attention may cause unconscious breath-holding for up to 30 or 45 seconds, which can quickly drop oxygen saturation into the 70% range. Stressful peaks in flying can also trigger shallow or chaotic breathing that will randomly trigger the EDS, causing hypoxia.

Episodic patterns of periodic breathing ("Cheyne-Stokes") have been observed in all their investigated pilots above 8000 feet. The usual, regular respirations are replaced with clusters of subconscious over-breathing (hyperventilation), followed either by absent or (less often) shallow breathing. This results in variations of blood O_2 saturation up to 12% in flight, discovered post-flight in review of continuous recording. (This is a reason to use a recording "wristwatch" oximeter, and download the record after flight, to see whether unrecognized hypoxia occurred.)

They observed one troublesome incident of slight but continuous coughing at 25,000 feet – the pilot could not inhale effectively to trigger the EDS and could not speak. He had turned the EDS down to 'N' when he meant to turn it up to 'F' to increase flow. Hypoxia then caused tunnel vision and stupor, though he could hear. Fortunately, the other pilot was alert to trouble and took control. The hypoxia may have impaired his cough reflex; at any event he stopped coughing and recovered.

Other "minor" activities were also seen to cause moderate hypoxia: eating, drinking, talking to each other or ATC, and pushing to urinate.

Conclusions

- Class A airspace, especially above 20,000 feet, is life-threatening territory for both hypoxia and hypothermia, and neither comes with an idiot light. Prepare intelligently, have backup oxygen up there with confirmed function, and take off with less than a full tank only if you don't really need O_2.
- Hyperventilation is important – it causes tissue hypoxia. Expect subconscious hyperventilation above 10,000 feet, increasing with altitude. If you feel air hunger, you're most likely hyperventilating; count out loud to six slowly between breaths until the air hunger diminishes.
- Use oxygen above 5000 feet for peak performance and minimum stupidity.
- Buy an excellent, proven oxygen system and read the manual, memorizing the bold print. Where the manual confuses you, e-mail a question to the manufacturer and follow up with an actual telephone call to ensure understanding. Review the manual when you take the equipment out of storage after a layoff.
- Test every aspect of your oxygen system on the ground – and use fresh batteries.
- Use an oximeter to measure the effectiveness of your system for yourself, but thoughtfully understanding its failure modes (cold fingers, motion, sunlight, etc.). If you buy a cheap one, also check your life and liability insurance coverage so your heirs won't be burdened financially. More info on oximeters below.
- Keep your oxygen pressure gauge in sight. If you feel foggy mentally, you are probably hypoxic.

Should you use an oximeter?

Yes, there is no other way to test your system's effectiveness. If your system works as designed, you may feel that you don't "need" one. If you become hypoxic, you may not function well enough to understand what it's saying. They are prone to particular errors. Yet we recommend that every pilot flying above 20,000 feet use a quality oximeter. Though imperfect, they are useful, especially for intermittent use, to determine if O_2 flow rates are correct for you in the conditions you are flying in, and if your system has been configured properly. A recording oximeter can allow you to discover incidents that might have caused unnoticed hypoxia while flying.

Pulse oximeters work by shining two colours of light into an area of tissue with known blood perfusion. They measure the ratio of the reflection over the absorption of the two colours by the tissue. They should constantly calibrate the ratio between the surge of reflected light caused by each pulse and the intervening quiescent flow, to produce a valid reading.

Inexpensive oximeters are neither as reliable nor as accurate. Manufacturers claim their readings are +/-2% or +/-3% in the range of 70-100% saturation. This means that when the oximeter reads precisely 87%, your actual blood oxygen saturation is probably in the range of 84-90% for the less accurate, 85-89% for the more accurate – in the best laboratory conditions, which your cockpit is not! What can delude this instrument?

- Sunlight can "overpower" the unit's own spectrophotometric light source. Some models have better shielding than others.
- Pigmented skin yields lower saturation readings when actual values are in the 80% range.
- Fidgeting degrades their accuracy by 5-20% (that is, with a true O_2 saturation of 95%, the meter may read 75-90%). It's the pilot's job to continually fidget with the controls!
- The oximeter is measuring the oxygenation of the blood in the fingertip. What really matters is the oxygenation of the blood flowing through the brain. Hyperventilation constricts brain arteries but not finger arteries.
- Cold fingers have low blood flow, so readings will be low, a problem on wave flights! Only measure warm fingers. (Use a "claw" bicycle mitten to keep the fingers warm, to protect the finger probe from being dislodged, and allow pinch with thumb and first fingers.)
- Smoking? – carbon monoxide falsely elevates saturation readings due the color of carboxyhemoglobin.

Gerald Ince

1991 – A busy launch line at the Cowley Summer Camp. Moments after the student flight in the trainer is seen to be thermalling, there is a sailplane stampede onto the runway. At the front of all this activity is Jerry Vesely in his homebuilt VES-1 (PIK-20 fuselage and HP-18 wings) with son Peter in the foreground getting the towrope ready. In the background just to the east are the Porcupine Hills.

Chapter 6

Glider Pilot's Heaven
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Glider Pilot's Heaven

Cowley continues to seduce those who have tasted its lavish splendour. For years the dreams of Gold and Diamond climbs have come true; on at least two days of every summer camp lenticulars entice – their form and strength and height vary as much as the blue summer skies – patiently waiting to be discovered by the adventurer in the form of a gigantic roller coaster along the Livingstone Range from 10,000 to 40,000 feet.

This majesty is often shared with cumulus and thermal wave; cross-country flights begin early in the valley, inviting breathtaking flights west towards Crowsnest Pass and the Continental Divide; north past the Chain Lakes; south along the rock faces of the Waterton mountains, over to the Milk River Ridge, or east over the Porcupine Hills with their "landing fields" nestled between depressions, and over the grasslands of the Peigan Indian Reserve.

1971 — The Cowley "Diamond mine"

Garnet Thomas

Usually one must be patient in prospecting for altitude diamonds, even in Alberta with our fabulous Rockies. Ask John Pomietlarz, Canadian Diamond Badge #6. Ask Julien Audette, our national altitude record holder, or Ross Grady, one of the first to pick a diamond out of the cold blue skies above Cowley, Alberta. They were among the first to go on the 'pilgrimages' to the Pincher Creek area in southwestern Alberta, in search of "The Wave".

For John and a number of others, the pilgrimages eventually paid off in diamonds, but it took years of patient gambling against the frustratingly unpredictable weather. This is the land of the chinook wind, which can roar over the mountains in midwinter to melt the snows and bring a temporary, very muddy spring. These same strong westerlies attracted our first wave hunters, usually during Easter in spring, or on the fall Thanksgiving weekend. But, in an area that cannot only produce a chinook in winter, but a fairly frequent blizzard in June, no spring or fall weekend could be guaranteed to be right for the wave …

Here, near the mouth of the Crowsnest Pass, in unrivalled mountain prairie panorama, a couple of dozen pilots and eleven gliders from the Edmonton, Calgary and Regina clubs converged on Cowley during Thanksgiving weekend 1971, most of them to seek the wave again.

On Friday evening, October 8, gliders and people from Edmonton, Calgary and Regina, began to arrive at the small towns of Pincher Creek and Lundbreck for overnight lodging; Cowley itself being too small. All the right factors seemed to be combining in our favour. It was mild and clear, with a strong High sitting near us, and a westerly flow over the mountains indicated.

Came the dawn! Saturday, October 9. The Edmonton contingent (Jack Burrell, Ron Innes and Dan Pandur with their Libelle; Ed Dumas, Don Seller and Les Passmore who would fly the Club 1-23D, and Harry Byrt with the HP-11 that he and John Pomietlarz share) headed out to the strip early, under the urging of John who was determined to make everyone rise with the birds. Don and Les headed over to Pincher Creek to pick up Don's Super Cub which would be our towplane. It was cloudless, warm, and slightly hazy. At Pincher Creek the wind was already westerly at 15-20 mph. The haze layer indicated stable, layered air — ideal for steady well-formed waves. Neil Bell and I arrived with the 1-23 in tow soon after from Claresholm where we had spent the night with my family, and hot on our heels Julien Audette with his HP-11 and some of the Regina club members with two 1-26s and another Super Cub arrived.

On arrival at the strip we found everything ideal except the wind, which was blowing

directly out of the north down the flats, and not too strongly at that. We set about assembling gliders in the shirt sleeve warmth, put in tiedowns, and sat down to wait. Of the fellows who were to fly the 1-23D at Cowley that weekend, I was the only one who had flown there before, and that only briefly with Victor Berg in our old TG-2 on a memorable day three years earlier. So we wheeled out the ship and took it up for a few flights to get a feel of the terrain. About noon, Harry moved out the HP-11 and said "I'm going wave flying." The wind had slowly sneaked around to westerly, and though there were still no clouds, he obviously felt that the time was ripe. He took off to the west and did what was to become our standard tow procedure for the day, a climbing circuit over the field and then straight west towards the great rock wall — the Livingstone Range.

I was dressing to follow him in the 1-23, when he radioed back that he had released in 10 up and was climbing strongly. Les (who did a great job of towing in Don's Super Cub) pulled me in the same pattern, one circuit over the field and straight west. We passed through an area of good steady lift — the secondary wave, and had climbed to 8000 feet (4000 above the field level), when we were halfway to the mountains. Soon after followed strong sink in which we lost 1000 feet and I had some trouble keeping the rope snugged up. Then as that great rock wall loomed close, the air began a steadily increasing upsurge, and I was away in lift so strong the vario was pegged. At 10,000 feet I put on my mask, and a few minutes later at 13,000 feet penetrated across the peaks hoping to find an even better wave ahead, but soon after doing a lot of sinking, I had to scoot back across the peaks to a position east of the Livingstone to recontact what was obviously the primary wave — a good place to sit tight for awhile.

I tacked back and forth almost directly above a road about a half mile east of the Range, concentrating on staying in the 10-up stuff, but increasingly taking time to admire the ever widening panorama of prairies to the east and range after range of mighty peaks marching west to the Pacific. The good lift zone seemed relatively short — a three or four mile tack to the south brought a reliable drop off in lift (opposite the open pass). A tack back to the north for a few miles would end with a wavery dropoff in lift, why I wasn't sure, as the ridge seemed to continue further north at almost the same height.

At 18,000 feet I was surprised to see Harry in his HP-11 about 500 feet below me, as I'd been looking for him constantly above. He, of course, was not desperate to hang on to a proven patch of lift as I was, as he'd made his Diamond flight a few years earlier and he appeared to be ranging out much further on exploration forays than I. Soon after I also spotted Ron in the Libelle, at about Harry's height. The lift was slowing down to about an average of 400 feet per minute now, and the question of whether a diamond gain could be made or not began to preoccupy me. I was also labouring under the erroneous impression that a Diamond gain was 19,404 feet (rather than the actual 16,404). I was using 8000 as my low point although I knew it was somewhat below that point and therefore had set 28,000 as my minimum required altitude.

At 21,000 feet I caught my last glimpse of Harry and Ron, and I had found some slightly improved lift on the northerly end of my tack so I continued in that direction. Twenty-eight thousand feet still looked a long way off, and I was now totally preoccupied with

finding better lift, or at least with squeezing everything out of it. At 25,000 feet the lift was down to one or two hundred feet per minute and fluctuated down to zero quite often in an irritating way. However, I was warm, felt alert, and still had 1600 pounds of oxygen, and so determined to sit tight and wait for an improvement, for a pulse to come through and push the wave a little higher. It now seemed necessary to fly slower to stay in the meagre lift, and I continued further north of the field, indicating 35 mph, with the luff, luff, luff of the pre-stall buffet often in my ears. At a point roughly twenty five miles north of the field, with the town of Claresholm directly east, I was at 27,300 indicated still getting a meagre lift indication, but the glider would go no higher. Seven hundred feet short! I turned around and confirmed that I had a barograph trace, and continued north to near the Chain Lakes, finding no improvement. I had now been up about three hours, the oxygen was down to 1300 psi. I was beginning to feel cold and I was stiff so, discouraged and feeling that I'd probably missed the Diamond again, I dashed back south along a line of sink at 80–85 mph until I reached the airfield. Still at 18,000 feet or so, I put on a steep side-slipping turn, opened spoilers and spiralled on down over the field. I could see the other two sailplanes on the ground and felt disappointment for them as well.

To my surprise on landing, I was received with open arms and many questions:

"Where have you been?" "We thought you'd got lost."

"How high did you get?"

"What's your barograph look like?"

"You've got it!" "Another diamond!" "Ron got his too."

Great relief and satisfaction — the wave had been great after all, and suddenly I saw the whole flight in a new perspective. It had been a wonderful flight, and I could savour and remember with pure satisfaction all the wonderful things I had seen from that great vantage point.

Soon after (near 4 pm), Don Seller piled into the 1-23 and headed aloft. And by now Dan had the Libelle airborne again and reported good news on his way up.

The 1-23 had no radio, so we couldn't tell how Don was doing, but both he and Dan later proved to have had very fast climbs right up to 25,000. Dan returned to the field just as the long mountain-cast shadows of sunset darkened the field. We turned on the car lights for Don, who was still up, as it can be very hard to spot in the early evening shadows. He soon returned as well, with a big grin on his face, feeling all the better because he'd made the flight with his right arm in a cast.

We ended that day in a state of happy shock. Four new Diamonds chalked up on four attempts. What luck!, and as we rushed back to the motels for a much needed hot supper, even a flat tire halfway back didn't discourage things one bit.

Incidentally, just after I landed, those of us on the ground witnessed one of the more amazing bit of flying to be seen in these parts. André Dumestre of Calgary was completing a successful attempt to set a new French 100 kilometre speed to goal record (Black Diamond to Cowley). We spotted him a couple of miles out, lower than fifty feet, and it appeared certain that he would land a mile or two short. Somehow he kept his Libelle airborne, literally dipping below the rolly hillocks to the north and miraculously reappearing again —

still just a few feet off the ground. He lifted the Libelle over the field fence and dropped it onto the runway, leaving us all slack jawed and positively disbelieving our eyes. His claim was for 82 mph. Additional Calgary pilots had arrived to be with us that day too: George Blunden in his Cirrus, Eric Mortis in the Dart, and Don Skinner with the Calgary club's Bergfalke.

Sunday, October 10, also dawned clear and warm, and the others in our group were eager to add to our diamond pot however no wind came that day. We sat in the eye of a calm, not even any thermals to liven things up. Maybe tomorrow!

Monday, October 11, the wind had returned — more northerly and much colder. The airmass had changed too, as powerful wave conditions appeared to be evidenced by heavy dark rotor clouds with four visible repeating sequences from the first right up against the Livingstone Range, to the fourth well east of the Porcupines. Each was capped by wide, extensive lens cloud. It looked like a record day perhaps, one for Julien and John and Harry, and a day for the remainder of our party to pick up their Diamonds.

John took off first, climbed around once and headed for the mountain. Great black rotor clouds nearly obscured the high lenticulars. The tow was extremely violent, and the sink became so strong that John was forced to release and dash back to the field. Les, towing in the Super Cub, had quite a ride too. He was thrown violently against the top of the cockpit when they hit the gusts, and he cut the top of his head. The earphones flew right off his ears and, as he put it: "I never experienced such a wallop of negative 'g' before."

Following that disheartening attempt to contact the primary under the ominous looking rotor near the Livingstone, everyone on subsequent flights tried to contact the secondary wave, which today appeared to be just about over the airfield.

Jack in the Libelle hooked on, and we could see him silhouetted against the high lenticular of the secondary as he radioed that he was at 18,000 feet up in the "cup" of the broad lenticular, and that he would have to move away or go into cloud. He moved south, hoping to contact a higher wave. John hooked on again as well, and eventually ended up at 25,000, forty miles south of the field, high over Waterton Park. Coming back partially into wind was a long slow process. Jack made it to about 21,000, and when he came down was not quite sure whether he'd made his Diamond or not, but got his Gold for sure. The turbulence was increasing however, and the time to derig for the long drive back was near, so at 2 pm we pulled up stakes. The others would have to wait for another trip.

The diamond mine at Cowley had yielded four — possibly five new Diamonds for the Edmonton Soaring Club, plus other diamond gains by John and Harry. We used to look with envy at the Black Forest Gliderport — the Mecca of wave flying in the USA. However, our own recent experience at Cowley proves it to be one of the great wave flying sites in North America. And think: one thousand miles of unbroken prairie lies between Cowley and Winnipeg, Manitoba. Give a fellow, say, 25,000 feet at 9 am over Cowley and let him head east at his best L/D until he contacts thermals, say out over Maple Creek, Saskatchewan on one of those days when thermals extend right across the prairies …

… and … who's to say what we couldn't do with the world distance record?

1981 — The Halloween wave

Tony Burton

THE COWLEY WAVE atoned for its lack of performance at the Thanksgiving Wave Camp with admirable verve — serving up to altitude-famished pilots a banquet of nine Diamond climbs and two Canadian altitude records.

The effort began on the weekend after the wave camp. Bruce Hea got a favourable weather report and had the Calgary Terminal Control Unit open the Livingstone Block. Saturday provided only scratching exercises over the Porcupine Hills just to the east of the airstrip, but Sunday morning presented four Cu Nim pilots with beautiful lenticulars to tempt us into the air. I was first up on a bouncy tow behind the Citabria which arced around to the edge of the "Porkies" and moved slowly north of the field. At only 5800 asl, an extended surge of lift prompted me to release. Feeling a little smug about saving myself half the cost of a normal 4000 foot wave tow, I swung westwards into the lift, gained a couple of hundred feet, then promptly fell out. It became apparent that I was low down in the rotor of the tertiary wave behind the airstrip; I struggled to use every "up" bump I could stumble into but I slowly lost ground.

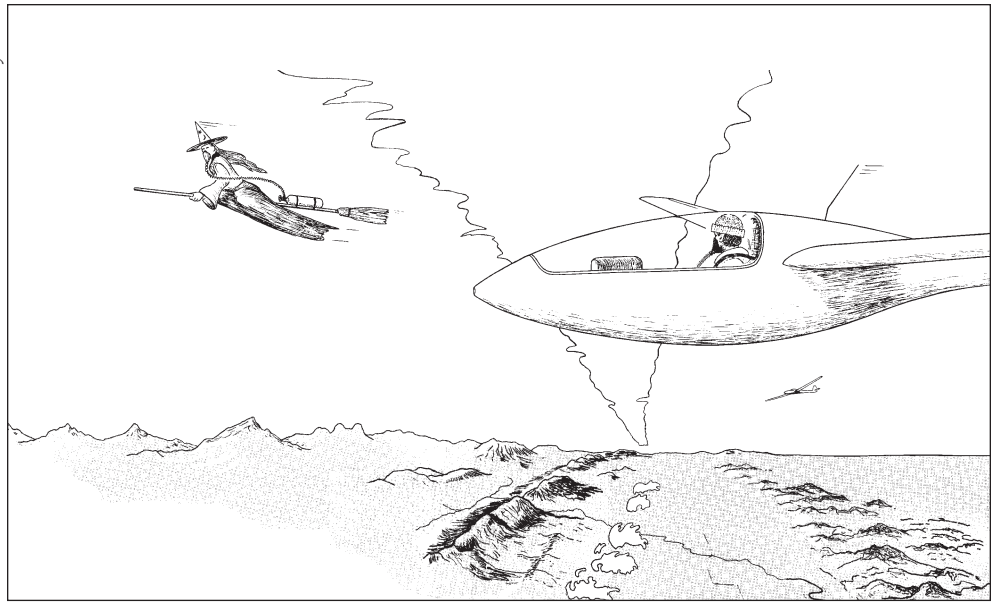
In the meantime, Bruce came up on the second tow and he hung on past my position while the towplane moved westward into the secondary which was about two miles to the west of the airstrip. After release Bruce radioed that he was climbing at 500 fpm at 8000 feet. Hearing the good news, I headed forward quickly, hoping that I would have enough height left to contact. With at most 1500 agl I entered the rotor area, and after a bumpy 2000 foot ride, I was on the smooth 'escalator' at 7600 feet. The lift was not very strong, at the higher levels only 50 to 250 fpm, but it kept going, and we climbed steadily for two hours. At about 28,000 feet, Bruce called Calgary Terminal for further clearance, however, they said there would be a forty minute delay for passing commercial traffic. Well, besides frozen toes and lowering oxygen, neither of us had the patience to wait that long. We both hung on a few minutes longer then started the descent.

Back on the ground, happy and warming up, we chatted about the day's events. Bruce complained that the Calgary controllers lacked some appreciation of the limitations of glider and pilot, and said that he was going to have a talk with them during the week. He did, and as you will read, it worked.

A few days later on the Thursday before Hallowe'en, Bruce called me up and said it looked like the wave conditions were going to be good again and he had notified ATC to reopen the Livingstone Block for the weekend. Was I interested in joining the party? You bet I was. All that week, lenticulars had been decorating the sky to the west of my back yard in Claresholm.

October 31

This Saturday morning presented a solid lenticular arch from horizon to horizon! Oh boy, oh boy, oh boy. By noon, six gliders had arrived at Cowley, and at two, I was off. Once


Tony Burton

again, a tow into the secondary was the key, being shorter and much less turbulent than the primary, as Hans König was to discover later in the day. The secondary was working to over 20,000 feet. George Dunbar in his Dart, F-OAK, achieved his Diamond climb to 23,300 feet entirely in the secondary. Other pilots penetrated to the primary from 16 to 18,000 feet and arrived above the rotor clouds with only about a three thousand foot loss.

George relates, "My tow was the last, and I released over the Porcupine Hills in what turned out to be rather broken lift. However, when I penetrated to the west the lift became better, and finally when I got to about 9000 feet I left the rotor below and felt the silky smoothness of the wave. At times it would show over 10 knots rate of climb, but mostly I was registering a good 5 knots. Because of a low point after release, I calculated that a Diamond climb would require something over 22,000 feet. I decided to continue to over 23,000 to be sure, and at that point opened the spoilers to come down. From the clock on the panel I knew it would be getting dark soon … it was only after landing that I realized that the Dart was still flying on Daylight Time, so I really had an hour more than I had thought!

After descending some distance, I found that I was still well to the east, over the Porcupine Hills, so I pulled in the spoilers and increased the speed. It was only at 85 knots that I could see any progress over the ground. Even at that speed I was still in the wave, and actually climbing at 3 to 5 knots, but I wondered how long that would last. I had to slow up a little in the rougher lower air, but began to worry a bit, even with four or five thousand feet above ground, if I could cover the two or three miles back to the field? It finally worked out all right, but without too much to spare."

The primary wave was providing 600 feet per minute lift at the lower levels just behind Centre Peak, but it weakened considerably at about 25,000 for a while before a renewed pulse in the system allowed an additional climb at 300 fpm. When I was at 27,000 I finally

saw Geri Moore in his DG-200 'LB' and Bruce Hea in his Libelle 'QJS' flying together directly below a few thousand feet, and I let down to join them and enjoy a little company for a change.

This was Geri's first wave flight at Cowley, and he was joyfully adding more and more metres to a Diamond climb under the arch. He says, "Ever since arriving out west recently, pilots have been whispering in my ear great tales of Cowley, home of the majestic mega-wave, the Chinook Arch. One of those pilots was now soaring beside me, on his way to a height record. He got me out of bed the night before with an excited voice telling me that the weatherman was predicting ideal wave conditions. "I'm glad I was ready for it, because high altitude attempts require a lot of careful sailplane preparation. My previous wave encounters had quickly convinced me to upgrade my oxygen system, and for once I was properly dressed, but I still need better boots and gloves. There were distinct temperature drops at 25,000 and 30,000 feet and the DG-200 got two small cracks in the canopy from the extreme cold. I also appreciated small but important things like a properly marked map after getting hopelessly lost for a while on this first flight from Cowley. The positive attitude of the pilots that weekend made it a safe event. I'm sure not used to ATC communications, and never before had I the opportunity to hob knob with a 747. I'll have to study a bit and visit Calgary ATC this winter." Geri finished the day with a 7300 metre climb to 31,000 feet.

I had quite a cold climb. The huge lenticular arch had cut off the sun all day. Its leading edge appeared to be a few miles forward and coming off the mountains of the Continental Divide. The arch was very high, and at the top of my climb I estimated it to be at about 40,000 feet. The canopy tended to ice up quickly if I didn't keep the nose vent on my RS-15 wide open. That didn't help my toes, or the radio, which began transmitting only intermittently. The met records that day were giving –56°C (–69°F) at 36,000 and –43°C (–45°F) at 30,000.

Once again, Bruce and I were alone at the top (that's him in the background in the sketch on the previous page). This time when we were approaching 29,000 we saw a commercial flight complete with contrail coming at us from the west. It passed directly overhead about 3000 feet above us on the "High Level 500" airway. I then heard Bruce request clearance to Flight Level 370 for one hour, and it was granted by ATC almost immediately.

There was a broad area behind Centre Peak that continued giving an honest 300 to 400 fpm lift, and we climbed up in great circles. With a high true airspeed, I was tending to penetrate too far forward every time I tried to maintain an into-wind heading. Winds were recorded at 88 knots at 24,000 and 74 knots at 34,000 feet.

By the time I was approaching 35,000 feet, I decided to call it a day; my toes and heels were icy, the cold was finally soaking through my gloves, my gut was inflated, the beginnings of positive pressure in the mask made breathing 'funny', and the canopy was losing the battle with the frost. All in all, it was getting a little too spooky, even for Halloween. It took twenty-five minutes to descend. Bruce had the same problems and landed only a couple of minutes behind me. He had worse visibility problems as the smaller canopy on his Libelle didn't allow for much cockpit warming or better ventilation. We both estimated that

our high point was about 35,000. After calibration, Bruce's height was found to be 34,400 feet (10,485 m) for a gain of about 26,000 feet (7940 m), for which he has claimed the Canadian territorial absolute altitude and altitude gain records.

I will never know my true height, the needle of the barograph ran off the top of the drum at 33,000 feet. But I matched the 1966 Canadian territorial record set by Wolf Mix, and it whetted my appetite for further attempts. Much satisfied, of course, we all helped tie down the gliders, and then headed into Pincher Creek to eat, drink, and post-mortem the day's events to death, and wait to see what the next morning had to offer.

November 1

From the motel window in Pincher Creek, lenticulars could be seen working off the mountains in Waterton National Park south of Cowley and the Crowsnest Pass. The morning was clean, Indian Summer at its best, and the day would break the high temperature record established in 1907. There were eager and earlier starts today as pilots untied their ships and got oxygen refills. Hal Werneburg was first off in his Mini-Nimbus '24' at nine-thirty, and eventually reached 28,000 feet. It turned out to be about all that could be squeezed out of the wave that day. The lift in the lower levels was good though, and gave sweet climbs of 700 to 800 fpm.

I launched after Hal, and at 1000 feet noticed my blinker wasn't blinking, so a quick return to re-turn the oxygen bottle valve (the PRICE oxygen system checklist works fine provided you don't shut off the tank afterwards). Off once again, I eventually met Hal at 24,000. We topped out a half hour later and Hal descended to give Hans König a try.

Hans did "good". Getting to 27,700 feet, he made a 6416 metre gain for his Diamond altitude. Certainly it was much 'gooder' for him than the day before when nothing worked right, and he was unable to connect on two tows to the very rough air under the primary. The secondary was cooking again to over 22,000. Bruce Anderson in his Phoebus C, F-UKY, climbed to over 17,000 in the secondary before going into the primary with very little loss of height. He made two climbs there while the wave quit at the south end of the Block, then eventually reached 27,400 feet in a three hour flight for his Diamond climb of 5900 metres.

Great! The only way this weekend could have been better would be to have had more pilots there. The wave was generous to everyone taking the effort to go for it. The sky was clear above Cowley. Below, scruffy rotor cloud marked the primary at about 12,000 feet; and to the south, gorgeous stacks of lennies still decorated the mountains in Waterton Park.

Now Rob Young in his Open Cirrus, GORT, and Rick Matthews in his ASW-19 came up to enjoy the view. And they did. Rob climbed to 22,000 in the secondary and reached 26,800 in the primary. I saw Rick floating around and he gently moved over and directly under me, as serenely as one has seen an Apollo 'docking'. "You're looking fine", said he. "Thank you", said I.

Packed and heading home to Claresholm at sunset, I had to stop beside the highway, as did others, and gape at the absolutely incandescent lenticulars which finally formed over Cowley. What a finale to a memorable weekend.

1982 — The rotor spit me into the wave

Ursula Wiese

IT HAD BEEN ROUGH through the rotor, and I still hung on the towline when it became smooth — very smooth; but I wanted to make sure this time that I had contacted the wave at 8200 feet asl, eight miles west of the Cowley airstrip. The vario showed a moderate climb of 5 knots, I notched the barograph, with the usual safe 300 feet "loss", consciously pointing my Ka6CR "Cloverleaf" into wind, and increasing my speed to about 60 knots. I was quite certain the upward motion of the air would now lift me high enough for my Diamond climb.

I leaned back — and "down" stared at me. I tried somewhere else, somewhat south, then west towards Centre Peak. But a constant heavy down was all I got. Around me, dark rotor clouds, swirling and frightening. If I wanted another tow, I'd better head for home with still some height left *if* I managed to avoid the thousands of downdraft. With 7400 feet on the altimeter, still eight miles west of the airstrip, with the wind blowing about 25 knots from the west, and downwards was the pull of sinking air, and gravity, and speed … I resigned myself to the lost battle — another day, another try.

Suddenly Cloverleaf trembled terribly, something knocked against her fuselage, and her left wing was lifted into a 80° bank. I was scared. Opposite aileron didn't help. The unwanted turn continued — another bang — I was a toy in the rotor's turbulence with the vario jumping up and down like a yo-yo, then another throw about and the vario pegged … up … and it was smooth, so smooth that I didn't dare to breathe — because it could be just another second before I would get pulled down again. The climb continued, the altimeter's finger began to wind up, slowly, at about 4 knots through 8000 feet. I watched the upswirling wisps, what great haste they had to reach the cloudtop, only to pour downwards on the other side!

I headed for the upgoing air, I climbed through 9000 leaving the wild cloud below me and began to relax. I recalculated the new height from my low point of 7400 to reach my 5000 metre gain, and hoped for the great view I would soon see from greater heights. But a solid layer of cloud covered all the mountain peaks, and I moved slowly away from the wild white clouds, leaving the Rockies below, viewing Calgary in the distant haze, and the prairies beyond … I heard garbled radio transmissions from my fellow pilots, but I couldn't see anybody above, below or behind. I felt very alone with Cloverleaf.

It was pleasantly warm in my cockpit, despite the overcast of the arch as I pointed Cloverleaf's nose towards the midafternoon sun; my feet stuck in camel hair booties, covered by oversized moon boots; my body was kept cosy warm by layers of pure wool and 'hot pants'. It felt just fine, but I had an eerie feeling way up there, and suddenly longed for the descent.

I wanted to give myself some extra height. At 26,000 indicated I pulled full spoilers, trimmed out to 55 knots and let the wind drift me over the huge white rotor clouds, hoping for a smooth descent on their 'other' side. In gentle turns Cloverleaf carried me safely down and around the fierce turbulence. I enjoyed this descent the most, carrying my first Diamond with me.

Klaus Stachow

1982 – Ursula in her K26 "Cloverleaf", prepares for a wave flight launch, with Tony at the ready. Ursula set seven feminine soaring records in this glider.

Only two days later I realized the possibility of being the first Canadian woman glider pilot to get a Diamond height in Canada, and the records list revealed that both territorial records for gain of height and absolute altitude could be claimed. The butterflies then carried me away … to a dream for more Diamonds. Four years later they had all come, but a rotor which spit me into the wave started it all.

1982 — Centre Peak moves into your living room

ALBERTA Soaring Council PR work began to expand. Jack Emack, TV producer for the Canadian Broadcasting Corporation approached Mike Apps on 15 September, 1982:

"I have received approval to produce a half hour documentary on mountain wave soaring and hereby request permission and assistance from your organization. I would like authorization to film the activities taking place at the Cowley wave camp on October 7 to 11, 1982. We will feature a student going to the wave for his or her first time and contrast that with an experienced glider pilot or two attempting an altitude record.

Arrangements have been made with the Edmonton Soaring Club for use of their 2-33 glider and we will be using Air Switch Helicopters for some of the aerial photography. The program will be telecast locally on December 13 at 7 pm and be seen on the full CBC television network at a later date."

The TV staff stood at the Cowley airstrip ready for the great wave to wave from above. But it did not quite happen. That October camp had warm and beautiful fall days with temperatures in the mid-teens. The following year they returned in full gear, and one of our actors was

student Andrew Jackson, who had his first wave flight and was thrilled by the experience – the video captured his very big grin. The experienced glider pilots were Bruce Hea with his Libelle 'QJS' and Kevin Bennett with his Open Cirrus 'GORT'. Finally, in *Riding the Mountain Wave*, Centre Peak's beauty moved into the living room of the many TV viewers; they flew with us over the Livingstone spine, the Continental Divide and the mountain ranges beyond.

Ev Cheston

1983 – A small reunion of soaring oldtimers at Cowley. From the left is Norman Eley, Bob Cheston, Harold Eley and George Ryning.

1983 — All weather and worries, tales and facts

Marty Slater and **Tony Burton**

THIS YEAR'S SUMMER CAMP had lots of variety to offer. The weather ran the gamut from severe thunderstorms with high winds and hail, to very hot and stable conditions, to wave. There was a very good turnout of pilots and ships, from the Grunau Baby to the latest Ventus. Perhaps this is what makes the appeal of the summer camp so unique. There is really something for everyone – whether you are doing training flights in a 2-22, or trying to set records in the latest glass ship.

The first day was taken up with people arriving, renewing acquaintances and rigging, washing or fiddling with their ships.

On Sunday a storm had been brewing for most of the afternoon in the Crowsnest Pass to the southwest of the field. This buildup was noted on the ground and in the air, and soon advisories from "Cowley Ground" had gliders landing enmasse and derigging. The storm moved onto the field very quickly once it crossed the Livingstone Range, and when the blow-out arrived, winds gusted over 40 knots with hard rain, hail and lightening. A few

ships who landed just before the storm hit had to be towed to their tiedowns in the height of the storm, with helpers hanging onto wingtips or stretched out on the wings.

Doug Stroud from Moose Jaw in his Libelle was on downwind and was caught by the sudden wind increase while turning final. He couldn't make the runway, and was forced down short among a field of hay bales, but was fortunate to avoid them all — an almost zero groundspeed helped. When he was able to see through the rain, a hay bale stood right at his nose.

Meanwhile, Kevin Bennett was flying east of the field somewhere. When Kevin received the wind advisory from the ground, he turned tail and headed for Fort Macleod airport 45 km to the east. As he was descending to enter the circuit there, the storm front arrived and he found himself thrust up, varios pegged even with full spoilers. In almost no time he was at 13,000 at cloudbase, and was forced to run northwards at over 100 knots to avoid going into cloud. He then tried to land at Claresholm to roll behind the large buildings to get out of the wind. However, again he was carried up in the circuit and had to continue further north; and again the same repeated itself over a farm strip near Nanton. Finally, he was able to skirt the northern edge of the storm and land at High River in sunshine and light wind — 101 kilometres later — somewhat shaken by the entire affair. At Cowley, the last radio message heard from him at the height of the winds was unreadable, and there was concern as to where he was and what shape he was in. A towplane was sent up to search the area east of the field; but finally, the telephone let us know he was safe.

On Monday a similar pattern developed. However, the storm was not as severe as the previous day and everyone was down and secure before it arrived.

Tuesday dawned with moderate winds and the prospect of possible wave. When the launches began in the morning the winds were about 20 knots down the runway. However, the clouds appeared to be cumulus. As the day progressed, several pilots were able to thermal up and transition to the wave which had developed. Russ Flint from Winnipeg landed again and installed an oxygen system borrowed from Terry Frazier*. Russ then took off again and was able to get Diamond altitude to finish his Diamond badge. Les Oilund from Grande Prairie also did his Diamond height gain in a Phoebus, but Les' barograph wasn't wound so he only had a "practise" Diamond. Tony Burton climbed high enough for his umpteenth Diamond height gain. His radio message was that this flight marked over a quarter of a million feet gained in height, that works out to over fifteen Diamond height gains. More gold and diamond climbs were achieved that day.

Wednesday was again hope for wave although it appeared the weather was becoming fairly stable and forecast to continue that way throughout the rest of the week. At the pilot's meeting, Tony introduced Harold Eley from Regina who had arrived with his 1-35. Harold is unique for a couple of reasons: first, he was the second pilot in the world to earn all of his Diamonds in a 1-26, and second, this year marked the 25th anniversary of their first trip to Cowley (Cook's airstrip actually).

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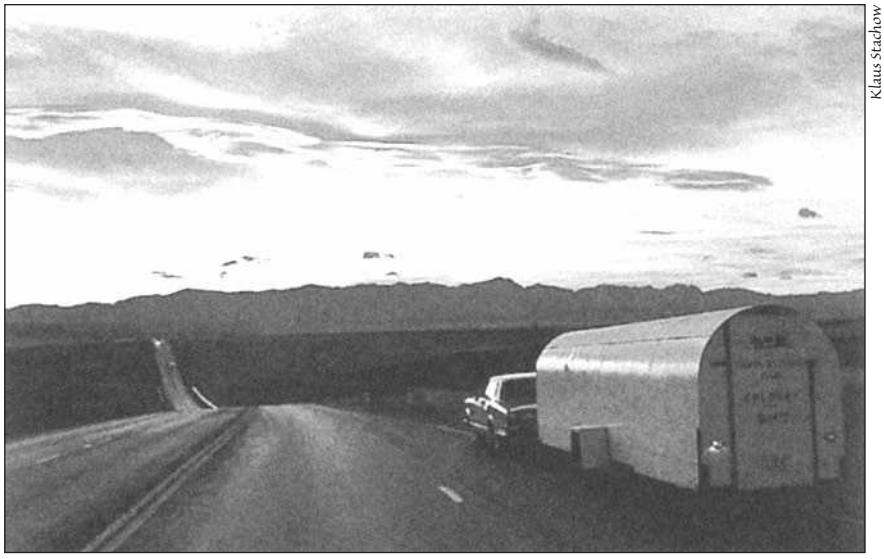
* *Terry, a pilot from Charlotte, NC, lost both legs in Vietnam and was flying an ASW-20 modified to accommodate him.*

On the road to Heaven.



Klaus Stachow

Thursday and Friday were the cross-country days of the camp. The wind had subsided and the weatherman was promising enough instability for convection marked by cumulus. Two more than Silver C distances, one straight-out and one out-and-return, were accomplished by two Grande Prairie pilots, to complete their Silver C badges. Russ Flint, and Lloyd Bungey from Vancouver with passenger Gary Roach from Port Alberni, both landed just short on their respective 300 km triangle attempts. Perhaps though, the most valiant effort belongs to Ted Gillespie of Camrose taking off for a Silver distance in his club's 2-33! After 40 km to the east, he had to land in the back yard of Chief Nelson Small Legs, notable delegate to the recent Constitutional Conference in Ottawa.

On Saturday, the "old" guys Walter Mueller from Grande Prairie in the Ka6E and Harold Eley in his 1-35 flew to Maple Creek, Saskatchewan for 330 kilometres. Russ Flint finally completed a 300 kilometre triangle. Lee Johnson in the Phoebus went 230 kilometres to just west of Medicine Hat. Certainly many good flights were done this week! But we also know that Cowley can produce much better conditions.

The new Blue Thermal Soaring Club of Medicine Hat had moved their young operation to Cowley. A bouquet to all the instructors who gave freely of their time to help out instructing in the club's 2-22: Al Sunley, Graeme Craig, Paul Pentek, Dave Clark … The students were out from dawn to dusk wrestling with their two-seater, not only in the air, but also on the ground; there was this boundless energy and enthusiasm of Bruno Schrein making sure his club aircraft and students were always flying.

The towpilots had their hands full enduring long hot days and delivering some special requests:

No tight thermalling on tow please, but lift would be nice — Tow to 2000 feet agl into lift, upwind, straight upwind — Over dip in mountain straight west — Look for lift, sniffer 2000 feet — 8000 feet primary Livingstone Range — 2000 feet in lift, you've got an 18 hour pilot on

your hands — I'll try to stay on this time — 2000 feet lift maybe? Have a nice day — Not slower than 70 mph please; 75 would be nice; no thermalling type turns.

Many little tales were told, sitting under a wing:

- listening to Klaus Stachow describing how he got his last Diamond and telling the story with the same enthusiasm as the first time he told it;
- listening to Mrs. Eley's version of the first trip they made to Cook's airstrip twenty-five years ago;
- listening to Norman Eley describe how he went skydiving at age seventy;
- looking at Bob Cheston's 1955 homemade barograph and traces as he relived his flights;
- watching the Eley brothers in action; actually it consisted of Norman and Wilbur egging Harold on to get flying;
- watching the burger vendor who was more interested in watching the gliders and simply enjoying everything than trying to sell hamburgers.

1984 — The east visits Cowley

Dick Vine

IT WAS LIKE LEAVING the toddler's pool for the great ocean. Three members of the Bluenose Soaring Club in Nova Scotia stood on the dry, dusty prairie field watching textbook lenticulars stacked over an angry rotor cloud; to the west, the Livingstone Range reaching into the west wind set it bouncing across the Porcupine Hills. On the ground, a collection of pilots from across the country fettled a picture book fleet of glassware for the coming challenge. Club two-seat sailplanes were rigged for checkrides and the directors of the wave camp, Mike Apps and Kevin Bennett, warned of the penalties should some careless pilot stray beyond the limit of the airspace. The eastern contingent, Joanne Daley, Nick Sleyden-Dew, and Dick Vine were entered on the flight sheet for the two-seaters, secretly wondering about the airtow in rough rotors and the hazards of hypoxia.

Although we were up at the crack of dawn to the tune of fluttering tents in the stiff west wind, there was plenty of time to get the chores done since the airspace didn't open until eleven. A briefing was held and special tow tickets were issued to ensure that all pilots had been approved for the conditions. Tows began before noon and wave clouds could be seen all along the Oldman River valley. Some aircraft were soon climbing in lift although it was somewhat broken. Kevin kindly offered to demonstrate his skill by taking me up for my first experience of wave. On tow, the conditions were smooth at first, but became more demanding around 3500 agl, then all became still and the vario wound around the dial to 12 knot lift without any indication of roughness. Absolutely uncanny! The Blanik was tacked to remain in the hot spot with a few digressions due to lack of experience, but gradually the limits of the lift area were recognized. At one stage, a lenticular cloud formed below the glider and rapidly spread and then subsided and disappeared — spooky. Soon, a

cloud deck at 17,000 feet was reached, so the descent began with full spoilers and the sink in the downside of the primary. Although height was lost very rapidly, it still took nearly 30 minutes to reach circuit height. After a few minutes of level flight to gain one's bearing, a smooth landing was achieved — whew!

Later Joanne, a new member of Bluenose this year, was tucked into the Edmonton Blanik, rigged in chute and oxygen for an attempt on the two-seat record with Chester Zwarych at the controls. After several unsuccessful attempts to climb above 21,000 feet, they returned to the field after a spectacular view of the Livingstone Range and the Rockies at the Continental Divide off to the west.

On Sunday there was a chance for Nick to ride the Blanik to dizzy heights, again with Chester, also to find wave good for around 20,000 feet and a flight of two hours. The pilots from Alberta, already used to their spectacular conditions were, we thought, pretty much well able to take it all in their stride. The Nova Scotians were much impressed, both with the conditions and also with the kindness and generosity of the local pilots. Some time before the camp was due, we had phoned ahead to Tony Burton to find out if some flying might be had by out-of-town pilots, and were assured that the organizers would do their best. By Jimminy, so they did! Much praise is due to the many Albertans who have done the research in the air and against the red tape of MoT airspace regulations, and also to obtain the use of the airfield. Congratulations, and many many thanks to you all.

1985 — The "Prime Minister" goes cross–country

Terry Southwood

LOOKING BACK over the last year of flying, my ASW-20 "Papa Mike" (a.k.a. Prime Minister) and I shared some great experiences in our first season together — but one flight stands out in my mind, even though it counted for naught.

It was Friday, well into the Cowley summer camp, and although the diamonds remained elusive, a rich store of memories had already been accumulated. The day started typically enough, with conditions looking good in the valley but not elsewhere. I gave the barograph to my friend and crew, Don Jessee, who was going to try for his five hours in the Lark. After getting him airborne I departed in the ASW-20 and climbed up to cloudbase with no specific objective in mind. I did want to force myself to fly faster and decided to wander up the valley to Longview. I had attempted a 300 kilometre triangle to Cardston and Longview earlier in the week and had been blocked at the Chain Lakes.

Conditions now looked good and I headed north at about 80 knots, following some very nice cumulus, porpoising under some and stopping for a couple of turns under the best. Without the pressure of a task, I simply enjoyed the beauty of it all, slipping easily into "cross-country mode". A storm was building in the mountains and I watched the lightning far away, wondering if it might pass north of the field. I followed the Porkies at first and then skipped over to the west side of the valley to some better looking cumulus, working a conservative

band between 9 to 11,000 feet but cruising quickly. The cumulus ended at Longview so from there I returned south to the Chain Lakes where another line of cumulus split off towards Claresholm. At this stage the radio began to come alive with people in the circuit at Cowley and it was obvious that the storm was moving in back there. It was not a factor to me of course, and I declined any invitation to return. In fact I had to resist the temptation to gloat over the radio!

West of Claresholm, I hit the low point of the flight, getting down to about 7300 feet before finding a good thermal. Lift on the east side of the Porkies remained good after that and once I gained a thousand feet in a single porpoise. Conditions outside the valley continued to improve and I followed big puffy clouds down to Cardston, where they abruptly ended. A big blue hole was coming in, so I retreated back towards Cowley which was now blocked by the storm front.

Cowley Ground called to advise that the rain was stopping and to ask if I had seen Edmonton's 1-23, which I spotted shortly afterwards. It was being flown by Barb MacIntosh to her Silver C. At one point I witnessed a sight I had never seen before. We had parted company and then I saw her working a thermal below me with a hawk.

I'd shared a thermal with hawks many times, but they never seemed to take any interest. Not this one. It formation-flew behind her inside wingtip and neatly followed her around with its wings folded a little — no doubt to lower its performance down to the 1-23! In due course Barb resisted both the advances of the hawk and my attempts to lead her anywhere, and she headed for Cardston.

I decided to try for home. Although the storm front formed a continuous line, it consisted of only light rain and Pincher Creek could be seen through the virga to give me direction. I was 25 to 30 miles out at 11,000 feet when I started in. Light rain streamed across the canopy and I fought patches of sink and an obvious headwind. The speed-to-fly was cranked down to survival setting. Suddenly I broke through the rain and the town of Pincher Creek was spread out to my left. Passing over Pincher Junction, I whip out my glide calculator, measure off the distance and figure the height requirements. Everything looked fine in theory but of course the wings were wet. Anyway, we devout cowards always have alternatives and mine is to divert to Pincher Creek airport if I don't think I can make it home after using up half the altitude.

The air is deathly still and I am down to 55 knots — best L/D. Where is the field? I know it's over there, but ... look! There's a bunch of white dots. Trailers. Watch them. They don't seem to be rising or falling in the canopy. I'm on glidepath and I can land straight in, but I'm still way out. Decision time. "I think I can, I think can", like the little train.

At 1300 feet agl I hit some zero sink. The altimeter holds. The dots get bigger. They start to fall in the canopy. Yahoo! I push the stick forward. I pull the stick back. Wait dummy! What if there's sink following the lift? I cruise on at 55, but the sink never comes and I gradually pick up speed. Suddenly I'm over the distant threshold of runway 29 so I push it and go to negative flap. I cross the intersection at 500 feet and 120 knots, and pull up into a circuit. We touch gently down and roll to a stop on the money. Papa Mike's canopy opens with a grin nearly as big as mine.

1985 — I reached out and touched the face of God

THE WAVE was working fine, the rotor of moderate turbulence. Only a small group of pilots were left to adventure into the wave this last day of the camp. The westerly blew at 25 knots over the field and the sky was filled with sharp lenticulars. Tows proceeded in continuous procession in the midmorning hours. Shortly after Jack Davies had taken off in the Pilatus B4, "Whiskey Jack", Ken Palmer drove into the field with the word that he had seen a flash of white falling out of the sky northwest of Lundbreck — but it could have been a bird.

Pilots came in for landing again after Gold and Diamond climbs and we were still waiting. The more we tried to hear from Jack and the more our eyes searched the sky for the B4's silhouette, the more we worried that he was in trouble. An RCMP officer driving onto the field confirmed our doubts, as he had come to tell us that we no longer had to listen or to search … the last of us left the field, shocked at what had befallen Jack.

Jack had begun to derig the Pilatus when the word of a fine wave had come. He then decided to re-rig and try for his Diamond climb. The barograph bungee cords had been hooked on the main spar pins, and in the rush to get airborne, he had not secured a safety pin to two of these bolts. On tow, transitions from negative to positive wing loading produced neutral moments which allowed the bungee to progressively pull out one of the pins holding the left wing. Just after release from tow, the left pin became free and the left wing folded up. Towpilot Tom Schollie was unaware of the tragedy that happened as he had turned around towards the field for another tow. Some ranchers in the foothills below at first thought the aircraft was doing aerobatics, pulling out of a steep turn into a vertical dive … there had been no attempt to bail out … the time from wing failure to crash was no more than about ten seconds …

On the first day of the Cowley summer camp on July 27, 1986, the pilots gathered again around the flagpole, joined by Jack's wife Alice and some friends. It was a dedication of a plaque to an instructor and friend we had lost in search of the wave. It was sunny in a chilly westerly; cumulus formed under the wave as we listened to the recitation of "High Flight" by John Magee jr, "*… I reached out and touched the face of God.*" There — the silhouette of a sailplane soared in the far distance.

1986 — My first sixty dollar tow

Rick Zabrodski

IT WAS MID-JANUARY and southern Alberta had been experiencing an unusually mild winter as the chinooks seemed to provide tantalizing lenticular clouds to the west and south of Calgary day after day. Despite the fact that the skiing had been great as well, I began to think about flying as I usually do when I haven't had a recent "flying fix".

So when Don Rowe phoned to ask if I was interested in seeing if there was any lift under

that chinook arch it took about three seconds to decide. Don contacted Lethbridge Flight Service to see if we could get the Livingstone Block open and we were given the okay for Sunday, January 26th.

The next morning the weatherman came through! Another beautiful chinook arch to the west with warm, moderate winds made the trip to Claresholm and rigging a relatively simple task. We had decided that Don would make the first tow as he had more experience in wave flying out of Claresholm. However, on the flightline Don got held up with some minor items so I decided to go first knowing that daylight would be the limiting factor to the duration of the flight if we in fact found some lift.

Jerry Vesely in his Citabria got me and my Pik-20B off of runway 22 into a 15 knot headwind in short order and we began to slowly climb to the west. From previous flights at Cowley I had come to respect the sometimes ferocious intensity of the rotor and had my straps as tight as possible. So where was the rough air? At 2000 feet agl and around 10 kilometres west of the airport I was still waiting for any kind of turbulence, up or down. Jerry recognized this as somewhat unusual as well and headed southwest of the Porcupine Hills. We continued on … smooth air. About 10 minutes later, I could see Cowley airfield clearly ahead.

Still no lift. This was becoming not only distinctly unusual but also disconcerting — what if the rope breaks now? Five minutes later I considered my options again. I was about 5000 feet agl and we were over the Cowley airfield, 50 kilometres upwind from Claresholm. Should I give up and get Jerry to tow me back and look for lift in all that still air? Or should we press on, tach time ticking away at a dollar a minute, and make the same decision in another ten minutes (dollars) with nothing but what we called in my hang gliding days a "sled run" to show for it. I looked to the west; there they were, lenticular clouds stretching across as chinook arch from Montana to northern Alberta. So where was the lift? At this point I was actually praying for some rotor as a sign from God that I was not hallucinating or just dreaming that those lennies were there. It was never like this at wave camp in October! Well, I decided that if I had come this far I was going to forget the cost and find this lift even if I had to fly right to Centre Peak.

Ten minutes later; we are now 45 minutes on tow. Don has called on the radio with a puzzled, "say again your location?", and I confirm that Centre Peak is nicely in view two to three miles ahead as I go through 12,500 and state that it has literally been smooth sailing all the way. Too smooth. The primary has to be here!

At last the vario indicates lift, a mere 100 fpm, then 200 fpm and it stabilizes. This is it? A quick mental check indicates that I can glide safely the sixty kilometres back to Claresholm, if the same smooth air is present on the return trip (an optimist's outlook is always helpful at times like this). I take a deep breath and release. I slow down to minimum sink and am gratified to see that the 200 fpm is indeed still there and still going up. Five minutes later, almost right over Centre Peak, the vario begins to sing! Glassy smooth air and a steady 500 to 600 fpm carry me upward and now the lift is everywhere!

I double check my oxygen system and begin a climb in air that I have never seen so crystal clear. I have been this high before but have never seen so far with such clarity. I

pass through 20,000 in front of a lenticular still with a constant 500 fpm. Above me is the chinook arch. Now I begin to regret leaving the barograph at home! Gradually the sun goes behind the chinook arch and it becomes very, very cold. I have to open my air vent and canopy side vent to keep the canopy clear. I have to decide if I want to beat my personal record of 28,000 feet that I had achieved at the Cowley wave camp in October, a flight with the only interrupted barograph trace I have ever had. The maximum authorized altitude is 29,000 feet. As I go through 27,000 feet I decide against it because of the cold and the fact that nobody would believe me anyway. Then I have several seconds of a rapidly accelerating heart rate as I put the nose down and put on 90 degrees of flap … I'm still climbing. This is not supposed to happen. I usually fall like a rock when I put on full flaps. Visions of a near miss with an Air Canada 747 go through my mind as I put the gear down and head downwind looking for a sink with as much concern as I had been looking for lift only a short time before.

I eventually found it, some 15 km east near the Porcupine Hills and took it downward to 21,000 where the sun reappeared and things began to warm up, relatively speaking. The next two hours were spent enjoying the spectacular winter view of the Rockies and not once even being concerned about finding or staying in lift as I made a "mini-task" flying along the Block boundaries in still, smooth air. I felt reassured by Don reporting similar conditions on tow who took a more direct route towards the mountains. He did find some weak secondary lift, but took almost an hour to reach 18,000 feet for an attempt on the primary that he eventually reached but had to leave prematurely, still climbing through 21,000, in the interest of not having to rely on runway lights upon his return at dusk.

All in all, we both agreed that despite the atypical conditions we had each experienced a most spectacular soaring flight. A flight to remember. Was it worth sixty bucks and would I do it all over again? You bet.

1986 — August nuptials

THE MOTIONLESS AIR was sated with all the winged creatures of the parched Cowley airstrip; black thunderheads and lightning trespassed the mountain peaks from the north to the west and the south, engulfing the skies of the plains to the east; veils of rain painted the burdened sky… Finally a breeze came forth as one hundred campers gathered within a circle of sailplanes who had just descended from thermal flight. Then silver wings of a Blanik shone under the clouds as it made its way to earth, delivering Steve Weinhold and Shirley Wilson for their vows to marry. They walked hand in hand down the grassy runway "aisle" to meet the festive group and the display of the wings of men at the threshold.

The quiet was then broken by the voice of the Justice of the Peace who read the "hymn of wedlock" to those who had come to wed and to witness. Before long a sailplane swooped past and pulled up at high speed to carry the words of their love into the heavens above.

As the ceremony ended, the clouds retreated and two pairs of fibreglass wings passed low, in formation, the whistle of their fleeting flight uniting with the wind and the cheers.

Steve and Shirley take their vows.

Bern Weinhold

Then Steve addressed the party, and his thoughts soared back to a photo of his late father standing at the base of the Eagle Memorial on the Wasserkuppe in Germany, and to his bride's late father who had towed gliders at Heber City, Utah. Surely both men were present in spirit among this assembly and in the idyllic setting for the event.

Then the champagne corks popped, confetti spread and the specially designed wedding cake, donated by Gerhardt Schaefer of Edmonton, helped with the merrymaking, while the sky stretched again in eternal blue above the mountains that stood guard in the setting sun and over the celebration of the nuptials of Shirley Wilson and Stephan Weinhold.

1987 — The Quest

Steve Weinhold

THIS STORY RELATES THE EVENTS leading to the fulfilment of a dream. It was a dream born in early May of 1987 while working in the Pincher Creek area of southwest Alberta. This particular evening I drove out to Beauvais Lake Provincial Park, never having visited it and wanting to become more familiar with the local terrain. Many times I had overflown this area during our annual Cowley flying camps; now I could more closely investigate potential off-field landing sites.

As I strolled about, the brisk westerly wind tugged at my jacket as though it was trying to get my attention, a reminder that I was in the Crowsnest Pass. The sun was setting as I looked northwest toward the Livingstone Range whose eastern flanks were now a sombre shade of dark gray. At this time of year the upper reaches still held some stubborn patches of snow, now barely discernable in the failing light. The mountains cast a mantle of darkness over the Cowley valley. To the east, the last rays of light touched some of the more prominent fir covered knolls clearly illustrating the origin of the name of the Porcupine Hills.

The sky now occupied centre stage as it prepared a light show that held me spellbound. Stacks of lennies shifted about; building here, vanishing there, the leading edges almost a luminescent yellow with deep magenta undersides and slate gray trailing edges — all this against a deep orange zenith. These were the untamed stallions of the sky which permitted the fortunate few to climb on board in search of diamonds and broad horizons. "For I have slipped the surely bonds of earth …" Indeed, an all-encompassing performance consisting of primary, secondary and tertiary lenticulars. The onset of darkness brought me back from my reverie.

Driving back to Pincher Creek I recalled that many entries in *The Cook Book* were made during this very time of year. And so in turn other eyes had surely been witness to what I had seen — Stachow, Hea, Mamini, Riddell, Audette, Eley, Cook — some of these I had the fortune to meet through personal contact, others through our literature, and still others I would never know. I was overcome by an overwhelming urge to form a bond with these wave pioneers. To be accepted as a kindred spirit among their ranks would require personal sacrifice as well as recognition of their accomplishments. I thought that a cairn in their honour erected on Centre Peak of the Livingstone Range might meet that need.

As ideas formed they were put into action. A visit to the county office in Pincher Creek resulted in two maps, a 1:50,000 topographical map with 100 foot contour intervals which would prove useful in planning a route up the mountain and a county land map which would give me landowners' names in the event I needed to cross privately owned land. Several evenings were spent travelling local roads at the base of the mountain and spotting the eastern slopes with my telescope. After choosing an ascent route I contacted Peter Hucik for permission to cross his land with the intent of climbing to the summit of Centre Peak.

(He recounted how in past years he had been to the top on more than one occasion.) Meanwhile, I also decided to incorporate a plaque into the cairn so that others who might venture to the summit would understand the significance of this pile of stones.

A month passed by, and as June ended an inscription evolved over the course of five drafts. This was then stencilled onto a one foot square aluminum plate one eighth inch thick. I test drilled into limestone rocks in my back yard with a hand drill and masonry bits to be sure I had the appropriate tools to set the rock anchors for the plaque once I was on the summit.

Cowley Wave Site

This cairn is dedicated to the memory of those pioneers who gave freely of courage and time to explore this mountain wave area along the Livingstone Range.

These individuals persevered both on the ground and in the air to make their dreams become reality. Their legacy must be respected and protected so that future generations might enjoy the benefits and exhilaration of one of the world's foremost mountain wave soaring sites.

Soar high on silent wings;
search out the serenity of space.

July 1987

It was my intention to erect the cairn prior to the Cowley summer camp. Not knowing what difficulties might be encountered during the climb, I decided on a two day excursion with an overnight on the mountain top. This in itself might prove to be a pleasant experience. My brother Bern had expressed an interest in accompanying me on the venture, and so it was that on the morning of Wednesday, July 15, we found ourselves on the eastern slope of the Livingstones.

The morning sun beamed down out of a clear blue sky. A light easterly wind created a murmur in the fir trees. We slung our 50 pound packs laden with camping gear on our backs and started our ascent following an old seismic exploration line. This trail ended on the spine of a long treed ridge which ran west up the mountainside to within 1000 feet of the top. If we could reach this point we would be 2000 feet north of Centre Peak. I had determined during previous examinations with the spotting scope that a direct ascent up the east slope of Centre Peak was not feasible. The final 1000 feet consisted of unstable scree slopes which terminated in vertical drops of 50 to 100 feet. Our plan would be to cross over top of the Livingstone Range ridgeline north of Centre Peak and then work south from the west side to reach the summit.

The weight of our packs forced us to proceed at a measured pace. Occasionally the sound of a Clark's nutcracker or raven would break the silence. As we gained altitude the trees became shorter and were spaced further apart permitting a welcome breeze to fan our perspiring bodies. Having broken through the treeline we dropped our packs and paused for a snack of beef jerky and dried fruit. As we gazed out over the broad expanse of the Cowley valley I wondered what impact the proposed Oldman River dam might have on the future of this area. It was 11 am now and we had been climbing for two hours. From this point on the pitch of the slope continually increased and the footing changed to large cobbles requiring attention to the placement of each step. At 7500 feet our ascent was halted by a vertical face some 30 feet high. We diverted southward and intercepted a sheep trail which enabled us to negotiate the otherwise unstable scree slope. Boulders which worked loose

under our steps would start a violent rolling tumble, taking others with them as they bounced down and finally disappeared out of sight 1000 feet below. Their crash and clatter bellowed back from the cliff faces. After a scramble over a vertical obstacle that afforded some hand and toe holds we were able to break over to the west side of the range: it was 1 pm.

What a relief to set down those packs! The sandwiches and juice tasted especially good in the noticeably thinner air. A peregrine falcon swooped by, soaring the ridge lift. We heard the clamouring cries of its offspring somewhere in the cliffs but were unable to spot the nest site. Crowsnest Mountain at 9138 feet broke the skyline ten miles to the west. Cumulus were billowing over the mountains as far south as Waterton Lakes although the prairies to the east were not yet spawning any cloud.

Refreshed after our break, Bern and I worked south along a scree slope which became continually steeper and thus also more unstable. But, within 800 feet of the top, we had come to an impasse. To our left were vertical spires which offered no footholds and the steeply pitched scree on which we stood terminated in an 80 foot vertical drop to our right. No more than 600 feet before us lay easy access to the summit of Centre Peak. So near and yet so far! Prudence dictated that we go no farther. We were neither experienced enough nor equipped for technical rock climbing, so to proceed would be foolhardy. One misplaced step or disturbed rock would result in a scree avalanche and certain tragedy. With a heavy heart I took a last look at the peak, turned north and retraced the path we had just ascended.

During our climb in the morning our legs were pushing against the force of gravity, thus our breathing had been laboured. Now however, gravity was helping us down, our legs had only to check our descent with each step. At 5 pm we were back at our van, the muscles in our thighs screaming for mercy. A frosty beer out of the cooler was our only reward. That evening we swam in the Oldman River at its crossing with highway 22 and prepared a barbecue dinner. As the orange sky silhouetted the sawtoothed spine of the Livingstones, I resolved not to admit defeat after the first attempt. I would come back and try again!

Two weeks later Shirley and I attended the Cowley summer camp and celebrated our first anniversary during the closing weekend. During the week we had driven to Sparwood, BC to replenish my supply of "Kokanee" beer. On our return I detoured north at Blairmore and travelled a dirt road which led to some open pit coal mines that lay west of the Livingstone Range. From this vantage point I once again took out my spotting scope and glassed Centre Peak in search of an accessible route to the summit. An approach from the southwest might be possible. The attempt would have to wait though as my work took me to Texas and then on to Michigan; I did not return to Alberta until Christmas.

1988 turned out to be particularly depressing for me. For the first time since 1980 I did not join the Cu Nim Gliding Club as my entire summer was spent in Michigan. I felt far removed from the soaring community which had become a fraternal home for me. I did receive some satisfaction in being fortunate enough to attend both the EAA Convention in Oshkosh as well as the Reno Air Races — anyone even remotely interested in aviation would find either of these events well worth seeing. The year drew to a close and I had not even laid eyes on the Livingstones. In 1989 things would be different. Late March I left Michigan to return

home to Calgary. Several Sundays later in April I took some of my radio control gliders out to our club to look for some early season thermals. To my surprise a group of instructors was present to start the annual spring checkrides. Before long I was coerced into a Scout to do some towing and I was once again an active club member.

Several months later I was back at Cowley. At times, when I looked at the Livingstone Range, it felt as though Centre Peak was beckoning me, and I of course was eager to go. While taking the camp's final morning temperature sounding, I took the Scout to 10,000 feet west over the Livingstone Range. This gave me an opportunity to survey my proposed route from a different perspective. On descent I skirted over Centre Peak at 8400 feet—a lone ram mountain sheep was standing sentinel. If the weather cooperated, I would attempt the climb again on the following weekend.

By the middle of the week the weather reports sounded promising, sunny days with scattered evening thundershowers indicated the likelihood of a weekend with some convection for soaring. Friday afternoon I packed my gear and told Shirley I'd be back home Sunday night. She was concerned that I was going alone this time, so I included my handheld transceiver in my packsack. If I should have an accident I could contact an overflying airliner on 121.5 MHz. I stopped briefly on my southbound route at our airfield at Black Diamond to tow some students. From there it was on to the Crowsnest Pass where I spent the night in the van.

Saturday, August 12, dawned clear and calm. The first beams of light beckoned in through the rear window of the van and woke me, and following a hearty breakfast I made a final check of my gear to see that nothing had been overlooked. My overflight last weekend had shown that all snowfields were melted so I had no option but to pack my water with me. At Blairmore I followed the old coal mining road to the eastern slopes of the mountain range. An east fork on this road in turn took me northward on a jeep trail paralleling Gold Creek, which has its origin at the base of Centre Peak. I hoped to follow this stream through the forest to guide me to my destination.

At 9:15 I was hiking into the sun just now clearing the Livingstone Range. Fortunately I had discovered an old seismic trail which made the first half hour walking quite enjoyable. Our abundant rains this year left the forest floor carpeted in a lush green with a myriad of wildflowers now in bloom. At points where the stream crossed the trail I looked for animal sign in the soft earth and soon saw bear tracks. Although they were only black bears, I kept up a steady whistling of tunes that came to mind to broadcast my presence to whom it may concern.

All too soon my pathway came to an abrupt stop, but I had gained 500 feet in the past one and a half miles and was presently at 6000 feet. The next hour was spent pushing my way through dense undergrowth and tripping often; I'm sure my curses frightened any bear in the area away. On several occasions I heard crashing ahead of me similar to the sounds I was making, but the only tracks I encountered were those of elk. The gain was 500 feet vertical in a half mile when I broke into more open pine in a saddle between two ridges. Another half hour and I finally cleared the treeline at 7000 feet.

Ahead of me the mountain proper seemed to be staring down at me. A steep slope of

loose boulders rose 800 feet ahead ending in a 40 foot vertical wall which fell off into an abyss to the north and trailed off to the south out of sight. Forty-five minutes of scrambling brought me to the base of this wall which I followed south in search of a cranny that would permit me to scale it.

Before me on my left a trickle of water wetted the limestone face and provided moisture for a small patch of grass at its base. I removed my pack here and ate a light snack. Half my water supply had been consumed and I realized I would have to replenish the stock. A long shoelace removed from my hiking boot acted as a wick when held against the wet rock face. In five minutes I recovered two litres of water. Proceeding a little further without the packsack I encountered a narrow ledge with suitable handholds to permit scaling the face. A chimney provided the means by which I was able to clear the last of the vertical wall. From this point on it was a straightforward walk up a moderate slope consisting of loose rock. Forty-five minutes of hiking put me on the summit at 2 pm.

The reward for climbing any mountain is the vista which stretches out around you in all directions. Under a clear blue sky the Porcupine Hills to the east melted into a patchwork quilt of green and yellow until that too finally diffused into the horizon near the Saskatchewan border. To the south the pale gray scar on Turtle Mountain's flank marked the location of the Frank Slide which took place at the turn of the century, burying an entire coal mining town while it slept. Further still, Chief Mountain in Montana stood sentinel just beyond Waterton Lakes National Park. To the west, Crowsnest Mountain marked the continental divide and the British Columbia border.

The charts show Centre Peak at 8364 feet. This peak is actually very small being no more than four feet wide and running north-south along the spine for no more than twenty feet. Here I found a small pile of rock rubble with a post lying across it. The post was wrapped in a faded orange survey ribbon. Under the rock rubble a brass plate was grouted into the bedrock placed here by the Geodetic Survey of Canada. I opened a plastic 35 mm film container which held two pieces of paper. One was dated June 1985 by a survey crew who admitted arriving here by helicopter. The other dated August 4, 1980 was signed by two men aged 19 and 24 respectively. Their comment was simply: "Arrived at the top at 6 pm. Windy as hell and cold. Please keep this note behind."

Work now began on my objective. A three foot square base was carefully prepared upon which subsequent layers of rock were placed using small fragments to securely lock the structure together. I quickly depleted the supply of loose stone in the immediate area and was forced to descend to a point some 50 feet away for a source of rock. Carrying the material at this altitude was tiring but provided security against occasional wind gusts that attempted to dislodge one's footing.

When the cairn was two feet high I decided to return to my packsack and bring it up. This provided a break in the work, as well as allowing me to set up a campsite while there was still daylight. A niche under a rock ledge provided a large enough flat area to lay out the sleeping bag wrapped in a plastic sheet, in turn weighted with stones against the gusty wind. I returned to the Peak, now only a half hour away, with tools, plaque and radio. Before resuming work I set the radio to 123.3 and shortly thereafter the frequency came alive. Several

Tony Burton

of the Cu Nim pilots were flying cross-country. I spoke with Dick Mamini flying his ASW-12 at Strathmore 175 kilometres away. He promised to telephone Shirley to let her know I had safely reached my goal.

I worked on as the sun slowly settled into British Columbia. A flat-faced two foot square rock six inches thick was rolled up to the base of the cairn and, after several failed attempts, lifted to the three foot level on the south face. After it was secured by placing other rocks around it, the anchors were drilled and the plaque secured to it.

I sat down and rested briefly; the sun disappeared below the orange western horizon and the wind's fingers now had a chill. A scimitar-shaped silhouette approached from the north, flying the ridge lift. I sat motionless as the peregrine passed within twenty feet of me, unaware of my presence. Perhaps it was the same resident my brother and I encountered two years ago.

At 9 pm I went down to my camp for supper. As I crawled into the sleeping bag the southern sky was alive with lightning. The cognac I had packed up with me now provided a warm internal glow, soothing my aching body and quickly weighted my eyelids. Later I awoke with a light drumming of rain on the plastic sheet covering me. My feet and the base of the sleeping bag were wet so I drew them up nearer to me under the sheet. The

rain continued intermittently through the night.

Shafts of light broke through the early morning cloud deck and dappled the Cowley valley. I carefully slid out of the sleeping bag, not disturbing the pockets of rainwater trapped by the plastic cover sheet. This water was then funnelled into my canteen. I returned to the cairn and capped it off when I was no longer able to set the rocks any higher. The sun had now burned off much of the overcast and it was an opportune time for some photographs. My own note joined the others in the canister: "This cairn was erected in honour of the soaring movement. Anyone wishing more information on the subject should contact the Cu Nim Gliding Club in Calgary."

I took one last look at the pristine beauty around me and spoke in silence to some inner thoughts. I had established contact with those whom I admired. An inner peace vaulted upwards, spiralling in a thermal not of warm air, but of kindred sentiment. It was time to return to earth.

1988 — An ode to Cowley towpilots

Iain Colquhoun

I WROTE the "Coyote Pilot's Howl" (opposite) to capture the thrill and excitement of towing sailplanes into the mountain wave at Cowley. Barry Bradley of the Cu Nim Gliding Club provided the original theme. Barry saw the Coyotes as a club within a club; much as Earnest Gann in *Fate is the Hunter* saw all pilots as a fraternity somewhat apart from the rest of society — bound by the ultimate, lonely responsibility for the fate of their craft, and their secret struggle with the faceless menace that lurks in the dark skies around them.

The name "Coyote" comes from the Coyote pilots favourite breakfast, Coyote pancakes, a mix made and marketed by the Hutterites in Magrath, Alberta — "A howling success!" It is said Barry uses straight mineral engine oil as shortening when he bakes up a batch every year at the summer camp.

The setting for the poem is the Cowley Fall Camp. Let me add a few things that make the poem a little clearer. There are two surviving grass strips: runway 11 pointing to the southeast and runway 21 to the southwest. More often than not (and especially during the fall camp) the wind howls like a banshee down 21, and the great mountain wave swells like living thing above the mountains. To the west the mountains rise and fall for a thousand kilometres to the Pacific. To the east, beyond the Porkies, the great prairies roll to the ends of the earth. At the south end of the Livingstones is the Crowsnest Pass, and out of the far northwest the Oldman River flows through "the Gap" eastwards across the valley and then south between the field and the Porkies. In a nearby bend in the river is a swimming hole that is an indescribable blessing during the hot, endless days of the summer camp.

Meteorology tells me the strong wind has something to do with wet and dry adiabats. The Indians (who also call the wind the Snow Eater) reckon it is the breath of a beautiful maiden lying in the Shining Mountains sighing in her long winter's sleep. Flying in the

The Coyote Pilot's Howl

When the cruel winds blow 'round the campfire's glow, under stars of icy hale,
From frozen lips moist with rot-gut sips comes a queer and eerie tale,
Of a time gone by when the storm was high and the Crowsnest shrieked and snowed;
In the darkened sun, straight down 'twenty-one', the Coyote Pilots towed.

On a pale straw morn from the west was born a warm and murmured sigh.
One again believed that a goddess breathed and her breath filled the early sky.
From her ocean home she strove to roam where the sun leaves its dark midnight grave,
And her craft was the air and the wind was her hair and her wings were the great mountain wave.

As the pale gold light quelled the restless night and dark shadows fled to their lair,
As the white birds slept, from their midst there crept one whose dreams sensed the whispering air.
On the field alone, seeming turned to stone, staring far to the vanishing gloom,
The Coyote could tell by those hues of Hell, that today he would tow to his doom.

In the crimson sun golden rays were spun, and they flowed o'er the Porkies' shield;
Down the river's bowl, past the swimming hole, to the frozen, hoary the field.
As the camp awoke and the cook shack smoke hurried east in the quickening swell,
Every pilot who stalked the great wave knew of this day there would be tales to tell.

Though the lift was strong still the tows were long, through mine fields of rotor and sink.
Of the gale's savage whip as it battered his ship, the Coyote tried hard not to think.
Through the gale's savage lash and the thundering crash of the dark air's murderous rage,
'Neath the dark slabs of heaven the Coyote was driven for the Devil had settled his wage.

In the darkening sun the ships, one by one, scurried home from the stern mountain's glare.
By the deafening groan a child would have known that a storm like a beast rode the air.
'Though his body was wracked, he had beaten Hell's pact, and he sneered as he turned from his foe,
But one sailplane remained, and his energy drained, the Coyote made one final tow.

Long ages ticked by as they rose in the sky – two souls bound by fate and by steel.
Before two thousand feet, the sailplane was beat, and returned his bruised body to heal.
As the storm dimmed the view and the gale's fury grew, the Coyote's clan waited in vain.
For Hell's blade to the haft had rent pilot and craft. They would never be heard of again.

When the cruel winds blow 'round the campfire's glow, under stars of icy hale,
Watchers still can hear, as they cower in fear, a distant, hellish wail.
It echoes long like the banshee's song 'round the mountains' flinty scowl.
O'er the frozen ground comes the hollow sound of the Coyote pilot's howl.

Iain R. Colquhoun, 19 December 1988

mini-cosmos between Cowley and the Livingstones, the ancient wisdom is more appealing than new-fangled thermodynamics!

And who are the Coyotes? The Coyote pilots are the towpilots of the Cowley Fall Camp. Picture now a Coyote standing alone on the field sampling the gentle, early morning breeze, already quickening from the west. The wind and the lennies are building and the white sailplanes are scurrying to the flightline to launch to the stratosphere. The winds and the turbulence continue to build. The darkness of the storm descends on the field. As the day wears on, the Coyote, tired, beat-up, and scared, continues to tow as if to feed his very soul.

Many years later, an old Coyote is sitting by the campfire on a cold, clear October night. Sipping Scotch and telling a tale of a time gone by when the storm was high and the Crowsnest shrieked and snowed. And how, in the darkened sun, straight down 21, the Coyote Pilots towed …

1990 — Quest II — trekking to Centre Peak

Linda Tittle

AS DAWN BROKE on August 2, 1990, ten Cowley campers assembled to begin the 1st Annual Climb of Centre Peak. It was inspired by Steve Weinhold's successful quest to place a plaque dedicating the mountain to soaring at the top of the peak in 1989. Steve was pleasantly surprised at the number of us who accepted his offer to guide the day hike up to the top, not only for the enthusiasm we had but also for the confidence we showed in him.

We did have some doubts at the beginning — the last road we travelled on up the western side of the Livingstone Range was more promise than fact. Al Stirling's borrowed old car negotiated all hazards, and "Long live the Vista Cruiser!" became our chant. On arriving at the meadow which was our parking spot we could see the tiny cairn silhouetted above, and this gave us a sense of determination which compensated for the intimidating view of the mountain.

Steve told us in our briefing, "It's an easy climb after the agony of the trip through the brush." After a short walk up a survey cutline towards the mountain, he directed us to turn into the woods at a fallen log. We bushwhacked through a forest, following no trail, and got very wet from the dew, but that discomfort didn't last long. Eventually we came to an open section of rock which was a chance to practise for what was to come, then back up another steep wooded slope before we reached the treeline.

We stopped for our first long rest period and for a substantial snack, while Steve pointed out most of the route that we would climb. We started out across the loose rocks, those of us without experience staying close to Steve, those with more going ahead. It seemed to be quite steep at that point and it seemed that the rocks were falling off the mountain. Lee Coates decided to stay at treeline because he is wary of heights when he doesn't have wings attached. He followed much of the climb visually; he also took photos of wildflowers and spent time building a chair from rocks: it will be there for others to sit on for many years.

Tony Burton

In a salute to the climbers at the soaring cairn on Centre Peak. "August Moon" makes a flypast.

The one and only casualty came halfway up — Fred Guest stood up under a ledge and cut his scalp. Some of us welcomed the rest while the bleeding was stopped. Fred worried later that his laughter (while bleeding) was a sign of a serious concussion.

There was another welcome rest period while a climbable route was explored by the experienced climbers since we were off course a bit from the original path taken by Steve. Following a democratic discussion we continued up the mountain! Gradually the sights became more dramatic — we could almost always see our parking area far below, the mountains of British Columbia appeared, Crowsnest Peak got taller and taller, Montana's moun-

Tony Burton

2 August 1990, a small band of pilots make the five hour climb to the soaring cairn on Centre Peak. A container in the base of the cairn contains a diary of all the climbers who have reached the top and a copy of this story. A proud and tired Linda Tittle stands beside the goal as storm clouds quickly develop to the north.

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tains appeared, and we finally came around a corner and the Cowley valley spread out in front of us. At this point it became an "easy stroll" up along the ridgeline to the top (at least it would have been easy if we weren't already tired).

Being on top of the mountain after the five hour climb was an experience with varied emotions for everyone. We radioed Cowley Ground when we were near the top and two gliders did beat-ups that could not be equalled. "Being buzzed on the mountain top was fun", understated Dave Arthurs. "Memorable flypast by our Cowley gliders" – Mario Saba. "Seeing … spectacular flybys … has made me determined to continue with soaring so I can come back someday in a glider.

"Looking around from the top of Centre Peak I made up my mind not to transfer to … Tulsa – since I cannot imagine a better place to live than Southern Alberta and I would not like to leave the Cu Nim and Cowley gliding facilities." (This was Fred making im-

portant life decisions after his bump on the head.) Yuro 'the mountain goat' Ihns had fun, a small workout, and said that, "seeing the gliders buzz us that close really made me want a licence!" Tony Burton was aware of, "the bigness of the mountain, seeing the movement and power of the airflow around the peaks, the formation and swirling of the clouds on both sides of the ridge, the powerful contrast of the colours — the beige of the rocks, the black of the gathering storm to the north, the white of clouds forming in the sun closer to the peak." Steve's emotions were a bit more elaborate. "This was my third visit to Centre Peak. On both previous occasions a falcon had flown by. As I sat now, watching the sailplanes come by from the north, I again spotted a falcon fifty feet off the spine coming at us. He would fold his wings and stoop when in sink, spreading them and pulling up in the stronger lift. After passing overhead he banked westward and pulled into a thermal coming off the flank of the mountain. Effortlessly he climbed until I lost him to sight. I believe my father talks to me here. In that I find great peace."

The three hour trip down was a fairly uneventful reversal of the trip up, although the storm did arrive as the last climbers reached the bottom of the rocks. Though there was thunder and lightning, the rain was gentle and did not last long. We had removed our rain gear by the time we got to the cars.

At the pilots meeting on Friday, I tried to summarize the day — with apologies to the Academy Awards:

I would like to thank my parents without whose efforts I would not be here today. I would like to thank all the pioneers who inspired Steve to climb the Peak and erect the cairn. I would like to thank all those who attend the Cowley Camp who make this such a special experience.

I'd like to thank the whole group of climbers; they followed the guideline that the group would go no faster than the 'least common denominator' (the slowest) and that was me. When the line stretched out (or scattered to explore different routes), there was always someone who stayed to bring up the rear, right behind me …

The very best part of the day was, for me, being on top for the airshow: the unbelievable fly-by from 6A (Eric Greenwell), the glider on tow coming our way, the towplane rocking his wings at us. Words cannot describe what it felt like to have AM (Stewart Tittle) fly by! In a week of Cowley flying where only a few pilots were getting away each day, it was wonderful that AM was one that day.

The biggest thanks goes of course to Steve Weinhold. He called this a non-technical climb and I'm sure that, technically, he is correct. I'm also sure that I have never worked harder in my life. When I hinted that I would stop if I was holding the group up, he said that I was going to get to the top because I would be the first woman to do so. As he stuck with me, I realized that the challenge for Steve was to guide me safely to the top. We speculated going up about what I would say to people about the climb. Would I recommend it to others? Would I do it again?

Yes, I would do it again. Yes, I would recommend it to others. Thank you, Steve.

Later Friday, Russ spent an hour circling Centre Peak. He says, "… my eyes (traced) each bit of the route we took. I was astonished at how impossible it looked from the comfortable

and secure vantage point of a cozy reclining seat in a beautiful cloud-white fantasy machine, free to choose to leave the mountain at any moment and soar freely away to other beckoning peaks and valleys. How different this was from the touching and feeling of the trees, brush, and the rocks of yesterday. The substance of Centre Peak had made its mark on my body in cuts and bruises, aches and blisters. But the essence of Centre Peak will still be for me, the glider pilot, the entity which in the morning glows in the sun as it rises over the Porcupine Hills on the other side of the valley; which gives rise to those early puffs of clouds to tell us it will be a good soaring day, and which so often had rewarded us with wave … and which in the evenings remains silhouetted against the western sky, a sight that thousands have seen over the millennia, but only glider pilots have seen in their special way.

And now, that extra small bump on top will tell the thousands of others who see it in the future just a little bit of a different way of seeing things around us."

1992 — Wave camp

Tony Burton

AS I WRITE this report, it is grey, dull, and cold, and has been that way for a few days — thank God we moved the event ahead a week this year!

It was a successful camp with forty-eight registering, and there was a strong turnout from Cold Lake regulars (Grant Humphrey kept most of the towing operation going mid-week, and George Szukala acted as the camp safety officer). Many pilots got wave climbs on Thursday, Friday, and Saturday. That was a relief because it started out looking like another one of those, "You should have been here last week," soaring event scenarios. Then it was finally Indian Summer in southern Alberta with some gorgeous lennies overhead and one day provided a classic chinook arch.

The high moved out on Friday, the 2nd of October when I moved onto the field with the equipment. Not a soul showed up after work as I had expected, so I went to bed feeling like the Maytag repair man until Darwin Roberts appeared after dark with the Grob trailer. He was hoping to get a ride back with his son who had never been to Cowley, but he never arrived. However, I had seen a car driving along the road to the west just before dark which came to a halt for a while with a flashlight sweeping around, then it carried on. Indeed, that had been him. Cowley can't be found in the dark by strangers, folks.

Saturday morning the Grob 103 and a Blanik arrived from Cu Nim behind NJK and PCK. A bunch of the boys from Cold Lake had been around for days taking their leisure at the Beaver Mines bed and breakfast. The morning was dedicated to getting organizational details out of the way, setting up the fuel, and repairing some badger holes on 21. The afternoon saw a few flights done and there was a little wave. Bob Mercer, a 747 driver and RS-15 pilot from Hudson, Quebec was on hand, our most distant camper.

Sunday morning was pretty much clagged over and didn't look as if it had any prom-

ise whatever so I went home for the day. There were some training flights in AUK however, and there was enough lift by midafternoon for Mike Glatiotis to eke out a 1:17 hour flight in "Fruit Juice", the Cu Nim Jantar.

Monday was the same only worse and there were a half dozen flights made just for something to do. The morning pilots meeting in the cook shack was habitable with the stove full of burning wood. Bingo managed to waft around in some zero sink grey puffs under the 7000 foot overcast to extend his glide to 25 minutes. Chris Herten flew over from Golden in a 182 in the morning with his girlfriend, and for a while it looked questionable whether he would be able to fly back through the pass which was almost socked in.

Tuesday morning was cold and it had snowed everywhere but on the field overnight (the snowline on the hills had come down to about eye level). Tenters had stayed comfortable by taking only their shoes off before crawling into the sack. Karin Michel stayed toasty in the back of her car inside two sleeping bags.

The day had only 2500 foot bases but it was unstable enough to provide small cu with tiny thermals enticing enough to sucker everyone aloft but not good enough to sustain one for long — at least you could see the tops of the Livingstones. Most pilots managed to hang in for 25 to 30 minutes, and Bob Mercer was the day's scratchmaster with a 75 minute flight. Most of the entertainment that afternoon was watching the mighty George Szukala try to shoehorn himself into Fruit Juice. He just managed with no seat, no chute, and just enough foam to keep the oxygen regulator from excavating his right shoulder blade. I thought he would have done a little better if he had taken off his army boots, though.

On Wednesday a high had built in but the upper winds were a fairly light 40 knots out of 320–340°. The morning pilots meeting ended with Mike videoing everyone seated along benches in front of the cook shack doing the "Cowley wave". Flights got going after lunch when a stiff wind right out of the west allowed some careful but consistent ridge soaring to 2000 agl back on the Porkies. Bingo was so far back for a while he was disappearing behind the bumps, and we radioed up what kind of pizza we expected when we had to retrieve him. He got back though, after a flight of almost two hours.

By Thursday a Pacific cold front had gone through and the forecast was decidedly better, the winds were 270° all the way up although below 40 knots. The high for the day was even going to allow us to peel off a layer of clothes. The major admonition at the meeting was, DO NOT outland the Blanik because we have no trailer — recalling the two day retrieve of the ESC Blanik last year after Deirdre Duffy and Hugh McColeman landed out on the south end of the Porkies.

The Blanik landed out a few miles west of the airfield.

Deirdre and Elaine Friesen took the honours — their barograph trace looked something like a pyramid, a 5000 foot tow followed by a dive to the ground after missing the wave and getting back into the rotor. This time the ship was aerotowed off into a stiff west wind blowing straight down the field.

We got some decent wave flights finally, with Bingo getting to 25,000 feet in the Dart, Marek Wakulczyk to 28,000 in Fruit Juice, I made 30,300 in Echo Echo, and Don Matheson finally got his Diamond climb to 25,400. His barograph failed last year, robbing him of that

badge leg. Climbs were slow past about 27,000 through a hazy layer of thin cirrus which topped near 31,000 feet.

Dave Mercer tried a cross-country using the wave but found it a bit thin south of the pass, and he also landed out in the RS-15 just east of the Waterton reservoir. We finally found that out after flying shut down around five and we went to sit by the phone for our missing pilot. He eventually got retrieved by the light of car headlamps. Fifteen pilots ate at the Swiss Alpine in Pincher Creek that evening, many meals subsidized by the outlandings.

Another visitor from far away appeared on the field in the morning, Eric Durance from the Windsor club. He was in Calgary on business and was able to scrounge a day off to experience Cowley. George gave him a great two hour ride in the Grob around the valley and into the bottom of the wave.

On Friday the upper winds were not that favourable for wave, being out of the northwest, but they were howling – 56 knots at 18,000, 82 knots at 24,000, and 109 knots at 30,000! At the meeting the pilots were warned of possible high winds coming down to the surface, and DO NOT land the Blanik out.

The Blanik landed out — having no trailer seems to be the kiss of death on hopes for contacting the wave. This time it was Marek and Peter Clare. As you might expect, the rotor gave a wild ride today, and Marek said a moment of inattention got such a large loop in the towrope a release was mandatory, and down they went into a field northwest of Cowley. Don also got shot down landing his RHJ-8 in the same field the Blanik did yesterday.

There were lots of wave climbs with Mike (Fruit Juice) and Dave Morgan (HP-11) getting Gold climbs. The wave was 10 knots up low down but petered out in the mid-20s. Deirdre got to 22,500 in the ESC 1-23, I got to 23,500, Mike — 23,300, Bingo — 27,500, Chester Zwarych — 23,800, Karin and Marek — 17,000 in the Blanik (after it got aerotowed once again), Dave Morgan made 20,000, and Dave Mercer reported 27,200. It was a happy day, and campers crawled into bed under pearl-edged moonlit lennies.

On Saturday morning a few of the Calgary pilots returned to a fine sky with a vague arch and surface winds gusting over 35 knots which shut the operation down for a while. The upper winds had moved a bit more westerly and eased off considerably (62 knots at 30,000 feet). The wavelength was unusual with only two waves in the valley rather than the normal three and quite rough rotor, and the arch high above slowly drifted eastwards until it was 40 km downwind by 6 o'clock. Uwe Kleinhempel arrived from Golden with a group of his students and their Blanik (finally, a trailer).

Bingo was first off at 1130 and worked himself up to 30,200 (the first of several to exceed 30,000 this day). The wave was 10+ up at the bottom, and on my flight with Uwe in the Grob to give him his wave and site check, we had to fly at over 100 knots to keep down to a reasonable no-oxygen altitude. Mike and Dave Morgan re-smoked their barographs and improved yesterday's Gold climbs to Diamond flights of 28,000 feet each, Edmond Duggan from Cold Lake got a Gold climb in the 1-23 to 23,000 feet, and Deirdre improved on her feminine altitude record of last year by climbing to 30,900 in the 1-23. Unfortunately, Deirdre couldn't claim the record because the Sporting Code rule requiring an FAI sporting licence

Tony Burton

1996 – Don't land out the Blanik! It happens every year anyway; above, at the 1996 Summer Camp. At least this time there was a trailer, although it took a "5-mule team" to pull it out of the remote pasture north of Centre Peak after Darwin Roberts and passenger Stewart Baker dropped out of the wave.

to be held by the claiming pilot was being enforced this year by the Aero Club of Canada.

I shouldn't have mentioned to Jay Poscente that the current "height du jour" was my 30,300 feet – that gave him the incentive to scrabble up to 31,300 to take away this year's SAC wave trophy in all likelihood. Dave Mercer reported getting a bit higher than that but he can't prove it. Chester contacted the arch when it was behind the Porcupines, the only one to do so. The front face of the arch is not usually visible from the ground as it normally sits further west giving one only the lower leading edge to see. Now, layers upon layers of solid stacked cloud laminations could be seen – a remarkable sight from the ground and probably even more remarkable from a Chester-eye view.

Someone thought that the total altitude achieved today by the fifteen wave flights would add up to a BIG number – yes – well over 300,000 feet, counting the tows.

Sunday morning started clear even though it looked sort of clagged in to the north – Calgary was reporting rain. The upper winds were favourable and the bad weather wasn't supposed to arrive until late afternoon, but during the morning meeting a solid cloud deck condensed out of midair and the Livingstone peaks disappeared. As it seemed permanent, decisions were made to derig and the camp began to dismantle early. Mike drove his camper down to the flightline and boiled up much appreciated hot chocolate on demand. By early afternoon, only a half dozen souls remained to visit the Castle Haus Inn bed and breakfast in Beaver Mines for a Thanksgiving dinner which was worth the wait.

On Monday Ursula and I drove back to Cowley to do an inventory of the shack and to bring the Grob back to Claresholm (we weren't sure if Kerry Stevenson had got the message that he didn't have to take it back to Black Diamond). It turned out that he did drive down, and he decided to take the back road to Head-Smashed-In Buffalo Jump because he had never gone that way before and wanted to see the scenery. As we were driving south towards Fort Macleod we decided to drive westbound on the buffalo jump road because we hadn't been on it in that direction before and wanted to see the scenery, and we met Kerry half way along.

The back roads through the south end of the Porkies are pure rustic wild west, and the weather was gorgeous and warm of course, with the valley full of cu with waves on top. See you up there next year.

Flyin' the Cowley "wave"

Anon.

ME AND MY GOOD friend Glider Bill decided to go to Cowley to fly the wave last year. I am pretty new at flyin' gliders but Glider Bill is an expert. He isn't an instructor — he says that he knows too much about glidin' to be a good instructor. He says that by the time he learnt a student all he knows that the student would be too old to fly. I'm sure lucky to have Glider Bill for my friend.

I asked Glider Bill about flyin' the wave. He told me that only a few of the pilots who goes to Cowley gets to fly the wave. I wanted to learn all that I could about the wave so I asked a lot of questions. He said that flyin' the wave was like a religious experience. The wave has mystical qualities. I wanted to know how I would find the wave. He said that only pilots of pure hearts would find the wave and that only I would know how. This didn't make much sence to me. I have heard tell of pilots getting tremendous lift from the Cowley wave and I sure wanted to be worthy enough to fly it. I tried to get him to tell me more but he only said that I would have to experience the wave myself to really appreciate it.

Well I sure was confused. Now I am new at flyin' gliders. Glider Bill has been flyin' them things for years. I knew that Glider Bill was just about the best glider driver around. But he wouldn't hardly talk to me any more about the wave all the rest of the way to Cowley. He said that he had to meditate and cleanse his heart so that he would be able to fly the wave.

Well we arrived at Cowley and took our gliders out of their boxes. There was lots of other pilots there and everyone sure seemed real serious. Glider Bill launched ahead of me. I didn't see him the rest of the day. I took four flights that first weekend and tried to find that damn wave but I guess my heart wasn't pure enough.

I inquired of Glider Bill if he flew the wave. He looked like I'd slapped him in the face. He said that real glider pilots don't ask other glider pilots that question and real glider pilots don't talk a whole lot about the wave. He said to be one with the wave was better than

sex and you don't talk about that either. Well, I apologized. I told him that I was still learnin' the finer points about being a glider pilot. I sure didn't mean to talk out of turn and I would be more careful like about talkin' of such things.

I felt real down in the dumps all that next week. We went back to Cowley the next weekend. A lot of those same guys was there again. I was real careful not to mention the wave to anyone lest they be offended. There is lots of edequit about glider drivin' that I have to learn. Well we launched a whole bunch of them gliders and I set off to find the wave. I flew all day Saturday, but I didn't find no wave. I was real discouraged. I didn't talk to a soul about it tho'. I may be from Saskatchewan but you don't have to hit me in the head with a 2 by 4 morin once for me to learn something.

Sunday was a bright and beautiful day. I don't know why but I felt different that morning. I somehow knew that I would find the wave that day. We launched them gliders again. I was one of the last ones off. I flew my little heart out but I couldn't find the wave. I was feelin' like I would never be a real glider pilot just because I learnt flyin' in an airplane with an engine. I was trying real hard not to let that interfere much. I was about to give up when I got into one hell of a thermal. I figured that if I couldn't find wave that I might just as well fly thermals. Well out of no where another glider appeared. It was a beautiful little white glider probably one of them glass ones. I could see this big guy all cramped uplike in the cockpit. We circled together in this big thermal for a long time. After a while he decided to leave the thermal. As he swooshed by I saw this big fellow grin at me. He extended his arm and tipped his hand to and fro at me.

My heart soared! I finally knew what Glider Bill had been talkin' about. That night I proudly put into my log book, "Sited the Cowley Wave, flew same".

I knew enough not to talk to the other pilots about me havin' found the wave. But I couldn't resist writin' down this story for others to read. I sure hope that I haven't broken some other glidin edequit by doin' so. I have heard tell of pilots getting tremendous lift from the Cowley wave. But I also have figured out that them real glider pilots are horrible liars. Do you believe them other stories about finding good lift low over smoke stacks?

I do know that the "wave" from the big friendly glider feller sure made me feel good. Maybe next year I'll be able to help some other newcomer.

The Canadian multiplace altitude records – 2020

Melanie Paradis & Patrick Pelletier

Melanie's story

ARRIVING AT THE FALL COWLEY CAMP on Sunday evening, I was excited and nervous as this would be my first opportunity to experience mountain wave. I soon heard the sad news that a wing stand had given out while Patrick was rigging, rendering his glider unserviceable. I offered my sympathy and disbelief and told him that he would have to get in our two-seater from Edmonton so he could mentor the uninitiated.

Monday, I was able to line up a wave checkride with Gary Hill. Gary and I were able to get to the primary wave in the ESC Perkoz. It was a great flight with a taste of everything the wave had to offer. Rotor, wave, cloud formations, tracking vs heading, fighting to stay out of controlled airspace and most amazingly, how quiet and smooth it was in the wave and how effortless the climb was. If you weren't paying attention, you would quickly bust through the 12,500 ft base of Victor 300 airway before you could get clear of it north of Centre Peak. I was amazed at how strong the upper winds were and how fast we could descend when we were on the down side of the wave.

That night, my family had our truck camper parked at the end of Runway 21 beside all the tied-down gliders, and endured the windiest overnight camping we had ever experienced. Finding it hard to get to sleep, my husband Tyler and I found ourselves wandering around in the dark checking on the gliders, and righted a blown over wing stand on the Perkoz. Back in bed afterwards, with the camper rocking in 80 km/hour winds, my mind swirled thinking about the day's events, and the excitement of tomorrow's wave conditions to come.

The next morning, Peanut arrived. He said he thought it was going to be a great wave day and wanted to know if I would like to go break the two-seat altitude record. Before I knew it, I was saying "Okay!", and sprung into action untying and DI'ing the Perkoz. Positives and release checks completed, we pulled the glider over to fill the oxygen tank to max capacity, while Tyler brought the towplane over to the flight line. My knowledge of oxygen equipment with my hospital respiratory therapist background left me feeling comfortable that the regulator and tanks were much the same, and the use of nasal cannulas and mask use, and partial pressures of O_2 at altitude were all second nature. Since Patrick and I would be relying on our oxygen system to keep us functioning for our flight, a clear plan and team work would need to be followed. We discussed the plan and I practised switching over from nasal cannula to mask and switching over the *Mountain High* O2 connections, which sounds simple enough, but at altitude would need to be done in a timely and practised manner to avoid hypoxia. Patrick then briefed me what would happen should one of us feel the effects of hypoxia. As talking would be hindered with the masks, we will check in with one another every 1000 feet with a thumbs up. Should either of us feel any effects of hypoxia, either of us were to open the spoilers and descend as seconds would matter to get down to a safer altitude.

While Patrick and a small crew pushed the glider out to the flight line, I went back to the camper to get my winter gear on and have a bite to eat. A quick mental check-in with myself was completed on my short walk to the camper to ensure *"I AM SAFE"* to fly. When I arrived at the camper, my three boys were about to start their on-line school day, and were using my cell phone as a wifi connection to log onto their class meets. I told them, "Sorry boys, you're going to miss school this morning, as I would like to document our attempt to break a Canadian altitude record." Amazement to both the statement of missing school and to their mom going off to break a Canadian record ensued. With their words of encouragement ringing in my ears, off I went to get into my parachute, set up *XCSoar*, and get strapped in to the glider.

Our ESC fleet manager Ray was close by and since I had only flown the Perkoz twice this season (I had been jumping between six other glider types between Cu Nim and ESC), my familiarity with how to switch radio frequencies, check battery life, and switch the onboard batteries were minimal as every aircraft seems to be slightly different. Two of the three on-board batteries were at minimal charge so I requested a hand held for the backseat as a back-up and Patrick was happy to provide his.

While Patrick and I were busily prepping for our flight, Tyler Paradis, who is a "Calgary Enroute" IFR Controller (encompassing Cowley airspace), our towpilot for this flight, and who also happens to be my husband, was coordinating with Edmonton ACC to open a block extension above FL280 in an hour's time. A big thank you to Todd Trischuk, the Edmonton ACC Shift Manager at the time, who organized approval for this request.

The time came where we were all strapped in, crew plan in place and rehearsed, and discussion of tasks divided up. I was to fly take-off, aerotow, initial wave climb to 20,000 feet, all air to ground communications and ATC clearance coordination through Cowley ground, descent from the wave, return to the airfield, circuit and landing. Patrick's tasks were pre-flight game plan coordinator and briefer, high altitude wave climb and navigation, crew safety coordinator, in-flight crew on-board communications and crew physiological monitor.

Takeoff was uneventful and initial climb out was great and we quickly rose to 5000, which is where we stayed for quite some time on our journey over to the Rocks. The tow was rough at points once we were into the foothills. Full control deflections were definitely needed at times, but from stories I had heard about passing through the rotor it wasn't too bad. As we were approaching where we thought the primary wave should be, Patrick asked me to call Tyler to tell him to turn west, but before I could make the call, Tyler was already turning where we wanted him to due to his experience attaining his Diamond climb the day before on his wave flight, or possibly from his sixth sense from decades of avoiding the wrath of his

wife. Regardless of the reason, our VSI started to read 10 knots up at which point we released. Our typical right turn off tow was quickly shortened and we turned back into the wave with the towplane in sight. Amazingly, the VSI and altimeter quickly marched up. We worked our way north to get past Centre Peak before we reached 12,500 feet to clear Victor 300 airway and continued our strong steady climb. At 18,000 we switched over from cannulas to masks.

Time had no meaning as I was lost in the wonder of the flight. As each 1000 feet ticked by, our goal seemed possible. Through 22,000 feet, it became obvious to Patrick that the wave would likely reach above 30,000 feet and he asked that I call Cowley Ground to obtain clearance to FL350. (The initial clearance was to FL320.) Patrick reminded me to make sure my muscles were relaxed and to wiggle my toes, and mentioned that shivering can lead to hypoxia. I flashed back to bedside experiences with cardiac patients shivering and watching their oxygen saturation plummet. I focused on keeping my muscles relaxed and my legs warm by resting my arms over my chilly legs, with my down gloves resting on my thighs. I was grateful for my winter boots, layered pants, jacket, hat, gloves and wool socks. Passing through FL280, Patrick told me to look up and I was shocked to see an Airbus 330 passing overhead. Its contrails remained as we continued to climb and we were subsequently given a clearance to FL350. My movements now were very deliberate so as not to consume more O_2 than was being delivered to my body. The small window vent on the Perkoz kept popping open and I weighed the risk of letting in the -43C air and risk shivering, or moving my arm up to close it consuming too much oxygen through my movement. Passing through FL300 I focused on my breathing, maintaining a normal respiratory rate of 10-12 breaths/minute by counting 6-8 seconds between each breath and tried to keep a normal tidal volume to each breath as I did not want to decrease my CO_2 levels, as I know in my practice as a perfusionist that decreased CO_2 can lead to cerebral vasoconstriction.

I really wanted to look around and take a picture, but instead I tried my best to imitate a rag doll with limp muscles. As we reached FL320, I tried not to get excited as I did not want my heart rate to increase as my cardiac output would increase along with my oxygen demand, which could push me over the edge to hypoxemia. Within seconds of being at FL320, Patrick opened the spoilers, increased speed, and did a rapid descent using the rapidly descending air on the downward side of the wave to get down to 28,000 feet within a minute. I was very grateful for the extremely effective airbrakes on the Perkoz, Patrick's 15 years of wave experience, his military training which included hypoxia training and high-g CF18 maneuvers. These all contributed to his immediate escape planning when he recognized his own hypoxia through the beginning of tingling fingers after he took a picture at FL320.

At 28,000 feet we discussed if we should continue to climb and we decided that since other pilots were waiting for the Perkoz, we should head back. Control was handed back over to me, at which point I inwardly laughed at the seemingly ludicrousness of our altitude. How do I get down from 28,000 feet?! With a fighter pilot in the back seat to guide me through it, no problem! Spoilers, speed and staying in the down-going side of the wave brought us down quickly. Once below the base of Victor 300, we decided to head west and pop over a large bank of cloud instead of going under it, so we could take advantage of the lift on the other side of it, instead of going under it into the rotor. I had never descended toward a cloud

formation from above before, and our shadow on the impressive cloud bank could be seen with a concentric rainbow around it. Beautiful!

We followed the edge of the cloud southbound and came around the end of it and started heading north to the field at which point I closed the spoilers and fought upwind. We arrived back at the field with a few thousand feet to spare. I popped the spoilers to descend to circuit altitude, but Patrick said, "Why waste the height when we are paying for it," and with a detectable grin in his voice took control and put a show on for me. It was amazing to see such precise control, and his ease at the controls from years of military training shining through. At circuit altitude I took control and landed back at the field into a very stiff headwind, which I was thankful for as it was these amazing winds that afforded us the wave from the Livingstone Range to achieve our record setting goal.

What an amazing feat made after such a simple question – "Wanna break a record?"

… and Patrick

MELANIE'S ACCOUNT OF OUR FLIGHT sums up our achievement quite well, and after reading it I feel that all I can offer is my recollection of events and thoughts that led to us breaking a long-standing altitude record. I must point out that after the fact, a seemingly unconnected event led to this record attempt. Upon arrival in Cowley, my glider became unusable for the duration of the camp and I essentially started looking for someone to fly with after I was done kicking rocks and feeling bad about not being able to fly my own machine on what I consider to be the highlight of the year. Yes… I'm addicted to high-altitude flight! On to the story…

At the fall Cowley camps, I got in the habit of getting up well before sunrise to have a look at the weather forecasts, read the NOTAMs and to take a peek outside my hotel room door to look at the weather conditions in the Pincher Creek area and more specifically, looking for signs of rotor or lenticular formations towards the Cowley airfield. It only took a second to tell that a strong wave was occurring. The sight of well-formed lenticular clouds and the associated high winds at Pincher Creek told me that it was time to pack up my high altitude gear, head for the field and find someone who is awake and willing to go flying.

When I arrived at the field shortly after sunrise, only three people were up and about. Melanie and Tyler Paradis and me. The initial conversation went like this:

Me: We should be flying right now!

Tyler: If you want to go, take the Perkoz and I'll tow you.

Me: Melanie, wanna break the two-seat altitude record?

Melanie: Okay!

And that got the ball rolling. We got to work getting the Perkoz ready and topping up the O_2. Although this may seem like an impromptu "let's go flying" type of thing, a lot of thoughts were going through my head as we were preparing to go break a record and were knowingly about to put ourselves at significant physiological risk flying above 25,000 feet. I did feel a certain burden of responsibility upon deciding to break a record and putting someone else at risk, so I had some thinking ahead of me and only about an hour to do it.

As we were preparing the glider and equipment prior to launch, I was building a list of essential briefing items in my mind so that the risks we were about to take were mitigated as much as possible. The main challenge to breaking a two-seat record is the fact that there are two crew members on board and how to achieve and maintain safety throughout the flight. This may seem trivial in low altitude flight, however when the oxygen masks go on, the number one challenge is communication between the two of us. The number two challenge is the physiological monitoring of the crew. Third is air-to-ground communications and fourth is the coordination and sharing of tasks between the crew members. Below is a list of elements that I considered essential to a crew briefing to achieve as safe a flight as possible during our record attempt.

- **Crew Communication:** Our pre-flight briefing consisted of how we were going to communicate with each other once the masks go on. Around 16,000 feet and up to 25,000 feet we briefed that we could momentarily lift our masks to say a few words. Above 25,000 feet, we briefed that no more words would be used and only a thumbs up to the other crew member every time the altimeter climbs through another thousand. In the event that one of us feels unwell either through hypoxia or any other reason, the affected crew member only had to pull the spoiler handle open fully and this was the signal to start an emergency descent and turn towards the dump side of the wave to maximize our descent rate.
- **Physiological monitoring:** I am fortunate to have been trained to recognize my personal hypoxia symptoms through my Air Force high-altitude chamber training and I am confident I can recognize my own in time to carry out emergency actions. How do I monitor someone who has never experienced their own personal symptoms and has only had brief exposure to the wave once before? The answer was the combination of a few things:
    1. Establish that if you are not feeling exactly the way you feel right now standing on the ground, you are likely hypoxic.
    2. Establish a prompt thumbs-up given to me every time the altimeter crosses another thousand once above 25,000 feet.
    3. This one came up in flight as a welcome annoyance: The front cockpit vent kept popping open every 30 seconds, which allowed me to monitor Mel's reaction and watching her coordination while she closed the vent repeatedly. As an added precaution, our pre-flight briefing included the use of our oxygen settings at altitude and selecting the highest manual setting upon crossing above 28,000 feet (R/M on the *Mountain High*).
    4. And finally to further mitigate the risk, we briefed that we should avoid unnecessary movement above 28,000 feet since muscle use consumes O_2.
- **Air-to-ground communication:** Although this was a minor challenge, the fact that only the front seat had transmit capability required some coordination between the two of us. I carried my own handheld just in case. We did however talk about what clearance I wanted from ATC to both Mel and Tyler as he would act as the liaison between us and Edmonton ACC.

- **Coordination and task sharing:** A two-seat record requires each crew member to act as a team. We established who was going to do what before getting airborne. Mel would do the take-off, air tow through the rotor, release and carry out the initial wave climb below 20,000 feet, all communications, and the descent back down from high-altitude for landing. My tasks were wave climb above 20,000 and navigation at high altitude, physiological monitoring of the crew and a few other tasks.

Aside from those "big picture" tasks were some more specific items that needed discussion like "how and when are we going to switch from cannulas to masks?" The answer, as an example, was low enough to do it while able to fix a problem, and we established the order of front seat first while the other is flying. Confirm oxygen flow in the mask, then relinquish control, and repeat for the back seat. This item actually proved to work quite well. When my turn came to don the mask, I had made the switch but could not establish oxygen flow which required me to retrace all the oxygen tubing until the fault was found.

Patrick and Melanie, shortly after returning from their absolute altitude and gain of height record flight. The calibrated results from this flight is a height gain of 7275m (23,868 ft) and an absolute height of 9831m (32,254 ft). The previous territorial record (ie flown within Canada) gain of height was set in 1961 at Cowley at 7102m (23,300 ft) with absolute altitude record of 9083m (29,800 ft).

The above elements I listed are not a complete list of considerations I made prior to us attempting to break this record. These elements are there to highlight that if you are going to attempt a task using a glider with two crew members, you will need to figure out what will maximize crew efficiency in a challenging environment and ensure everyone's safety.

Without re-telling our story, I wish to highlight that Mel's performance has been outstanding and performed as an ideal crew member throughout the entire experience. As a professional military aviator, I seldom get the chance to fly with civilian pilots in challenging environments. Her actions, teamwork and adherence to the plan we established were instrumental in us achieving success and her performance was equivalent to what is expected of a military aviator. She would be my first pick should the opportunity to break another two-seat record present itself again.

1994 – The fall camp produced a good wave on 8 October. Mike Glatiotis is soaring his Mini-Nimbus, Jolly Miller, in the primary of the Cowley wave at over 20,000 feet.

Addendum I

"THE COOK BOOK"

The following text is a copy of the diary kept by pilots who flew from Cook's field beginning on 25 June, 1956. It is a fascinating glimpse into the past when mountain lee waves supplied a new and adventurous means of soaring.

"To: Future pilots who will compile this soaring log.

Record here your experience so that others may know you and share. An informal meeting in March 1956 of Calgary Soaring Pilots concluded arrangements for an assemblage of effort to explore the Pincher Creek Area to support the contention that here is an ideal soaring site.

To record what we believe will be soaring history, this log is opened. This history should record all FAI qualifying flights, and all flights of Silver "C" standard or better. They should be written, to be readable by the novice so that all may gain of this knowledge, for the betterment of the sport and to deepen the enjoyment of the art of Soaring.

By kind permission of Mr. W.A. Cook it is possible to have this base of operations on his airstrip and to enjoy the hospitality that could have no equal. We are indeed grateful for these circumstances."

signed by A.W. Riddell and Participating Pilots of the 1956 Meet:
J.R. (Bob) Cheston, Julien Audette, Frank Matthews, Len Russell, Alan Foster, and Henri Chabot.

June 25, 1956 A.W. Riddell

Cook's airstrip to Seven Persons 140 miles
takeoff 11:18 — air time 4:19

The weather was an incoming Pacific airmass, clear skies to the east early, and a few cumulus off the rocks. By 1030 cu was forming off most of the small hills and tending to street downwind. By takeoff the knob north of Pincher Station was triggering excellent cu, while the rise south of Pincher Creek was triggering another street. Cloud was forming over the prairie towards Lethbridge roughly in these two streets. I released at 5500 asl over the knob north of Pincher Station in 10 to 15 ft/sec rise and climbed to 10,500 at cloud base.

I started cross-country and arrived over Lethbridge in one hour for 50 mph groundspeed. The lift appeared to be best along the sunny edge of the street over sunny ground. Cloud base decreased to 9000 feet past Lethbridge and the streets became heavier, and at times building large complexes with precipitation; lift not generally good under there. Two thermals at about 1000 feet disrupted my landing patterns for continued flight. Past Lethbridge, large storm areas were developing by 1400 hours. I was finally caught in a complex near Medicine Hat that I could not fly out from under. I had stayed too long and the cloud started to precipitate. I made it out to a dry area and landed.

On studying the clouds from the ground I could see my mistake quite clearly. Al Foster was along within the hour for an easy retrieve.

When committed to a cross-country, apply your effort to that end. I should have made better mileage, but I liked staying around in small lift after it was no longer profitable. A most enjoyable flight.

June 26, 1956 A. W. Riddell

Gold C height gain — 10,990 feet
Absolute height recorded — 17,570 feet
Unofficial height reached — 20,200 feet

A memorable flight. I had been to 11,000 in a wave the previous year, but this was a true lee wave flight. The weather conditions gave general cumulus in the area, but nothing that appeared to indicate waves, indeed we could not soar in the Pincher Creek area despite several attempts.

I towed up at 1311 and released in lift too far back from the wave front and had to land. At 1406, I towed in front of the Cowley Radio Range where contact was made and I released at 6500 asl. I found the convective cloud was well back in the wave and the best lift was one-half to one mile in front of the embedded convective cloud. This cloud was based at 10 or 12,000 and topped at 15 to 17,000 feet. I had climbed up in the secondary wave so I topped it at 18,000 and flew to the primary wave off the Livingstone Range. I made

20,000 and proceeded down to establish a low point on my barograph. I did this at 6600 feet over Lundbreck and went back up to 20,200 in the primary wave.

Crossing from wave to wave cost only three to four thousand feet. By 1800 hours I was very cold and feeling the effects of anoxia, so I came in. The lenticulars were starting to form about this time and the convective cloud was dying out as the sun went down. The lenticulars appeared to be about 35,000 feet.

Later as Bob Cheston was up, the lenticular cloud formed an arch from horizon to horizon and deepened down to 12 to 15,000 feet. Oxygen equipment will be a necessity to prevent rash or inadvertent ascents beyond human tolerance. Three waves developed, the primary over the Livingstones, the secondary about centred over Happy Valley *[Waldren Flats]*, and the third over the west edge of the Porcupine Hills. The lift was good, about 15 fpm in the best parts and 10 fpm average over wide areas.

June 26, 1956 J.R. Cheston

Silver C height gain
4920 ft on official barogram
takeoff 19:45 — air time 1:05

The wind was very strong again today, probably stronger than Monday. I felt the wind was too strong for my experience so I did not fly early in the day. In the evening the wind subsided somewhat and I felt I should at least make a practice flight. The tow seemed fairly normal, although rough, until after we swung in a SE direction past Pincher Creek, where there seemed to be a large down area and we lost altitude on tow. After making a large half turn we headed back to the NW over Pincher Creek towards the *[Crowsnest]* Pass. By the time we got there the climb was normal again, and west of Pincher Creek we were in lift and I released 3600 above ground. I soon found that the lift kept in much the same place in relation to the ground, not so very wide through the direction of the wind (west wind), but long crossways to the wind.

This must be a wave. I just had to make beats across the wind direction adjusting my east-west position from time to time. Before long I was up to 12,400 asl. I was still going up nicely but on account of the lateness I had to return.

This wave I worked was slightly west of *[the town of]* Pincher Creek and my beat was from even with Pincher Creek to about two-thirds the way over to Pincher Station. I could see a wave type cloud away above me, probably another 5000 feet or so, but to the west of me. There did not appear to be any cloud associated with the wave I was in. I think I was in the second or third wave. The tow was rough but higher up the flight was quite smooth and easy. I was highly elated over this flight.

June 28, 1956 A.W. Riddell

An evening wave flight
Cook's airstrip
takeoff 16:45 — air time 3:35

This flight is very interesting in that these conditions may prevail quite often in stable air conditions. A late afternoon exploratory flight after previous ones of the day were in the order of one hour. Takeoff to check the knob north of Pincher Station, release at 6500. Patchy lift until I contacted a wave that Bob Cheston was soaring, just rising from the knoll east of the strip. The surface wind was from the east, upper wind west.

I climbed out to 9000 and crossed up into the Porkies. Good lift to 10,000 and 12,000 generated by ground features. The condition got better about 1700 hours and at 10,000 lift was available virtually all over the valley if you flew clear of the cloud shadows and over sunny ground. I flew to the south of the airway and explored from Cowley to Lundbreck over the mountain ridges, towards Waterton back over Pincher Creek and back to Cook's airstrip about 2000 hours. As the sun set and the shadow of the rocks spread over the basin, the lift died and I came in. At 1000 feet over the hangar I maintained height for 15 minutes for no apparent reason that I have been able to figure out.

June 28, 1956 J.R. Cheston

Wave flying
takeoff 15:35 — air time 4:08

The wind was light this day. On tow we gained fairly normally until we got a mile or so west of the Pincher Creek/Pincher Station line. After that we went all over a large area to the west and hardly gained any height. In this area much of the time showed 15 ft/sec down interspersed with small patches of quite vigorous lift, maybe 10 to 20 up at times. We still weren't over 2000 feet so I didn't want to release in this area where there was so much "down". We returned easterly and the gain became more normal. The release was at 3000 feet (over ground) somewhat south of Pincher Station.

One thermal was worked up about 1000 feet or so until I drifted back (easterly) even with the airstrip. After heading west again to Pincher Station, the next thermal was worked to over 8000 asl. I was moving somewhat southerly, while drifting eastward, and soon found that the lift was no longer drifting downwind. So this rise was continued above the hill that is behind the airstrip (east).

About this time I saw Bill Riddell a little way below me. We worked this lift together for a while. I should have gone exploring with him, but instead I stayed more or less over and behind the airstrip, still gaining. By the time I was over 12,000 feet, Bill had disappeared and I had my lunch and took a few pictures. During this time, I did not concern myself with

staying in the best lift, but just relaxed, sometimes rising and sometimes dropping as I drifted through the lift. I was still around 11,000 asl when I resumed serious flying and I was above some of the convection cloud to the east and north of me. I found I was following the lift in a westerly direction. The lift seemed fair about even with Pincher Creek and I was gaining again. However, I found that I was still following the lift westward and getting harder to stay in. I followed it west to about even with Cowley. I thought I might find another band of lift farther to the east, but this did not materialize. I came down after a very enjoyable flight. The wind was light easterly or northerly and the upper wind, around 10 to 12,000 asl, was westerly, maybe 30 mph or so.

Western Canadian Soaring Meet
June 22 to July 1, 1957
Cook's airstrip, Pincher Creek, Alberta

Participants: A.W. Riddell, F.B. Matthews, John M. Robertson, R.J. (Rusty) Chapin, Alan Foster, J.R. (Bob) Cheston, Chem LeCheminant, W.L. (Locke) Robertson, J. Audette.

June 25, 1957 J.R. Cheston

Gold C height gain in wave
Gain 13,200 ft — absolute 19,200 ft — low 6000 ft
Aircraft AV-36 Cook's strip
takeoff 17:50 — air time 1:50

This flight was the third flight I made today in search of wave lift carrying oxygen. The first flight produced a gain from 6700 to 10,400 in thermals in very strong west wind, landing at Cowley strip. The second flight, an exploration over the foothills west of Cowley airport, produced no lift.

On this, the third flight, we took off from Cowley and following the road on the west side of Cowley airport straight south until we were south of the main highway; we seemed to be in medium lift all the way. Then, still on tow, we swung easterly toward Pincher Creek. We seemed to have lift just west of Pincher Creek and I released. Working the lift which seemed rather difficult, I found I was almost directly over Pincher Creek, a little north. I worked this very small area of marginal lift for more than 30 minutes gaining slightly and finally losing. I gave it up and headed northwest. I found more lift about 2 miles west of Pincher road. This lift was long north and south, but not very wide so it must be wave. My altitude on reaching this lift was 6000. The lift soon began to work better. After I got to about 8000 the green rate up was reading more then 15. This climb rate was maintained to 16,000 and was then reduced till I reached 17,300, when I decided I was high enough.

During the climb I was gradually working westwards making quite a sharp correction westward just below cloud base to be well clear of the wave cloud. Its base was 12,000. At 17,300 I was well above the cloud probably 2 or 3000 feet. I went over the cloud to explore the lift. The lift gradually got less the further I went over the cloud (downwind). I pushed back into the wind again now thinking to try some more gain. The best lift seemed to be from one third to half way over to the edge of the next cloud upwind. I climbed to over 19,000 and then went downwind over the cloud to descend. I went downwind almost one-third the way over to the next wave cloud. This was too far as my sink rate was not much more than normal. After I came back under the trailing edge of the cloud, then the red pip went right against the top, and before long I was down, very cold indeed, but otherwise fine.

The wave clouds seemed to be staggered, each one extending further south. The ones away to the southeast were quite a bit higher than the ones where I was.

June 25, 1957 W. L. (Locke) Robertson

Silver C altitude in wave
release 7200 ft — maximum 10,700 ft — gain 3500 ft

Upon landing after an interesting wave flight with George Ryning in which we cruised around at 3000 to 3500 feet above ground for nearly an hour, I immediately took off to try and climb into the main wave lift which Bob Cheston had just returned from.

The tow was normal and I released at 3500 (7000 asl) in +2 to 3 ft/sec just east of Castle River, tacked back and forth over a limited area. The lift gradually improved until I realized I was getting fairly close to the cloud (just under the leading edge). I now flew out in front into 15 to 20 ft/sec up. At 10,700 asl I left the lift and headed for home. It was almost dark and landed at 2108 using car lights for markers. It would appear that best wave conditions occur in morning and evening.

June 26, 1957 R.F. (Rusty) Chapin

Gold C gain in wave
gain 12,717 ft — absolute height 19,717 ft
takeoff 05:56 — air time 5:00 — landing 10:56
Fauvel AV-36 CF-HRO

Profiting by the discovery of wave action by Bob Cheston and Locke Robertson in the late evening of June 25th, 1957, I scrambled out of a comfortable bed at four o'clock June 26, 1957 to see that the standing wave was still working if cloud action was being read properly. Due to splendid cooperation of all other pilots and ground crew, which included Ted Jensen

being roused at 0500 hours to do my towing with his Cruiser, I was clear of the ground at 0556 hours.

Tow climb was due west to a point about 8 miles of Cook's airstrip. A swing south along a triple ridge formation seemed to produce rather weak lift which seemed to improve with exploration and much maneuvering. As the lift seemed rather long and narrow it was assumed to be either ridge lift or wave. A pattern was established by the time we reached 6000 with lift a steady 3 ft/sec. Not wishing to pull a boner I stayed on tow and worked up to 7000 with an increase of lift to 7 to 8 ft/sec. Release was made at 7000 after 43 minutes on tow.

The lift area was worked in race track fashion until a steady lift of 15 ft/sec was observed at which time I flew a crab type pattern, maintaining position by altering crab angle and ground speed. At 10,000 I put on and tested my oxygen supply. At 13,000 I started using oxygen with a close check on pressures and requirements.

At 15,000 I decided to try to push out into the wave ahead which was clearly indicated by the cloud formation. This was a mistake, because as I tried to fly out, I saw that I would be rather low if and when I made contact, so a quick 180 degree turn and further flight put me over the "triple" ridge I had started on. This time I worked strong lift of at least 15 ft/sec up to 18,500. This put me in a better position to penetrate to the next forward wave. This was done after taking a few photographs, just in case this was maximum altitude. A successful jump forward was made, arriving at approximately 14,000. Some difficulty was experienced finding the best lift. But after exploring in front of the cloud for nearly one half hour at zero sink, I finally pinned it down. Up again at 15 ft/sec plus until 19,500 at which time the lift had weakened to 5 ft/sec. Exploration did not produce anything better and I struggled up to 19,717 arriving with zero sink. I stayed awhile just taking in the beautiful scenery and checking instruments and oxygen equipment.

I decided to try one more penetration to the next wave in front and attempt one more climb to better my previous mark. Due to wind, I felt I was going to be too low again, so this idea was abandoned and confirmed by lowering oxygen supply. I broke off at 10,000 and took off my oxygen face mask; and believe it or not, I started looking for down air to speed my return to the hospitality of Cook's airstrip.

A tired, happy landing was made safely exactly five hours after takeoff. I have just completed the best flight of my lifetime, but I wish to go on record in stating that this flight would have been impossible without the hard work and cooperation of the numerous persons assisting as ground crew and cheering sections. I only wish, and most sincerely wish that in repayment, I can be on the ground crew for the pilot who breaks this record wide open.

1957 — Locke Robertson and farmer witnessing his landing. "I set course due east and found out that by flying along the sunny side of the cloud street, I could hold an airspeed of about 70 mph and gained height. Unfortunately this happy state of affairs did not last, lift became marginal, then gradually petered out and I landed six miles south of Welling."

Bob Cheston

June 27, 1957 W.L. Robertson

Silver C distance, Pincher Creek to Welling, Alberta
takeoff 11:31 — air time 2:39

After several days of wind this day dawned clear and calm; by ten o'clock a few cumulus were starting to pop on the horizon and it looked like a good day for cross-country.
The Double Bubble had been trailered in the previous evening and put together in the dark, however, there was still considerable fussing to do and by the time all was ready it was about eleven o'clock.

At 11:31 with Rusty Chapin towing I took off; wind was light and direction variable. We turned toward Pincher Station and picked up lift over plowed fields. We hit good thermals near Castle River, worked up on tow to 2000 feet and released. After release good lift was worked to cloud base (8000 asl). Since I had the necessary height to start a cross-country and the cumulus was building very nicely, I set a course due east more or less. I found that by flying along the sunny side of a cloud street that was forming I could hold an airspeed of about 70 to 80 mph and maintain height.

Unfortunately, this happy state of affairs did not last and the clear areas started to fill in, so I headed for a sunny area to the south and east, at 1700 feet, caught another good thermal that took me back to cloud base. Next thermal picked up just north of St. Mary's dam. This was last time to cloud base as the anvil from a cumulus nimbus to the west was killing the lift. From here on the lift was marginal and I scratched along at 1500 to 2000 feet working lift over plowed fields. This lift gradually petered out and I landed six miles south of Welling.

Phoned Mrs. Cook and she in turn informed the retrieve crew of my position. The retrieve went very smoothly due to the efforts of the very excellent crew consisting of George Ryning, Rusty Chapin and Bob Cheston. Thanks a lot fellows.

Western Canadian Soaring Meet
June 28 to July 6, 1958
Cook's airstrip, Pincher Creek, Alberta

Participants: Alan Foster, Norman Eley, Julien Audette, Harold Townsend, Ed Jones, Harold Eley, Bill Cowan, S.M. Scott, K. Wing, Bill Thudium, R.S. White.

Easter Weekend Soaring Camp and Wave Flight Expedition
April 15 to 17, 1960

Attended by: Harold Townsend, Julien Audette, Ralph White, Wilbur Eley, Ross Grady, Harold Eley, Norm Eley, Ken Collins, Bruce Hea.

April 15, 1960 H.L. Townsend

As an introduction to the most successful wave flight expedition ever conducted at Pincher Creek, I am writing this preface from the viewpoint of a towpilot, with the hope that this may assist future pilots in more easily finding and utilizing the primary wave.

✦ ✦ ✦

At 4:30 Sunday morning, April 17, skies were covered by a high overcast extending eastward from a sharply defined arch extending north and south over the Livingstone Range. Winds at the airstrip were light westerly, becoming variable in the next hour or two, swinging from west through north and remaining light, although by midmorning they became westerly at about 30 mph. First launches by airtow were underway to the west by 5:30. Immediately after takeoff, reasonably strong lift was encountered at about one thousand over the highway. At first it was felt this was the result of a steep wind gradient; however, as the lift persisted over a larger area, most flights eventually released in this area at between a thousand and two thousand feet. In the meantime, the arch was slowly moving eastward, with very well defined lenticular action showing up along its edge in the morning sun.

All sailplanes launched encountered strong lift over a large area extending across the wind from Pincher Creek to Pincher Station. However no one was able to reach altitudes higher than 12 to 14,000 feet msl. Conditions were smooth, and no difficulty was observed during aerotows at this state. By eleven o'clock most flights were down, with the general feeling of disappointment. By this time the arch had moved east of the strip still showing strong wave forms. Also, a classic lenticular had now formed high over Frank

and another was working about 6 miles south of Cowley and just east and parallel to the Livingstone Range. Feeling this was an indication of the primary wave, I towed Ken Collins in the direction of Cowley in somewhat turbulent conditions. Penetration under the southern end of the lenticular east of the Livingstones (which put us just north of Cowley) proved to be extremely turbulent, however, upon reaching a point just upwind of the leading edge of the lenticular, we ran out of the turbulence into very smooth strong wave lift; this at about 7000 feet. Here Ken released and I returned to tow Ross Grady out to the same area. Again the same turbulence, although worse under the cloud. Ross hung on until about 6 to 8 miles north of Cowley where he too released in strong lift. All remaining flights followed the same routine with the resulting observations:

On this particular day, the primary wave was definitely close in to the mountains as described. Although no roll cloud was evident, it is felt that flying on tow under the cloud placed us in the rotor area. It is strongly recommended that tows should be conducted well clear of the cloud (to the south) at relatively lower altitudes, which I believe would reduce the turbulent effect. Also, much higher height gains are, I'm sure, possible, as we were all towing to 7 or 9000 feet. A recommended practice would be to tow over at 1500 to 2000 feet west of the cloud, then climb by beating back and forth north-south until lift is encountered. Although this is surmising that the wave will be encountered in the same relative place, I feel this to be the case, because of the nature of the Livingstone Range.

April 17, 1960 H.L. Townsend

SGS 1-26, CF-ZDF
release 9100 msl — absolute altitude 24,586 msl
takeoff 13:25 — landing 15:30 — air time 2:05

By 1300 hours the primary wave cloud was marking strongly over the Livingstones with three well defined clouds stationary over the Porkies spaced downwind at about ten miles intervals, with a monstrous cloud east of this with the appearance of an arch. Ted Jensen towed me to about eight miles north of Cowley when I released at just over 9000 feet in very turbulent lift. By penetrating slightly upwind I encountered 1200 to 1500 fpm lift, and steadying at 40 mph on a westerly heading, climb was commenced. Went on oxygen at 13,000 feet and continued climb, maintaining position over a crossroad below. The Livingstones rapidly dropped away, and by looking over my shoulder, I found myself out in front of the lenticular, climbing up its face. All the time, the rate of climb reduced slowly, but flight all the time remained extremely smooth and the sailplane became progressively quieter as I climbed. Above 20,000 rate of climb became very slow, and I was unable to find anything any better, even though I altered position north and south and westward to directly over the Livingstones. Finally, at better than 24,000 and with oxygen down to 200 pounds, I decided to return to Pincher.

Flying east back over the top of the cloud, I fought my way down through areas of very strong turbulent lift, climbing at times even with full spoilers and 75 indicated.

It is felt that slightly higher altitudes could have been reached if more oxygen had been aboard. Lesson: in wave flying be completely prepared. I missed Diamond height by only 200 feet.

I rush to take this opportunity to extend my sincere thanks to the Cooks for their wonderful hospitality and to the Cu Nims of Calgary for the opportunity to fly with them. Pincher Creek is definitely the "Bishop" of Canada and I look forward to seeing many records broken starting from here.

Note: the Bishop referred to is the airport in the lee of the Sierra Nevada mountains in California from which Paul Bikle flew the long held world altitude record of 46,267 feet on 25 Feb 1961.

April 17, 1960 R.S. (Ralph) White

SGS 1-26, CF-KPP, owned by K.J. Collins
Cook's strip, Pincher Creek
Elapsed time 1:34 — absolute altitude 23,778 — gain 16,503

Alvie Cook has stoutly maintained that Pincher Creek is the best soaring site in Canada if not on the continent, and six glider pilots from western Canada are likely to support him in this belief.

May I briefly add to a very thorough and excellent introduction to the reports by Harold Townsend. I would like to say that there was a certain amount of cumulus cloud on this particular day; it passed rapidly through the air with a tendency to obscure the wave cloud that was remaining stationary near Cowley. This was later recognized by Harold Townsend who finally co-opted Ken Collins into going out to "take a reading". They started the parade that Harold has previously talked about. Ross Grady then went out and Julien Audette followed. He was towed into very turbulent air and they abandoned the attempt. Julien later went up to over 20,000. By this time our towpilot Harold Townsend was very tired and when Ken Collins came down all "fired up", he sent me off to get my Gold C height gain.

I had to enlist Ted Jensen to do the towing. Harold did a marvellous job of briefing both of us and we did exactly as he told us to do. I should say here that I believe, had Harold followed his own wise counselling that he too would have later earned his Diamond for height gain. He told us to tow out low for two good reasons: to minimize the turbulence encountered and also to allow for a larger height gain.

My flight was very much like Harold's already reported but flown a little later in the day. It lasted only 1:34 hours. It is amazing how extremely turbulent the tow was, especially under the wave cloud. This no doubt is where the well known roll clouds form but in this case no cloud existed at this level. The large wave cloud was about 20 miles from Pincher Creek

being located six to eight miles north of Cowley airport. When I was near enough to the leading edge where I expected to find good lift and I felt that I could penetrate the balance of the distance upwind on my own I cast off after the tow train had fought its way down to 7000 feet for the third time. We had quite a time in staying down to this height and how often we struggled to get up and stay up to that height. At any rate I released, and almost immediately was struck by a "freight train", at least it felt like it. The aircraft went out of control momentarily and we were in a vertical position. I wondered just how much this machine would take. Then I was too busy to worry any more and soon arrived out in front of this very large cloud.

It did not appear like a lenticular but rather more like a cumulus. However, it had vastly different formation and development characteristics extending from about 8500 to 21,000. The air became frighteningly calm and exceedingly smooth and I had a hard time believing that everything was alright with me and the glider. The only thing wrong was the fact that the altimeter kept winding up and the VSI indicated 1200 feet up. What a sensation! It was simply thrilling! As my barogram shows this lift eased off a bit and gave me a scare as I thought I hadn't yet reached Gold C height, and so got busy locating more lift. Each time I drifted into the cloud, the inside of the canopy would fog up and I'd have to turn more directly into wind. The whole climb was made by drifting face into wind up and back across the face of the cloud turning no more than say 40 degrees. After a further very slow climb to 24,000, I must have become careless and drifted back over the top of the cloud before I realized what had happened. I was now reading red and did not like the prospects of sinking down into the middle of this cloud from the top. So I decided to use the 2000 foot I had above it to penetrate upwind to get out front once more. After I moved up I became to show a little green air but I erroneously calculated that I needed to gain back the 1500 feet I had just sacrificed, plus an additional 1500 feet to reach Diamond height.

Remembering that I was using a borrowed sailplane and that Ken had asked me not to stay too long as someone else wanted to fly in the wave and that I was using up his oxygen together with the fact that I had beaten Ken's absolute height, I decided to turn tail and go home.

I too flew over the top towards the base. It didn't take long now flying downwind, and I soon opened the spoilers fully and increased the airspeed to 100 mph and made a rapid descent to a very happy landing.

We were a tired lot that evening and our calculation suffered inaccuracy. We figured that I was considerably short of my Diamond. Only several days later did I accurately recalculate the gain to find that I had actually made it. Oh happy day!!

I believe that similar flights could be well utilized to start some mighty fine cross-country trips ...

My sincere thanks have gone out to Ken Collins for the use of his very fine sailplane and all his first rate gear. Also to Harold Townsend who briefed us well and guided us into the air to explore the primary wave; to Ted Jensen for a fine job of towing. (I hope he becomes a glider pilot some day.) Thanks too to all the other pilots and helpers who assisted in a most successful meet.

Our thanks and appreciation are always lacking when we try to thank the Cook family enough for their hospitality and encouragement.

Sincerely, R.S. White

PS Harold Townsend went up to over 20,000 later as did Harold Eley, and Julien Audette who will report their flights later in this "Cook Book".

April 17, 1960 K.J. Collins

SGS 1-26, CF-KPP Cook's strip
release 6800 ft — absolute 20,300 ft
takeoff 10:20 — landing 11:50 — air time 1:30

At 11 o'clock on Easter Sunday I was sitting at over 20,000 feet looking over the Rockies. The scene was breathtaking. One I like to think is reserved for soaring pilots.

Although the climb itself seemed so easy, it really was the helping hand and hard work of many people who in the present and past years helped me toward that climb. To mention these people would take too long, besides you only have to look at the faces at any soaring club to know them.

Previously I had spent two hours in the wave and did not get over 11,300. Later at breakfast, Harold Townsend and I discussed what appeared to be a lenticular cloud sitting due east of the Livingstone Range. After much discussion it was decided to tow NNW to a few miles west of Lundbreck. If nothing was found fly due east towards a high arch approximately ten miles west of Fort Macleod.

Tow itself was fairly rough and near Lundbreck we flew under a cloud which from the underside appeared like a cumulus. Here the going was extremely rough, and in a patch of strong lift the release was made at 6800. In no time at all I was in danger of being sucked into the cloud and a few moments at high speed brought me to the leading edge. Here everything went deathly still. Airspeed read 45, VSI ran 1200, at 9000 the oxygen mask was donned and I settled down for what I hoped was a long climb. Suddenly I was in cloud and 75 was put on to get into the clear again. I had been flying too slow and had fallen back into the leading edge of the lenticular. At about 12,000 the crown of the cloud was passed and I was above all clouds except the high arch behind me to the east.

From here on it was easy. As I passed 17,000 Gold C #12 was completed.

April 17, 1960 R.F. (Ross) Grady

LK-10A, CF-KPS Cook's strip
takeoff 07:00 — landing 08:30 — air time 1:30

Arriving at Cook's airfield at six in the morning, Bill Harvey, my wife Florence and I started into assembly "Creepee" after a retrieve late Saturday night from an attempted triangle flight from Pincher Creek to Champion to Taber and return. I made the first two legs after a flight of 3 hours and 45 minutes and was rained down at Taber when a large buildup came in from the west.

I was towed up at 0700 by Harold Townsend and encountered my first wave lift directly off the runway at about 1500 feet. On release I worked the velvety-smooth lift for about one hour to climb to 11,600 feet. Ken Collins was several hundred feet above and seemed not to be gaining either. After a short while we dropped back of the lift area and descended to the airport and some much needed breakfast.

April 17, 1960 R.F. (Ross) Grady

LK-10A, CF-KPS Cook's strip
Gold C altitude gain, absolute 25,454 ft
takeoff 11:00 — air time 1:08

R. Grady and Bill Harvey LK-10A, CF-KPS
Absolute two-place 15,854 ft

During breakfast, Ken Collins, Ralph White, Harold Townsend, Julien Audette and myself discussed our encounter with the secondary wave flight that morning and of the obvious great lenticular and helm clouds sitting over the Livingstone Range some 30 miles WNW of Cook's airport. We decided to try a tow to the mountain area and soon returned to Cook's. Ken was towed away shortly after ten o'clock and when Harold returned, he was jubilant with the strong lift he had encountered.

I decided to be towed to the same area and away we went. About 20 miles out of Pincher Creek we encountered tremendous area of turbulence, enough to put both towplane and glider out of control, then a smooth area, then more turbulence. After about three rough areas we encountered smooth weak lift and I watched the instruments carefully for a sign of lift strong enough to release in. First we encountered rough lift and suddenly the velvet-smooth 1500 feet green and I decided to release.

I was now facing directly into the east face of the Livingstone Range at about 8800 half a mile from the face of the mountains. Quickly and smoothly the LK rose in the 15 to 1800 fpm lift. I stayed facing into wind and drifted to the right and left about one quarter mile each way to investigate the width of the lift area, which stayed very constant. To the wind

I was sitting fairly well fix, perhaps slowing moving ahead as I quickly rose far above the peaks below. At 14,000 I decided I would be using my oxygen equipment and so put it on. I had 350 pounds of oxygen in the small tank, which I had figured to last for about 50 minutes. At 18,600 I climbed up past the top of the great lenticular into the clear blue sky above, the lift now was down to about 1200 fpm and still very smooth. I was now getting very cold inside and at 20,000 the canopy was frosting up on the inside. I decided to hold the climb until I had about 175 pounds of oxygen left. At 25,000 indicated 175 pounds showed on the oxygen pressure gauge, and I thought, well, let's get one thousand feet more and then head down. I got to 26,000 indicated with so much frost on the canopy I couldn't see out and nearly froze to death. With knees chattering, I turned 180 degree and headed out over the huge broken clouds below for Pincher. It took 7 minutes to get to Pincher Creek some 30 to 35 miles which would give a ground speed close to 300 mph. I skirted Pincher Creek at 23,000 and headed back to the wave.

Crossing over the Great Lenticular at about 18,000 I encountered the same lift and headed on through and over into the mountains to the west. I got out the camera and took some pictures back down on the clouds and mountains. The canopy was now clear again and I headed west over the next two ranges of mountains, at about 85 mph indicated, turned south till I came to the Crowsnest Pass highway and followed the highway east to Frank, took several shots of the Frank Slide from above and headed back to Pincher, very pleased at the luck and climb I had attained.

After discussing the turbulence we had encountered, we all agreed that everyone trying to traverse the wave strata from Pincher should be very careful of the invisible walls of turbulence which could tear a glider or towplane to pieces. We thought that in future we could possibly tow WSW from Pincher to the mountains and then turn north and fly parallel to the mountains to get into the primary wave. One should also wear very warm clothes and have frost shields on the windscreen.

After a very successful weekend by every pilot attending, it was unanimously agreed that Pincher Creek has the qualities of the best high altitude flying areas of the world.

April 17, 1960 J.J. Audette

Schweizer 1-26C, CF-ZDF Cook's airstrip
Gold C completed with height gain of 14,000 ft
air time 2:02

Written July 1962

This Log Book was push-passed on to me. So, because of my memory being such as it is, my remarks will be very short.

The first flight will be unforgettable after being towed into the rotor area right under rotor cloud. Release was made as soon as convenient and return was made to field

completely demoralized. The only thing good about this flight was the experience gained in where not to tow which helped these past years.

After letting Harold Townsend use CF-ZDF, although all signs of lenticular were gone and it was late in the day, I was talked into trying a flight into an area near Cook's strip which was creating lift. This area was located and height gain of 14,000 feet was made at a rate of climb that never exceeded 200 fpm. Several other pilots ahead of me have written a very comprehensive story on this weekend and I can only concern their sentiments.

Julien Audette

April 1, 1961 J.J. Audette

1-23G, CF-ZDO Cook Airstrip
takeoff 10:00 — air time 2:20 — landing 12:20
absolute height 31,000 ft

takeoff 13:50 — airtime 2:50 — landing 16:40
absolute height 30,630 ft Canadian record
height gain 23,320 ft Canadian record and Diamond height gain

April 22, 1962 J.J. Audette

1-23G, CF-ZDO Cook Airstrip
takeoff 09:47 — air time 7:55
absolute height 27,300 ft

Cross-country completed from 1 mi W – 4 mi N of Cowley airport to 10 mi E of Moose Jaw, Saskatchewan for a distance of 374.5 statute miles.
Completes 3rd Diamond CANADA DIAMOND #1
WORLD DIAMOND #240

July — 1962 Attached is summary of (Julien's) flights *[reprinted on page 60]*

Labour Day 1964
Weak thermal soaring conditions

1965 – The break before heading home: sitting from left; Klaus Stachow, Don Knight, Dick Mamini; second row, right to left; Cal Garvie, Gail Mamini, Wilf Eriksen, Bill Thudium, Mike Kiss, Ted Jessenberger.

Thanksgiving Weekend 1964
George Blunden and Ralph White complete five hour Silver C duration flights.

Bill Thudium — 24,000 feet
Dick Mamini — Gold C height gain 22,000 feet
Julien Audette — 24,000 feet cross-country to Bow Island

Many thanks to the Cooks for their wonderful cooperation from all concerned.

October 24/25, 1964
Weak conditions
Walter Hillen, Gold C height gain 18,300 feet

Thank you Cooks from the Cu Nim Gliding Club

September 1965 Labour Day Wave Soaring Camp

In attendance: — Jim Britton, Mike Kiss, Geo Ryning, Eric Steisslinger, Cal Garvie, Dick Mamini, Joe Drobeic, Walter Hillen, Klaus Stachow, André the Frenchman *[Dumestre]*, Bill Thudium, Barry Bradley, Ken M(a)cTavish, Barry Gilles, Julien Audette.

The first two days we waited for wave, but only thermal conditions existed. Monday, still no wave, but good thermal conditions. More weekends to come – we wait.

Thanksgiving weekend, October 9, 10, 11, 1965

In attendance — George Ryning, Jim Britton, Cal Garvie, Mike Kiss, Dick Mamini, Walter Hillen, Joe Drobeic, Klaus Stachow, Eric Steisslinger, Hans Urbas, Bill Thudium, George Blunden, Ken Wilkie, André the Mad Frenchman, Julien Audette, Chuck-the-Towpilot, Barry Gilles, Ken McTavish, Barry Bradley, George Dunbar.

Saturday, October 9, 1965

Everything looked right for fantastic wave conditions, but very good thermals developed instead. Jim Britton just missed his five hours by 20 minutes. George Ryning made a cross-country flight to Cowley. The rum was great, as usual.

Sunday, October 10, 1965
Good thermal day; still no wave
Monday, October 11, 1965

Despite poor forecast from met office, Julien Audette pioneers a "wave sniffing" flight over Cowley airfield. He reported back favourable lift on his 98 channel Bayside radio. The rush was on!

Blunden and Garvie — 20,700 feet
Julien Audette — 22,200 feet
Dick Mamini — 20,500 feet
Mike Kiss — 14,000 feet
Steisslinger and Urbas — 25,000 feet
Klaus Stachow — 23,500 feet
George Blunden — 21,800 feet
Bill Thudium — 21,000 feet

The end results: Two five-hour flights: Kiss and Stachow
Three Gold altitudes: Blunden, Mamini, Stachow

Everyone went home happy. Amen. Many thanks to the Cooks.

October 16, 1965 After coming to Pincher Creek for ten years, I am going to make my first entry in *The Cook Book*. After retrieving from Cowley I caught smooth wave lift at 1400 above the east end of Cook's field. Climbed to 13,800 feet asl, but could get no further. 1hr:40 min flight. George Ryning

[also on the 16th], Stachow, Steisslinger, Mamini and Thudium achieved their Diamond altitude. Klaus Stachow flew to Lethbridge to complete his Silver C, arrived at 19,000 asl. Jessenberger and Garvie flew to 23,500 in the Bergfalke II (with the aid of Mamini and Blunden just as passengers).

Saturday, October 23, 1965
Again, George Blunden accomplished his five hours. This time he plans to submit to FAI.

Mike Glatiotis

Every wave pilot's goal — 18,000 feet over Cowley and climbing on a beautiful fall afternoon!

July 30, 1983

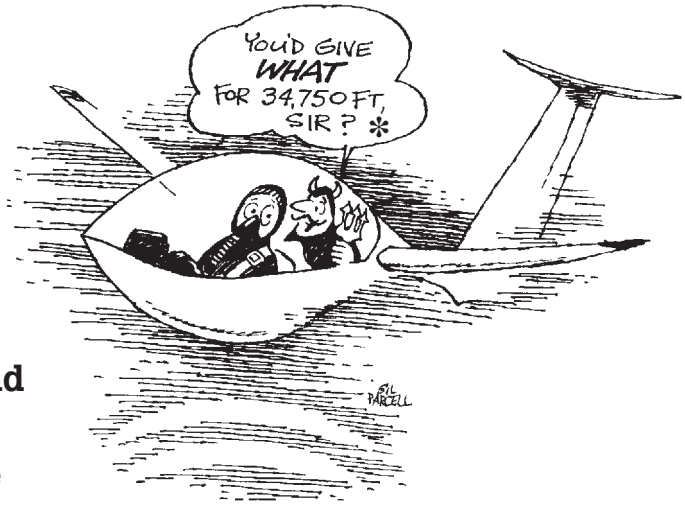
A small group of the "oldtimers" gathered on the occasion of the 1983 Cowley summer camp to trade lies about the events written on the preceding pages. Unfortunately, Alvie Cook who was to be the centre of attraction, was too ill to attend. Those present were: Harold Eley, Bob Cheston, George Ryning, Bruce Hea, George Dunbar, Richard Mamini, Klaus Stachow, Norman Eley, Wilbur Eley.

PS — August 1, 1984 Bill Riddell

I am privileged to add a postscript, now twenty-eight years later, to a document that had receded out of mind. Indeed, had Ursula not been diligent in her search for detail to write "The Cowley Story", this would not have come to pass. An exchange of letters and a visit have refreshed the memories. I do not know how the Cooks were contacted; however, that friendship was developed by the Cu Nims and we were able to share as well. That hospitality, I suggest, made possible the exploration of that area. I am grateful for it as I am sure were all others. This book was conceived in the rumpus room at the Cook ranch and hence its name. To me, it honours the Cooks for their great contribution to soaring and, like the ground crews, we too often forget what it takes to support the pilot. Therefore, with Paul, I can say, "Render honour to whom honour is due."

PPS — *Despise not the day of small beginnings. Zach. 4:10*

Addendum II



Record and Diamond badge leg flights in the Cowley wave

*** height needed to exceed Cdn record as of 2020**

Pilot	*Gain/Abs*	*Date*	*Glider*	*Record*
Bob Cheston (not Dia)	4067m	25 Jun 57	Fauvel AV-36	height gain
Ralph White	5030/7280	17 Apr 60	1-26	absolute alt
Julien Audette	7108/9336	1 Apr 61	1-23G	gain/absolute
Harold Eley	5532	1 Apr 61	1-26	
John Pomietlarz	5122	1 Apr 61	TG2	
Bob Cheston	5730	9 Oct 61	Fauvel AV-36	
Ed McClanahan	7864	9 Oct 61	1-23	to USA
Ross Grady	6468	7 Oct 62	1-23G	
Don McLaughlin		62		
Eric Steisslinger		16 Oct 65		
Richard Mamini	5796	17 Oct 65	L-Spatz	
Leroy Wood	6400 (est)	10 Apr 66	1-23G	
Bill Thudium	6550 (est)	10 Apr 66	BG-12	
Wilbur Eley	5486	6 Oct 66	1-26	
Adolf Kohlfuerst		10 Oct 66	SF-26	
Calvin Garvie		10 Oct 66	L Spatz	
Rene Bosshart		10 Oct 66		
Wolf Mix	7418/9704	10 Oct 66	SF-26	gain/absolute
Kerry Bissell	5700	10 Oct 66	Viking	
Alfred Schmied		Oct 67	Ka6CR	
Eric Mortis	5508	10 Oct 68	HP11A	
Jack Kane		68		
Dave Marsden	6563	13 Oct 68	HP14	
Joseph Gegenbauer	5090	13 Oct 68	1-23D	
Klaus Stachow	5116	17 Oct 68	SF-26	

Pilot	*Gain/Abs*	*Date*	*Glider*	*Record*
Harry Byrt	6096	3 Oct 68	HP11A	
Bruce Hea	5456	19 Oct 69	L-Spatz	
Garnet Thomas	6264	9 Oct 71	1-23	
Ron Innes		9 Oct 71	Libelle	
Dan Pandur		9 Oct 71	Libelle	
Don Seller		9 Oct 71	1-23	
James Brayshaw	7300	7 Oct 73	Ka6CR	
Chester Zwarych		Oct 73	2-33	
Norm Ronaasen	5334	Oct 73	Bergfalke	
Larry Riegert	6700	Oct 73	Bergfalke	
Malcolm McPhee		Oct 74	1-23	
Jim Strong		74		
Ken Walker		74		
Henry Schroeder	6096	12 Oct 74	1-23	
Dave Tustin	6553	8 Oct 76	HP14T	
Lee Coates	5288	8 Oct 76	SF-26	
J. R. (Rick) Matthews	6400	10 Oct 76	ASW-19	
C. G. Pedersen	5242	10 Oct 76		
John Parkinson	5895	5 Aug 78	Dart	
Rainer Zimm	5995	6 Aug 78		
Donald Rowe	6560	31 Jul 79	Open Cirrus	
Gary Kneier	6910	6 Aug 79	Open Cirrus	
Dave Hennigar	5486	5 Oct 79	HP14T	
Kenneth O'Toole	6095	80	ASW 15B	
George Dunbar	5310	31 Oct 81	Dart	
Bruce Hea (not Dia)	7841/10485	31 Oct 81	Libelle 201	gain/absolute
Bruce Anderson	5900	1 Nov 81	Phoebus C	
Hans König	6416	1 Nov 81	Mini Nimbus	
Bruce Nicmans	5936	2 Aug 82	Lark IS29	
Kevin Bennett	6570	2 Aug 82	Open Cirrus	
Stephan Weinhold	6550	2 Aug 82	Kestrel 19	
Fritz Bortenlänger	5601	2 Aug 82	Jantar Std	
Ursula Wiese	5720/8035	23 Oct 82	Ka6CR	female gain/absolute
Francis Parsons	6090	Oct 82	Libelle	
Russ Flint	6248	26 Jul 83	Std Cirrus	
Andrew Jackson	5913	8 Oct 83	Libelle 201	
Ken Cathro	6187	8 Oct 83	Libelle	
David George	5639	8 Oct 83	Ka6E	
Jay Beattie	8153	8 Oct 83	1-23	height gain
Cecil Sorensen	5730	8 Oct 83	1-35	
Ronald Lien	5121	8 Oct 83	1-23H	
Bruce Anderson	5610	8 Oct 83	Ventus B	
Simon MacIntosh	5639	8 Oct 83	ASW 15	
Graham Parkinson		8 Oct 83		

Pilot	*Gain/Abs*	*Date*	*Glider*	*Record*
Patrick Wickenhauser	6218	6 Oct 84	1-35	
Gary Ockwell	6431	6 Oct 84	1-23	
Jerry Vesely	5486	6 Oct 84	VES 1	
Terry Southwood	5400	13 Oct 85	ASW 20	
Bruno Schrein	6900	13 Oct 85	Blanik	
Mike Apps	7072	13 Oct 85	ASW 20FP	
Bruce Friesen	6127	13 Oct 85	1-23	
Alan Sunley	5730	13 Oct 85	ASW 15	
James Feyerer	5638	13 Oct 85	Jantar Std	
Gerhardt Schaefer	5029	14 Oct 85	ASW 15	
Mike Thompson	5130	3 Aug 89	Grob 102	
Jim Oke	5830	3 Aug 89	ASW 20	
David Mercer	5100	9 Oct 89	1-26	
Stewart Midwinter	5610	9 Oct 89	Jantar Std	
Bryan Florence	5030	9 Oct 89	Astir G103	
Sylvain Larue	6710	9 Oct 90	Dart 17R	
Vaughan Allan	5450	9 Oct 90	Mini Nimbus	
Buzz Burwash	5450	9 Oct 90	ASW 20FP	
Jay Poscente	6210	28 Jul 91	Mini Nimbus	
Deirdre Duffy	6575/8986	15 Oct 91	ASW 15B	1-26 gain/abs
Rodney Crutcher	5410	14 Oct 91	ASW 20	
Neville Robinson	5307	14 Oct 91	BG-12B	
Donald Matheson	5100	8 Oct 92	RHJ-8	
David Morgan	5307	10 Oct 92	HP-11 AT	
David Fowlow	5270	31 Jul 93	Blanik L13	
Karla Hopp	5550/7986	9 Oct 94	1-26	1-26 gain/fem abs
Keith Bjorndahl	5480	8 Oct 94	1-26	1-26 gain/abs
Mike Cook	5760	9 Oct 94	K5	
Randy Blackwell	5019	8 Oct 95	1-26B	
Dave Mercer (not Dia)	8458	8 Oct 95	RS 15	height gain
Todd Benko	6130/8763	9 Oct 95	1-26	1-26 gain/abs
Graeme Craig	5290	9 Oct 95	ASW-15	
Trevor Florence	5730	10 Oct 96	Astir CS77	
John Broomhall	5600	10 Oct 96	ASW 15B	
Neil Gegenbauer	5150	11 Oct 96	Astir CS77	
Michael Swendsen	5760	11 Oct 96	HP-16	
Aaron Archibald	5440	14 Oct 96	LS-4	
Darwin Roberts	5530	8 Oct 00	HP-16	
Orlan Dowdeswell	5190	8 Oct 00	Jantar	
Henning Mortensen	5030	8 Oct 00	Jantar	
Alan Spurgeon	5160	6 Oct 01	PW-5	
Ron Cattaruzza	5390	6 Oct 01	ASW-15	
Henning Mortensen	5420	8 Oct 01	Std. Cirrus	
Derek Brown	6200	9 Oct 02	Blanik L13	

Pilot	*Gain/Abs*	*Date*	*Glider*	*Record*
Alan Hoar	5900	9 Oct 02	Std. Cirrus	
Scot Harrison	5210	9 Oct 02	Blanik L13	
David Rolland	6420	9 Oct 02	Std. Cirrus	
Bob Hagen	5310	9 Oct 02	Puchacz	
Mel Blackburn	6035	9 Oct 02	PW-5	
David Mercer	113.0 kph	13 Oct 02	Genesis 2	100 km speed to goal, Club
Mark Westphal	5470	8 Oct 03	DG-400	
Terry Hooper	5650	8 Oct 03	Jantar	
David Mercer	142.0 kph /133.5 kph	6 Oct 04	Genesis 2	100 km speed to goal, Club
David Mercer	167.1 kph /157.1 kph	7 Oct 04	Genesis 2	100 km speed to goal, Club
Gordon Taciuk	7040	7 Oct 04	Jantar	
Martin Argerami	5200	6 Oct 05	Jantar	
John Mulder	5074	30 Sep 07	Jantar	
Guy Blood	5250	10 Oct 10	Libelle 201	
Gary Hill	6100	7 Oct 13	Puchacz	
Conrad Lamoureaux	5310	6 Oct 13	Open Cirrus	
Patrick Pelletier	5203	4 Oct 14	DG-300	
Pavan Kumar	6138	12 Oct 15	Libelle 201	
Skyler Guest	6500	6 Oct 17	Blanik L-33	
David Hocking	6470	6 Oct 17	ASW-19	
Christopher Gough	5480	7 Oct 19	ASW-19	
Bruce MacGowan	5790	7 Oct 19	Libelle 201	
Patrick McMahon	5470	7 Oct 19	ASW-19	
Tyler Paradis	6229	5 Oct 20	Jantar	
Patrick Pelletier/Melanie Paradis	7275/9831	6 Oct 20	Perkoz	gain/absolute multi-place
Stephen Godreau	5597	9 Oct 20	Jantar	

This list is complete as could be made from available sources and contact with individual pilots. It is possible that other US visitors to Cowley besides Ed McClanahan in 1961 achieved Diamond climbs, but the Soaring Society of America does not keep this data.

Index

This is a book that covers a lot of territory.

"Stalking the Mountain Wave" is a book of soaring aviation history and politics, of geology, meteorology, and aviation medicine, of great campfire tales and a little poetry, and piloting technique in making use of a unique phenomenon of nature – the awesome and powerful mountain wave wind that often sets up in the lee of the Rocky Mountains in Alberta when a southwester comes blowing in all the way from the Pacific Ocean.

To powered craft, the mountain wave is often a little understood danger to be avoided at all costs, but to sailplane pilots it is a source of immense energy that can provide no less than a free ride into the stratosphere to those who both understand and respect the strength of this wind and accept its challenge.

Ursula Wiese, who wrote and compiled this book, is a historian for Alberta and Canadian glider pilots and a respected pilot in her own right. She holds several Canadian soaring records and earned the first Diamond Badge in Canada to be held by a woman.

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