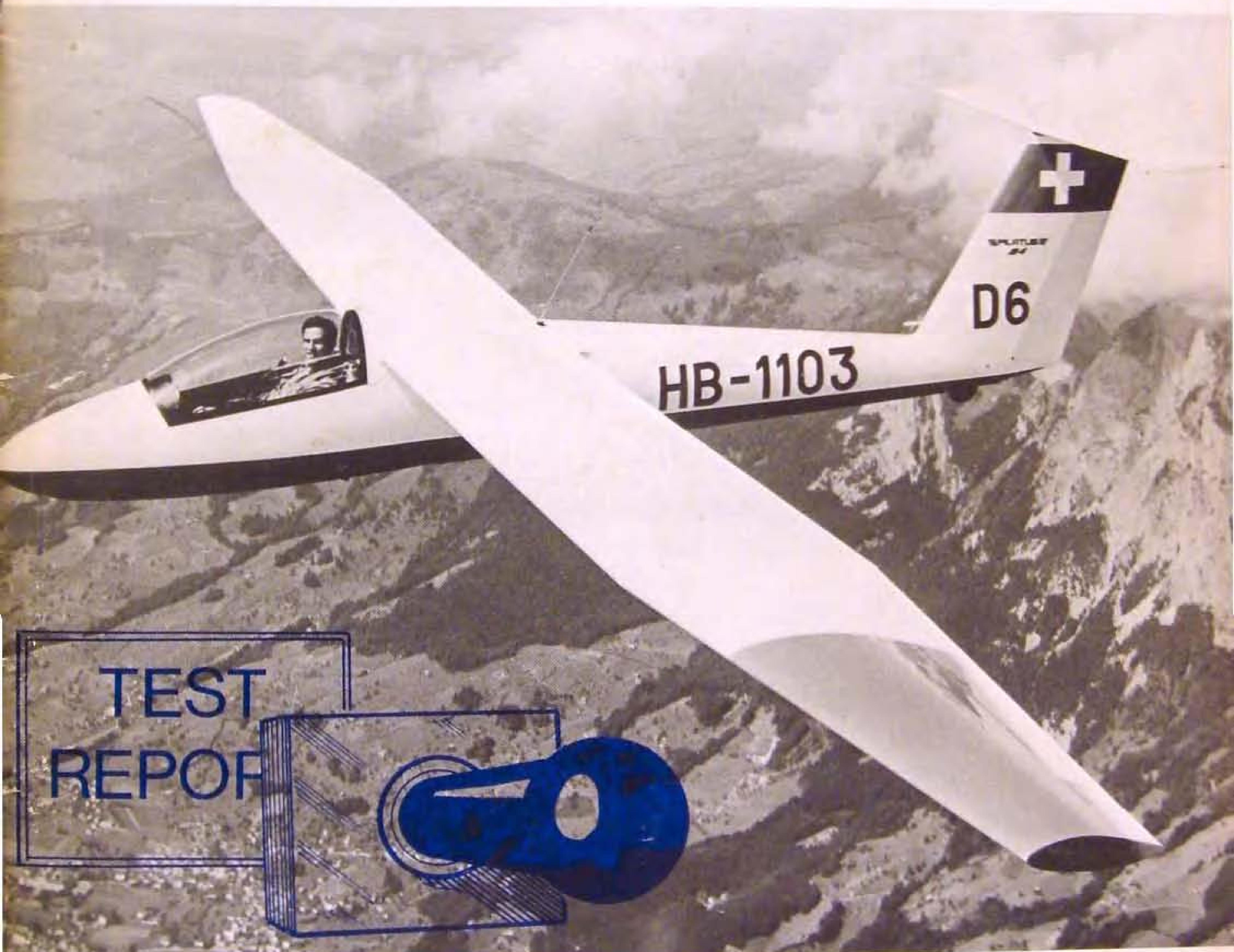
SOARING PILOT

the INTERNATIONAL gliding magazine



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Spring 1973

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SOARING PILOT

SPRING 1973

Editorial

Hardly a month has passed during the last five decades without a discovery of importance being made in respect of our chosen sport. While, technologically, progress has been rapid, the glider pilot as an individual has been slow to realise that he has become involved in a society of professional airmen.

Many reasons and excuses for this lack of progress could be put forward, but what is more important is the remedy; if gliding is to advance safely and positively, the modern sailplane pilot must be made award, and then taught how to cope with the increasing number of problems which are being laid at his feet during the continuous search for efficiency.

Our policy will be to foster the professional outlook and also help destroy the myth that the glider pilot is an eccentric amateur. While it is possible to explain the complexities of airspace and its relative problems in our pages, it is the prerogative of the pilot to set his own standards, both in the air and when in the presence of the layman. In the latter context the glider pilot is his own ambassador, it is he who will ultimately shape the picture of the 'typical glider pilot' to the public eye, and if gliding is to reach wider horizons it must be accepted by the ordinary man in the street as something in which he can partake, and not as an exclusive club for those of peculiar habit.

However, regardless of our policy and hopes, we must not forget our heritage; as we progress briskly into the future we are apt to forget the past all too quickly. In an attempt to apply the brake to our forgetfulness, we have commissioned a series of articles from internationally known gliding penmen, who will chronicle for us the early pitfalls and progress of glidings early days.

It is also accepted that many sailplane pilots take great interest in the other facets of aviation, and to provide for these people, occasional features will be presented covering various aspects of power flying, parachuting and ballooning.

As an INDEPENDENT publication, we shall open our pages to those pilots who wish to comment on the current scene in our 'Pilots Forum', and we are prepared to publish all letters of an intelligent nature directed toward a progressive gliding movement throughout the world.

Comments and suggestions regarding this our first issue of – SOARING PILOT will be very welcome and I look forward to receiving articles from readers for possible inclusion in future editions.

DOUG BIRCH

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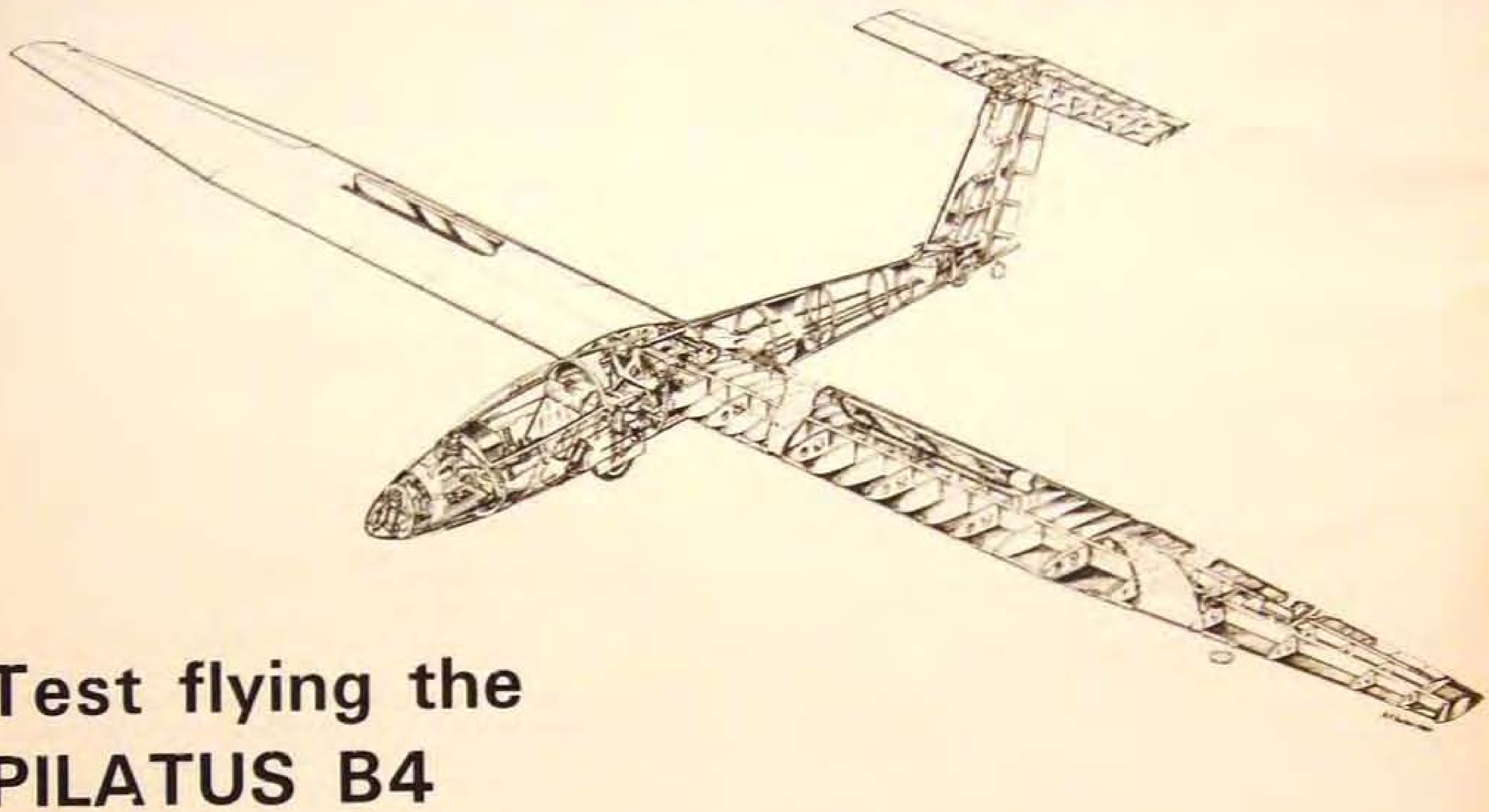


Test flying the PILATUS B4

The Pilatus Aircraft Factory, a subsidiary of Oerlikon-Buehrie Holding AG, with 600 employees, is facing a difficult period. Its efforts are currently aimed at establishing the guidelines to ensure the company's long-term survival as an aircraft company. The main problem is keeping the existing technical staff as a team, particularly since the medium-term prospects in the aircraft manufacturing field are extremely uncertain at the present time. One of the conditions considered by the management as necessary for survival is collaboration with other aircraft companies on an international level. At the time of going to press, negotiations were taking place with Fokker-VFW with regard to producing the Twin Porter twin turbo-prop aircraft as a joint programme. The Twin Porter should – based on long years of success with the single-engined Porter – fill the market gap between the Islander and Twin Otter. The other main consideration at present is the building of the B4 all-metal sailplane – a new single seat Standard class glider.

The Pilatus B4 tested by SOARING PILOT was flown on three consecutive weekends in varying weather conditions during February, 1973. Although these conditions were never ideal we were able to ascertain from the flights made (total flight time 3 hours 14 minutes) the fundamental knowledge required to assemble the following unbiased report. Bearing in mind the peculiarities of the English weather and country-side, special attention was focused on the aircraft's acceptance of these conditions e.g. short field landings and 'scraping' potential. The aircraft was flown at an AUW of 728 lbs and both winch and aero-tow launches were used.

COCKPIT DESIGN AND INSTRUMENTATION

Impressive, would be the correct adjective to describe the basic instrumentation of the Pilatus. The panel being made up of Air Speed Indicator, Variometer, Altimeter, Artificial Horizon, Turn and Slip, Compass and Accelerometer all of which, we were assured, are standard fittings. An adjustable duct located at the top of the instrument panel provides cabin ventilation, and in flight works very efficiently. Space at the foot of the mushroom shaped console is ample for either radio or oxygen flowmeter, but not both. However, other locations are available for these instruments.

The cockpit is spacious, with rudder pedals and seat back that can be adjusted during flight without too much difficulty. In this day and age of narrow fuselage machines, it was a rare pleasure to be able to fly without having ones shoulders crammed tight against the sides of the aircraft – a point which all big pilots should note.

All controls are arranged for easy reach. For the absent minded and forgetful pilot, they are pictorially reminded as to whether the wheels are up or down, or airbrakes in or out by small drawings affixed near the appropriate control lever, which in these cases are situated to the pilots left.

Barograph, oxygen bottles and other equipment may be easily accommodated in the storage compartment between the seat back and the main bulkhead.

The canopy permits excellent forward and sideward visibility, and is hinged sideways for access. A clear view window is provided on the left hand side.

A final reasurring point, which the discerning pilot will note about the cockpit design, is the strong sturdy appearance of the fuselage around the nose and seat areas, this is probably psychological and determined by the knowledge that the machine is built of sheet alloy – ideal in the case of a hefty bang – but how easy is it to repair?

LAUNCH CHARACTERISTICS

During aero-tow the flight characteristics of the Pilatus are both crisp and efficient, once correctly positioned behind the tug no effort is required to keep it there. Any pitching moments are easily controlled and stability about the other axes are also very good. During a deliberately planned 45° crosswind take-off we were further impressed by the minimum of effort required to position and hold the aircraft.

Winch launching proved very simple, although during ones first "all metal" winch launch the noise can be rather distracting, however, if mentioned in pilot briefing no problems should arise. For those pilots who look for maximum height, the aircraft did show a tendency to 'hunt' slightly with the stick hard back, but this of course is pilot initiated. Slight forward pressure eliminated this tendency immediately with no appreciable loss of height.

The tow-hook is seemingly located in the optimum position for aero-tow launching bit it was noted that for winch launching a position slightly forward of its present location would have been preferable.

FLIGHT OBSERVATIONS

Stalling and Turning – For the initial stall importance was attached to its approach, subsequent development was examined during later tests.

From a cruising speed of 45 mph, gradual application of backward pressure to the control column was applied. At the tested AUW of 728 lbs. the aircraft was reluctant to stall until the airspeed had dropped to 36.5 mph (Placarded stall speed – 39 mph). The approach of the stall is unmistakeably felt by control buffeting and reduced control forces, which gives sufficient warning to relatively inexperienced pilots of their attitude of flight.

Once stalled, normal recovery procedure is immediate and effective.

During steep stall tests it was found that to recover correctly, rudders **must** be centralised, otherwise it was not difficult to induce the aircraft into a spin. However, normal banked turns which resulted in a minimal loss of altitude showed **NO** tendency to spin.

The feature of the low stalling speed is of course of prime importance in European climates, this coupled with a relatively light wing loading makes it possible to use even the weakest thermals, of which we are blessed with plenty. A minimum measured speed of 36 knts in a steady turn at 30° bank (AUW 728 lbs.) proved ideal on the days the aircraft was tested. This speed will have to be slightly adjusted according to varying conditions.

During comparision flights with a Cirrus of the same class, the Pilatus proved slightly better in weak conditions – showing an ability to latch onto the weakest of lift. However, during a series of three comparison test glides, the Standard Cirrus glide angle proved to be definitely superior.

Spinning and Rate of Roll – Spinning the Pilatus is not difficult, but it must also be emphasised that recovery is childs play. From heights of approximately 2000 ft. calculated spinning tests revealed that although the spin develops rapidly, recovery is completed in a half-turn. A full blooded spin of 5 full turns was also terminated in just over a half-turn. With airbrakes open the aircraft seems loathe to rotate; recovery was ultra-immediate.

A timed rate of roll of 3½ secs. from 45° left to 45° right took place at a cruising speed, of 45 mph, but this was reduced to 3 secs. when rolling through the same angles at an indicated airspeed of 62 mph. All this pointing to the qualities required for hill soaring or mountain flying in which the Pilatus should be supreme.

AEROBATICS AND FAST FLYING

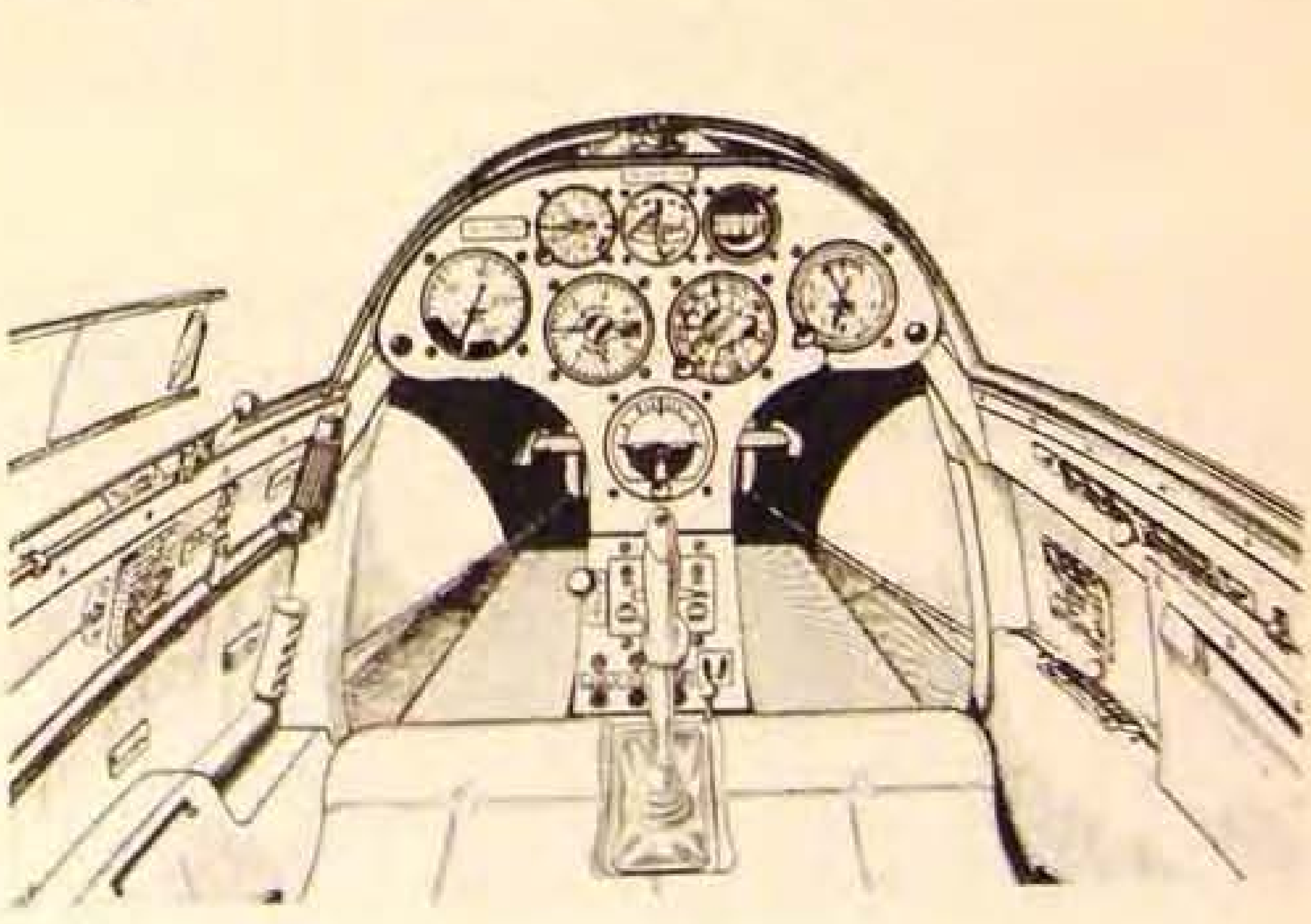
The certified manoeuvres for the Pilatus, Looping, Wing Over, Lazy Eight, Spins, Chandelle and Steep Spirals were all flown just for the pleasure more than anything else, an attitude of mind which we believe most pilots fly aerobatics for. All manoeuvres were executed well within ½ the max load factors (see table), and the behaviour of the machine was 'robust' which definitely gave confidence in the machine and ones ability to perform such aerobatics.

The maximum permitted airspeed of 149 mph is quite easy to reach and care had to be taken not to exceed this figure. This figure applies both to calm and turbulent conditions, although we were only able to conduct high speed tests during average weather, with no excess of rough air.

Trimming the aircraft to a hands-off position is possible, although the test team decided this was not the easiest thing to accomplish, probably due to the positive roll tendencies of the machine. Nevertheless, the cross-country or competition pilot can eat his sandwiches, read his map, calculate his final glide or whatever without undue worry.

LANDING

This was perhaps the easiest operation to complete, particularly the short field landings. The approach speed (53 mph) is comparatively low and this coupled with the highly efficient airbrakes enables an accurate touch down to be selected every time. Once down the wheel brake proves to be extremely effective and rolling time is cut to a minimum. The Tyre, which is of fairly large diameter, ensures good handling while rolling.



RIGGING AND GROUND HANDLING

The B4 can be rigged and de-rigged by three persons providing they know exactly what to do. The two wing halves are attached in a conventional fashion by mating the main spar flange and the auxiliary spar with the corresponding fuselage fittings. Connector pins are then secured with safety pins.

Aileron and divebrake rods are also connected by pins that are attached to the rod fork ends. After the aileron and divebrake connections have been locked with safety pins, the wing root fillet may be inserted.

The tailplane is merely plugged in and secured with a single bolt, which connects and locks the elevator control at the same time. The aircraft is now ready for flight.

Handling on the ground is made easy by the large main wheel and the small wheel on the tail.

TECHNICAL DATA

Fuselage and empennage – The fuselage is typified by its comparatively large cross section in the cockpit area. The semi-monocoque design consists of bulkheads and stringers with flush riveting of skin panels. The rear fuselage consists of riveted half shells. The swept back fin design allows a fairly short aft fuselage design to be used without greatly affecting stability.

Horizontal and directional control surfaces are all metal. The horizontal tail consists of fixed stabilizer and simple hinged elevator. Trim is effected by spring bias of the elevator.

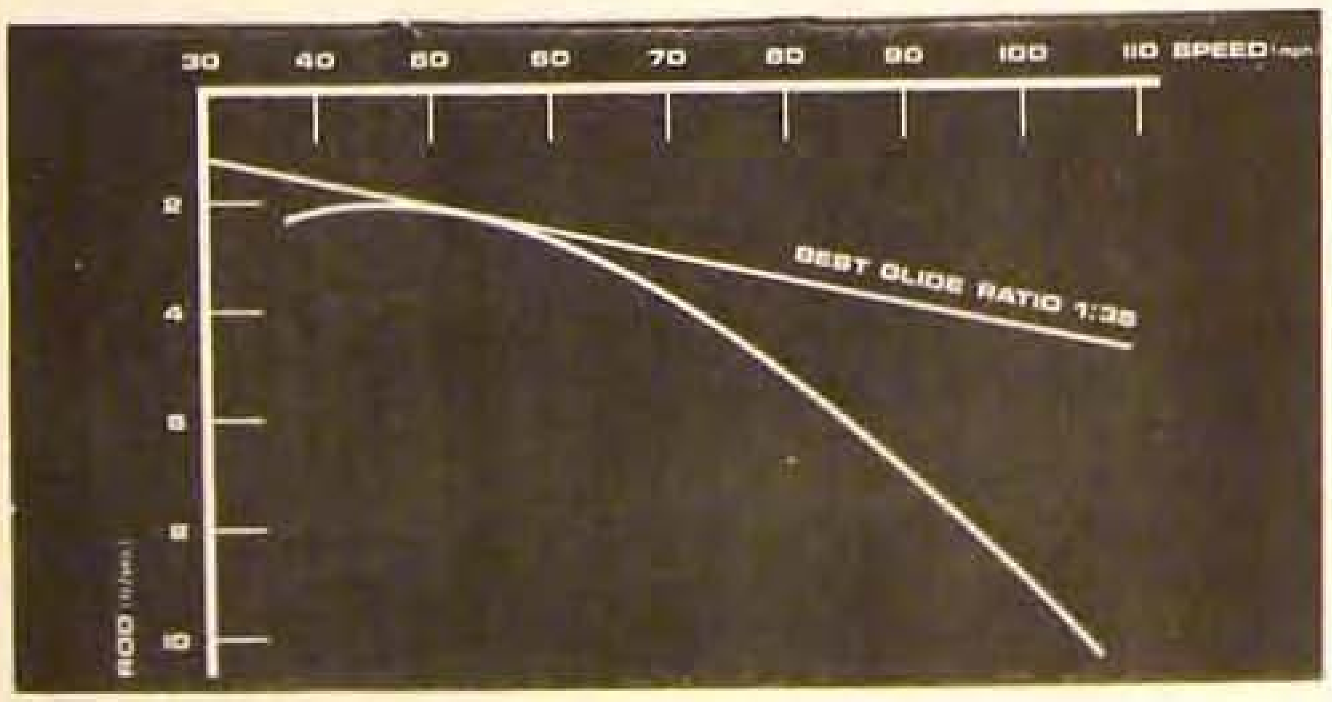
The main landing gear which is fixed (retractable gear as optional extra) is located about one foot forward of the mean centre of gravity. No front skid is therefore required, an interchangeable wear strip being provided instead.

Wing – The two part wing utilises a NACA 64_3–618 profile and an aspect ratio of 16. The wing maintains a constant chord to 60% span and the outer panels feature a double taper.

A 5 point system attaches the wings to the fuselage, utilizing 3 pins on the main spars and 2 on the secondary spars. The light alloy U profile main spar utilizes milled connector fittings with exchangeable steel bushings. A carefully designed wing root fillet accentuates the aerodynamic design. Joints have been avoided by the use of especially large skin panels. A single row of countersunk rivets provide the connection between the main spar and the wing upper surface. The tapered outer wing section is also aerodynamically clean. Accurate wing profile is maintained by closely inserted hard foam ribs interspaced between the metal ribs. The aileron slots are sealed from above. Wing tip formers protect the wing tips and ailerons from damage.

SURFACE FINISH

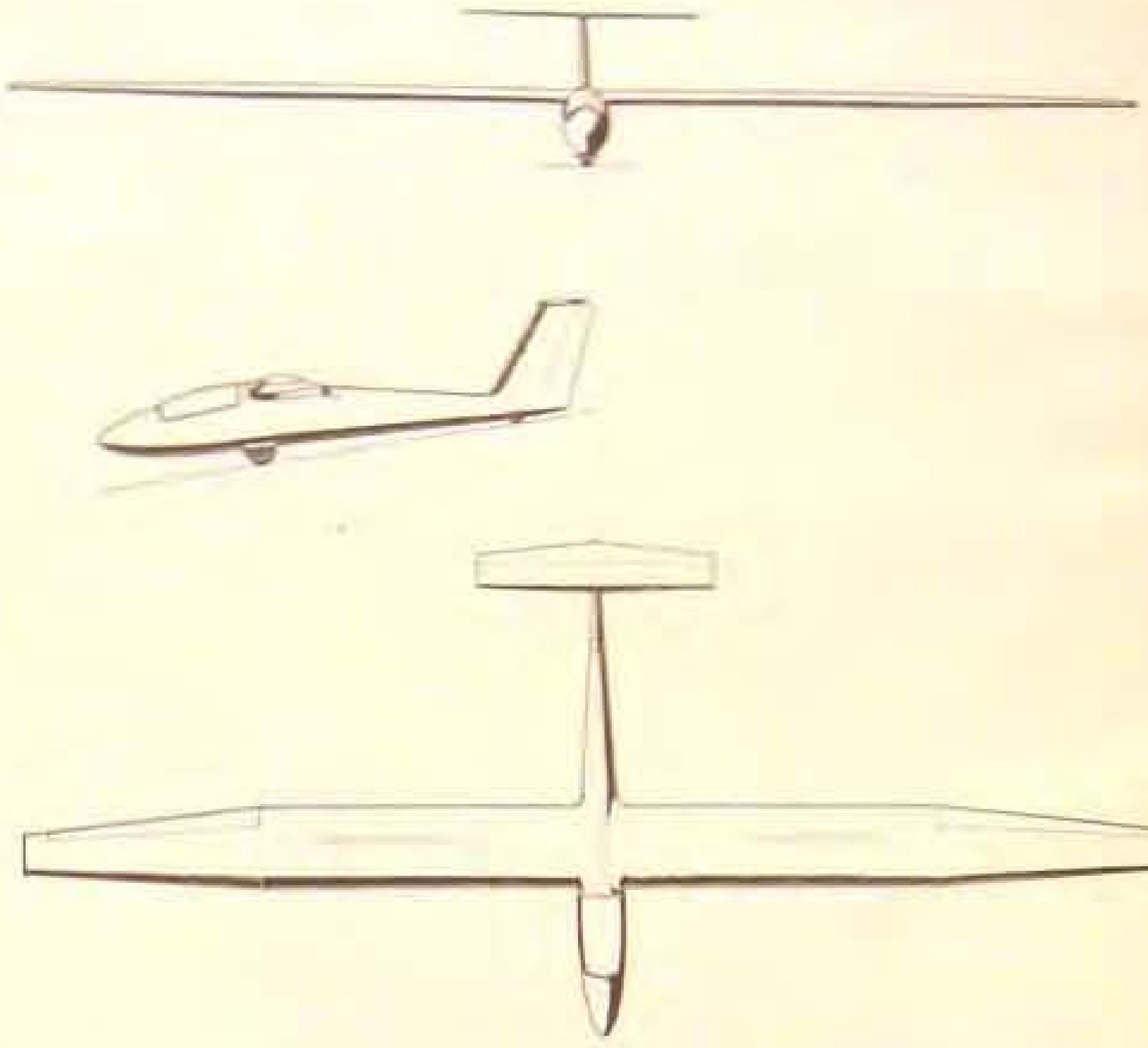
The entire airframe is protected by zinc chromate primer. Exterior surfaces are covered with several coats of weather-proof epoxy primer and then finished with a synthetic enamel. Steel fittings are either cadnium plated or finished in baked enamel.



CONCLUSION

The all-metal Pilatus B4 standard class sailplane fills the much needed gap between the high and low performance categories of gliders. It was found to be very easy to fly with very few vices and its sturdy construction evokes confidence in its capabilities.

As an advanced club machine, we feel that it could well prove to be a vital asset as well as the stepping stone, from the now ageing Skylarks and Olympias which make up a considerable proportion of club fleets, to the more sophisticated "glass" machines.



Although we did not complete any cross-country flights it did prove by its weak thermal acceptance that it would definitely fit into this category. Competition wise we are inclined to believe that it was not really built for this particular type of flying, but are prepared to stand corrected.

Maintenance costs of metal machines are allegedly lower than those constructed from wood and fabric, but this is a point which has yet to be proved to us. A special set of tools are available for the owner who wishes to repair minor damage himself with the help of a detailed manual.

All in all this machine would be a good buy and we do forsee large numbers of these machines invading the international scene.

British Agents:– Yorkshire Sailplanes and Southern Soaring.

Classification

Certificate of airworthiness (LFS) Standard class

Specific Features

All metal construction, single seater for training, performance and limited aerobatics. High wing, T-tail.

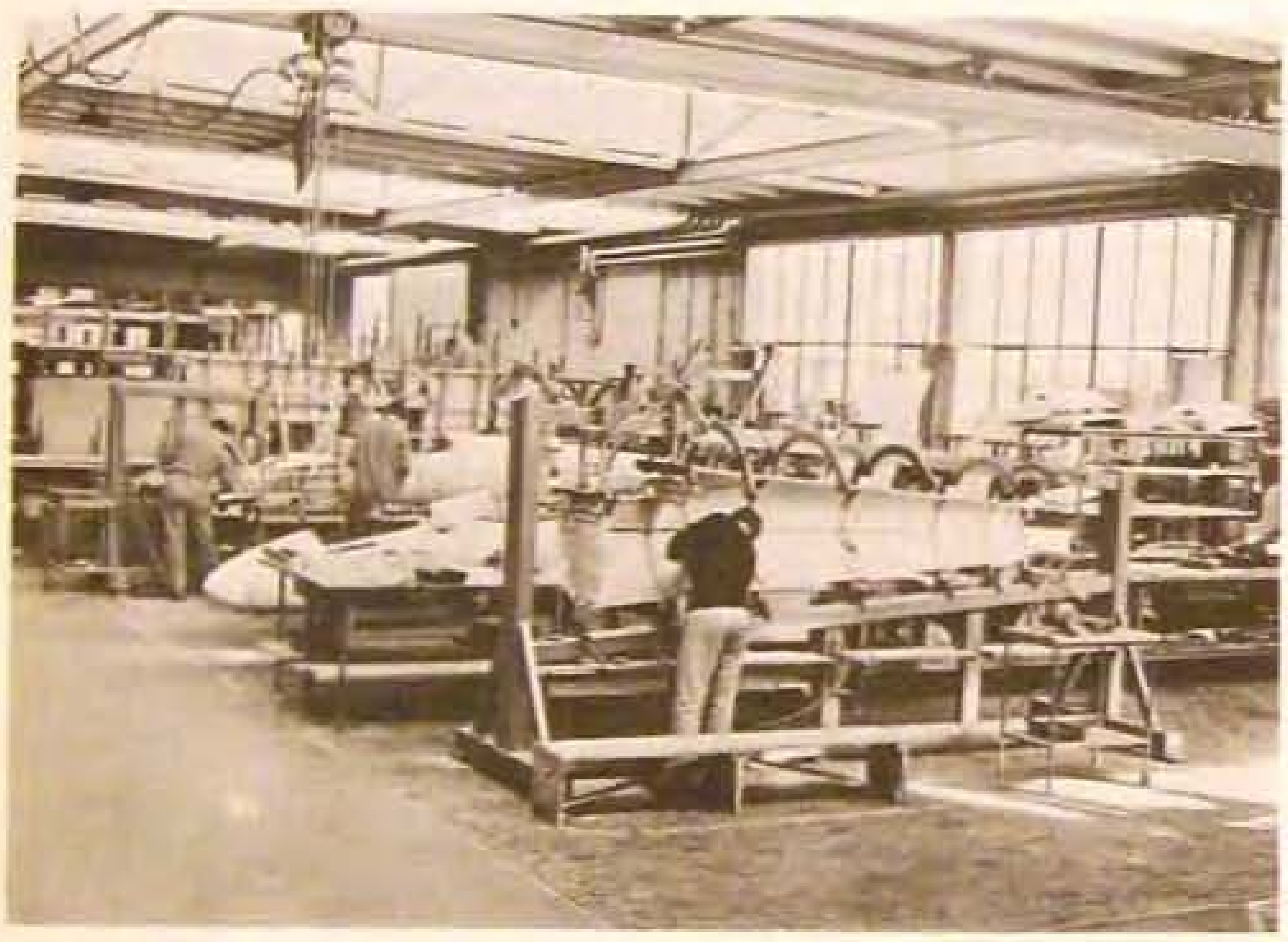
Fixed landing gear with brakes (retractable gear as optional extra). Air brakes on wing top surface.

Dimensions and Aerodynamic Details

Wing span	49 ft 2.40 in.
Length	21 ft. 6.59 in.
Height	5 ft. 1.81 in.
Mean aerodynamic chord (MAC)	3 ft. 0.84 in.
Dihedral	1°
Wing profile	NACA $64_3 - 618$
Wing area	151.13 ft^2
Wing loading (T.O. weight lb)	5.13 lb/ft^2

Weight and Center of Gravity

Empty weight	506 lb
Payload	264 lb
All up weight	770 lb
Corresponding CG	11.03 in. to 1 ft 5.03 in. behind da (30 to 46.3% MAC)
Datum	Wing leading edge



Load Factors

Max. positive/negative	+6.32/-4.32 g

Speeds

Maximum (calm or turbulent conditions	149 mph
Maximum in aircraft tow	112 mph
Maximum in winch tow	81 mph
Stalling speed	39 mph

Flight Limitations

Certified manoeuvres	Looping Wing over Lazy eight Spins Steep spiral Chandelle
Cloud flying	certified (with equipped aircraft)

Performance

Best glide ratio	35 to 53 mph
Minimum sink	2.1 ft/sec at 44,7 mph

See order form page 22


9N-AAZ
NEPAL AIRLINES

INTERNATIONAL COMPETITION CALENDAR

GREAT BRITAIN

Open/Standard Class Nationals at Lasham — 18th August – 2nd September

Daily Telegraph European Gliding Competition will also take place in conjunction with with British Nationals at Lasham. 10 to 15 foreign pilots will be invited to participate.

Sport/Club Class Nationals at Husbands Bosworth. — 26th May – 3rd June

HOLLAND

International One Day Contest "VICTOR BOIN CHALLENGE" at Eindhoven 19th May

Dutch Nationals at Terlet National Soaring Centre — 28th May – 9th June

Dutch Summer Contest at Terlet — 18th June – 30th June

Two-seater One Day Contest at Eindhoven — 4th August

BELGIUM

International "ARDENNEN" Contest at St. Hubert (6 days in two stages) 21st – 22nd April and 28th April – 1st May

International "KEIHEUVEL" Contest near Mol. — 31st May – 3rd June

Belgium National Championships at National Soaring Centre St. Hubert — 30th June – 9th July

Club Class contest probably at Genk in period end of July early August.

FRANCE

Coupe d'Europe (huit jour d'Angers) – glass fibre machines only. — 13th – 26th July

International Mountain Contest at Vinon — 30th June – 12th July

French National Championships, venue undecided — 29th July – 9th August

GERMANY

German National Championships at Hahnweide . — 11th June – 23rd June

International "HAHNWEIDE" Contest — 26th May – 2nd June

International Motorglider Contest at Burg Feuerstein — 26th May – 3rd June

SWEDEN

International "ESKILSTUNA" Contest at Eskilstuna — 31st May – 3rd June

Swedish National Championships Open/Standard Classes at Arboga. — 9th – 16th June

FINLAND

Finnish National Championships at Utti — 9th June – 17th june

Foreign Pilots welcome to fly **hors concours** in this contest.

International Contest at Nummela — 23rd June – 1st July

This site is the closest to Helsinki. Beside Swedish entries it is hoped that the Soviet Union will enter this year.

10th Anniversary Contest of Rayskala at Rayskala. — 30th June – 8th July

This site is the probable venue for the 1976 World Championships.

Foreign Pilots interested in flying in one of the Finnish events should contact:
Finnish Aeronautical Association, Malmi Airport 00700, Helsinki 70, Finland.

UNITED STATES OF AMERICA

Standard Class National Championships at Chester, South Carolina — 19th – 28th June

Open Class National Championships at Liveral, Kansas — 24th July – 2nd August

These competitions will determine the USA team for 1974 World Championships.

CANADA

XXV Canadian National Soaring Championships at Winnipeg — 4th – 15th June

SWEDISH SOARING SCENE

by Yngve Norrvi

Sweden, known to many as the land of the midnight sun, is the largest of the Scandanavian countries, and covers a land area approximately twice the size of the British Isles, although the total population is only slightly in excess of that of Greater London.

Lying on a peninsula of land between lines of latitude 56° to 68°, it is separated from adjoining Norway by a high central rugged plateau; the Norwegian territory falling abruptly to a coastline broken by fjords and islands, while in Sweden the descent is more gradual, particularly to the south of the Artic Circle, where the lands are low lying and better suited to cultivation. It was here in these southern regions that the first tentative steps were taken to establish Sweden as a major gliding nation.

EARLY PIONEERING EFFORTS

Although spasmodic attempts to form gliding clubs are recorded as far back as the late 1920's little significant advancement took place. The early thirties, mainly through German influence, also saw further attempts to start the sport. A group of pilots, along with willing helpers, acquired a series of German designed glider plans and from these constructed "Anfanger", "Grunau 9" and later the "Schulgleiter SG 38" sailplanes. Once again, however, very little was to become of their efforts and their dreams of "silent adventures in the skies" failed to materialise.

Nothing further occured until 1940 when interest was shown by the KSAK, (Kungliga Svenska Aeroklubben – The Royal Aero Club of Sweden) who under the patronage of the then Crownprince Gustaf Adolf, (killed in an air accident in 1947) accomplished a comprehensive money collection for the creation of a soaring centre at Alleberg, a hill site some 250 miles south of Stockholm. With any remaining monies a fund was to be formed for the future development of the sport of gliding.

So successful was the collection that by 1941 the centre had been built and officially opened by the Crownprince. The land surrounding the hill was also purchased and the future of Sweden's gliding was assured.

ALLEBERG CENTRE

With the opening of the Alleberg site, Swedish soaring progressed rapidly, and now there are some 5000 active pilots encompassed within 80 clubs throughout the country, but for populative, economical and geographical reasons the majority of them are concentrated to the south.

To-day the gliding centre is still in use, although during the last decade its prime function has been the training and examination of soaring teachers and instructors from other clubs. According to available statistics a total of 751 teachers and instructors, plus an unknown number of gliding technicians have successfully completed the KSAK gliding sections thorough and comprehensive course.

At the centre, KSAK have also established a factory and workshop for the repairing and maintenance of all the Swedish soaring clubs machines, and in some cases those of Norwegian clubs.

GLIDING TRAINING

All gliding training takes place in 2–seat Bergfalke machines, and with the exception of only one, all Swedish clubs use tug-aircraft for launching right from the ab-initio stage.

The minimum age at which training can commence is 15 years, but to obtain the official gliding certificate issued by the Board of Civil Avaition (Luftfartsverket), the pupil must have reached an age of at least 16 years. To keep their licence valid pilots must fly a certain number of hours per year in a glider and also pass a thorough medical examination at certain intervals depending on age. For pilots under the age of 40 years – every 2 years, up to 60 years – 12 months, over 60 years – 6 months.

Swedish soaring clubs have at their disposal in the region of 260 gliders, of which 125 are the tandem seat Bergfalke. Among the single seat machines there are approximately, 50 K-8's and K-6's, 12 Mucha Standard, 14 Libelle, 10 Phoebus and a few Cirrus Standard class.

Ninety percent of the countries gliders belong to the clubs, the remainder being privately owned.

For glider towing the clubs have around 85 aircraft which are made up of 30 Super Cubs, 10 Cherokee's, a number of Tripacers, Beagles and Cessna 172's. 5 Tiger Moths are also still in use.

SPORTING SCENE

From the sporting viewpoint the country is divided into five districts. In each of these areas competitions are held annually to select pilots for participation in the Swedish National Championships (Svenska Masterkappen); the Open and Standard classes being flown bi-annually, while the Sports class for the lower performance gliders, e.g. K–8, K–6CR are held during the intervening years. The rules used in these competitions are, in most respects, similar to the ones used in World Championship gliding.

By far the most popular of the Swedish events is the National Soaring Competition (Rikssegelflygavlingen). Flying takes palce from Spring to Autumn each season at designated gliding sites with the object of giving all pilots an equal chance of winning, regardless of glider type. Based on pre-set handicapping systems, club executives report to a central organisation in Stockholm the results of their members efforts in respect of speed, altitude and distance flights, for which they are awarded marks according to a special scale.

At the close of the event, the points which have been accumulated during the whole of the competition period are totalled, and the individual and team winners for each seperate task are then announced.

This championship,similar to the British National Ladder competition, has now been taking place for over twenty five years.

WORLD CHAMPIONSHIP FLYING

Swedish teams have participated in all World Soaring Championships since 1948 and have the enviable record of winning on three occasions: 1948 at Samaden, Switzerland – Per-Axel Persson; 1950 in Sweden – Billy Nilsson and in 1972 at Vrsac, Yugoslavia – Göran Ax, Open class.

Second place positions have also been achieved on three occasions; in Poland 1958 and 1968 – Per Axel Persson, Standard class, while Göran Ax achieved the corresponding position in the Open class in 1968.

Furthermore, a Swede also won the 1960 World Championship title in Germany with the reservation that the winner represented Argentine, he being Rudolfo (Rolf) Hossinger, who was born and educated in Sweden where he also learned to fly. I am proud to say that he was trained under my own supervision at Alleberg at the end of the nineteen fourties's, when I was manager of the gliding centre there. Although he has worked for many years as pilot with the Argentine domestic airline, he often visit Sweden, and in fact took part in the 1971 Swedish National Championships, where he gained second place after the winner, Göran Ax, in the Open class.

The current Swedish soaring champions are; Open class – Göran Ax, and Standard class – Gunnar Karlsson. Jan-Ake Pettersson is the title holder of the Sports class. He is not to be confused with Ake Pettersson, who flew in the 1970 World Championships at Marfa and also at Yugoslavia in 1972, where he was forced to parachute from his Nimbus 2 after a collision in cloud with David Innes of Guernsey on the last day of the meeting.

MAJOR SWEDISH GLIDING RECORDS

Distance	610.2 km.	– 1966
Altitude	9655 m.	– 1969
Speed – 100 km. triangle	101.295 kmh	– 1970
300 km. triangle	92.54 kmh	– 1970
500 km. triangle	87.20 kmh	– 1972

During 1971, figures for 1972 not yet available, 66858 soaring flights were accomplished, 33071 of which were designated pure training flights. Flying time was 30655 hours, of which 8745 hours were recorded for training.

METEOROLOGICAL CONDITIONS

As a guide for pilots considering visiting Sweden, the following meteorological information will be found to be of use when planning ones journey.

The prevailing weather conditions for gliding in Sweden are generally very good, particularly during May and June when the cloud base tends to be high – up to 2000 metres, with dry thermals of strength 5-6 m/sec being the order of the day.

During July and August, statistically the rainiest months of the year – but also the warmest, the cloud base is considerably lower than May or June, but convection can still be very strong, particularly when the cumulo-nimbus formations which often occur during this period are prevalent.

September also gives good gliding conditions, but at this time of the year the days are much shorter and the sun is considerably lower in the sky, factors which incur obvious limitations to flying.

Several clubs, especially those in the north, commence their training on icebound lakes during February and March when the sun "comes back". It must also be mentioned that temperatures at this time of the year are extremely low.

Wave soaring is very popular during this period in the mountainous parts of the northern country and altitude gains of 3000 - 5000 metres are commonplace. This is the time of the year when southern glider pilots trail thousands of miles to get the opportunity of "gliding high".

*** Yngve Norrvi – Gliding Editor, Flygrevyn**

Alleberg Soaring Centre

Göran Ax

World Champion

Göran Ax was born 1942 in the small town of Eslov in the Skane district of southern Sweden. He started his pilot training in 1958, when he was 16 years old, as a member of the local gliding club and acquired his gliding licence a few days before Christmas of that year – on a very cold day in a Grunau Baby. Since that date he has recorded over 800 hours flying in gliders.

He competed for the first time in the Swedish National Championships of 1967 when he came second, the position he was to also occupy in 1968 and 1969. He finally won the Nationals in 1971 and became the Swedish Open class champion, flying a Phoebus C, after having won six of the seven tasks of the competition.

In his first international appearance at the World Soaring Championships in Poland 1968 he finished second after having lead the race until the last day of the tournament. At the Marfa World Championships of 1970 he had a very disappointing competition, only reaching 15th position in the final table. Yugoslavia, however, was his time of glory when he beat Viitanen of Finland to become Open class champion of the world in one of the closest finishes ever recorded.

He is a Gold C pilot with three diamonds and his name has figured prominently among the Swedish soaring record holders; at present he holds the Swedish 500 km. triangle record at 87.20 kph. He is also one of the five soaring pilots who have been awarded the title "Stor grabb" which means "Big Boy", a title given only to the most successful of Swedish sportsmen.

It should also be mentioned that Göran Ax is a very active member of the committee of the Royal Aero Club of Sweden, dealing with problems of air space, air traffic control etc., in the interests of the gliding fraternity.

By profession Göran Ax is an airline pilot with the Scandanavian Airlines System (SAS), flying DC–9's on the European routes. Before this he flew as a co-pilot on the DC–8 translantic services. Prior to starting his civilian career he served as a pilot on J–35 "Draken" jet fighters with the Air Force; with whom he still serves on the reserve list in order to stay familiar on flying this type of aircraft.

At the annual meeting with representatives of all Swedish soaring clubs, held in late November 1972, Göran Ax was awarded the Gold Medal with Wings, the highest order of distinction of the Royal Aero Club – a fitting reward for his victory at Vrsac 1972..

by Yngve Norrvi

the MIKE BOND column

The next time that you are sitting comfortably in your club-house bar after a successful days soaring, sipping ice-cold beer, and contemplating the niceties of life, I would ask you to count your blessings most carefully; for if you were not a founder member of the club, you would in all probability, not have the remotest conception or indeed interest in how the club was evolved. Neither would you appreciate the amount of work, both mental and physical which is associated with the selection and purchase of a suitable site from which to operate a gliding club.

There are at present many gliding clubs throughout the country, whose sites are negotiated on short term leases, and of course there are clubs who actually rent their airfields; and when for one reason or another they are forced to vacate these pieces of land, they are faced with the most formidable problems. During a recent visit to the Staffordshire Gliding Club, who themselves were faced with this situation, I spent a whole evening with chairman Colin Ratcliffe and secretary John Graham learning of the trials and tribulations encountered when this move had to be made.

The Staffordshire Gliding Club was formed in May, 1962, and operated from that date until January of this year at Meir Airfield, which lies adjacent to the Uttoxeter Road, some four miles out ot Stoke-on-Trent. Membership of the club has seen a high of 125, but today is nearer 80, and considering the problems which were experienced by the club it is gratifying to see such a hard core of enthusiasts.

We are all aware that most clubs experience various, and indeed numerous, problems throughout their existence, but it would appear that the Staffordshire club have had their share and a whole lot more.

The history of the club is punctuated by unfortunate incidents and annoying situations, although I am convinced that the majority of the former, and the whole of the latter are a direct result of the Meir site, which comes under the jurisdiction of Stoke City Council. As such, the site had to be shared with various football teams and their supporters each Saturday, along with inconsiderate aero-modellers, rugby teams, cricket matches and air rifle shooting . . . . Further harassment was caused when the Council gave the go ahead for the first phase of the building programme to proceed in the corner of the airfield – the contractors cut the new factory access road at right angles to the normal run of the gliding lines. At weekends when the road was not in use, learner drivers would converge **en masse,** and in general create havoc with the flying.

The site itself is surrounded by houses, and quite naturally, the occupants' children use the field as a leisure area. Unfortunately, where young ones are in evidence, vandalism occurs. On one occasion vandals gained access to the hangar, started up the Landrover, and drove it over, through and under the rigged gliders, causing hundreds of pounds worth of damage and rendering the club fleet inoperable.

Bearing these disheartening circumstances in mind, the committee were quite naturally always interested in new site proposals, but this interest was tempered by the knowledge that funds were extremely limited, and moreover, the likelihood of finding a suitable alternative site within Staffordshire appeared to be remote. By 1968, however, the club were forced to look around in earnest, as they were informed by the authorities that they could expect eviction any time during the next four years.

The members then began their investigations at a higher pitch, and to aid the cause, the tug aircraft took to the air on missions of aerial photography, systematically combing the surrounding countryside. Eventually, this had to be abandoned because of the enormous expense involved.

It was quite by accident that a member acquired information about a piece of land which appeared suitable for the clubs requirements. Situated at Morredge, approximately 4 miles NE of Leek, the land comprised 214 acres of grazing pasture; most of it uneven, and practically all of it undrained. The area was also covered by large patches of course forage, and along with enormous tufts of rushes, tons of loose rocks, hedges, ditches and dry walls, it appeared to be formidable proposition.

But the months of fruitless searching had resulted in desperation, and indeed, the only reason that the club managed to acquire the option on this particular piece of land, lay in the fact that the area was under the strict control of the Peak National Park, who on many occasions had refused to sell the land to prospective developers, as proposed buildings or developments must fall in line with the surrounding landscape, and the club agreed to follow this directive.

Therefore, in March 1969, the club called an extraordinary general meeting, which resulted in an overwhelming vote in favour of the move to Morredge. Considering that the price of the land stood at only £5,000, this result was to be expected. The members clubbed together to raise the required £1,000 deposit, and negotiations to purchase the site swung into action. The expected financial requirements for this venture were initially estimated at £12,600.

Cost of Land	£5,000
Hangar estimate	£5,000
Site preparations	£2,500
Legal fees	£100
TOTAL	£12,600

With club finances at an all time low, an approach was made to the Arts Council, and they were allocated 50% of the cost. Spurred on by this, raffles, barbeques and coffee evenings appeared in alarming numbers throughout the Staffordshire area. As a result, the club managed to raise the outstanding capital.

Having raised the money, and found a suitable site, one would assume that all problems were resolved. Alas, this was not so. The Peak National Park Board had stipulated that the hangar, in order to complement the surrounding countryside, must be constructed of natural grey stone, and because of these these exacting specifications the plans, which were originally submitted on November 29th, 1969 took until September 28th, 1972 before they were finally approved!

This disheartening delay was the result of the plans being bounced around in an eternal triangle between Leek Rural District Council, the Peak Planning Board and the Staffordshire C.C. As the Council Planning Meetings were only held monthly, delays were inevitable.

While the various Councils were contemplating the prop-proposed plans, the club committee began to organise working parties for the Morredge site preparations. Each week, while some of the members continued to fly at Meir, others turned up at the new site laden with picks, spades, scythes and coffee flasks. Although the club had hired contractors to undertake the major draining operations, the minor bogs were to be drained by members. The whole of the forage had to be cleared by hand, so that power mowers could operate successfully, but prior to this the tons of stone which lay on the furface had to be removed.

Other unforseen problems were encountered by the workers during their reclaimation campaign. One such body, Joe Yarwood, was walking across the site; at one point he was on solid ground, the next he was treading on what can best be described as a soggy trampoline. Exploratory excavations revealed an underground stream; further investigation discovered that it measured 100 yards long by 4 feet wide. In some places it reached a depth of 6 feet. The stream has since been named River Joe, in recognition of its discoverer.

Unfortunately, the position of River Joe relative to the intended cable runs was such that they crossed at right angles, therefore, a suitable method of spanning had to be devised. The problem was neatly solved by rolling concrete pipe castings, 4 feet diameter by ten feet long and weighing nearly 3 tons, into the required position along the river. The surface was then levelled off with loose soil and compressed.

When the plans were finally passed, and the site preparations were making visible progress, the bad luck which had dogged the club began to change for the better. One day, while the working party were taking a breather, they noticed aeromodellers about a half mile to the north of the site, their radio-controlled aircraft flying somewhat laxily along a regular beat. On further investigation they discovered the modellers were soearing their aircraft along a ridge; a ridge which appeared to hold distinct possibilities of genuine soaring for the club gliders.

The following weeks were spent in preparing a suitable landing area, and when this was completed they brought up a winch to the site, rigged the Olympia 2B, sat C.F.I. 'Doc' Bradwell in it and despatched him in search of the ridge lift. On returning a half hour later, he confirmed that the ridge was soarable. Other instructors also flew and consolidated the C.F.I.'s opinion, and on each flight the pilots returned to base through choice rather than necessity.

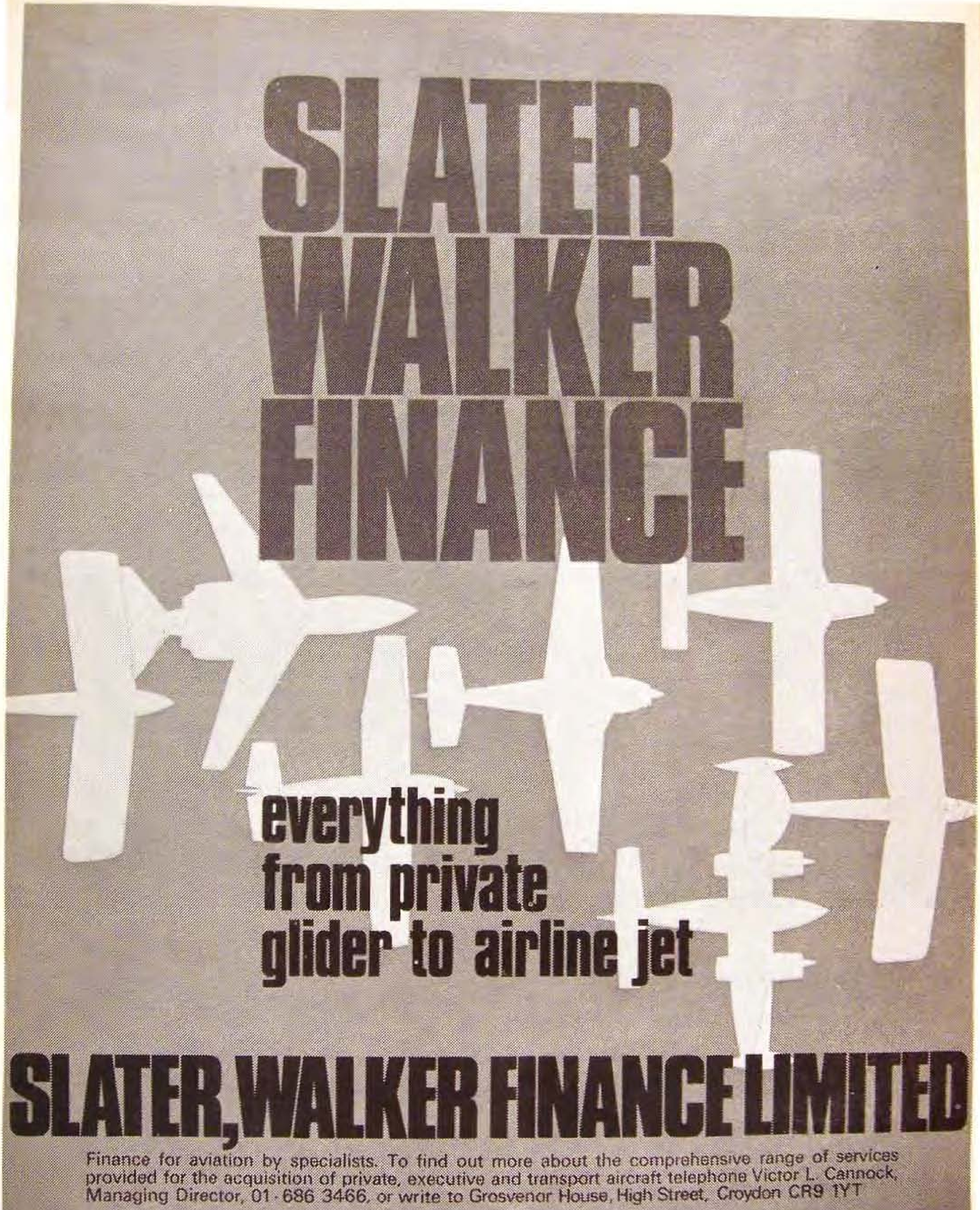
Lenticular cloud formations have been sighted on various occasions and it would appear that the possibility of wave soaring cannot be ruled out.

February of this year saw the fruition of three years hard work, and the completion of a four year dream. Although club flying began from the site in this month, gliders still had to be rigged and de-rigged daily. March, however, heralded the completion of the new hangar, and although the club is prepared to forge ahead with the building of a separate club house with sleeping accommodation, planning permission has not yet been received from the Peak National Park Board. In order to counteract this temporary problem, a section of the hangar has been designated for use as the clubhouse.

The club has now reached the end of the most trying period in its short history, but chairman Ratcliffe now extends a most warm welcome to all gliding enthisiasts and would be delighted to see them at the New Staffordshire Gliding Club.

Postscript.........I had the opportunity to read through some of the clubs newsletters, and an extract from one of them, written in September, 1968 by Neil Mackay, reads as follows:—

> ***"I am convinced, that given a permanent home of its own, the S.G.C. could become something rather special as gliding clubs go."***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Development of the KESTREL 19

Copyright Daily Telegraph

The Kestrel 19 is now establishing itself as one of the most successful gliders that Slingsbys have ever manufactured both in terms of competition successes and production numbers. The 19 metre Kestrel being of course a modification of the original Kestrel 17.

The design of the Kestrel 17 started in 1967 immediately after Dr. Wortmann had published his best aerofoil profile to date, the FX-67-K-150, 170 series; this aerofoil had lower profile drag over a wider C_L range than the earlier FX62-K-131 which had been used on the ASW-12. In addition it had a greater percentage thickness (15 or 17%) giving opportunity for a good spar and extremely docile stall characteristics.

The Glasflugel team of Herr Hanle and Herr Prosser, with helpful advice from Stuttgard University's Dr. Althaus, completed the design in 1968 and a prototype was ready later that year. Slingsbys had their disastrous fire in November 1968 and at that time were also coming to the conclusion that they had taken the wrong path in producing metal high performance gliders (HP-14 and T-53). They approached Glasflugel about possible licence arrangements but the bankruptcy in July 1969 intervened so all communications ceased.

When Vickers Ltd., took interest in the company in September 1969, Mr. Redshaw, now Sir Leonard, saw long term advantages in the high technology glass know-how which Glasflugel had developed and after Slingsbys had been acquired he re-opened negotiations; this resulted in a team of workmen from Slingsbys spending three months at Glasflugel in the winter of 1969 to learn the German techniques. They came back with a set of moulds taken from the German jigs and the first 17 metre Kestrel of Slingsby manufacture was ready in August 1970 to take part in the British Nationals at Doncaster.

Prior to this Glasflugel had already delivered about [illegible] Kestrels, some of which went to the 'States' in time for the

Marfa Nationals of July 1969. Ben Greene flew one and landed short of the field on one day, having flown through a wide region of heavy down. Other well known American pilots were heard making comments to the effect that the glider did not climb as well as it should. With these facts in mind I was determined to have a little more span on the Kestrel which I had obviously got to fly in the 1970 World Championships at Marfa. The real cause of the problem was not known at the time but more span was certainly not going to do any harm. Our own production line was not yet under way, so we imported a German 17 metre machine, and in the space of two months had extended its tips to make it into the first 19 metre Kestrel.

Flying the Kestrel 19 at Marfa was great fun, but in comparison to John Delafield, piloting the ASW-12, it obviously lost out in weak lift climb, whereas in strong lift it went away quite easily. I finished 4th but something was still not quite right.

Following the British Nationals at Doncaster we were determined to find out exactly what in fact was wrong with the 17 metre. To this end we tufted up the root-end and attached an Instamatic self-wind camera onto the fin. The pictures showed a clear vortex at the root junction where the fuselage wasps away at the same time as the wing is doing likewise. The fuselage design had been perfect as determined in the wind tunnel, but unfortunately nobody had ever tried it with a wing screwed into place. The best solution would probably have been to reduce the rapidity with which the cross section of the fuselage changed, but it would also have been the most expensive, because all existing fuselage moulds would have to have been scrapped. The answer came from the Glasflugel team with a really large fillet which effectively did the same job. New photographs confirmed that all was nearly 100% perfect.

After Marfa the super 22 metre span ships were obviously going to sweep the board unless something was done. The CIVV wisely decided to encourage a more moderate span, 19 metres, the largest that can reasonably be handled as a two piece wing. We had been considering a 20 metre span version of the Kestrel but the introduction of this class crystalised our ideas.

The 19 metre Kestrel which I had flown at Marfa had a tip chord only just over 12 inches so we determined to extend the wings of the 17 metre by a ½ metre at the root and another at the tip. The first glider actually produced in this new format had a carbon fibre spar, but this was really a piece of development work in that material to gain know-how for other purposes.

The orders which had disappeared ror the 17 metre Kestrel began to return as orders for 19 metre ships, and the first production 19 metre was shipped to Dick Georgeson in New Zealand in September 1971. Dick used it to win the South Island Championship and later in 1972 to set up a new world out-and-return record. Another 19 won the Australian Nationals and as confidence in Slingsbys returned so orders came in.

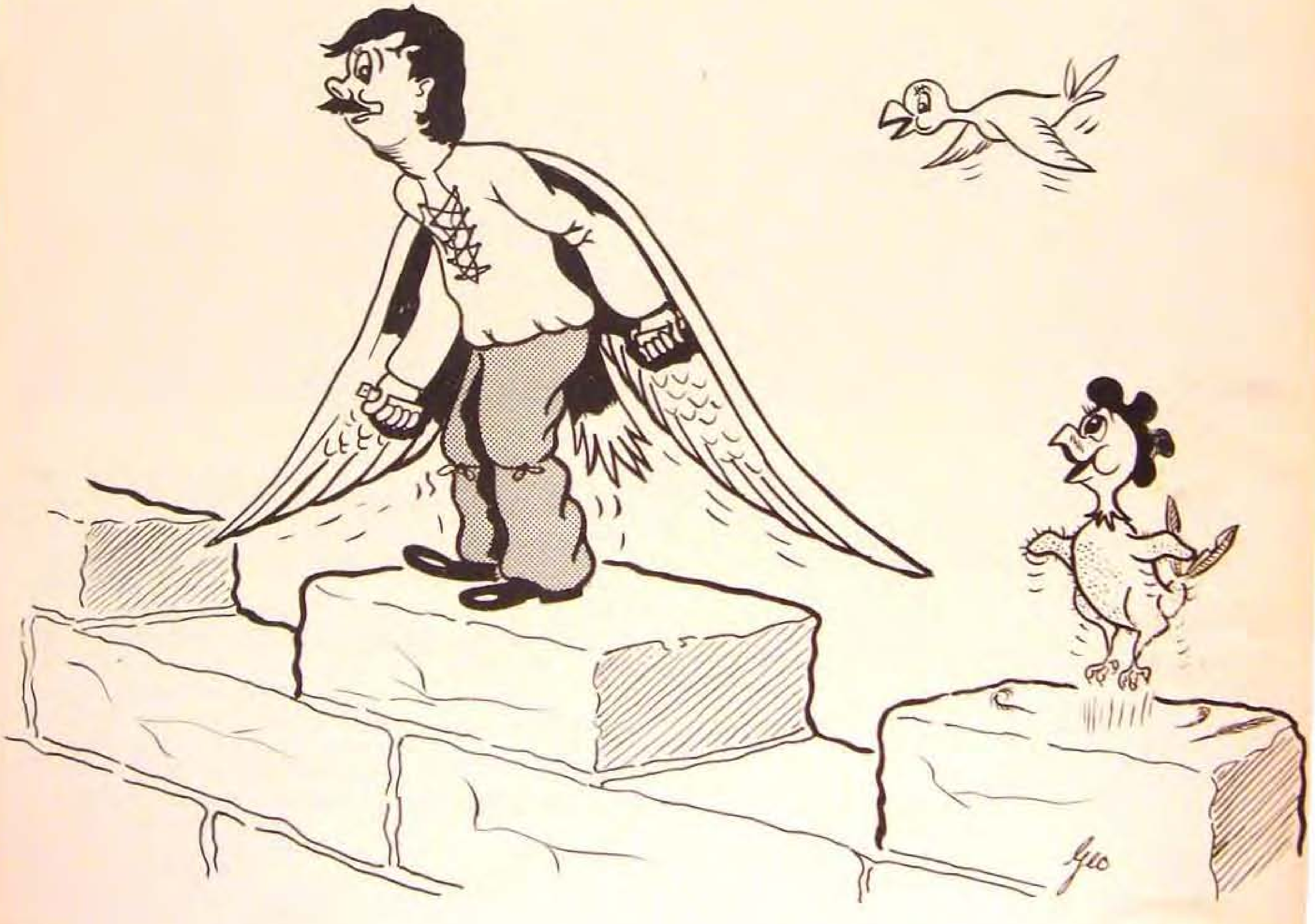
Minor changes and improvements continue to be made. The latest is the introduction of the anti-servo tab on the elevator which gives the required stability without the undesirable stick forces of the curl down. The flaps have been converted to 'flaperons', the instrument panel has been improved and a tray introduced above the spar junction, but basically the concept of a 19 metre span super ship has been proved right.

NOBODY THOUGHT OF UPCURRENTS

By Dr. Alan E. Slater MA. FR. Mets.

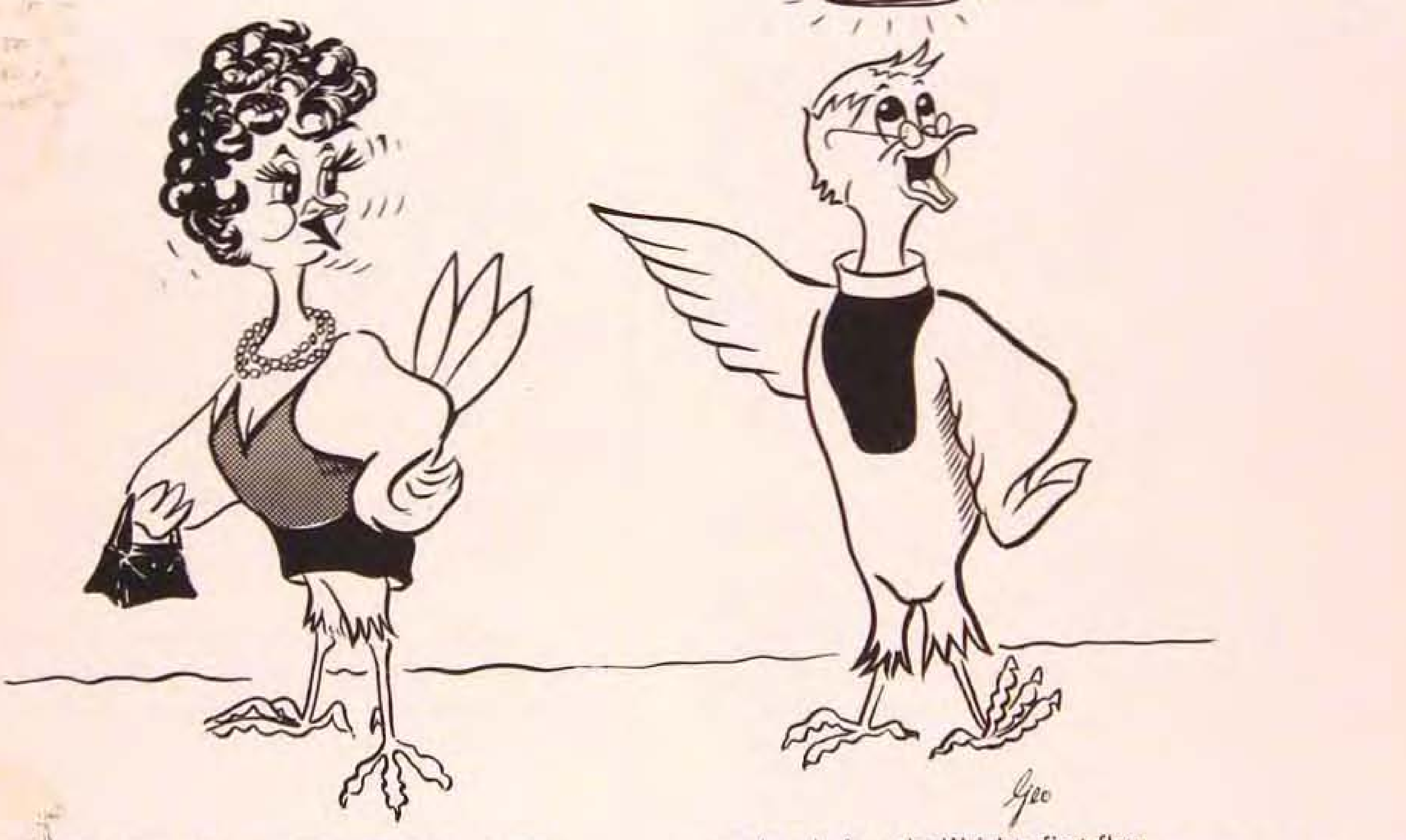
Most soaring by birds, and practically all soaring by sailplanes, is done by gliding through rising air. Yet through all the centuries when people watched birds soaring and wondered how they did it, there is no record, until less than a hundred years ago, that this ever occurred to a single one of them as a possible explanation. Why? The main reason, I feel sure, is the difficulty that the human brain has in grasping the concept of relative motion as distinct from absolute motion: how can gravity pull something down without bringing it any nearer the earth?

According to this line of thought, soaring implies that the force of gravity is somehow nullified or even abolished. But how? Probably the oldest hypothesis is that feathers have a natural tendency to stay up. Thus, when in 1507 John Damian jumped off Stirling Castle with artificial wings covered by feathers and broke his thigh, he attributed his fall to the fact that he had included some hens' feathers, "which yearned and coveted ye midden and not ye skies".



Some centuries later, in 1882, a writer signing himself A.O.H., writing in a bird-lovers' magazine called "Stray Feathers", was quite sure how soaring birds could nullify gravity. The secret, he said, "lies in so altering the magnetic polarity of the physical frame that in lieu of being attracted it is repelled by the earth." And the birds were able to achieve this, he added, by "living an absolutely pure life and intense religious concentration." Whether or not this explanation could have passed muster as long as birds were the only soarers, it would have had to be modified when human pilots took a hand in the game.

The concept of relative motion in a horizontal direction seems to have been just as difficult to grasp, probably over an even longer period of history. Thus Ptolemy, in the second century A.D., said that the Earth must be at rest in the centre of the Universe because, if it moved, we should feel its motion and every detachable object would float away in the opposite direction. Derived from this misconception is the idea that birds or gliders can soar by merely facing a horizontal wind, an idea which is still current among the general public to this day. (For instance, one windy day at Lasham, when the sky was covered by an unbroken could sheet only 400 feet above ground, a spectator was heard to ask: "Why don't they fly? There's plenty of wind, isn't there?")



Even the great Leonardo da Vinci suffered from this misconception, though he must be given the credit of being the first on record to be aware that birds could soar at all, for he watched them circling and saw with his own eyes that they gained height without flapping their wings. Leonardo said that the bird loses height on the half-circle in which it flies tail-to-wind, then it turns into wind and gains more height on that side of the circle than it had previously lost. Yet Leonardo understood slope-soaring, describing winds that, on hitting a mountain or a cliff, "bend their straight course towards the sky", and the birds as "receiving underneath themselves the continual buffettings" of the deflected winds. Then why did he not conceive the possibility that circling birds were in an upcurrent? Perhaps because he could imagine no reason why the wind should be deflected upwards over level country. And although, if his theory was right, a bird should be able to climb in circles in any part of the sky, he could see no significance in the fact that they preferred to do it in groups in isolated patches of air.

Nearly four centuries later, in 1920, the same theory was put forward in a pamplet by "Lt.-Col. R. de Villamil (late Royal Engineers)", namely, that the bird acquires momentum by flying downwind, then turns into wind and uses it by gaining height. His "proof" that upcurrent were not responsible was that (1) such soaring is usually done over level plains where the wind must be horizontal, and (2) the only evidence of rising hot air he ever saw took the form of little dust whirls that were obviously not powerful enough to lift a big bird. As with da Vinci, it did not occur to him to wonder why birds circled in groups. Yet the Wright brothers, nearly 20 years earlier, had noticed that, whenever birds were circling, there were large spaces between the groups in which no birds circled, and drew the obvious conclusion that they couldn't just soar anywhere, but only in localised patches where the air was presumably rising. Why, throughout all the preceding centuries of bird-watching, had nobody noticed this before?

Among those who never thought of upcurrents were a few who did at least think of something else which was actually based on known physical laws – namely, the energy of gusts. Most notable among them was S.P. Langley, a leading American astronomer who is best known to aviation history for his abortive attempt to launch a man-carrying aeroplane ten days before the Wrights first flew.

In his treatise "The Internal Work of the Wind", published by the Smithsonian Institution in 1893, Langley describes how, at the Allegheny Observatory 400 feet above the Ohio River, he timed every 25th turn of a revolving-cup anemometer on a 53-ft. mast and found the wind would more than double or halve its velocity in a few seconds. Then, realizing that the inertia of the metal cups caused the variations to be under-estimated, he made a miniature anemometer of wire with paper cups, registering every half-revolution, which could mean many times a second; this showed fluctuations of shorter period which were even more violent, and the wind speed once momentarily went right down to zero.

The idea that the energy of wind turbulence can account for soaring flight now so filled Langley's mind that there was no room in it for any alternative explanation. Thus, when he saw a turkey buzzard soaring over the parapet of a bridge over the Potomac in a gale blowing up the river, he attributed the feat to turbulence and said it was "not evident" why the bird "chose to keep over this spot". Thus the possibility of the wind being deflected upwards over the parapet never occurred to him.

In the rest of his treatise Langley worked out a supposed technique of soaring on the completely false assumption that a packet of air travelling with the wind would undergo the same violent changes of speed as those registered by a stationary anemometer; if so, the windward edge of the wing would have to to be lifted in a gust and the leeward edge in a lull. He doesn't seem to have realized how this reversal of airflow over the wing would disturb its feathers. Anyway, he must have noticed that his turkey buzzard hovering over the Potomac bridge was doing nothing of the sort, yet he attributed its soaring flight to turbulence.

However, some credit must be given to Langley for being first in the world to conceive the idea of the motorized sailplane, for he prophesied that the aircraft of the future could "circumnavigate the globe" almost entirely by soaring, only resorting to its motor in "exceptional moments of calm." Imagine the wretched passengers, continually tossed up and down in gusts, praying for an "exceptional moment of calm" in which their parsimonious pilot would be obliged to squander a dollop of precious fuel in straight-and-level flight.

We next have three examples of men who made meticulous observations of soaring birds, day after day for periods of years, but remained completely flummoxed as to how it was done.

First, a Mr. Lancaster set off in 1876 for South-western Florida, where he spent five years watching the soaring birds "in the hope of surprising their secret", according to Octave Chanute in his book "Progress in Flying Machines" (1899). Then he invented an implausible theory – something about "aspiration" – and built a glider in the vain hope of soaring it at ground level, which he must have noticed the birds never did so low down.

Then there was Jean-Pierre Mouillard, who watched soaring birds near Cairo for years without guessing their secret. His book "L'Empire de L'Air" (1881) inspired the Wright Brothers. But he was exasperated by critics who said that, since the feats he described were physically impossible, his eyes must have deceived him. He, too, built a glider.

Dr. E.H. Hankin, who made thousands of notes on his observations of soaring vultures and cheels in India, mostly at Agra, published a summary of them in his book "Animal Flight" (1913). Apart from slope-soaring over buildings, which, like Leonardo da Vinci, he understood, Hankin absolutely refused to believe in upcurrents, and among his voluminous notes he could always raise one or two to confute anyone who dared suggest such a thing. The shimmering of objects near the ground on a sunny day, he said, showed that heat eddies were much too small and weak to lift a bird; and, although this shimmering usually coincided with the sight of birds soaring, he produced a few notes, from among his thousands, showing that one phenomenon could occur without the other; therefore, he said, they could not possibly be connected. This led him to conceive a most original theory that "soarable air" undergoes some sort of molecular change when a bird's wing passes over it. He even asserted that details of the underside of a vulture's wing could look fuzzy when it was soaring – presumably because of this.

As for Sir George Cayley, who built the world's first man-carrying glider in 1853, he was completely unaware that birds ever soared at all, for he said that a gliding bird was merely using up momentum previously acquired by flapping. But he was a country gentleman, so may be he never looked at a bird unless it was within shooting distance.

When, at last, upcurrents came to be generally believed in, many people had fantastic ideas of what they were like and how they were used, right up to the time when human gliders began thermal soring after Wolf Hirth had shown the way in 1930. But that is another story.

SCENE International

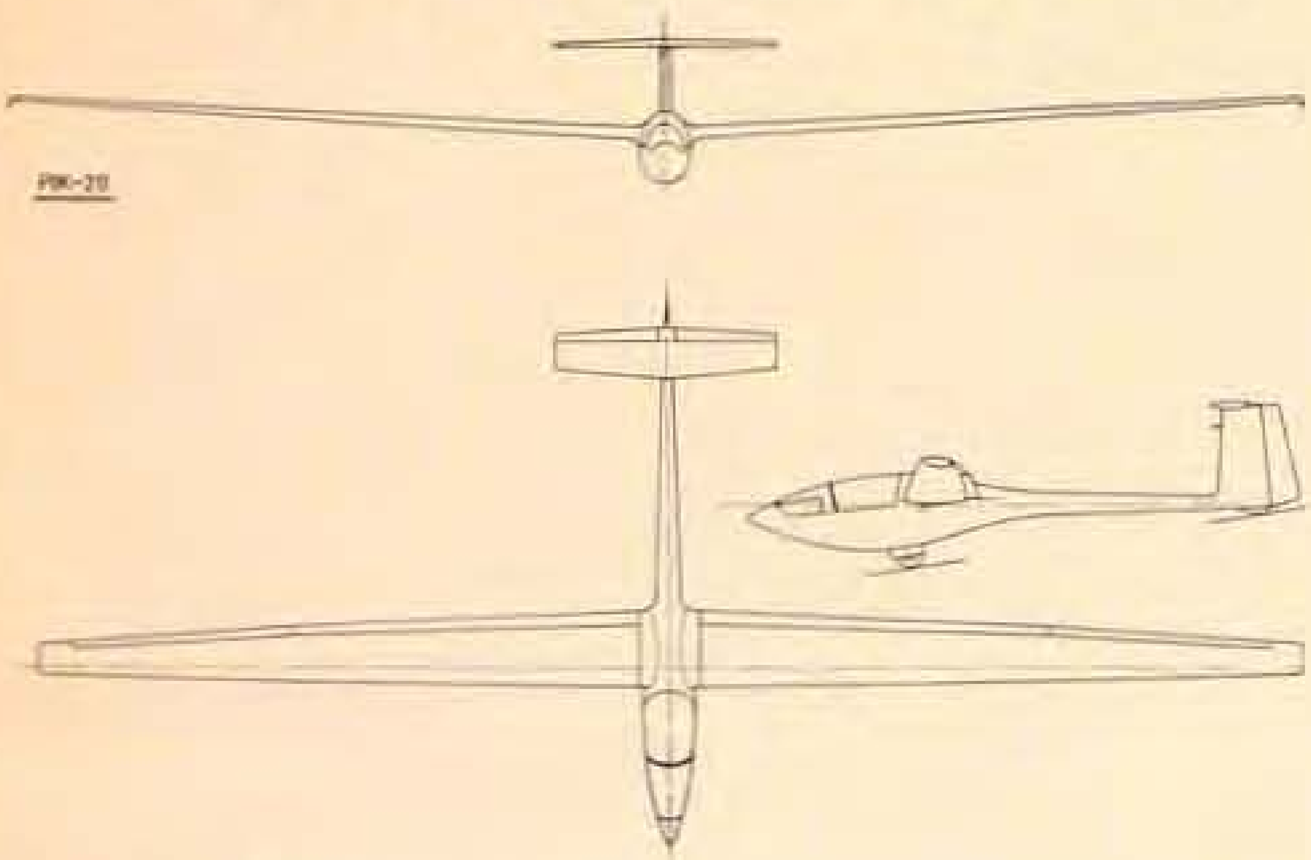
Fin..sh Flapped Standard Class Sailplane Nears ..tion

...lider design, the first in five years, is nearing ... Institute of Technology in Otaniemi, near ... ..plane is the latest development in the long ...IK gliders, one of which, PIK-16C Vasama won the ... Class award in connection with the World ...ips in Argentine in 1963. This newest member of ... PIK-20, which is a standard class glider ... and completely made from glass-fibre.

...igins of PIK-20 go back to the Spring of 1971 when a young ... of enthusiasts at the Institute of Technology had, for some time, been designing and building a glass-fibre two-seat tug aircraft, which had given the builders valuable information of the characteristics of modern plastics for lightplane design. With this knowledge and a good basic design by Pekka Tammi, based on the fact that flaps could now be incorporated into Standard class machines, the group started work.

At this stage of the programme the builders, quite understandably, are not too willing to quote any specific figures. However, the empty weight will be 205 kilos, Aspect Ratio 22.5 and Wing Loading 38 kg/m^2 with 80 kgs. of water ballast. The calculated best Glide Ratio is 39:1 at 102 km/h. Min.sink 0.65 at 82 km/t and Stall Speed 78 km/t, all with full ballast. Wing Sections are Wortmann, FX 67-K-170 (root) and FX 67-K-150 (tip).

At the time of writing the PIK-20 is still only a prototype project, but there are high hopes of eventual series production. First flight is expected sometime during the summer.



Southern Soaring Moves to Inkpen

Southern Soaring, the seven day a week gliding organisation, which for the past two years has operated from Compton Abbas airfield, Dorset, moved on March 1st, to Inkpen airfield, Shalbourne, Wiltshire.

From their new site Southern Soaring will continue to operate their comprehensive fleet of gliders, they being; two all-metal Blaniks, a Falke motor-glider, the new Pilatus B4 15 metre sailplane and a venerable Kite 1 of 1933 vintage. The club also operates two classic veterans, a T-21 trainer and a medium performance Olympia 2B single seater.

Southern Soaring has recently been appointed a UK agent for Pilatus Sailplanes of Switzerland.

The move brings every day flying to an already flourishing gliding club, which has among its 50 or so members a number of private owners, flying such high performance sailplanes as the Nimbus, Cirrus and Libelle.

Mr. Peter Cottrell, founder of Southern Soaring, has been appointed C.F.I., while his partner, Mr. Robert Cunningham, will act as his deputy.

Features of the club will be their learn-to-glide holiday courses, and they also provide aerotow and winch launch facilities for private owners.

Production of Schiebe Falke SF-25C

Mr. Cottrell says, "One of the major advantages of a professional organisation, such as ours, is that we are able to cut out much of the waiting and consequent frustration normally experienced when learning to glide. For example, during the week we are running a booking system that allows students to fly, by appointment, the Falke motor-glider.

Our move has been welcomed by members of the Inkpen club and we are looking forward to a successful first session."

To introduce this new operation the club are organising an open day at Inkpen during the Easter holidays. For further information contact the C.F.I. at Fontwell Magna 641.

Norwegian Gliding Centre welcomes Visitors

a report by Gillian Howe

The Norwegian Gliding Centre is situated at Notodden, some 40 miles west of Oslo, with a 1,500 metre tarmac runway lying along a wide river valley. To each side rise hills which offer excellent slope soaring until well into the night (it never gets really dark in the summer months). Behind these foothills stretch the bigger mountains, between 2,000 and 6,000 feet high. Thermals are plentiful and strong; 6kts being average and conditions start early – 8 am.

Wave, not unnaturally, is frequently in evidence, and long distance flights with fast speeds are feasible. On many evenings a local phenomena occurs whereby it is possible to fly up and down the local lake at a constant height of 1,000 metres.

The Centre has among its fleet 2 K-13's, 2 Bergfalkes, 1 Blanik, 1 Austria SH, 1 Zugvogel, 1 K-8 and a L-Spatz. During the week there is no queueing to fly these aircraft. Launches are by aero-tow behind one of the two Super Cubs and there are the minimum of formalities to complete – a briefing by the CFI on local conditions and airspace, and a two-seater check to fly one of the Centre's aircraft.

Flying costs are cheap, aero-tows to 2,000 ft. approximately 80p, and there appear to be no membership fees. There is excellent accommodation on the site, consisting of 4-bunk chalet-type rooms; to each pair is attached a bathroom and a kitchen. The cost of the accommodation is about £1.50 per night per chalet. It is advisable to take sleeping bags (being wedged between two foam mattresses is not ideal – one feels like a badly stuffed sandwich, and it gets draughty!), cooking and eating utensils. There is a restaurant on the site which provides meals and drinks throughout the day.

Notodden town, with well equipped shops, is about two miles away and there is plenty to do and see. The abundance of clear mountain lakes and streams are noted for their fishing. Walking is also very much recommended. Oslo is within easy reach and a visit is worth considering.

Weather is generally good, and certainly the Norwegian sun appears to be hotter than its English counterpart – with the wine clear air, hats are essential in the cockpit. Insect repellent is also advisable; the mosquitoes are not dangerous, but they are an irritation. In winter, skiing can be combined with gliding at the Centre.

The Norwegians are enthusiastic about their gliding and extend a warm welcome to visitors. Further information can be obtained from Mr. Harald Hoimyr, Norwegian Aero-Club, Nedre Slottsgade 17, OSLO 1.

Falke SF–25C

Powered Gliding

News from the Scheibe Workshop

Scheibe, has without doubt, had the greatest success of all motor glider manufacturers todate. 360 Falke's of types A and B have been built at the Scheibe factory, plus another 90 types B and C under licence by Sportavia Putzer and 30 B and C models by Slingsbys – in all 480 Motor-Falkes have been built and sold.

In retrospect it can be seen that with these simple-to-fly, hard wearing two-seat motor-gliders, Scheibe have hit the bull's eye. Not only do the number of aircraft sold prove Scheibe is following the right path, but the number of hours flown add considerable weight to any arguments. The Motor-Falkes fly, on average, 300 hours per year. This is triple the average flight hours for gliders and double those for powered aircraft.

Tandem-Falke

1972 saw the introduction of the Tandem-Falke with 15 units being produced. Powered by a Sportavia-Limbach 60 hp SL 1700EA engine the Tandem-Falke is equipped with a two-position Hoffman propeller. Carburettor pre-heating is also standard. Great consideration has been given to engine noise. When starting the engines RPM reach 2800, creating only minor noise and with an idling speed of 2500 RPM no discomfort is experienced. Only in fast flight, 3600 to 3700 RPM is the noise level high, but on decreasing to 3200 RPM, corresponding to about 160 km/h cruising speed, the Tandem-Falke again becomes relatively quiet.

Egon Scheibe does not, as yet, believe that there is any other economical method of constructing motor-gliders other than by using conventional materials, i.e. wood, fabric and metal tubing. Glass fibre construction would not bring any profitable advantages and the overall cost would be considerably higher.

German Sailplane Review

A brief look at some of the new gliders on offer from the industry.

For 1973, Alexander Schleicher introduces an improved version of the AS-W15. The prototype of the AS-W15 was first flown by Hans Werner Grosse on the occasion of the World Gliding Championships at Leszno, Poland in 1968. In the design of that glider the constructor did not look for extremely high performance, the accent being directed more toward manoeuvrability and handling, this being the reason for machines large ailerons, rudder and elevator.

During the development period of this aircraft, the regulations for standard-class gliders were modified several times, thus the AS-W15 became equipped with retractable landing gear. Secondly, and more important, with the introduction of water ballast it became necessary to reconstruct the AS-W15 to carry extra weight – the resultant aircraft being designated AS-W15B.

At 12 m^2, the AS-W15B's wing surface is larger than that of any comparable standard-class glider, except perhaps for that that of the Phoebus, giving the largest wing area and lowest wing loading. With the additional ballast the wing loading can be held within a reasonable field of 28 to 37 kg/m^2.

Water tanks will be installed in all production gliders from No. 15185 onwards. 15 being the number of the type and 185 the number of aircraft built to-date.

With the installation of the ballast tanks, the empty weight of the AS-W15B was increased by 15 kg. In this context, a re-inforcement of the spar, mainframe and landing gear were incorporated, as the regulations state that a glider must be landed when the occasion arises, with water ballast. The maximum take-off weight has been increased from 318 to 408 kg. 68 kgs of water ballast fill the tanks, but it is recommended that under this weight be used to prevent spillage. The tanks can be installed or taken out within ten minutes, ensuring easy repairing and maintenance.

AS-W17 20 metre Super-ship

During 1972, the AS-W17 showed thoroughbred qualities as a high-performance sailplane at international competition level. Further flight testing, however, has led to a series of modifications incorporating the recommendations of the test pilots.

As a instrument for record attempts, the AS-W17 was ideal, but competition pilots were experiencing handling difficulties, a trait which was also peculiar to the AS-W12 from which it has been developed.

Schleichers are now convinced that these problems are behind them and they are looking forward to a highly successful season in the competition field.

New technical data of the Schleicher gliders

Type		AS-W15	AS-W15B	AS-W17	AS-W12
Company		Schleicher			
Designated for		performance			
Crew		1	1	1	1
Wing span	m	15	15	20	18,30
Length overall	m	6,45	6,48	7,55	7,35
Height overall	m	1,45	1,56	1,85	1,68
Wing area	m^2	11	11	14,85	13,00
Wing aspect ratio		20,45	20,45	27,0	25,8
Profile		FX61-163		FX-K-131 mod.	
Weight empty	kg	210	225	405	320
Useful load	kg	108	115	115	110
Waterballast		–	68	50	–
Max. T-O Weight	kg	318	408	570	430
Wing loading	kg/m^2	28,90	30,09	33,30	31,80
max.		–	37,10	38,40	33,10
G-Limits		8,23	8,37	8,56	9,66
Best glide ratio		37,4	37,48	48	47
at	km/h	92	94	95	90
Min. speed	km/h	64	65	68	64
Min. sinking speed	m/s	0,59	0,60	0,50	0,48
at	km/h	72,50	74,30	75,00	70,00
Max. speed					
Smooth air	km/h	220	220	240	200
Rough air	km/h	220	220	240	200
Max. aero-tow speed	km/h	150	170	170	150
Max. winch-launching speed	km/h	110	120	120	115

Schneider LS-1d

In outward appearance the LS-1d is exactly the same as the LS-1c. Modifications are entirely internal and reflect the new FAI regulations regarding water ballast. The tanks, which are situated within the wings, are made up from rubber tubes covering a length of about 4 metres. Gross weight of the new model is 240 kgs, 20 kgs more than the LS-1c. Loading within the fuselage has been increased by 10 kgs.

LS-1f forerunner of the LS-2

The LS-1f is an experimental glider built as a research and development project to examine the new fuselage of the future LS-2. First tests of the new aerodynamically refined fuselage took place during the World Gliding Championships of 1972 at Yugoslavia. Lack of time, unfortunately, necessitated that wings of an LS-1 be used with this body. The first noticeable feature is the one piece canopy which cannot be removed entirely from the fuselage; tests have shown that this shape is in no way inferior to the former, where the front part was fixed and the back portion detachable. A further advantage of the new canopy is the omni-view. Seating position of the LS-1f has also been modified so that a normal parachute may now be used without any great inconvenience.

It is confidently predicted by the manufacturer that the LS-1f will be the sophisticated LS-1 of the near future. At present, however, the price of the LS-1c, without instruments but including Value Added Tax, is 25,200 DM, and the cost of the LS-1d is 26,200 DM.

V.E.R.Y. I.N.T.E.R.E.S.T.I.N.G.

Aircraft	der fliegenwagon
Light aircraft	der dlienen fliegenwagon
Propeller	der airfloggen fann
Self starter	der airfloggen flinger
Control Column	das puschenpullen schtik
Rudder pedals	der tailschwingen werks
Pilot	der tailschwingen puschenpullen werker
Student pilot	der dumbkoff lernen fliegen
Instructor	der dumbkoff schtulmit der dumbkoff lernen fliegen
Air Traffic	der schwienhund ubbenzie tauer watchen aller oder dumbkoffs fliegen
Ground studies	das hedshcratchen bukwerken
Link Trainer	boks mit aller fliegenwerks innit
V.F.R.	lookenouten seein fliegen
I.F.R.	lissenwaitenhopen fliegen
Forced Landing	trienengebackonner graund mittaut kraschen
First solo	trienen gebackonner graund mittaut kraschen
Precautionary landing	trienen gebackonner graund mittaut kraschen
Crosswind landing	trienen gebackonner graund mittaut kraschen
Parachute jump	trienen gebackonner graund mittaut der fliegenwagon
C.F.I.	der fliegen fuehrer!!

Cut here

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The PERFECT

DIVEBRAKE

by Keith Emslie* D.C.Ae., C.Eng., Mech.E., A.F.R.Ae.S.

Our amazingly efficient gliders require their drag to be increased considerably for two vital phases of flight, (a) to enable us to land safely in small fields, and (b) to limit our dive speeds to a safe value if we are recovering from inept cloud flying or aerobatics.

Unfortunately, the devices that have been fitted to gliders in the past have had very poor and even dangerous features, features that have come to be either casually ignored or accepted as inevitable. This attitude of mind is no longer necessary with the introduction of trailing-edge divebrakes, which are the first wholly satisfactory type of drag producing device.

This attempt to categorise and critically examine the snags of various types of divebrake will be aimed at all glider pilots, but keeping within the simple idea that all pilots must be able to understand and relate clearly to their own experience. It should also act as a refresher course for instructors who have not met some of the less usual brakes, and might not be clear about their side effects. Potential customers for gliders old and new, might find it helpful as a sort of "Which?" report, and no doubt the glider designers among us will find food for thought.

Many divebrakes look as though they were an afterthought, or were left to the craftsmen to fix to the glider without any preparatory design work at all, with the result that many of the minor snags experienced are just irritations to the pilot using the brakes, or mild disadvantages to a purchaser. However, two characteristics call for very thorough analysis because they affect safety; the hinge moments produced by the brake, and the effect the brake has on the lift of the wings.

BRAKES THAT ARE RELUCTANT OR TOO EAGER

Hinged plates that open forwards, and blow shut when released, tend to produce such large hinge moments that many a gentle pilot would be quite unable to pull them open at high speeds. Some form of aerodynamic balancing load is therefore necessary to reduce the self-closing hinge moments to a manageable size; perhaps a quarter, or even a tenth of what would otherwise develop. A modest reluctance to be pulled open is very desirable, while a brash over-eagerness is just not acceptable.

With overbalanced hinge moments there is always the danger of the brakes flying open inadvertently and even unnoticed by the pilot, no matter how good the locking device. I know this sounds unlikely, but it happens, even to me. (At least I noticed it happen). If you have not seen it happen yourself, look back through the accident records..... "brakes came open during the launch". It is not even as though self-opening hinge moments are desirable in normal operation, they produce an unstable effect when you are trying to aim for an accurate touch-down. When you try to push them a little less open, they suddenly click shut, then when unlocked again they jump wide open. So self-opening brakes are undesirable, and quite unacceptable because they are unsafe.

BRAKES THAT LET YOU DOWN

Large changes of wing lift due to use of the brakes make last-second alterations of the glide path very hazardous. No pilot would dream of retracting his trailing-edge flaps just before landing, when he was relying on the lift they were producing. But this is precisely the effect that you get when you open most divebrakes! Didn't you know? To be fair I haven't ever seen it described correctly in a text book, or covered thoroughly in a Theory of Flight lecture either.

Perhaps you remember being taught that divebrakes increase the stalling speed, but this is less than half the story. Look at the graphs of wing lift coefficient against angle of incidence where the flying speeds for a typical glider are shown along the scale of lift coefficient (Figure 1). The quoted nose-up angles of incidence are taken relative to the direction of flight along the glide path (which is **not** horizontal, and varies with speed and divebrake setting).

Think of the glider flying at point A, approaching to land at 42 knots. "Too slow" comes the chorus, "too near the stall of 36 knots; if you open the brakes the stalling speed goes up to 39 knots". Yes, quite correct, but the full story is even worse ......, as you open the brakes the lift force on the wings drops almost immediately toward the lower curve, long before the glider settles onto its steeper glide path and the wing incidence rises to point B. For a vital few seconds the wing wing lift force is much less than the weight of the glider, and Newton taught us what that means. Bruises and expensive noises.

It does not help to be piously flying with a lot of extra speed either. This would make the loss of lift force proportionately bigger, so you would thump down even harder!

You get more time to analyse what is happening when you try it the other way round. This time you are undershooting with the brakes out at point B, so you shut the brakes and zoom bodily upwards, then settle at point A and have another try. For a while the lift force on the wing exceeds the weight of the glider and accelerates it directly upwards. This is not harmful, but even so, beware of conciously trying to take advantage of this effect. If you do it on a high round-out, just as you are reaching the point of stall with the brakes out, and then slam them shut, you could well leave your clean wing at an incidence beyond it's angle of stall. Another thump from Newton.

From here on such nasty devices will be referred to brutally as lift dumpers, this being the precisely descriptive title given to them by the professional aerodynamicist. This refers to any device that projects from the upper surface of the wings. Watch an airliner use them on the landing roll, **after** the wheels are firmly grounded.

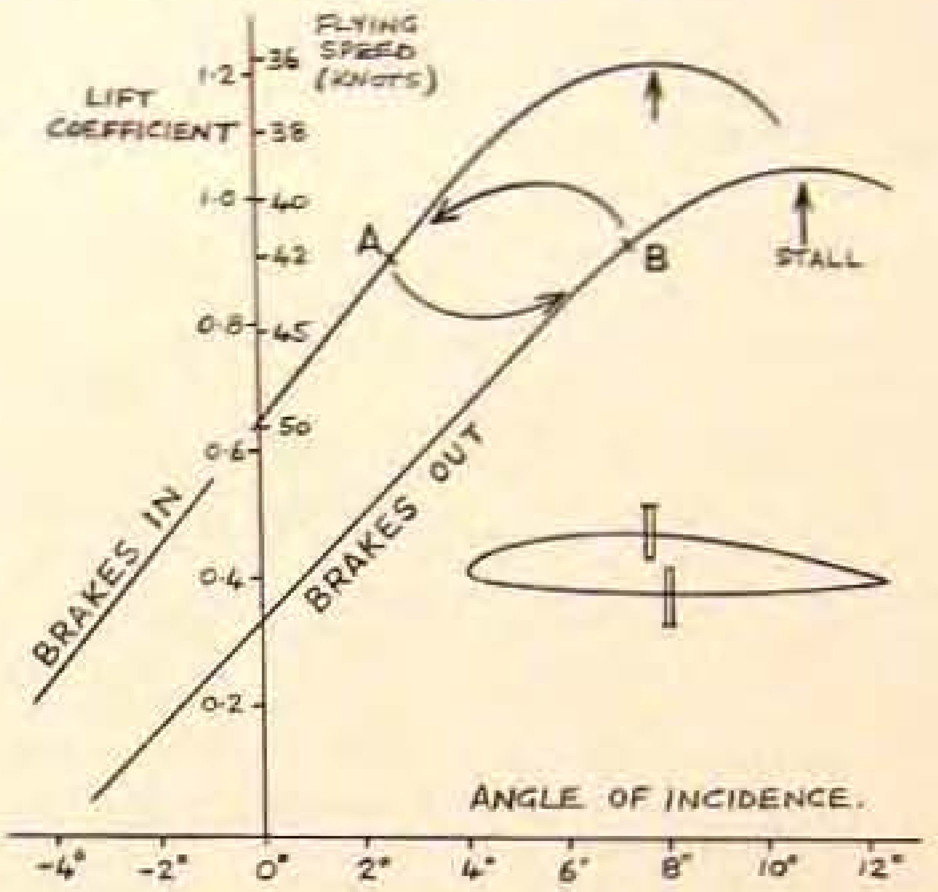


FIGURE 1. LIFT LOSS DUE TO SCISSOR BRAKES.

WHERE SHOULD WE PUT THEM?

In the search for a powerful divebrake there is a great temptation to put them where the local airflow is moving fastest. (Above the wings of course. Blame Murphy for that law!). If the local airspeed is 1.1 times the gliders flying speed, the divebrake would therefore generate 1.21 times the drag from a given frontal area. Alternatively, it need only be 1/1.21 times as big. Over the deepest part of the wing the airflow is speeded up x 1.2 or 1.3 at low incidence (i.e. high flying speed), while at high incidence the factor goes up to x 1.6 or even more. This makes up for the low flying speed that would otherwise tend to make the brake rather ineffective during the approach to land.

So, as it is very unfortunate that divebrakes above the wings act as lift dumpers, so it is completely inevitable that you must hang out plates below the rear of the wing but to increase lift, if you put them above the wing they will produce a downwards acting lift force, due to the inverse camber producing negative circulation, don't you know? No, we don't! And we don't like mumbo-jumbo, so we'll just accept it like sex as a Fact of Life. Well not quite like sex!

What about below the wings then? The local flow is not speeded up much, and might be even slower than flying speed, so the brakes would have to be big ones. But again, sex says that this will mean a lift force, and even though it is at least upwards, this merely means heavy landings due to closing the brakes instead of opening them.

So what about brakes that pop out from both upper and lower surfaces, the lift from one being cancelled by the download from the other – a sort of battle of the sexes? Yes, that would be an improvement, but if they were the same size top and bottom, the top half would be more effective at high incidence at landing speeds due to it being placed where the local airspeed is faster. So you get a download still, in fact the lift curve on Figure 1 is for a scissor type brake with equal upper and lower paddles. (see reference 1 for some actual measurements). Alright, we will make the lower paddle bigger than the upper one, until we get lift neither up nor down (who said the sexes were equal?). It's never been done, but there is no reason why it should not be – or is there? What happens at high speeds? The upper paddle loses its airflow boost, so the lower paddle wins again, lift is increased and the glider goes into a loop. This might or might not be acceptable, but is perhaps better than gross lift changes near the ground.

However, let us continue the line of thought – how to minimise the differences between low and high incidence? By moving to where the local flow speeds stay more constant despite the attitude, even if they are constantly slower and the brake area must be larger to be sufficiently effective. This means back towards the wing trailing-edge. So you may wonder why not, and cannot find a single valid reason, or why nobody did it before. But they did, it is just that we never noticed. More of this later, meanwhile let me just mention another possibility, only to relegate it as an also ran.

Plates hinged out from the fuselage have occasionally been tried, as are used on high speed fighters. However, at glider speeds the plates would need to be very large, and although they could be positioned to avoid flow around the wings and not to give lift changes, they are found to disturb the flow over the tailplane and fin. The plates would also shed a disturbed wake to buffet the tail, and spiralling flows would alter the airflow directions to give stability and trim changes. With access to a wind tunnel it might be possible to develop a divebrake, tailplane and fin layout; pay me £50,000 and I will gladly try it out for you. No guarantees of success, of course!

Tail parachutes? That is a great position for a drag producing device, but it is due for demolition under the next heading ....

HOW SHOULD WE RETRACT THEM?

These big plates that we wish to hide and then expose, can either slide into view, or hinge open just like any other sort of door. We can rule out the folding (concertina) door and the air cushion; sliding and hinged types being the only possibility for divebrakes. Remembering our earlier conclusion that a decent reluctance was ideal but over-eagerness definitely unsafe, the feature that really matters is the hinge momer .

Hinged at the front and opening forwards the door would blow shut – very strongly. Hinged at the rear the door would blow open – again very strongly. But the changes of airflow pattern past the plates at different part-open positions mean that the hinge moments change with the opening angle non-linearly, and at certain angles quite erratically. The two halves have different characteristics which are not completely compatible so you cannot get exact balance at all stages.

If one half is above the wing and the other half below, conditions change between low and high speeds as for the lift dumping effects. Careful choice of size between the upper and lower components, or differential gearing, or non-linear lever systems give some hope for balancing the pair – or rather delicately under balancing them. However, the trailing edge again appears to be a good place, with the two halves mounted as one unit, and the hinge position chosen carefully.

Plates that slide sideways into view tend to suck open, possibly very violently. This effect being due to the very low pressure generated in the area where the airflow accelerates to a very fast local speed past the edge of the plate. Often the plates are given a broad edge, carrying a piece of skin that will close the hole when the brake is retracted. This area suffers from low pressure and picks up quite a large force which tends to suck the divebrake open. A strong over-balance or unsafe over-eagerness. You can minimise the effect by making the plates as thin as possible to retract into the narrowest of slots. But there is no way at all to make sliding plates blow shut.

The arrangement often called "dragons teeth" would probably allow the use of thin plates and minimise the eagerness. In this case it would be necessary to resort to springs in the circuit to pull the brakes shut, and these springs might need to be very strong to work at high speeds, which in turn would produce very strong handle loads at zero and low speeds. When the spring eventually brakes ....?

A tail parachute is bound to suck open violently, unless someone can invent a parachute that candles until it is pulled open, and candles again when released. So that is also ruled out.

THE PERFECT DIVEBRAKE?

We have now followed through the major points of the argument that led me to favour rotating trailing edge brakes when scheming the layout that became the Birmingham Guild Gypsy 135. Of course it is arguable whether this is the final perfect solution, but there is absolutely no doubt that they are a huge improvement on previous types.

They are very strongly effective; when opened in a terminal dive they decelerated the glider to 14 knots less than the placard speed. Landing approach is at about 1 in 5 – to get half this effect you have to move the handle half-way open. Hinge moments are self-closing at all times, and the handle loads at high speeds are reasonable. There is no lift boost or lift dumping effect at all.

Of course there had to be a snag, one which caused much heart-searching during development flying. At high speeds and very small opening angles, the brakes set up a rapid oscillation known as "control surface buzz". This was first invented by early transonic fighters, and they suffered it very badly, with shock waves making things worse. As the flow seperates from the front edge of the brake it tends to raise that edge, and as the new flow gets established this effect relaxes again. Flexibility in the brake and its control circuit allow it to move and spring slightly, so that it has a natural frequency of oscillation. At a certain airspeed, the rate at which the flow separation above the brake develops just matches the frequency of the brake, which rotates open and closed a few degrees around the setting you are trying to hold. This is in no sense dangerous, and stops immediately you open the divebrake a little more, but it would be disconcerting to a timid pilot, so it was necessary to fit viscous dampers to the brakes. These have plates rotating in a bath of thick oil, and so allow you to move the brakes steadily open without a huge force, yet completely inhibit the buzz from happening (this needs to move the brake rapidly open and shut, so that the oil gives very large resistance).

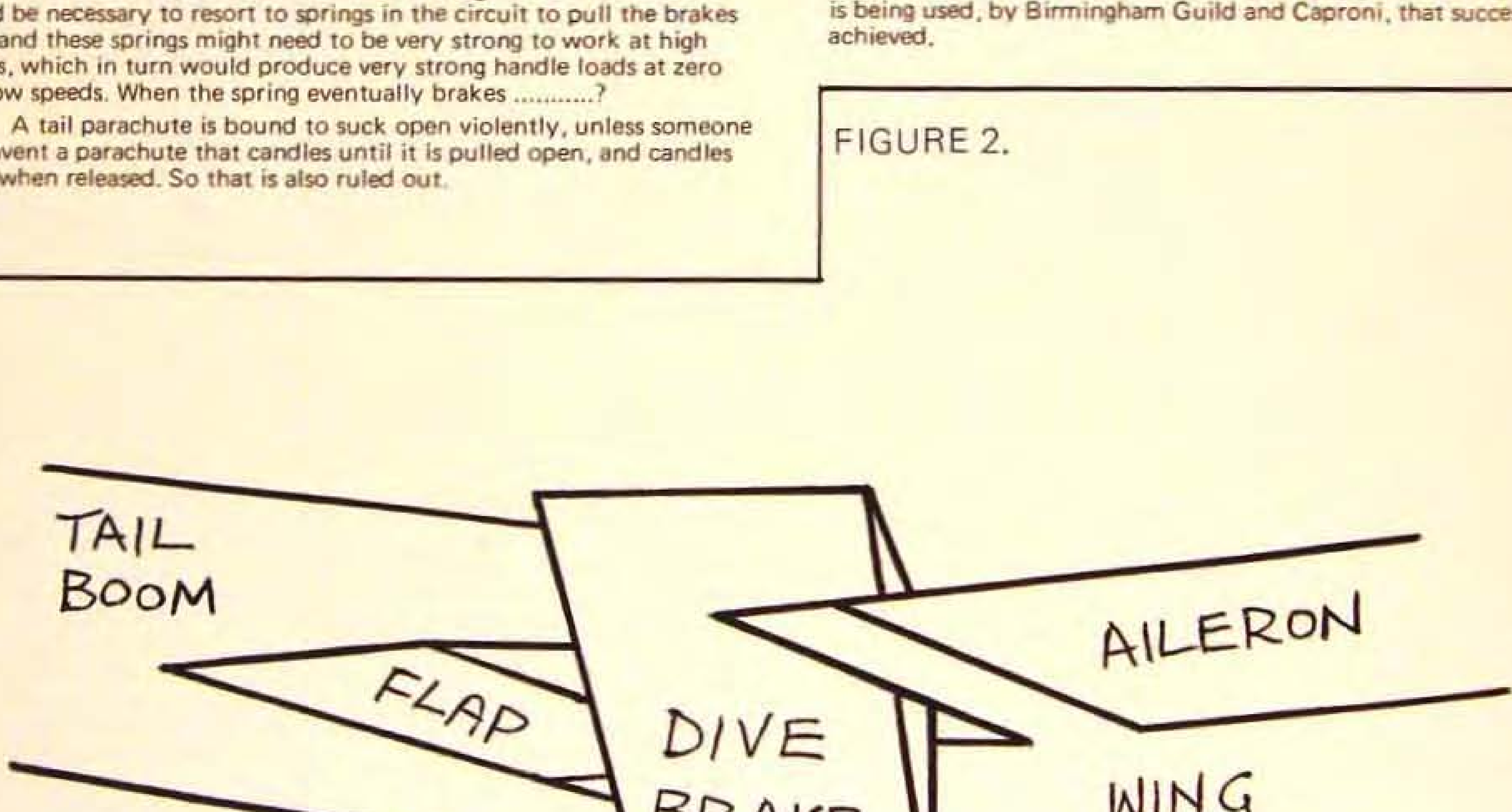
We think that the "stirring treacle" type of feel this gives to the divebrake is not merely acceptable, but attractive. In fact the way you see pilots' over-controlling the elevators, it might be a good idea to put a viscous damper in that circuit too!

Why haven't trailing-edge brakes been used before? But they have, on the de Havilland Vampire designed in 1942! (see Fig. 2 and Reference 2). The Fairey Barracuda had almost the same thing, and the Germans were making tunnel tests on similar units in 1941! (References 3 and 4).

Several glider designs that did not fly (more's the pity) showed trailing-edge brakes, for instance the Godwin design that came sixth in the 1947 BGA Competition (see Reference 5).

More recently some trailing-edge brakes have flown, but were too small to be properly effective and were discarded. It is not until now that the whole of the available trailing edge inboard of the ailerons is being used, by Birmingham Guild and Caproni, that success is being achieved.

FIGURE 2.



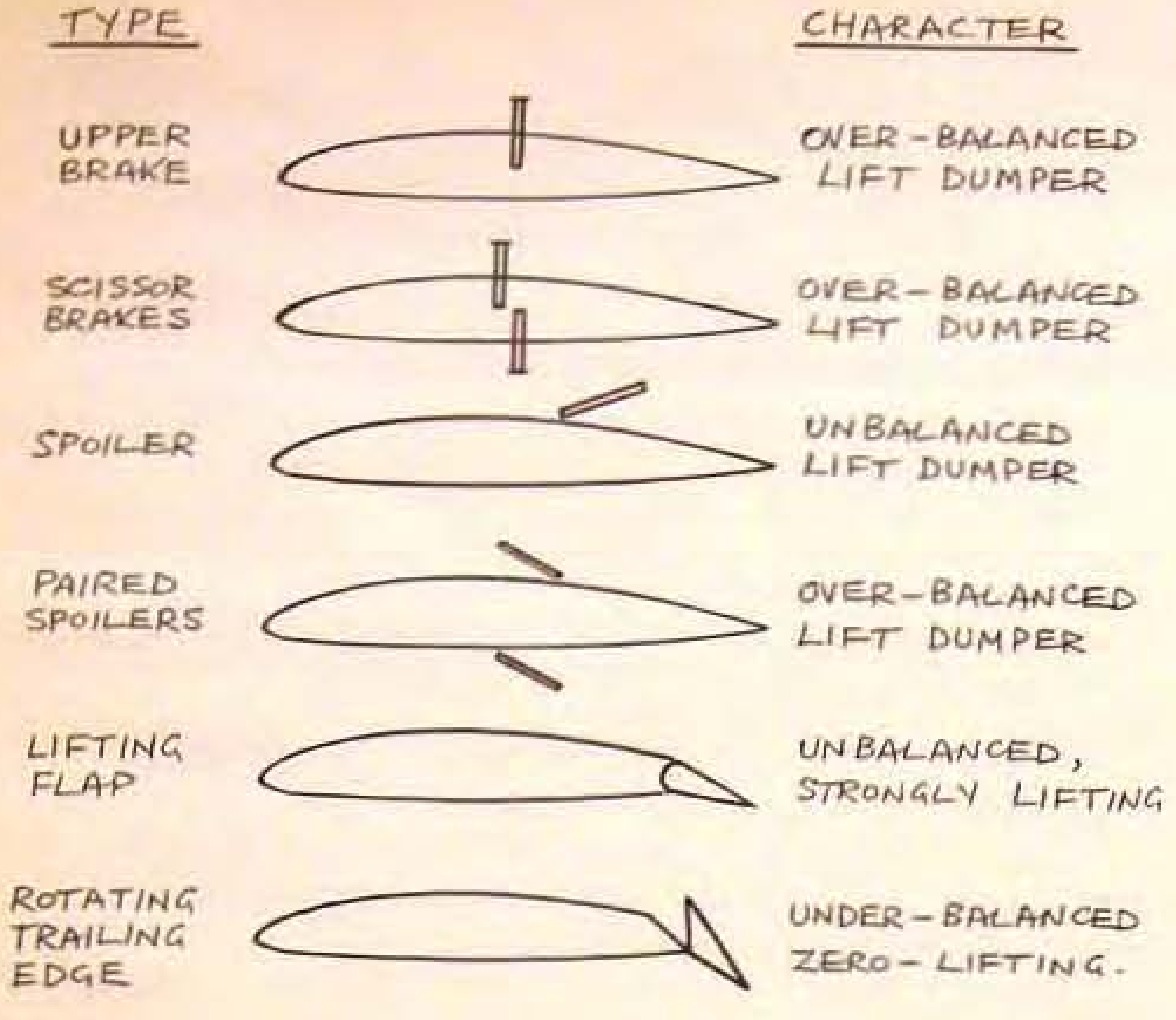


FIGURE 3. "WHICH ?"

WHICH?

The rotating trailing-edge divebrake emerges as not merely the Best Buy, but the only possible buy for effective operation without any of the dangerous side effects.

Brakes above the wings, and scissor brakes with equal areas above and below the wings, have a serious lift dumping effect which regularly causes heavy landing accidents.

Brakes which suck open (scissor brakes or overbalanced hinged spoilers) are also responsible for numerous accidents.

While there are no doubt changes that could be made to existing brakes to minimise, or even overcome, their deficiences, these are quite beyond the scope of most operators. They could only be carried out under skilled design supervision, and would require thorough flight testing prior to re-issue of the C of A.

In most cases it would be simpler to add trailing-edge divebrakes to an existing glider than to make alterations to the divebrakes already fitted.

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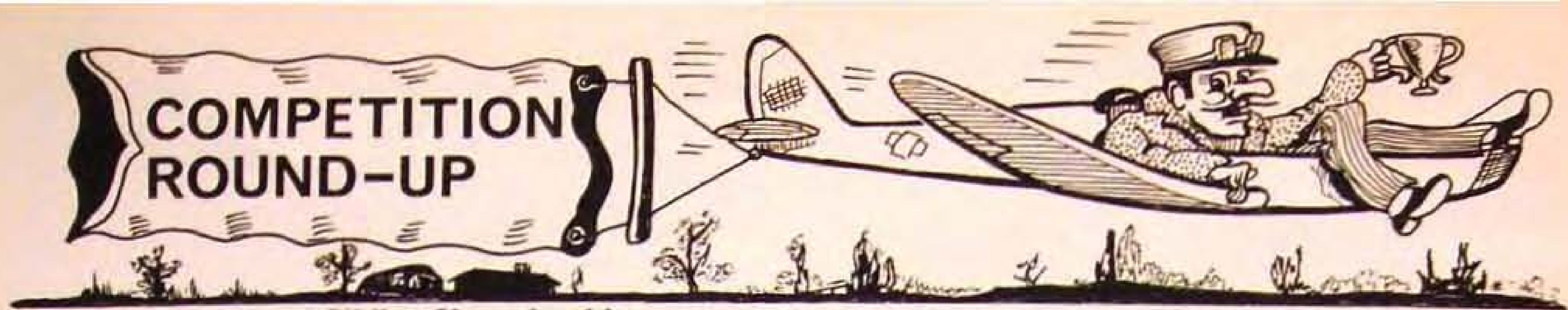
* *Chief Wind Tunnel Engineer, British Aircraft Corporation, Military Aircraft Division. Chairman, Saliplane Design Ltd., designers for the Birmingham Guild of the BG 135. Silver C, Full Instructor Rating, Blackpool and Fylde G.C.*



New Zealand National Gliding Championships

The tenth New Zealand Gliding Championships were held at Matamata, a small town in the fertile Waikato basin of the North Island, from 21st January to February 3rd, 1973.

A field of 21 gliders were entered in each of the two main groups. The Open (Handicap) and Standard Classes were combined and flew the same tasks while the lower performance Sports Class machines were given generally smaller routes. All classes were handicapped to NZGA rules.

Alan Cameron

Considerable interest was shown in the visit of Jan Wroblewski, the Polish World Standard Class Champion, who flew an ASW–15. Jan did not have a very successful competition, he found "our kilometres narrow and very long", but he was impressed by the friendliness of the competitors and crews. Indeed so many comments to this effect were heard from other pilots that it became hard to believe the selection of the New Zealand team for the next world championships hung entirely on the results of this contest.

The team was to be chosen from the first four placings in the Open (Handicap) class, provided two Standard class machines were included. As there were only three Open class machines (not to international specifications) in the contest, no complications arose.

The winner, Alan Cameron of Auckland (Libelle), has been New Zealand Champion before and has represented his country at several world contests. He won only the first and fourth day but flew consistently to finish the overall winner in both the Open and Standard classes. Nearly all the remaining 5 or 6 pilots in serious contention for the team had one or more bad days and the minor placings changed from day to day. Rory Gordon (Libelle), flying well on his home site made made up several places in the last few days to finish second while Tony Timmermans (Std. Cirrus) was third. Peter Heginbotham (Nimbus 2) had a difficult job overcoming the 74% handicap applied to his machine but achieved 4th place to Ivan Evans 5th by only 12 points out of 8000.

The Sports class was won by last year's champions; the team of Ari van Dyk and Peter Holthouse – who flew 5 days each in their K6–E. They too emerged as clear winners and flew consistently well to win not only the trophy, but also a parachute for their club, donated by the Rothmans tobacco company which sponsored the contest.

1st day (All comments from here refer to Open (Handicap) only.)

Task 162 km triangle.

Weak conditions with a strong inversion at 3500 feet. 14 completed.

1. A. Cameron (Libelle)	65.39 kph	1000 pts.
2. R. Gordon (Libelle*)	63.36 kph	927

*This is a flapped Libelle but flaps were fixed in position.

2nd day

Task. 248 km triangle. Similar conditions but with a strong wind. Only one completed the task due to severe cloud over development at the 2nd turn point.

1. I. Pryde (Libelle)	51.1 kph	800 pts.
2. I Evans (Libelle)	208 km	668
3. A. Cameron	204 km	656

3rd day

Task. 243 km triangle. 10 completed the first 8 placings were less than 80 points apart.

1. D. Yarrall (Std. Cirrus)	62.02 kph	1000 pts.
2. I. Evans	61.83 kph	997
3. A. Cameron	61.69 kph	994

4th day

Task 167 km triangle. 11 completed in generally better conditions than during the first week. There had been 4 enforced rest days up to this point.

1. A. Cameron	58.7 kph	1000 pts.
2. T. Timmermans	58.3 kph	992
3. B. Fowler (Libelle)	57.5 kph	978

5th day

Task. 168 km triangle. A 10 degree inversion at 4000 feet kept cloud to a minimum allowing strong heating to give good thermals. 17 completed out of 20 starters.

1. B. Fowler	65.8 kph	1000 pts.
2. D. Yarrall	65.08 kph	980
3. T. Timmermans	64.8 kph	974

'Jantar' model, presented to N.Z.G.A. by Jan Wroblewski.

6th day

Task. 206 km triangle. The inversion lifted to 7000 feet but severe over development on the second leg caused all competitors to land out.

1. P. Lyons (Libelle)	177 km	800 pts.
2. J. Wroblewski (ASW 15)	165 km	748
3. P. Heginbotham (Nimbus 11)	188 km	716

7th day

Task. 245 km triangle. Good conditions allowed 17 to finish the task. Heginbotham's speed of 72.2 kph was the fastest flight in the contest but his handicap relegated him to 6th place.

1. T. Timmermans	69.5 kph	1000 pts.
2. J. Wroblewski	67.7 kph	953
3. A. Cameron	64.1 kph	863

8th day

Task. Distance within a prescribed area. Good conditions with much cloud flying made this an interesting day. Greatest distance was by Heginbotham – 482 km.

1. T. Timmermans	451 km	1000 pts.
2. R. Gordon*	451 km	977

* The flapped Libelle's handicap is 86% compared to most Std. class gliders' 88% under NZGA rules.

At this point cumulative totals showed:–

1. A. Cameron	6749
2. R. Timmermans	6687
3. I. Evans	6469
4. R. Gordon	6390
5. B. Fowler	6276
6. P. Heginbotham	6199

9th day

Task. 303 km triangle. Strong conditions occurred on 1st and part of second leg but an over development at the 2nd turn point caught most pilots. Only 4 completed thereby changing the points table considerably.

1. P. Lyons	64.6 kph	1000 pts.
2. A. Cameron	63.0 kph	994
3. R. Gordon	63.6 kph	986
4. P. Heginbotham	65.4 kph	925

The overall scores were now:–

1. A. Cameron	7743
2. T. Timmermans	7378
3. R. Gordon	7376
4. P. Heginbotham	7124
5. I. Evans	6985
6. B. Fowler	6777

10th day – final day

Task. 234 km triangle. The day started weakly but improved markedly although there was little over development. 11 completed. Rory Gordon was some 10 minutes faster than the rest. Fowler in a "go for broke" effort landed out.

1. R. Gordon	71.3 kph	1000 pts.
2. T. Timmermans	66.1 kph	938
3. I. Evans	65.5 kph	922

Final placings.

1. A. Cameron	8564
2. R. Gordon	8376
3 T. Timmermans	8317
4. P. Heginbotham	7919
5. I. Evans	7909
6. B. Fowler	7074
7. I. Pryde	7071
8. D. Yarrall	6989
9. P. Lyons	6538
10. J. Wroblewdki	6289

Thirteenth Australian National Gliding Championship

January 3rd – 14th, 1973

reported by Bob Muller and Martin Simons

Once again Ingo Renner won the Open Class Championship at Waikerie, venue for the 1974 World Gliding Championships, flying the Cirrus XV borrowed from John Best. Ingo was almost left without a sailplane for the contest, but managed to arrange a loan of the Cirrus a few days before the competition began. He went on to win five days out of seven, and was second on another day, accumulating a lead of 58 points over David Jones, who was placed second.

John Williamson receives his N.G.A. tie from Sir Donald Anderson.

In the Standard Class Maurie Bradney beat Malcolm Jinks by seven points to become the new champion. The competition in this class was exceptionally keen with 31 aircraft competing, and some close results appeared.

The Sports Class was less well supported than in previous years. Gary Sunderland won the League 1 contest and John Boatswain and Peter Thomann tied for the lead in League 2. The Sports Class team award went to Bob Sutton and John Boatswain, who flew the Foka 5.

A total of 54 sailplanes competed with 70 pilots. There were seven contest days out of ten, both the first and last days of the meeting being declared no-contest days because of bad weather. At no time did Waikerie produce its best soaring conditions but the competition was extremely successful although, or perhaps because, conditions were often difficult.

The first contest days task, a 202.6 km. triangle via Meribah and Alawoona for the Open and Standard Class machines and a 151.6 km. out-and-return to Alawoona for the Sports class was considered by most pilots to be a 'classic' run, although patches of high cloud did produce some shaded areas which weakened convection.

Sue Martin (St. Libelle) who finished seventh, had four starts because of radio problems. Her exasperated comments were overheard by John Williamson who at the time was flying over the contest area – but not in his glider. The R.A.F. Hercules that was bringing him to Australia was still en route to Edinburgh Airbase.(Moss Potter, Ops. Director, was later heard to complain about certain 'ghost gliders' that were heard to report over the start gate – was the John Williamson Libelle one of these?

Ingo Renner won the day and attributed his success to correct choice of start time, but thought the lift hard to work, giving the smaller aircraft an advantage. The days flying produced more than 9500 kms. of cross-country flying and about 200 hours in the air. John Williamson arrived by road from Edinburgh later that day.

A macabre experience

With a weather forecast similar to that of the previous day, the task-setters decided upon an increase of distance for all classes on the second contest day. For the Open and Standard Classes, a triangle of 319 km. via Maggea and Lake Cullulleraine while a 271 km. triangle with turning points at Maggea and Meringur was the target for the Sports Class.

Tie-down area

Ingo Renner again won the day, with Tony Tabart and John Blackwell equal second. Malcolm Jinks headed the Standard Class. Only three of the Sports Class finished, Bill Mudge (ES 60) Paul Thomann (ES 60B) and R. Tomlinson whose rime was 2½ hours slower than that of Mudge.

John Williamson, British team member for the 1974 World Championships, flew his first contest task in Australia under some difficulties. His radio and electrical gear had suffered during his around the world trip, and he was using maps of unfamiliar scale. He found circumstances entirely new, with predominantly 'dry' thermals, and as a result flew cautiously but thought the task a good one for the conditions, and finished twelfth in his class. Malcolm Jinks found good thermals but had to work in a low band from 2000 to 4000 ft., occasionally breaking through to 5000 ft., but getting low south of Barmera on one occasion, but generally getting 700 f.p.m. over dust devils. Leo Petrauskas in the Sports Class reached the aerodrome but failed to cross the finish line, so scoring only his distance. Bert Persson landed early on the first leg and was aero-towed off for another go. Returning late he was defeated by the sea breeze and landed five miles out.

Another West Australian, Jack Dewhurst, had a macabre experience. Having landed out ten miles past the second turning point he found, in his paddock, the corpse of an old man who had died apparently of natural causes. The police had found an abandoned bicycle by the road side but had not discovered the fate of its owner until Jack called them.

The ground staff also found things tough. To test the temperature a crew on the starting grid actually fried an egg on the metalwork!

Radar "Golf Ball" at start gate

Three flights of 677 km.

On the third contest day and for the first time in Australia, the task for all classes was Prescribed Area Distance or Cat's Cradle. Eight turning points were named – Waikerie, Renmark, Lake Cullulleraine, Neribah, Pinnaroo, Alawoona, Karoonda and Swan Reach. Pilots could visit any or all of these in any sequence and as often as desired to accumulate the maximum possible distance. The only restriction was that after visiting one turning point, at least two others had to be rounded before returning to the same point. Only the last leg of the course could by flown as a 180° reverse track.

There was no start gate, pilots were awarded a bonus of one kilometre for each minute their take-off was delayed after the first launch – this was a controversial measure but was generally agreed to be better than nothing. A pilot who took off last might score sixty kilometres without leaving the aerodrome – but as it happened no one did so badly. Many pilots aimed to finish the day somewhere close to Waikerie to save long retrieves, but often they arrived over the site with several thousand feet in hand and still an hour or so of daylight left, so they were obliged to set off into the gathering dusk.

In the Open Class, quite incredibly, three pilots, Ingo Renner, Paul Mander and David Jones, flying completely different routes, tied for first place with 677 km. In the Standard Class Dick Deane totalled 624 km. after losing 10.5 km. as a result of a misplaced photograph. Martin Simons also beat the magical figure of 600 km. by 2 km.

The day produced what surely must be a record for any National competition. In all, competitors flew nearly 25,000 km., and over 400 hours.

Ingo Renner and Malcolm Jinks

Tabarts troubles

By virtue of his consistently brilliant flying, Ingo Renner was now placed firmly at the top of the Open Class table, with Tony Tabart established in second position at the start of the fourth contest day. Pilots had a choice of four triangles varying from 269 km. to 392 km. but prevailing conditions pointed to flying the shortest track and every pilot without exception came to this decision.

For the first time during this competition, Ingo Renner did not win the day, he was beaten by Paul Mander whose speed of 105.8 kph was just over 1.5 kph faster than Renner. Paul Mander said he considered the choice of start time critical, since those who chose the wrong time were caught under banks of high cloud. He made a fast trip to Nildottie with 6 kt. thermals to 6,500 ft., chased the sunlight along the second leg and found thermal streets, with a slowish but easy final leg, to glide home.

Tony Tabart had trouble with his aircraft as he crossed the start line, experiencing severe vibration of the Kestral 17. Everything loose in the cockpit flew down to the nose and he made a quick landing to ascertain the source of the trouble. It proved to be a sloppy flap linkage. He therefore, temporarily, restricted himself to a maximum airspeed of 80 kts., and this plus his enadvertently late start slowed him down and dropped him to seventh place.

In the Standard Class, Ray Dilley who was flying in his first Nationals, achieved premier position. His formula for success being somewhat unusual to say the least – he thought he was behind the whole field and kept chasing gliders he could see ahead. He had a good run to Nildottie but arrived under a dark cloud shadow and had to scratch to get away again. After this he had a struggle to Meribah, where one good thermal seems to have worked all day, being used by a whole succession of gliders, taking them up to 7000 ft. One more good thermal on the last leg took the leaders home – Dilley unknowingly being one of these.

Outlandings galore

A ridge of high pressure centred in the Australian Bight brought Waikerie under the influence of southwesterlies between 10 and 20 kts. Thermals to heights of 7000 ft. but of only moderate strength were forecast, with streeting east of the Mt. Lofty Ranges. Some patches of high cloud were still about, and it was predicted that a sea breeze would initially come from the N.W. Spencer Gulf area rather than from the south. So ran the met. man's prognostication for contest day five.

The task for both Open and Standard Classes was a figure eight or 'reflex quadrilateral' race via Robertstown, Hallet and Burra with return to Waikerie – 303.1 km. Sports Class competitors were set a triangle race of distance 245.4 km.

During the course of the day the weather deteriorated and over twenty aircraft ended the day somewhere along the last leg, while another dozen or so came down in the hills. Some were gradually trapped by the gentle rise of ground as they approached Robertstown – with altimeters still reading 2000 ft. they were only a few hundred feet above ground and a missed thermal at this altitude meant an immediate landing.

Only seventeen pilots completed the course; six in the Open ten in the Standard and one solitary pilot in the Sports Class – Gary Sunderland, who during the course of the task flew his 1000th hour in gliders. He has competed in every Australian National Championship since they began and this was his first win.

Ingo Renner returned to the winning trail by completing the fastest time of his class, with Maurie Bradney winning the Standard Class for that day.

Sel Owen, flying the HP 14T, experienced severe buffeting at 100 kts. as he was going over the starting line. The vibration stopped at 80 kts., Sel immediately landed and submitted an incident report, everybody being mindful of Jan Coohaas's experience last year when his HP 14T broke up and he had to jump for it. The latest incident with this type may help to throw light onto that case.

John Williamson's day

With a forecast of low strength thermals rising to only 5000 ft. late in the afternoon followed by a weak front which would cut everything off by 1700 hrs., the task-setters decided that a short triangle of distance 166.7 km. via Alawoona and Loxton would suffice.

Flying was better than expected, but many pilots after their longish retrieves of yesterday, were glad that day six was comparatively easy. For crews and spectators it was one of the most exciting days of the meeting. Most of the aircraft started within a few minutes of each other, streaming across the start-line in quick succession, and the finishes were even closer packed, often with three or four machines flashing across the airfield almost together.

In many ways it appeared to be a straightforward day, with the gliders having started together they tended to go around in gaggles. On the first leg it was possible to dolphin for considerable distances, and with gliders marking almost every thermal ahead, progress was quite easy. After rounding the first turning point the route lay across thermal streets, and although there was no shortage of lift it became essential to burn off some height between climbs.

The last leg produced some fine flying, with final glides being judged to the limit. As the close times proved, anyone who did need to take three or four extra turns on this stretch promptly put himself down half a dozen places.

Paul Mander headed the Open Class with a time of 2.02.4 and John Williamson's time in the Standard Class was 2.21.6. Perhaps everyone was conscious of the great pressure and need for speed at all times; there were several bad turning point photographs. John Williamson's camera had fallen out of its mount so that he had to fumble with it at critical moments. Maurie Bradney also had trouble, he completely missed the turning point (a small shed by the railway) at Sandalwood in his photograph by banking too steeply. However, he was observed and his photograph did show that he was in the right sector.

The final day

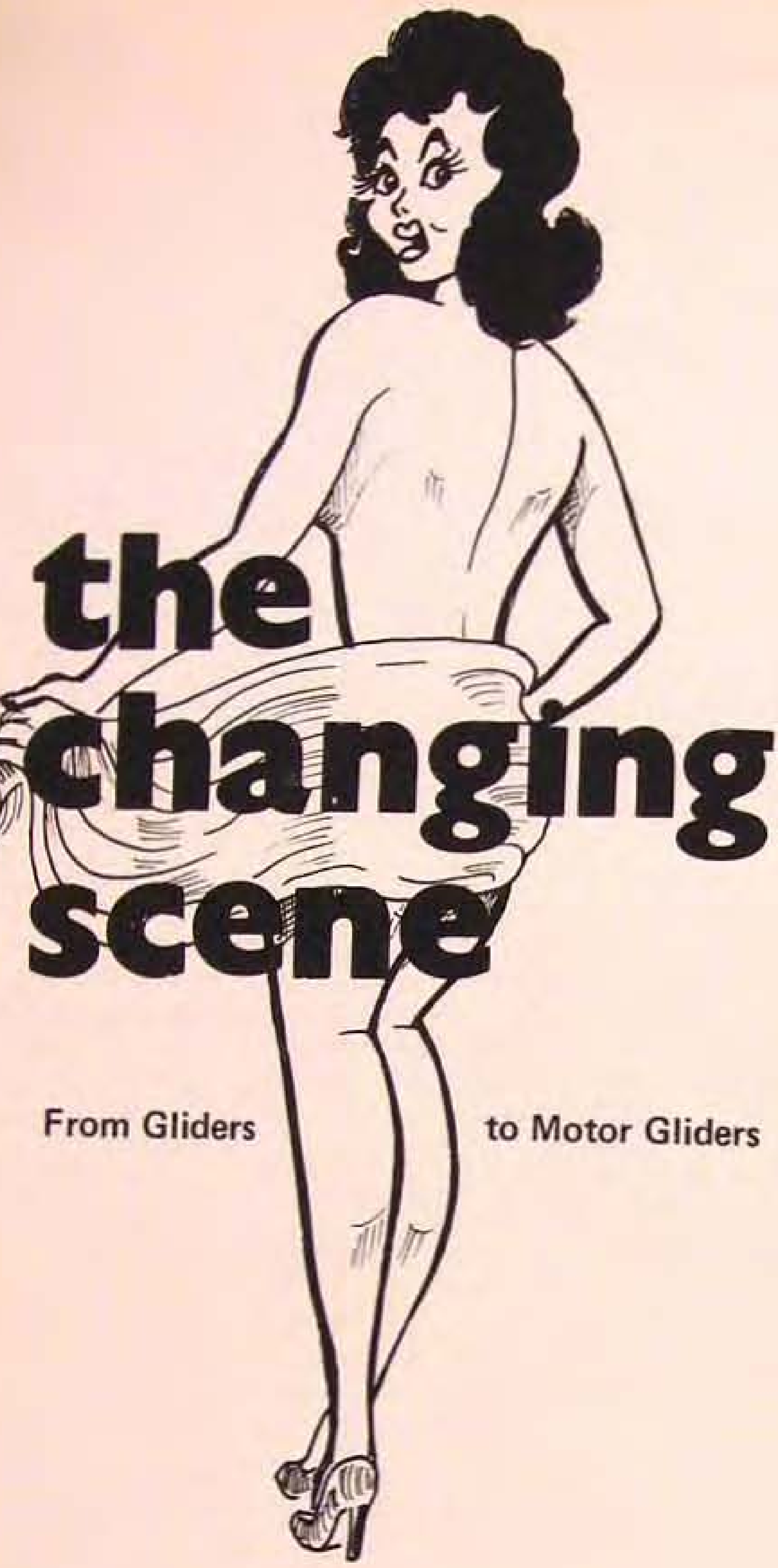
Only 18 pilots completed the set courses on the final flying day of the competition, and as had become the custom, Ingo Renner rounded off his fabulous week with another first. Dick Deane took the premier Standard Class placing in a time only a few minutes slower than Renner.

RESULTS

13th Australian National Gliding Championships
Waikerie. 1972-73

FINAL SCORES

STANDARD CLASS Pilot	Glider	Aircraft ident.	1 (4.1.73) Pts	2 (5.1.73) Pts	3 (7.1.73) Pts	4 (8.1.73) Pts	5 (9.1.73) Pts	6 (10.1.73) Pts	7 (11.1.73) Pts	Individual Championship Score	Place
Bradney, M.	St. Libelle	BA	58	52	50	54	64	52	56	386	1
Jinks, M.	Lib. H301B	24	56	60	55	52	62	56	40	379	2
Deane, R.	St. Libelle	BW	46	46	60	40	58	62	64	376	3
Dilley, R.	St. Libelle	322	38	58	41	57	54	60	26	334	4
Beckwith, O.	Lib. H301B	2	36	54	46	49	50	30	44	309	5
Simons, M.	St. Libelle	BV	50	42	58	40	42	50	23	305	6
Williamson, J.	St. Libelle	11	0	32	32	44	39	64	37	248	12
OPEN CLASS											
Renner, I.	Cirrus	XV	84	84	82	78	86	82	84	580	1
Jones, D.	Kestrel 17	301	78	73	82	56	74	79	80	522	2
Mander, P.	Kestrel 19	ZG	76	73	82	80	66	86	34	497	3
Tabart, A.	Kestrel 17	XC	82	81	78	16	83	84	58	482	4
Blackwell, J.	Lib. H301B	283	74	81	76	72	2	79	76	460	5
Geake, R.	Kestrel 19	SY	70	78	72	74	22	76	67	459	6



the changing scene

From Gliders to Motor Gliders

If anyone doubts that gliding's popularity is not increasing then a quick glance at a few statistics will show the true facts.

Ten years ago the movement comprised 427 gliders, 131 of them privately owned. In a year (1961) there were 226,000 launches yielding 39,500 hours and 49,000 cross-country miles. The most recent analysis (1972) shows 905 gliders, 510 private, 353,000 launches and 81,200 hours. The cross-country mileage was 93,000, poor by comparison with some years but nevertheless something like double the mileage of ten years ago. One thing is sure, the movement is becoming much more orientated toward cross-country flying.

A subjective impression of present-day gliding which can only be made by those who have been around for a few years is that gliding operations are much more efficient than they used to be. Further statistical anaylsis suggests that this is not true. The average club member of 1962 achieved 40 launches and 7 hours in the year. By 1972 the same average member was getting 40 launches and 9.1 hours. The growth of the movement appears to have bene-

Scheibe Tandem-Falke

fitted more people but not significantly the individual. Indeed as the proportion of privately owned gliders changes (30% of the total in 1962, 56% in 1972) it seems probable that the average club members lot is getting worse. This is supported to some extent by the glider utilisation figures which are:

Year	Lauches/glider	Hours/glider
1962	528	92
1967	457	99
1972	390	90

Although the typical club gliders' utilisation may not be reducing at all, the decline in launches per glider per year is likely to continue if the proportion of privately-owned gliders continues to increase. Certainly with total membership at 5700 in 1962 and 8900 in 1972 the number of members per club glider, another measure of the facilities offered, is no better now than it ever was. An approximation on this figure may be had by assuming four pilots for each privately owned machine and seeing how many club members per club glider remain.

Year	Numbers of Gliders		
	P.O.	Club	Total
1959	68	226	294
1962	131	296	427
1967	251	341	592
1972	510	395	905

Membership			Members
Flying Gliders			Club glider
.P.O.	Club	Total	
264	4012	4286	17.7
524	5186	5710	17.5
1004	6866	7870	20.1
2040	7890	8930	20.0

Reasonably static figures not indicating any significant changes, but certainly not an improvement.

The overall picture is one of a movement becoming top heavy with private owners, a look at one or two of the larger clubs will confirm. Lasham centre has, in ten years grown from 41 gliders (21 privately owned) to 102 (78 privately owned) an increase of 4 club aircraft and 57 private ones. London Gliding club shows a similar picture, from 33 (23 private) to 56 (47 private) in the same ten-year period. The slow growth rate in the numbers of Club gliders is due to several factors, the 'streamlining' of the club fleet and the 'cut-off' at the top end of the performance range being perhaps the most significant.

The steamlined club fleet may now-a-days comprise one type of two-seater and two types of single-seater, a far cry from the days of T.31, T.21, Cadet, Tutor, Grunau, Prefect, Olympia 2 and Skylark 2. Some aspects of the change are favourable, certainly there will be improved utilisation and perhaps economic viability. However the pilot progressing through the modern club may be significantly less experienced than his counterpart of 10 years earlier because of the fewer types that he has flown. The 'cut-off' at the top end of the performance range is perhaps more significant in influencing the swing to private ownership.

RF-5 Sperber

Ten years ago many clubs had at least one glider with a glide angle of 1 in 30 or thereabouts. A glider with a 1 in 40 glide angle would be quite unique in todays club. Again there are ramifications; the pilot who has flown only three or four types buys his own high-performance glider and although it isn't more difficult to fly, quite the reverse in fact, it is very much more subtle. This subtlety more than anything else is going to give problems in the future unless we see a significant improvements in training methods.

Other changes are taking place of course. The motor glider is with us. Sought after for years to broaden, improve and expedite training, its arrival on the scene certainly did that. At the same time it removed the training 'bottleneck' to produce a new one in the club solo fleet. Viewed with suspicion by the diehards it does not, so far, seem to have harmed the movement as a whole except perhaps to drive another nail into the coffin lid of club spirit. If the indications of other gliding movements are anything to go by we might expect a continued increase in the numbers of motor gliders. 10% of the machines in the German gliding movement are motor gliders. At present we have 15 in 905 not including the Fourniers which are excluded by the Redhill definition of a motor glider. All these changes, inevitable and inexorable as they are, are undoubtedly going to alter the movement as we know it. Whether for the better we will just have to wait and see. The extent of the changes may of course be significantly modified by the nature of the developments in the motor glider. The second generation is with us in the form of the tandem Falke and Schleicher K–16, and as well as being better gliders they are also better aeroplanes in terms of improved cruise performance at least. It must be supposed that the parallel development in both respects is inevitable but one cannot help but feel that the improved aeroplane characteristics will influence the movement in two ways. Firstly by drawing off the frustrated aeroplane pilots already with us and secondly by attracting aeroplane pilots or people who want to train as aeroplane pilots. This latter effect is probably the one that could do us most harm. Clubs should be aware of the potential risks and guard against them if they see fit.

It does seem that the development of the motor glider will eventually be halted by economic factors This appears to be so in the case of gliders, the limit to the number of gliders in the Kestrel 19/Nimbus/ASW-17 must be reached eventually as the resurgance of interest in the medium performance glider (1 in 30) seems to indicate. As far as the two-seater motor glider is concerned it is difficult to envisage getting much beyond the present 1 in 25 glide angle simply because sufficient return on the large capital investment seems unlikely.

So back to the opening statement "gliding is becoming increasingly popular". How best to cope with the increased demand is a matter for conjecture, or is it?

In ten years there has been an increase in the number of gliders per club from 7.3 to 10.5 and in the number of clubs from 58 to 86. Very few clubs either own their sites or alternatively have any real security of tenure, some are increasingly threatened by controlled airspace and others by the rise of land values. It seems almost inevitable therefore that the number of sites must be reduced with clubs sacrificing their autonomy for security. The larger centres will need properly managing and much will depend upon the foresight of the Committees that eventually relinquish control to the managers. More professional instructors will be required and here, as in management, the problem will not only be one of attracting the right people but of retaining them too.

With an increase in professionalism there is a risk that the non-professional instructor will contribute less. This I am certain would detract from the operation as a whole as well as detracting from the club spirit yet again.

The changes that are taking place within the gliding movement occur for the most part quite gradually and consequently un-noticed. Complacency more than anything else may make the movement into something that we do not want it to become.

VINTAGE GLIDER RALLY AND APPEAL:

A vintage Glider Rally is to be held at Husbands Bosworth from the 26th May until the 3rd June, at the same time as the Sport/Club C[illegible] and a Vintage Steam Engine Rally.

It is hoped that Clubs will publicize this event so that any owners of vintage gliders flying at their sites will be encouraged to enter. So far the Rally has been advertised in Sailplane & Gliding and in foreign magazines. It is hoped to further publicize the event by distributing posters and entry forms to clubs and owners of old gliders.

Considerable interest has already been shown at home and abroad, and the most modern gliders that have been accepted as entries have been Slingsby SKYs which are now 20 years old. Especial interest has been shown in Switzerland. So far enquiries about entry have been received from the owners of a Moswey 3, a Spyr 4 a Spalinger S.18 and a Jutter J.28. A Minimoa has been entered from Germany and the entry of an AIR 100 has been received from France.

Unfortunately, one of the Swiss entries has now been withdrawn because of the terrific cost of the channel crossing, (well over £100 [illegible] with trailer) and it is thought that the other foreign entrants may cancel when they discover the cost of the sea crossing. Therefore, a sponsor for this Vintage Glider Rally is being urgently sought. Some of the money would be used to assist those pilots who will be coming from long di[illegible] away. All enquiries, entries and offers of help should be sent to Christopher Wills, Juntercombe End Farm, Nettlebed, Oxon as soon as [illegible]

INTERNATIONAL MOTOR GLIDING COMPETITION 1973

The German Aero-Club is organising this Competition from May 26th – June 3rd, 1973, at Burg Feuerstein, near Nur[illegible] [illegible] purpose of the Competition is the exchange of experience in preparation for the Motor Gliding World Championship, and the meeting is initiated by [illegible] CIVV. Further information and entry forms can be obtained from the Deutscher Aero Club, 6000 Frankfurt/Main Niederrad, Lyoner Strasse [illegible] West Germany.

1st INTERNATIONAL WOMENS' GLIDING CONTEST:

This is a further reminder of the proposed Womens' Gliding Contest, to be held at LESZNO in July 1973. The competition will last for about [illegible] days, and contestants would fly Polish Pirat gliders on a rental basis. A Silver C and not less than 150 hours P.I. is the minimum requirement for entry, and further information can be obtained from the BGA office.

CLUB DIRECTORY

CLASSIFIED ADS.