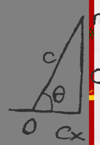
ENAC 3^{me} Ed

R_z

x



R_z

C_z MAX.
$\alpha = 18°$
$= 21°$
$\alpha = 12°$
$= 24°$

$\alpha = 6$

$= -3°$
$= -6°$

$C_z = -\frac{R_z}{\bar{q}S}$

DRAG COEFFICIENT

POLAIRE VENT ARRIERE P231

AXIS ARE LINKED TO SPEED
VARY INCIDENCE α

THE POINT 'M' AT THE EXTREME OF 'R' DESCRIBES A CONTINUOUS CURVE. THE COMPONENTS OF M ARE 'R_x' + 'R_z', WHICH ARE NEGATIVE IN THE DIAGRAM.

ANGLE θ IS THE ANGLE BETWEEN THE RESULTANT + 'V' SPEED.

θ + R ARE THE POLAR COORDINATES OF M

$\bar{q}$ KINETIC PRESSURE ~ WIND 'V' ON SURFACE 'S' PRODUCES A FORCE 'F' WHICH INCREASES AS THE SPEED INCREASES $\frac{F}{S} = \bar{q} = \frac{\rho V^2}{2}$

IF WE DIVIDE OM + ITS COMPONENTS $R_x + R_z$ BY $\bar{q}.S$ WE GET SIMILAR TRIANGLES. SINCE:
$R_z = -\bar{q}SC_z$ AND $R_x = -\bar{q}SC_x$

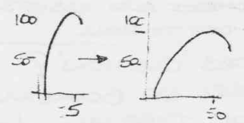
TO GET C_x AND C_z POSITIVE, CHANGE THEIR DIRECTION TO OPPOSE $R_z + R_z$, THAT IS TO THE UPPER RIGHT HAND SIDE.

M' BECOMES 'm', A COMPONENT OF C_x AND C_z

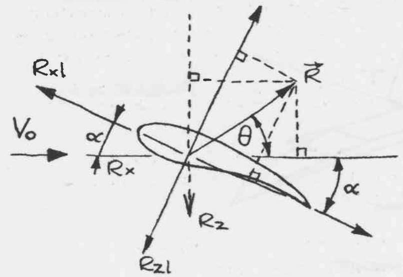
OM REPRESENT A $\bar{q}S$ PRÈS LA RESULTANTE. A
ANGLE Om WITH THE x AXIS IS $\hat{\theta}$
POINT 'm' DESCRIBES A CURVE HOMOTHETIQUE TO THAT DESCRIBED BY 'M'
THIS CURVE IS THE 'POLAR'
IT IS GRADUATED IN ANGLE OF ATTACK 'α'

ELLE DONNE A $\bar{q}S$ PRÈS LES COORDONNÉES POLAIRES DE L'EXTRÉMITÉ DE LA RESULTANTE AÉRODYNAMIQUE

* C_x SCALE IS NORMALLY DISTORTED TO PRODUCE A MORE USABLE CURVE



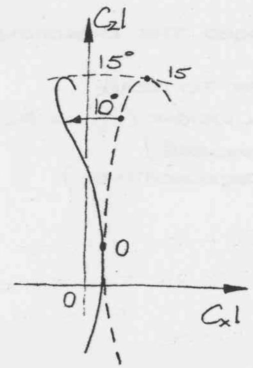
(58) ENAC ~ POLAIRE DE LILIENTHAL

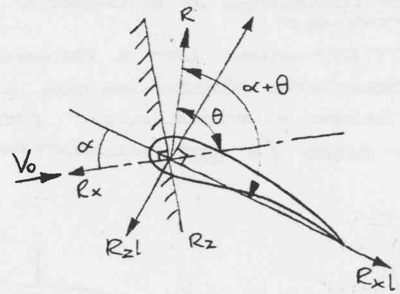


THE AXIS ARE NO LONGER BASED ON THE APPARENT WIND BUT ON THE CORD OF THE PROFILE OF THE WING OR BLADE.

WITH THIS NEW AXIS THE RESULTANT MAKES THE ANGLE $\theta + \alpha$

LILIENTHAL'S POLAIRE IS CONSTRUCTED BY ROTATING EACH POINT OF THE NORMAL POLAR AN AMOUNT CORRESPONDING TO THE ANGLE OF ATTACK ABOUT POINT O.

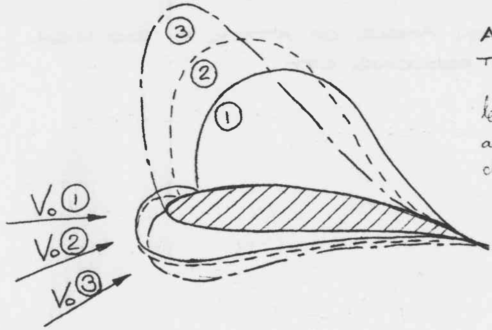




THIS CURVE ONLY APPEARS AT LARGE ANGLES OF ATTACK AND THE RESULTANT CAN SOMETIMES BE SITUATED INFRONT OF THE PERPENDICULAR TO THE PROFILE (EFFECT OF SUCTION ON THE LEADING EDGE) BUT IT IS STILL BEHIND THE PERPENDICULAR TO V_0 (cf. POLAIRE NORMALE)

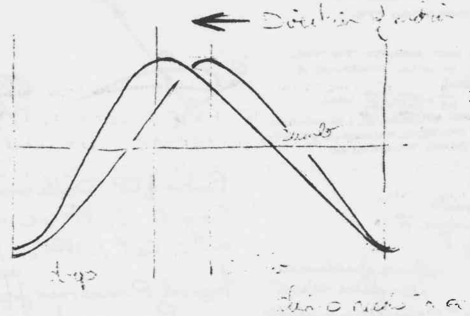
EXAMPLE: FOR $\alpha = 15°$ THE RESULTANT IS TO THE RIGHT OF THE VERTICAL AXIS FOR THE NORMAL POLAR AND TO THE LEFT FOR LILIENTHALS POLAR.

CHANGES IN LIFT WITH INCREASING ANGLE OF ATTACK



AS THE ANGLE OF ATTACK INCREASES THE CURVES CHANGE FROM 1 2 3

le point de dep max avance sur le extrados ainsi que le point de rebroussement le point d'arret recule sur intrados.



SINK DRAG MUST EQUAL CLIMB + DISTANCE

Speed with rtitudes

Swan climbs axis

inches

energy input must come from pilots arms. so it is ROLL INPUT

at resistance i pitch – bar being pulled forward at base of climb.

In resisting pull body is pulled forward.

CP moves forward pull i at top does it provide a little thrust.

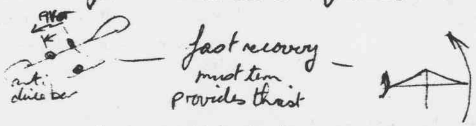
Fly glider as propeller – sculling

climb must be steep & strong

accelerate down at the top of climb

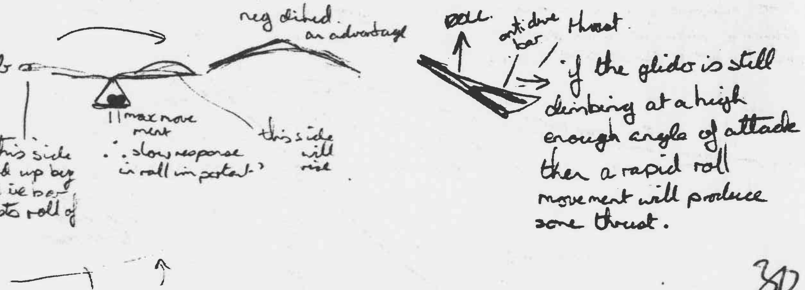
ut. Housemartin cannot put a lot of energy in through wings so it has to fly where there is lift? Thermal or dynamic

* fast strong pivots thrust



Thrust must come at beginning and end of climb.
– thrust from vortex only reduces drag it does not overcome it

Turn at top of climb must be energetic



If the glider is still climbing at a high enough angle of attack then a rapid roll movement will produce some thrust.

30

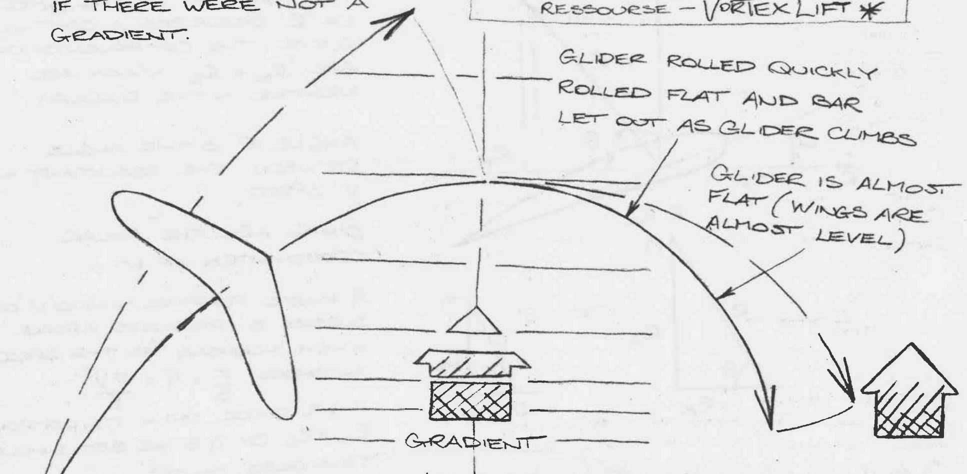
EFFECT OF GRADIENT ON A TURNING HANGLIDER.

* IF WEIGHT INCREASES GLIDER BECOMES CABREUSE/TAIL DOWN ~ WHAT HAPPENS IN RESSOURSE – VORTEX LIFT * ?

EXPECTED PATH DOWNWIND IF THERE WERE NOT A GRADIENT.

GLIDER ROLLED QUICKLY ROLLED FLAT AND BAR LET OUT AS GLIDER CLIMBS

GLIDER IS ALMOST FLAT (WINGS ARE ALMOST LEVEL)

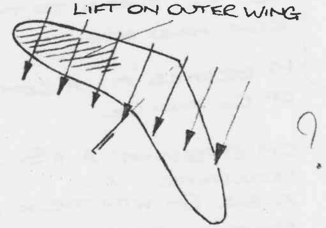


DOWNWIND PASSAGE THRO' GRADIENT ACTS TO ASSIST THE ROLL OF A HANG GLIDER THAT IS TURNING

UP WIND PASSAGE THROUGH GRADIENT ASSISTS MOVEMENT ROUND THE YAW AXIS OF THE HANG GLIDER

* EFFECT ON INDUCED DRAG. ?

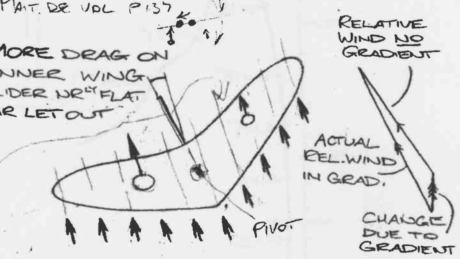
MORE INCREASE IN LIFT ON OUTER WING



MAT. DE VOL P137

MORE DRAG ON INNER WING
*GLIDER NRLY FLAT
*BAR LET OUT

? IND DRAG



CONTROL BAR IS PULLED IN AND WEIGHT SHIFTED TO INSIDE WING.

ANGLE OF ATTACK IS GREATER ON THE OUTSIDE WING, WHICH IS ALSO MOVING FASTER THROUGH THE AIR. (GLIDER IS TURNING.)

LIFT AND DRAG INCREASES.

- AS THE OVERALL ANGLE OF ATTACK HAS BEEN REDUCED, THE INCREASE IN LIFT HAS MOST EFFECT AND ASSISTS THE GLIDER TO ROLL.

?

GRADIENT PROVIDES 'CUSHION'? AT APEX, GIVES FEEL OF BOUNCING
* AROUND INSIDE THERMAL "OFF" "SLOPE") *

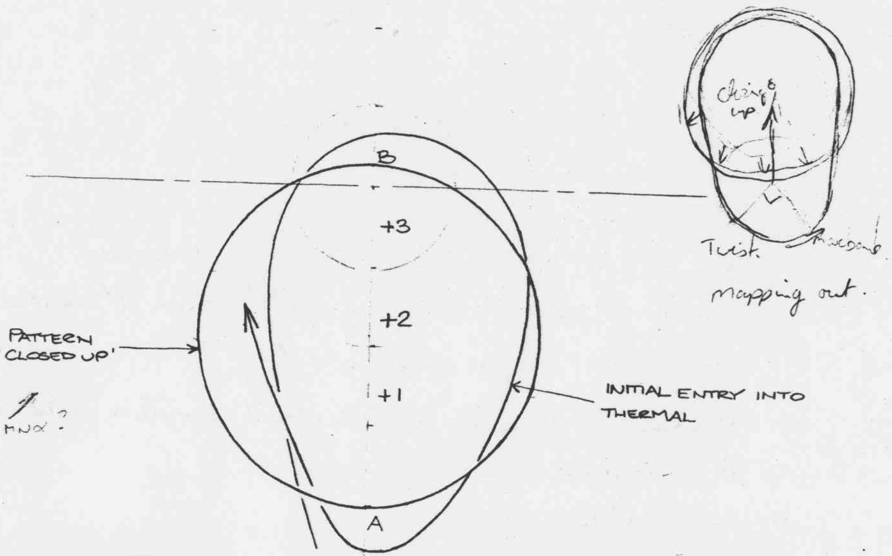
EASING OUT BAR GREATLY INCREASES LIFT AND DRAG ~ WITH A GLIDER THAT IS TRIMMED TO FLY TAIL DOWN. IN THIS CONDITION THE INCREASED DRAG HAS THE GREATER EFFECT ON THE INSIDE WING AND PULLS THE GLIDER ROUND TOWARDS THE AREA OF MAXIMUM GRADIENT (LIFT.)

* INERTIA – CONSTANT INCREASE IN AIR FLOW

- THE MOMENTUM OF THE GLIDER KEEPS IT FROM STALLING.
- THE GLIDER TURNS WITH LESS BANK THAN IT WOULD NORMALY NEED. (FOR THE SAME RADIUS OF TURN.)
- GLIDER PIVOTS ABOVE GLIDER IN YAW.

PTO INDUCED DRAG

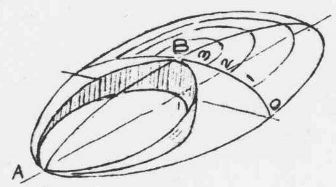
AS AN EXAMPLE : ON ENTERING THE THERMAL, THE PILOT WAITS 4 SECONDS AND TURNS. HE IS FLYING AT 10 METRES/SECOND SO THE THERMAL IS VERY ROUGHLY 80 METRES ACROSS. THE MAXIMUM LIFT IS 3 m/s. THE THERMAL IS SIMPLIFIED AND SHOWN WITH EVENLY SPACED CONTOURS.



PATTERN 'CLOSED UP'

INITIAL ENTRY INTO THERMAL

max rise
max α
MAX ?
Twist
max trap

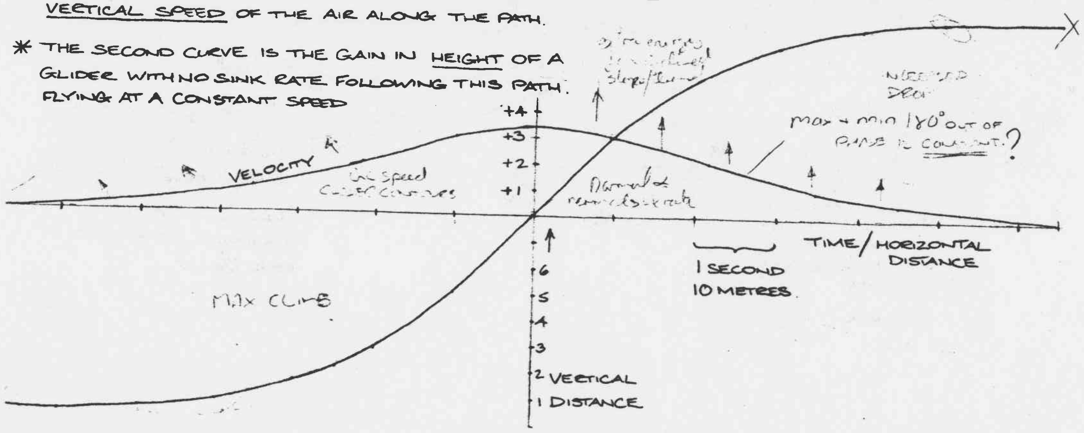


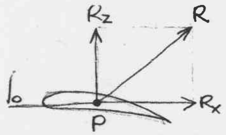
IMAGINING A PLAN SECTION OF A VERTICAL THERMAL COLUMN AS A FLAT HORIZONTAL DISC THEN IN ONE SECOND IT WILL DEFORM INTO A DOMED 'HUB CAP' SHAPE.

THE PATH OF A HANGGLIDER FLYING OFFCENTRE IS SHOWN SHADED IN THE LEFT HAND DIAGRAM (FOR THE SAKE OF ARGUMENT IT HAS NO SINK RATE)

THIS SECTION OPENED OUT IS PLOTTED BELOW.
THE VERTICAL SCALE IS EXAGERATED. IT REPRESENTS THE VERTICAL SPEED OF THE AIR ALONG THE PATH.

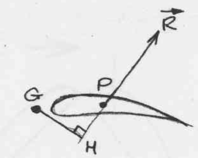
* THE SECOND CURVE IS THE GAIN IN HEIGHT OF A GLIDER WITH NO SINK RATE FOLLOWING THIS PATH FLYING AT A CONSTANT SPEED

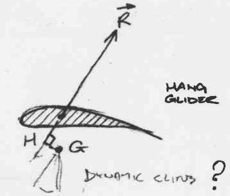




R IS APPLIED TO THE CENTRE OF PRESSURE WHEN INCIDENCE α VARIES R_Z AND R_X VARY AS SHOWN ON THE POLAIRE

IF THE RESULTANT IS NOT APPLIED TO THE CENTRE OF GRAVITY IT WILL PRODUCE A MOMENT ABOUT IT (CG)
THIS PITCH MOMENT $\vec{M} = \vec{GP} \wedge \vec{R}$ WILL DEPEND ON VARIATIONS OF $\vec{GP}$ & $\vec{R}$ WHICH WILL IN TURN DEPEND ON SEVERAL THINGS, ONE OF THE MOST IMPORTANT BEING INCIDENCE α

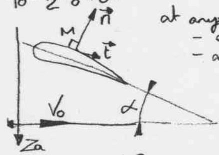




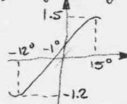
Dynamic climb ?

Position of CP Double curve
$C_{mo} > 0 \therefore \overline{FP} > 0 \therefore P$ is in front of F
$\alpha \nearrow \therefore C_z \nearrow \therefore |\overline{FP}| \searrow \therefore P$ moves back and approaches F
In general P moves nearer foyer when incidence $\nearrow$
P moves away from foyer when incidence $\searrow$

Winter pressure $\overline{q}_0$
$\overline{q}_0 = \frac{1}{2} \rho_0 V_0^2$



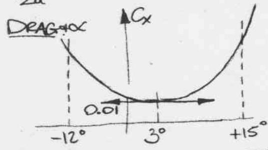
at any point M on the profile exists:
- a perpendicular force of pressure $\vec{n}$
- a tangental force of viscosity $\vec{t}$



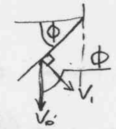
influence of incidence α
- straight line −12° to 15°
- limitation on absolute values of C_z

the straight section is characterised by :
a) the value of angle of lift nil α_0 (−1° for most profiles)
b) the slope $\frac{dC_z}{d\alpha} = C_{z\alpha} \simeq 0.1$ per degree
c) the max value of C_z ($\simeq 1.5$)

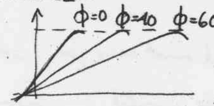
DRAG α



FLECHE ϕ

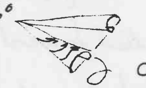


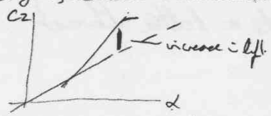
Curves C_z. $\hat{\imath}$

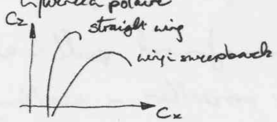


Sweepback deteriorates the slope $C_{z\alpha}$
The C_z max is unchanged but the α of C_z max $\nearrow$
– inconvenience for planes very tail down attitude on landing gives poor visibility.

TOURBILLONS D'APEX *
If $\phi > 45°$ + particularly for delta wings a system of vortices is set up at angles of attack greater than 6°
The flows on the underside comes up on the top surface. giving a conical vortice behind the wing



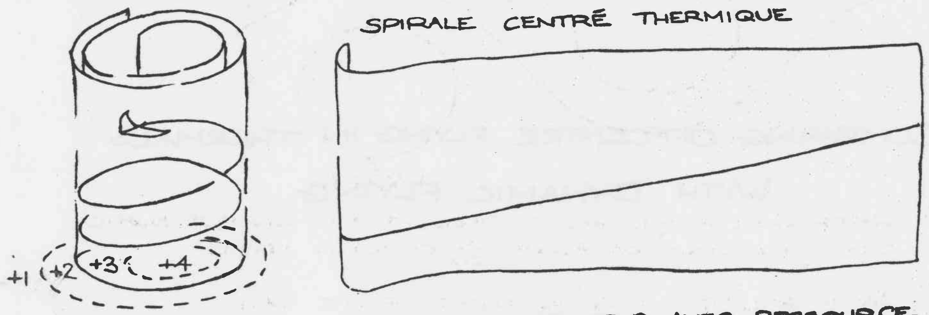


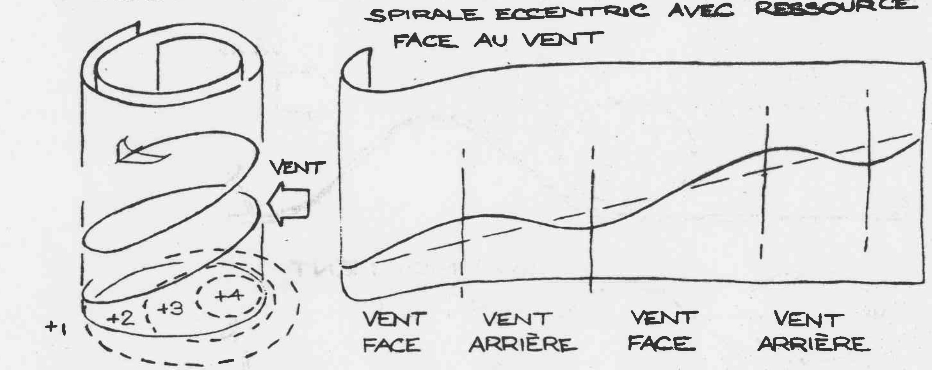


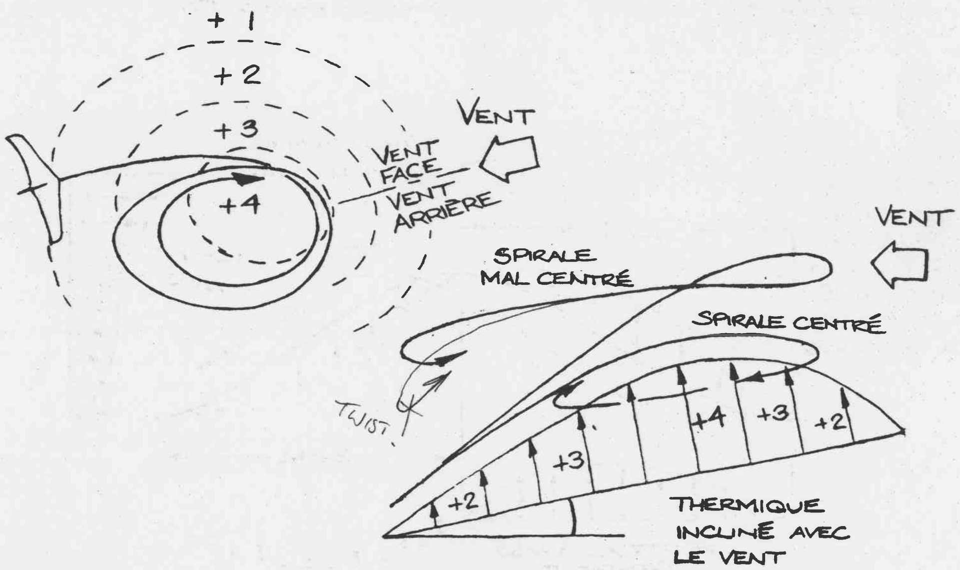
stall is gentle & progressive

UNE RESSOURCE FACE À UN GRADIENT DE VENT ENTRAÎNE UNE AUGMENTATION D'ÉNERGIE.

UNE DESCENTE DANS UN GRADIENT DE VENT ARRIÈRE ENTRAÎNE UNE AUGMENTATION D'ÉNERGIE.



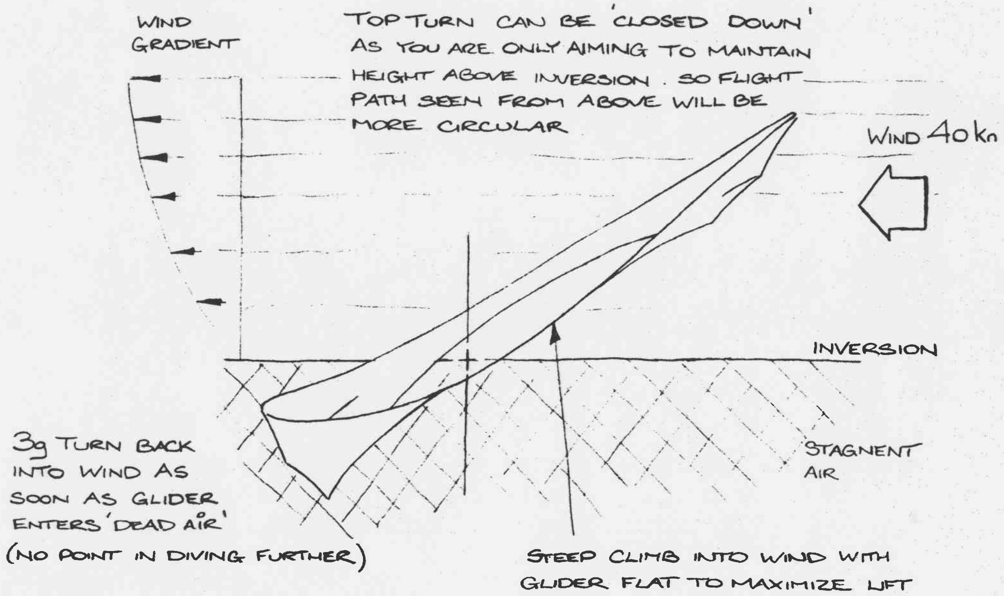




Vol Dynamique en Planeur

Renner a commencé ses essais avec un Libelle H 301 à courbure.
D'après ses comptes-rendus, le vent était presque calme au sol à Tocumwal, en Australie, le matin du 24 octobre 1974.
Après le décollage, l'attelage du planeur et du remorqueur pénétra dans une inversion (clairement visible avec le blocage de la brume) à une altitude d'à peu près 300 m.
Au-dessus de l'inversion, le vent était fort ; le planeur et le remorqueur ne progressaient que lentement contre le vent, et Ingo Renner estime la variation de la vitesse du vent à 40 nœuds (!).
A un point situé à environ 3 km au vent de l'aérodrome, Renner vira vent arrière à une altitude de 350 m et commença à plonger sous l'inversion avec une forte pente.
A une altitude d'environ 250 m, avec une vitesse de 200 km/h, il engagea un virage serré de 180° (accélération : 3 g) et cabra le planeur, sous le même angle (30°) que dans son piqué initial, face au vent.
Il retrouva son altitude de départ, fit un second virage de 180° avec une vitesse et un facteur de charge faibles et recommença la manœuvre.
De cette façon, il put garder son altitude pendant une vingtaine de minutes, mais le vent l'avait entraîné si loin qu'il lui fallait renoncer à son vol pour pouvoir regagner le terrain et s'y poser.
Au cours de vols ultérieurs sur un Pik 20, il acquit peu à peu assez d'expérience pour pouvoir remonter sans cesse contre le vent et rester au-dessus de l'aérodrome.

(D'après H. Reichmann)



EFFECT OF INCREASING / DECREASING WIND ON LIFT

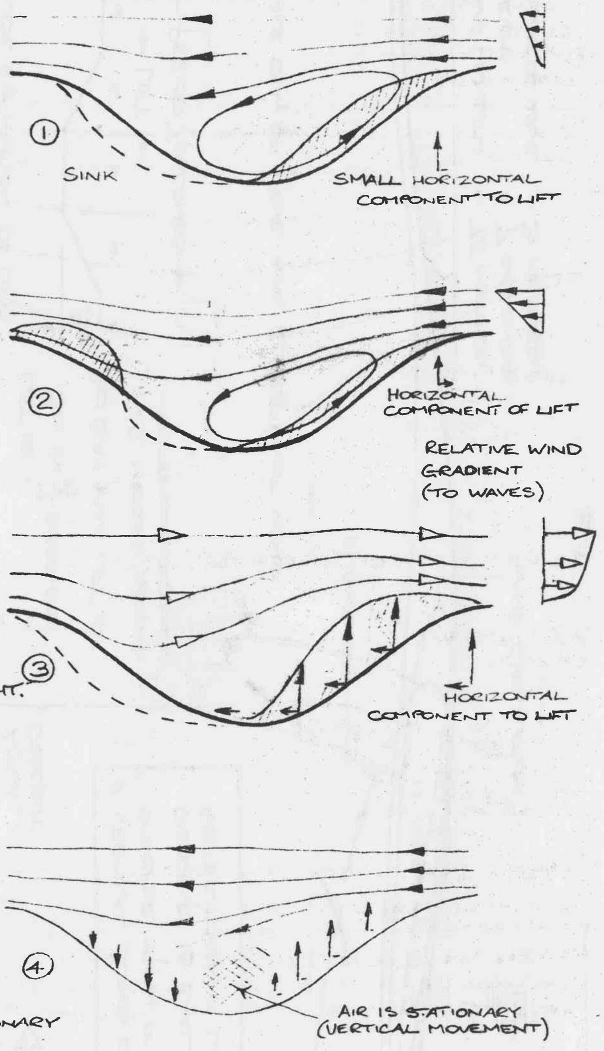
(NO ALLOWANCE HAS BEEN MADE FOR ANY CHANGE IN SHAPE)

① WIND SPEED = WAVE SPEED.
- LIFT REACHES THE WAVE CREST.
- GENTLE WIND GRADIENT OVER WAVE.

② INCREASING WIND.
- WIND SPEED > WAVE SPEED.
- DEPRESSES LIFT SLIGHTLY IN LEE (CREST BUILDING UP WILL RESTORE IT)
- WIND GRADIENT ABOVE CREST INCREASES SHARPLY. A SUDDEN GUST, IS THE ONLY TIME THERE WILL BE A WIND SHEAR (FLYING DOWN WIND)
- DYNAMIC LIFT WILL APPEAR ON THE WINDWARD FLANK OF WAVE.
- EVENTUALLY WAVE SPEED WILL CATCH UP WITH WIND SPEED AND RE-ESTABLISH THE SITUATION IN ①

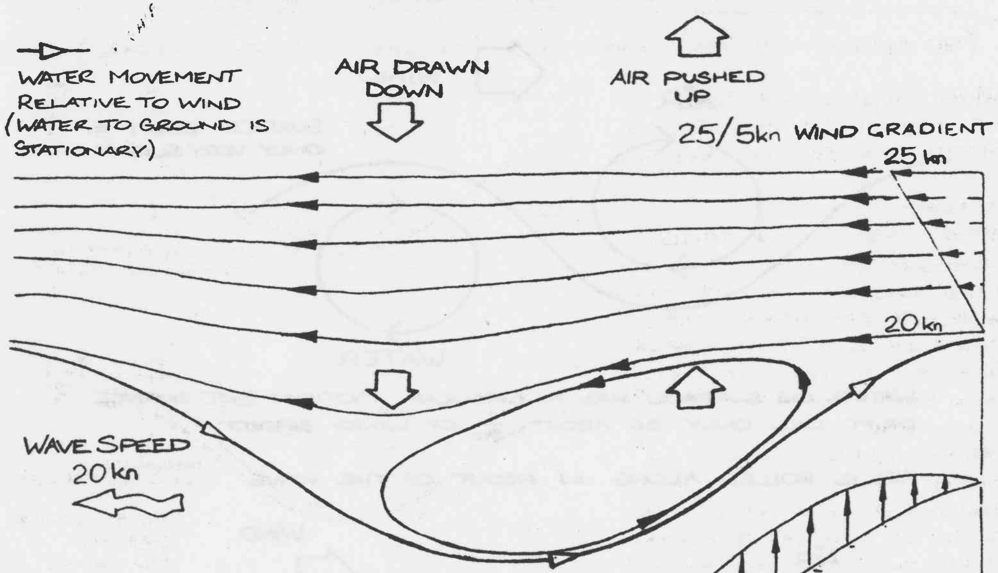
③ DECREASING WIND.
WIND SPEED < WAVE SPEED.
- EXTENT OF LIFT RISES TEMPORARILY UNTIL THE WAVES SLOW DOWN, BUT NOT THE STRENGTH OF LIFT WHICH DEPENDS ON WAVE SPEED + HT.
- WAVES WILL GRADUALLY SLOW TO MATCH WIND SPEED AND THE SITUATION IN ① WILL BE RE-ESTABLISHED WITH WEAKER LIFT AND WIND GRADIENT, UNLESS THE WIND CONTINUES TO DROP IN WHICH CASE THE WAVES WILL EVENTUALLY BE DAMPED DOWN

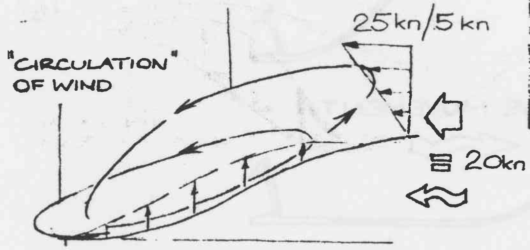
④ IS THE SAME SITUATION AS ① DRAWN A DIFFERENT WAY SHOWING AIR THAT IS BRIEFLY STATIONARY IN TERMS OF VERTICAL MOVEMENT

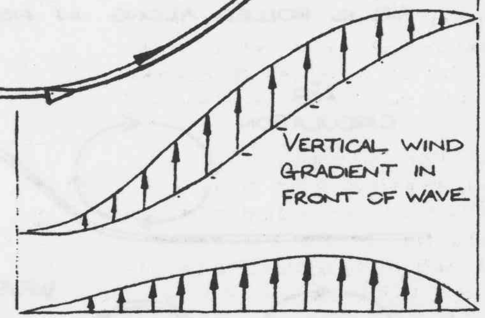


EVEN THOUGH IT REQUIRES WIND TO START THE WAVES BUILDING UP, THE VERTICAL LIFT IS NOT DEPENDENT ON THERE BEING WIND. IT WILL BE THERE AS LONG AS THERE IS A WAVE, SO THE LIFT WILL PERSIST AFTER THE WIND DROPS, UNTIL THE WAVES DIE AWAY.

AIR FLOW OVER WAVES - NOT TO SCALE





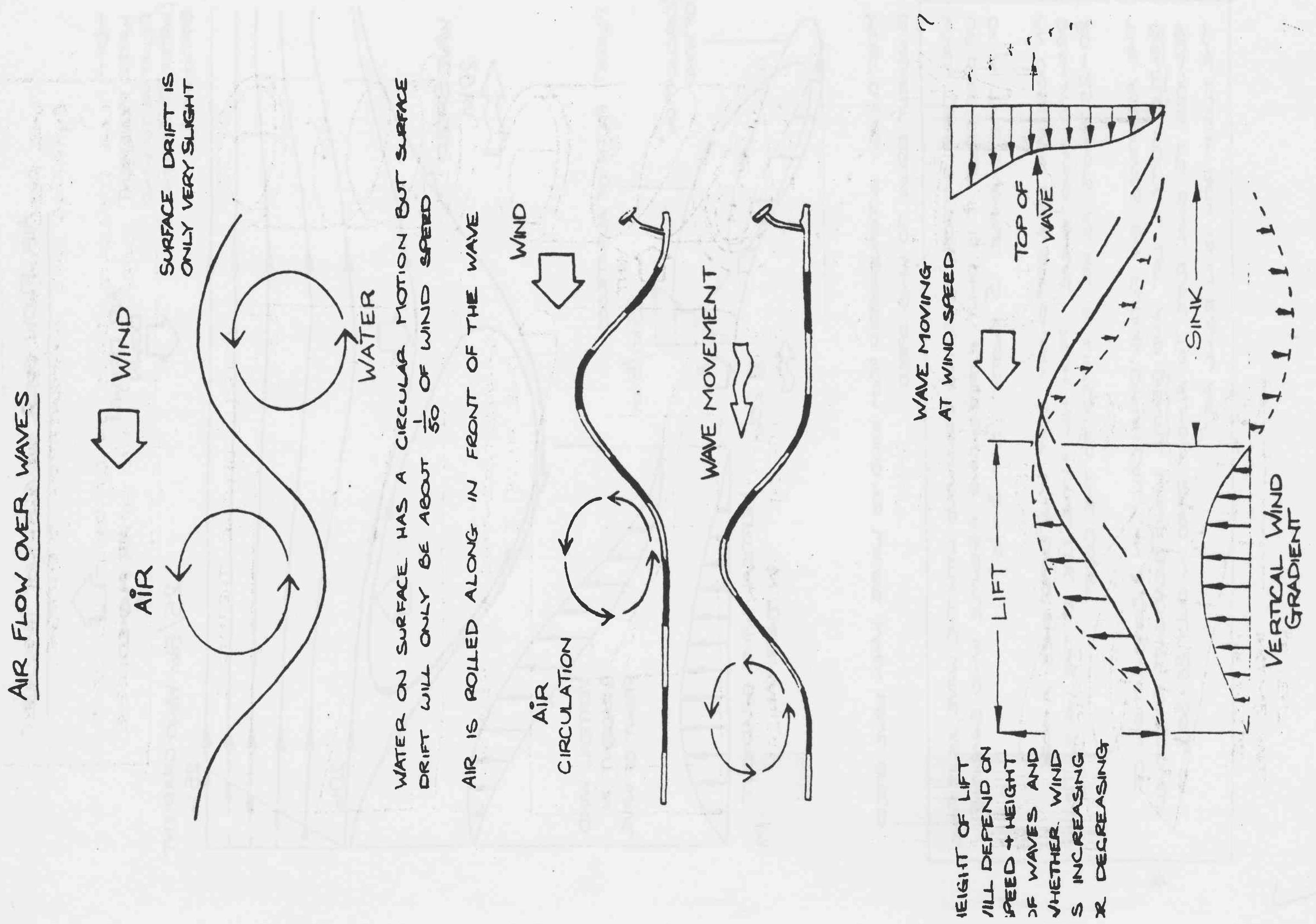


MOST ENERGY IS TRANSFERRED FROM WIND TO WAVES WHEN WAVE SPEED IS NEARLY EQUAL TO WIND SPEED

WHEN THE ALBATROSS IS FLYING DOWNWIND WITH THE WAVE, AS IT POPS UP OVER CREST IT IS ONLY EXPERIENCING A GENTLE WIND GRADIENT OF IN THIS EXAMPLE 5 KNOTS (SAY 3m/s)

AN OBSERVER ON A STATIONARY BOAT WILL EXPERIENCE A MORE DRAMATIC WIND 'SHEAR' FROM NIL IN THE LEE OF THE WAVE TO 20-25 KNOTS AS HE IS LIFTED TO THE CREST

THE ALBATROSS BY FLYING DYNAMICALLY IN A COMBINATION OF GENTLE VERTICAL LIFT AND GENTLE WIND GRADIENT, EFFECTIVELY REDUCES ITS SINK RATE TO ALMOST ZERO ~ ONLY 25-30% OF THE FLIGHT PATH IS IN RISING AIR *



SUMS — FOR 20 KNOT WIND. ('FETCH' IS NOT CONSIDERED)

COLES:

HT. OF WAVES $= \frac{1}{50}(\text{WIND SPEED kn})^2 = \frac{400}{50}$

$= 8$ FEET (3m)

MOST ENERGY IS TRANSFERRED FROM WIND WHEN THE PERIOD $= \frac{1}{3}$ WIND SPEED $= \frac{20}{3}$

SAY 7 SECONDS

DANTON:

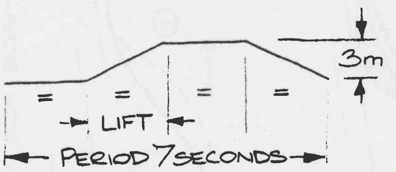
WAVE VELOCITY $\simeq$ 3x PERIOD

WAVE LENGTH(m) $\simeq (\text{PERIOD})^2 \times 1.5$

ie 49×1.5

$\simeq$ 75 METRES.

CRUDE ESTIMATION OF LIFT:

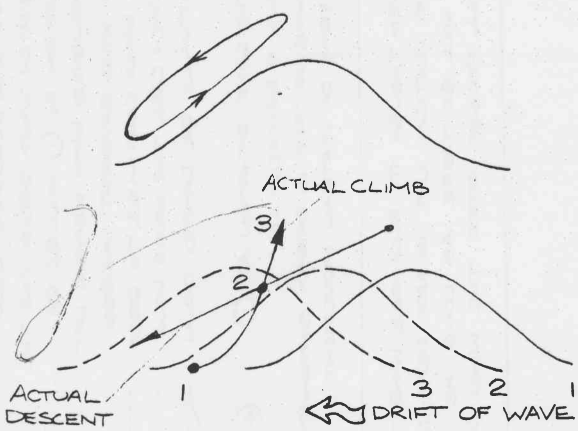


LIFT IS 3m IN $\frac{7}{4}$ SECONDS

SO SAY MAX LIFT IS:

1–2 METRES/SECOND

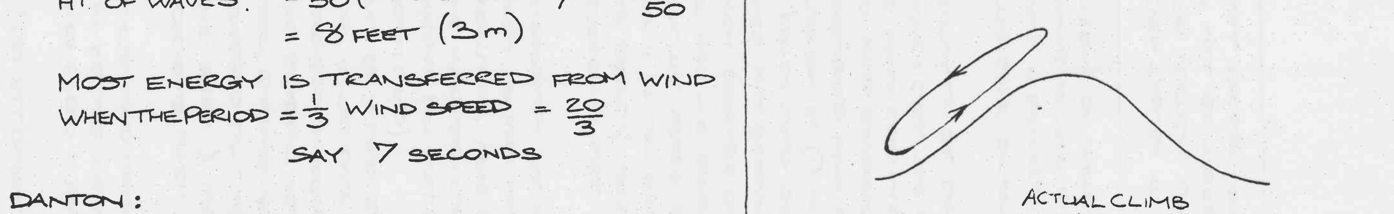
APPARENT CLIMB/DESCENT



* VERTICAL CLIMB OF ALBATROSS IS STEEPER THAN IT LOOKS

DESCENT IS SHALLOWER AND FASTER THAN IT LOOKS

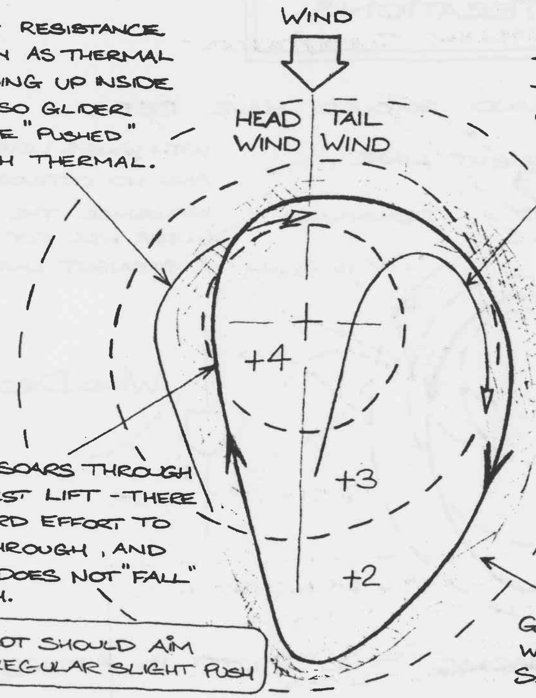
SCALE DIA. OF WAVE FOR 20/25 KNOT WIND

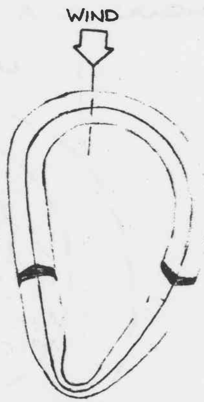


WAVE LENGTH = 75 METRES
PERIOD = 7 SECONDS
HEIGHT OF WAVE = 3 METRES

STRONG RESISTANCE TO TURN AS THERMAL IS RAISING UP INSIDE WING. SO GLIDER MUST BE "PUSHED" THROUGH THERMAL.

NO RESISTANCE TO PUSHING THROUGH THERMAL. SO TURN IS QUICKER AND GLIDER "FALLS THROUGH".





IDEAL FLIGHT PATTERN

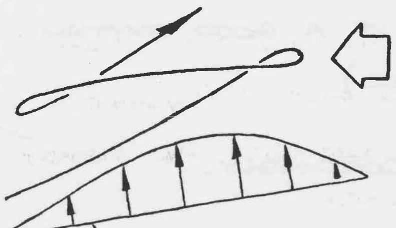
GLIDER SOARS THROUGH STRONGEST LIFT - THERE IS NO HARD EFFORT TO PUSH THROUGH, AND GLIDER DOES NOT "FALL" THROUGH.

THE PILOT SHOULD AIM FOR A REGULAR SLIGHT PUSH

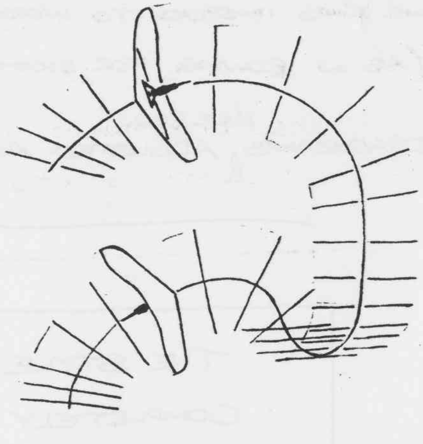
GLIDER CAN FLY IN A WIDE AREA KEEPING THE SAME RHYTHM.

FORWARD POSITIONING — VARY PAUSE BEFORE TURNING.

AFT POSITIONING. — GLIDER CAN CONTINUE UNTIL PILOT FEELS HE IS ABOUT TO FALL OUT OF THERMAL. ANY EXTRA SPEED PICKED UP CAN BE USED IN THE CLIMB.



INCLINED THERMAL



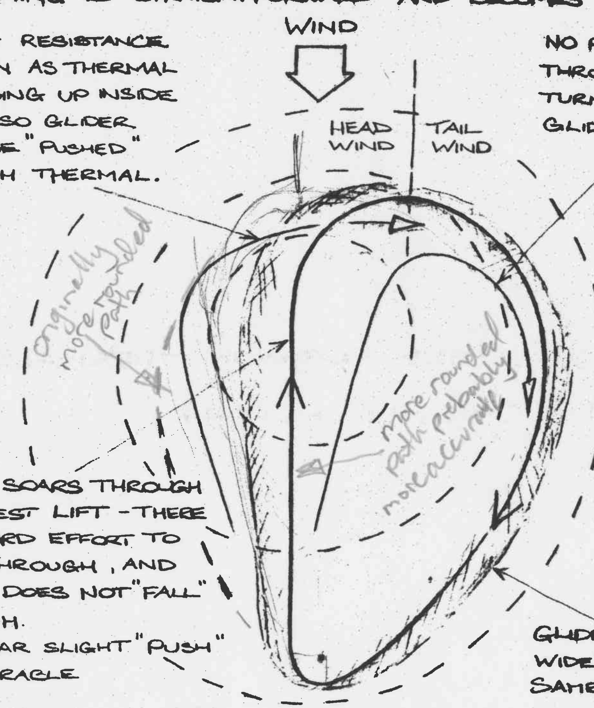
CLIMB - PAUSE, PULL IN BAR A TOUCH - TURN - PICK UP SPEED WITH THE TAILWIND. - FAST STEEP TURN ROUND INTO WIND AS SOON AS DROP IS NOTICED - QUICKLY RECOVER FROM TURN AND SOAR INTO WIND.

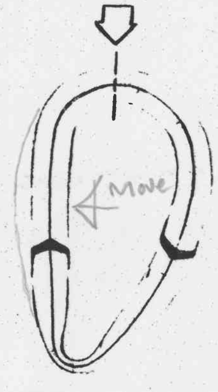
VIEW FROM WIND DIRECTION

POSITIONING IS STRAIGHTFORWARD AND BECOMES AUTOMATIC.

STRONG RESISTANCE TO TURN AS THERMAL IS RAISING UP INSIDE WING. SO GLIDER MUST BE "PUSHED" THROUGH THERMAL.

NO RESISTANCE TO PUSHING THROUGH THERMAL. SO TURN IS QUICKER AND GLIDER "FALLS THROUGH".





IDEAL FLIGHT PATH.

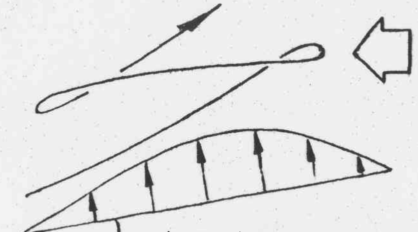
GLIDER SOARS THROUGH STRONGEST LIFT - THERE IS NO HARD EFFORT TO PUSH THROUGH, AND GLIDER DOES NOT "FALL" THROUGH.

* A REGULAR SLIGHT "PUSH" IS PREFERABLE

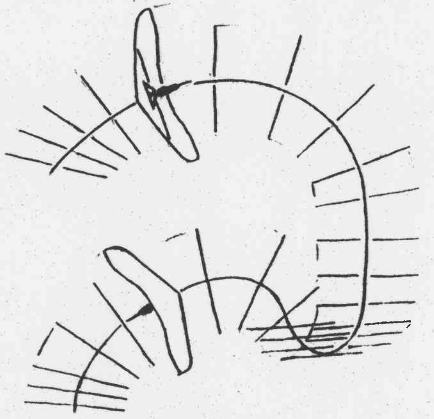
GLIDER CAN FLY IN A WIDE AREA KEEPING THE SAME RHYTHM.

FORWARD POSITIONING — VARY PAUSE BEFORE, TURNING.

AFT POSITIONING. — GLIDER CAN CONTINUE UNTIL PILOT FEELS HE IS ABOUT TO FALL OUT OF THERMAL. ANY EXTRA SPEED PICKED UP CAN BE USED IN THE CLIMB.



INCLINED THERMAL

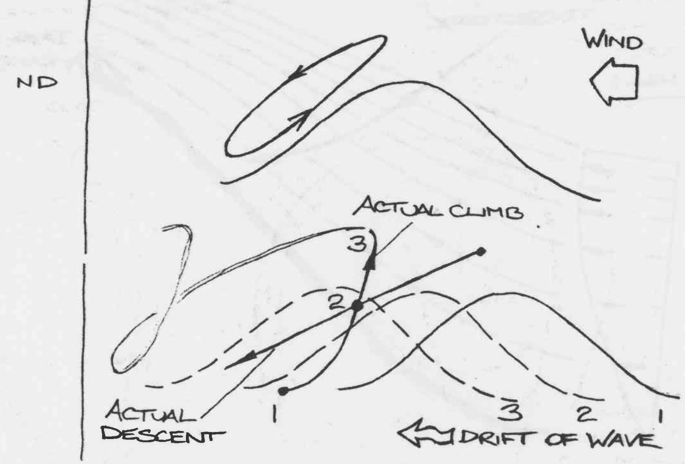


CLIMB - PAUSE, DRAG PULL IN BAR A SLIGHTLY TOUCH - TURN - PICK UP SPEED WITH THE TAILWIND. - FAST STEEP TURN ROUND INTO WIND AS SOON AS DROP IS NOTICED - QUICKLY RECOVER FROM TURN AND SOAR INTO WIND.

VIEW FROM WIND DIRECTION

SENT TO PJAGO 17th OCT
ALTERED 19th [illegible]

APPARENT CLIMB/DESCENT

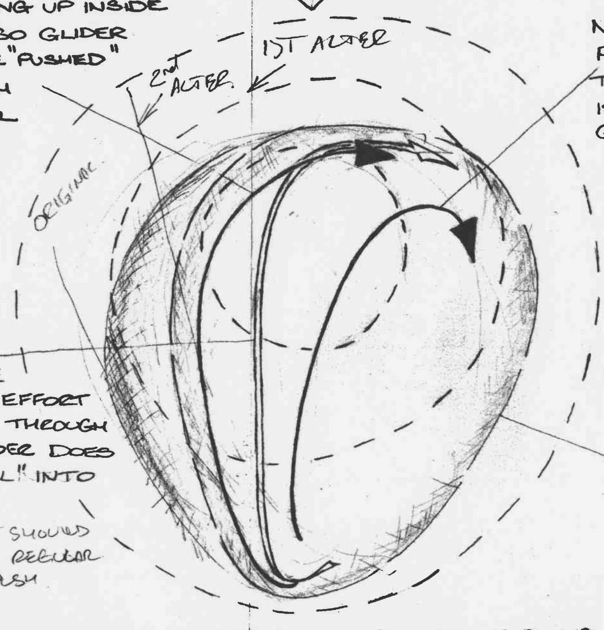


ND

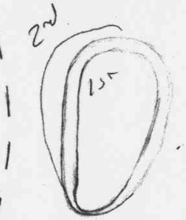
* VERTICAL CLIMB OF ALBATROSS IS STEEPER THAN IT LOOKS
DESCENT IS SHALLOWER AND FASTER THAN IT LOOKS

POSITIONING IS STRAIGHTFORWARD + BECOMES AUTOMATIC. THERE ARE WIDE LIMITS.

STRONG RESISTANCE TO TURN AS THERMAL IS RAISING UP INSIDE WING. SO GLIDER MUST BE "PUSHED" THROUGH THERMAL



NO RESISTANCE TO PUSHING THROUGH THERMAL SO TURN IS EASIER + QUICKER GLIDER 'FALLS THROUGH'



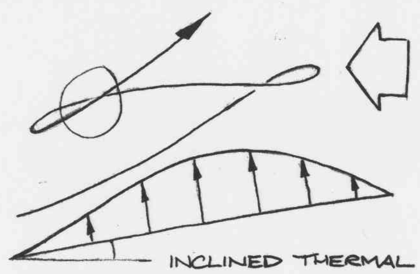
IDEAL SHAPE

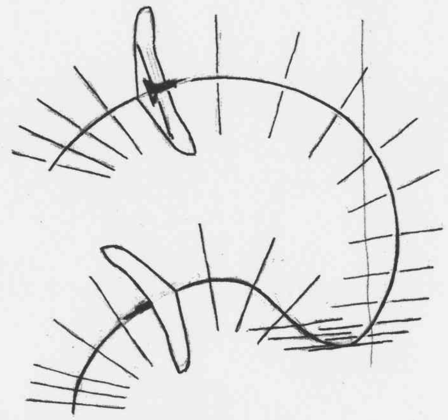
AVERAGE
NO HARD EFFORT TO PUSH THROUGH AND GLIDER DOES NOT "FALL" INTO TURN.

* THE PILOT SHOULD AIM FOR A REGULAR SLIGHT PUSH

GLIDER CAN FLY IN A WIDE AREA KEEPING THE SAME RYTHM

FORWARD CONTROL — VARY PAUSE BEFORE TURNING.
AFT POSITIONING — CAN CONTINUE UNTIL PILOT FEELS HE IS ABOUT TO FALL OUT OF THERMAL. ANY EXTRA SPEED PICKED UP CAN BE DUMPED IN CLIMB.





PULLIN BAR

CLIMB – PAUSE (1–~~2~~ SEC) – TURN – PICK UP SPEED WITH TAILWIND – FAST STEEP TURN ROUND INTO WIND AS SOON AS DROP IS NOTICED – QUICKLY RECOVER FROM TURN + SOAR INTO WIND.

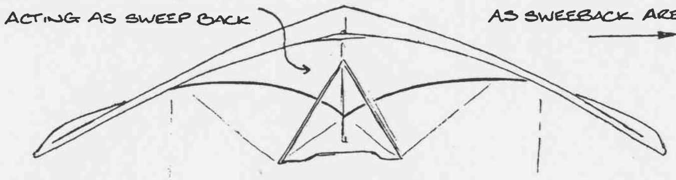
VIEW FROM WIND DIRECTION

JAGO-JAMIE
+ 1ST ALT 17th ALTERED 2nd 19th OCT.

* *Using the apparent wind direction as a reference.* D.S.

STABILITY OF A HANG GLIDER IN THE YAW AXIS.

COMES FROM. 1) SWEEP BACK
2) POSITIVE DIHEDRAL ACTING AS SWEEP BACK

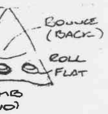


ALTHOUGH, AS ANGLE OF ATTACK INCREASES:
LEADING EDGE SWEEPBACK ANGLE DECREASES – TO APPARENT WIND, *may increase as sail deforms?*
EFFECTIVE SWEEP BACK ANGLE OF CENTRE SECTION DECREASES.

OVERALL, THE AREA OF SAIL ACTING AS SWEEP BACK INCREASES WITH ANGLE OF ATTACK AND THE GLIDER BECOMES MORE STABLE IN THE YAW AXIS, SO THE GLIDER WILL BE MORE AFFECTED BY ANY LOCAL CHANGE IN APPARENT WIND, SUCH AS A SMALL PATCH OF FASTER RISING AIR – OR A THERMAL.

D.S.

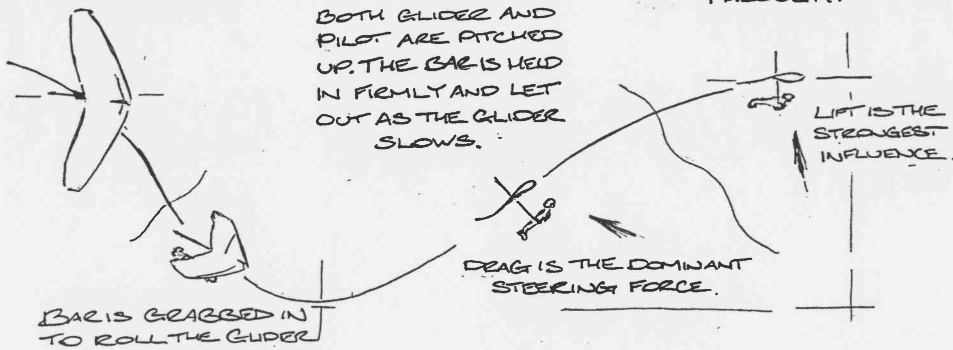
STEEP BANK – DROP – ROLL – CLIMB. *– Rebounding Thermal Gradient.*



GLIDER HAS JUST BOUNCED OFF THE WALL OF THE THERMAL AND DROPPED ABRUPTLY ON THE REBOUND.

PILOT WEIGHT IS SHOULDERED TO THE INSIDE TO ANTICIPATE THE INSIDE WING LIFTING AND DRIVE THE GLIDER THROUGH.

BOTH GLIDER AND PILOT ARE PITCHED UP. THE BAR IS HELD IN FIRMLY AND LET OUT AS THE GLIDER SLOWS.



IN PRACTICE THE PILOTS WEIGHT IS PUSHED FIRMLY TO THE INSIDE DURING THE CLIMB INCREASING THE PUSH AT THE TOP.

This is between mapping out and closed up – closed up the drop is less noticeable and everything is smooth + purposeful. – everything follows in seamless succession, no wasted time no wasted movement, no wasted effort.