Vulture energy budget as a basis for ecological considerations

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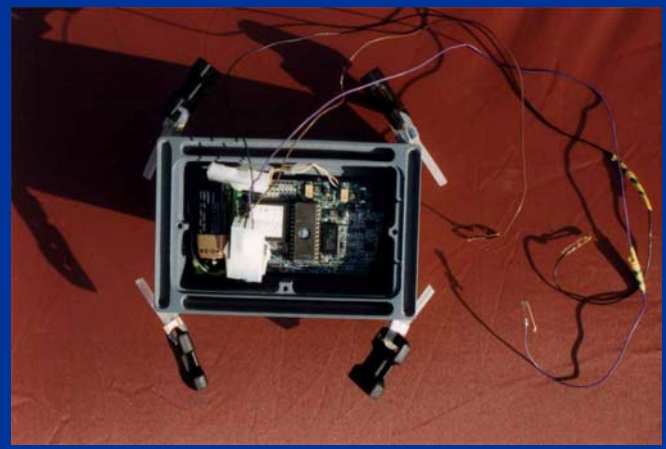
Background

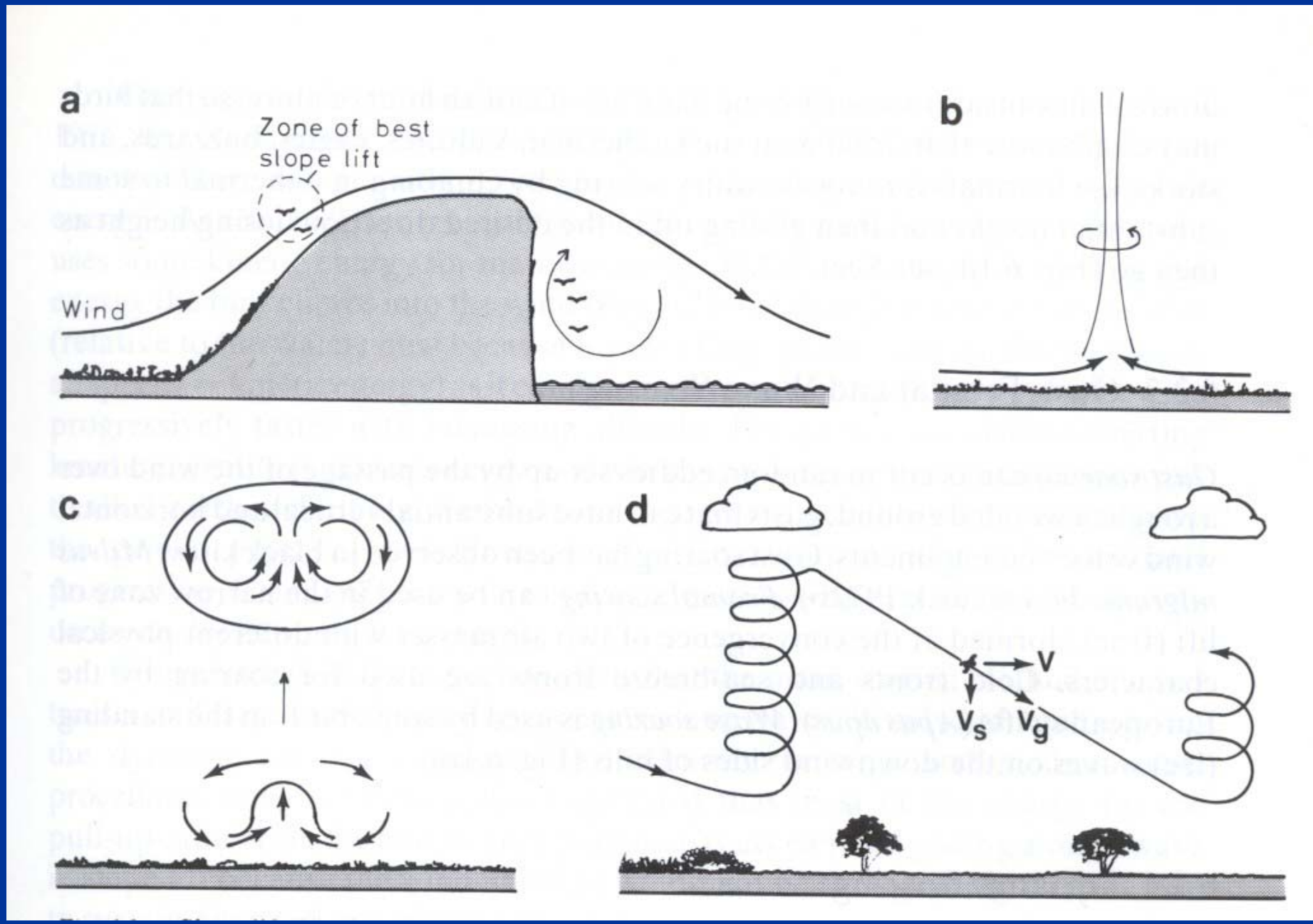
Sustaining populations of carrion eaters is problematic in the modern world.

Feeding stations are used so that knowledge of the energy requirements of Vultures is necessary

HYPOTHESIS
The heart-beat rate can be used as an indicator of energy expenditure

Heart rate measurements




a
Zone of best
slope lift
Wind
b
c
d
V
V_s
V_g

Flight is highly demanding energetically.

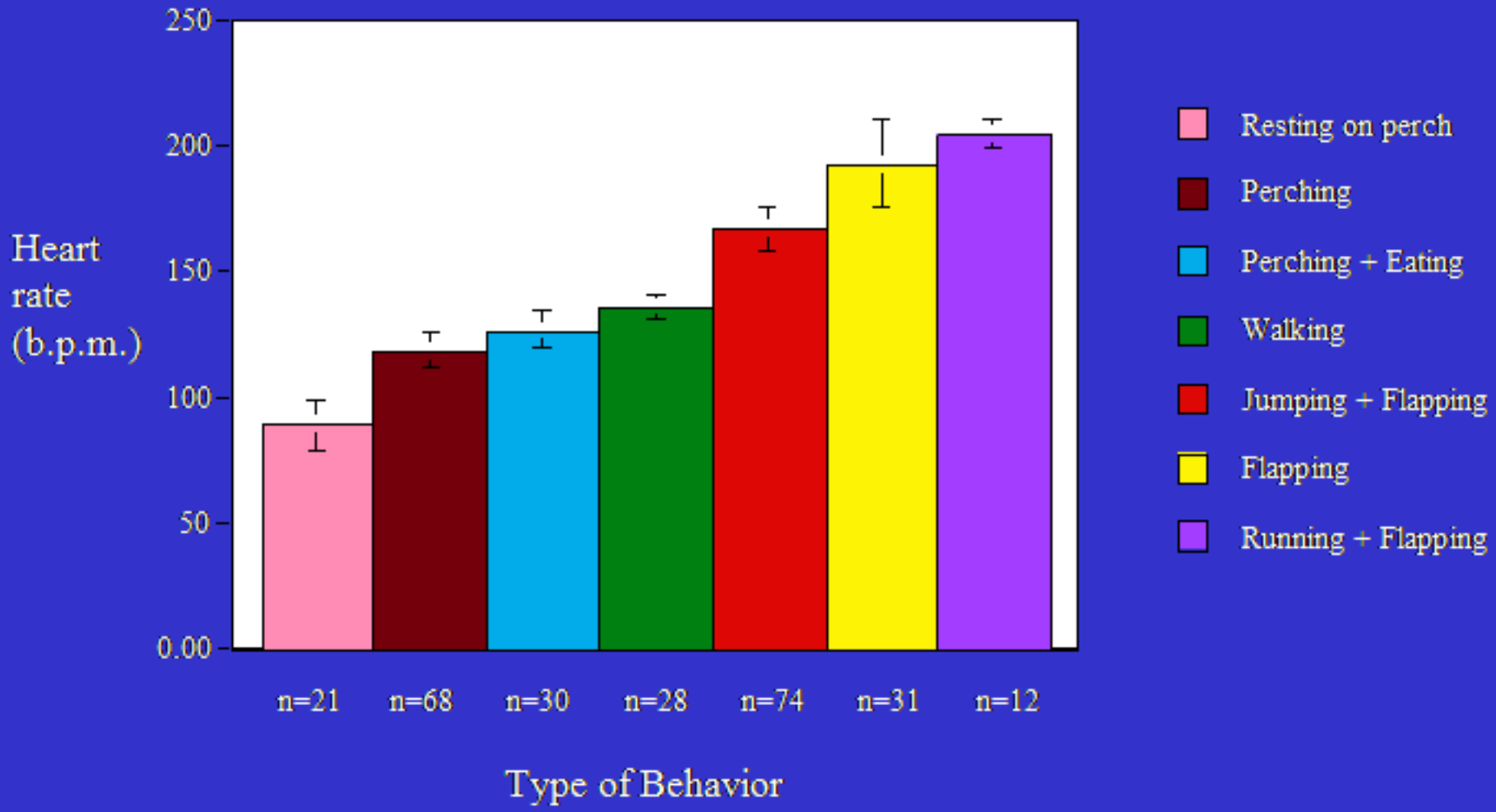
Much of the time is spent gliding.

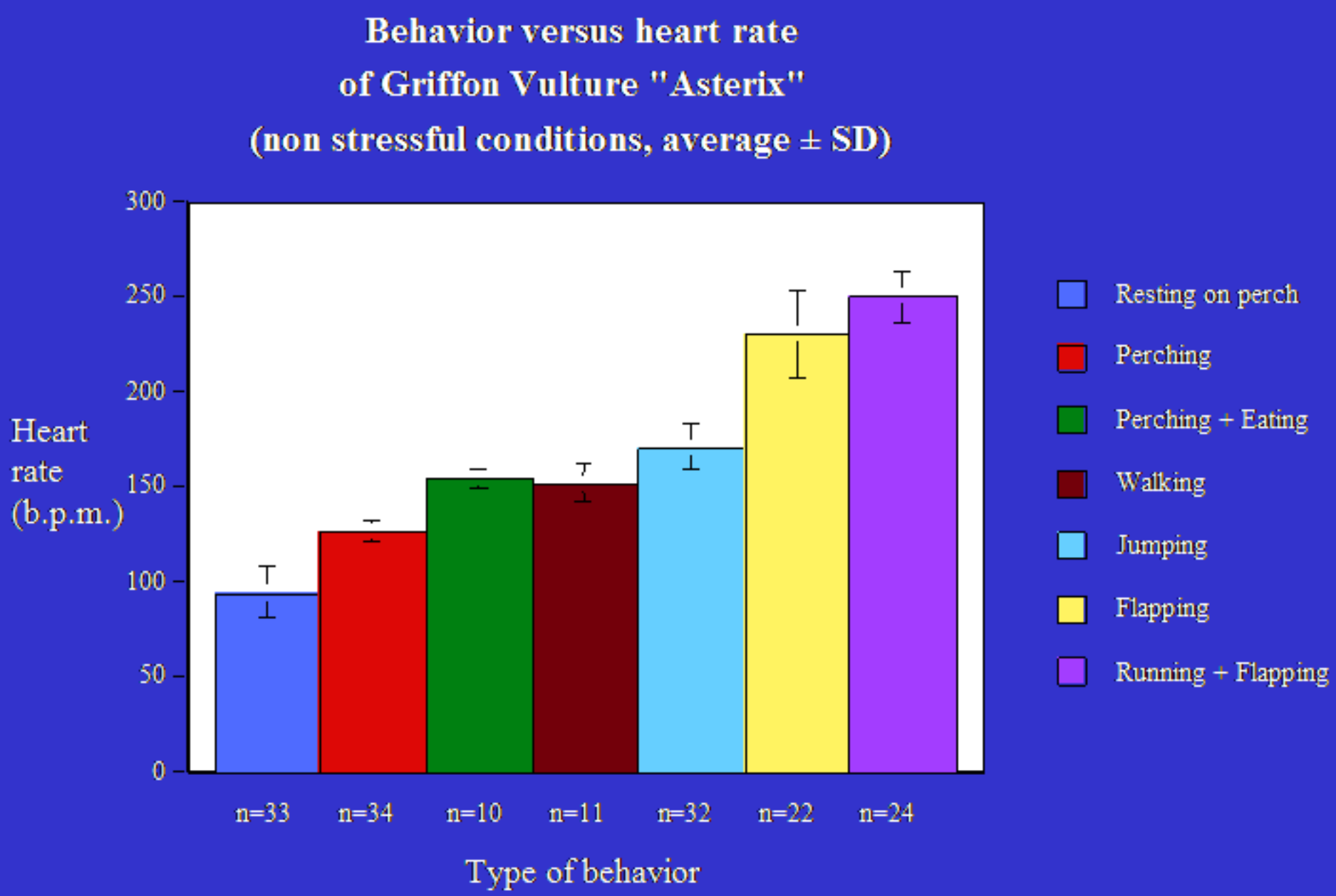
But flapping is the big energy budget Item.

Behavior versus heart rate

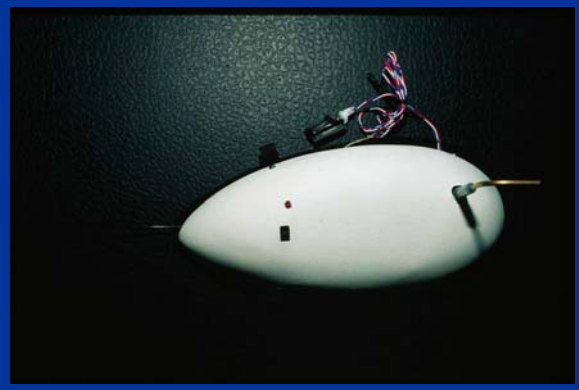
of Griffon Vulture "Robi"

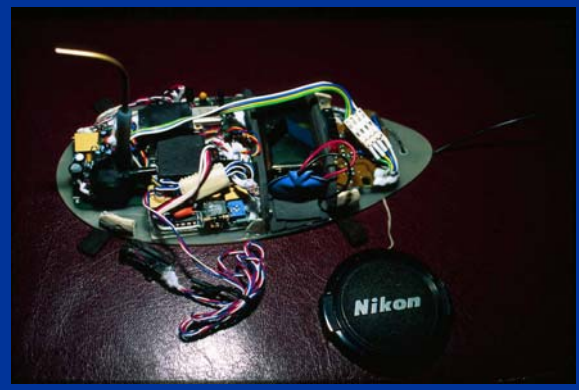
(non stressful conditions, average ± SD)

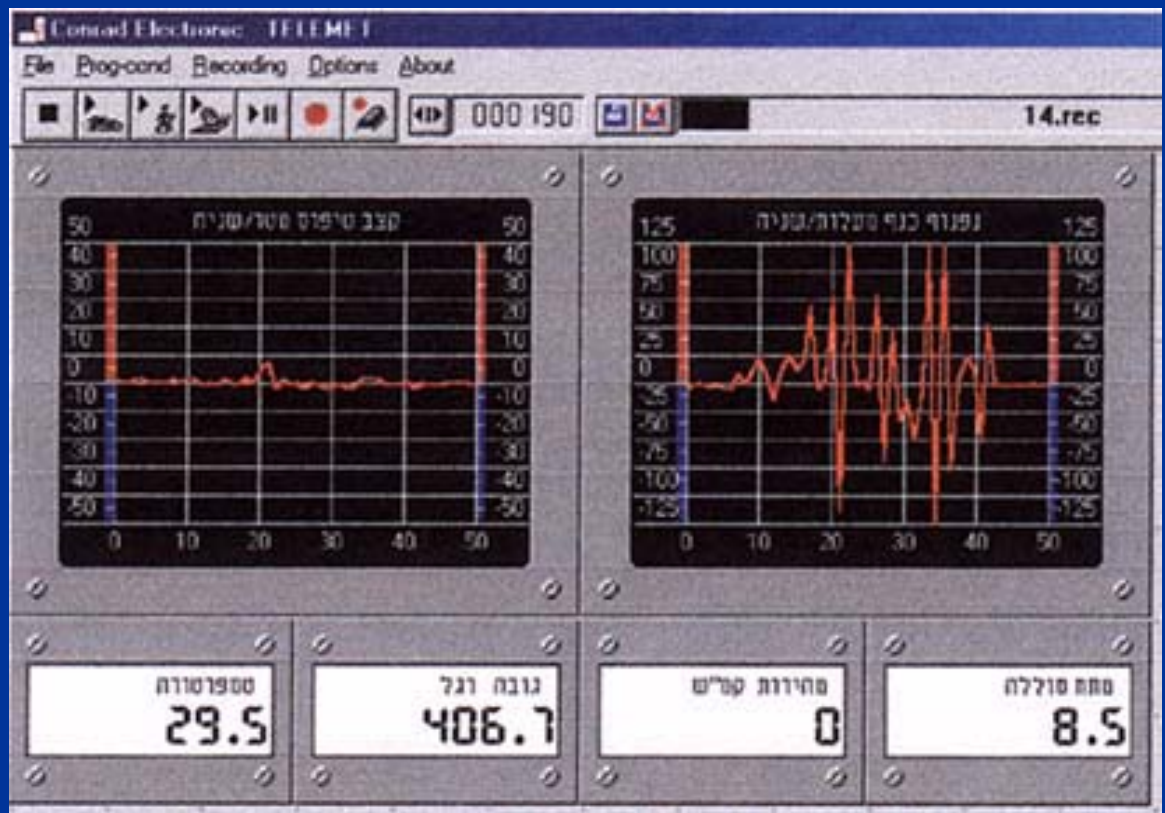



Behavior versus heart rate
of Griffon Vulture "Asterix"
(non stressful conditions, average ± SD)
Heart rate (b.p.m.)
300
250
200
150
100
50
0
n=33
n=34
n=10
n=11
n=32
n=22
n=24
Type of behavior
Resting on perch
Perching
Perching + Eating
Walking
Jumping
Flapping
Running + Flapping

Measuring the Physical Conditions of Vulture flight







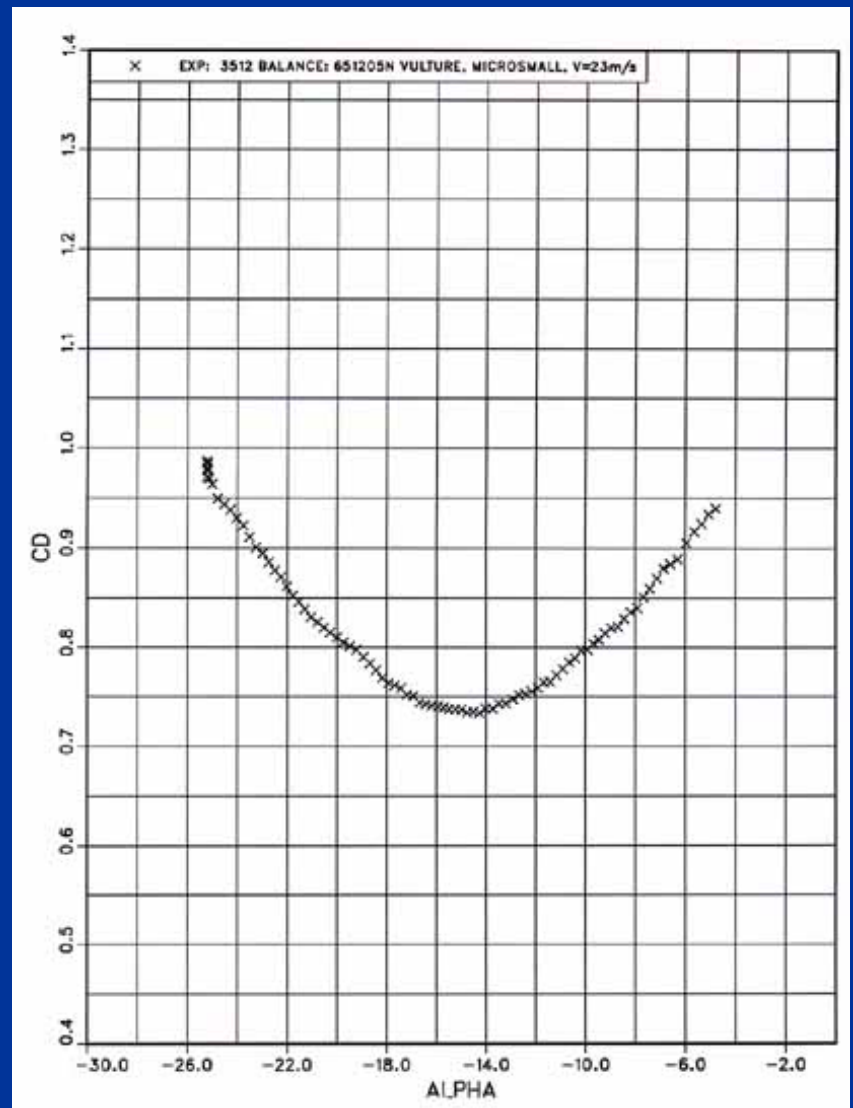
Does adding equipment change flight performance?

Technion Wind Tunnel Measurements of

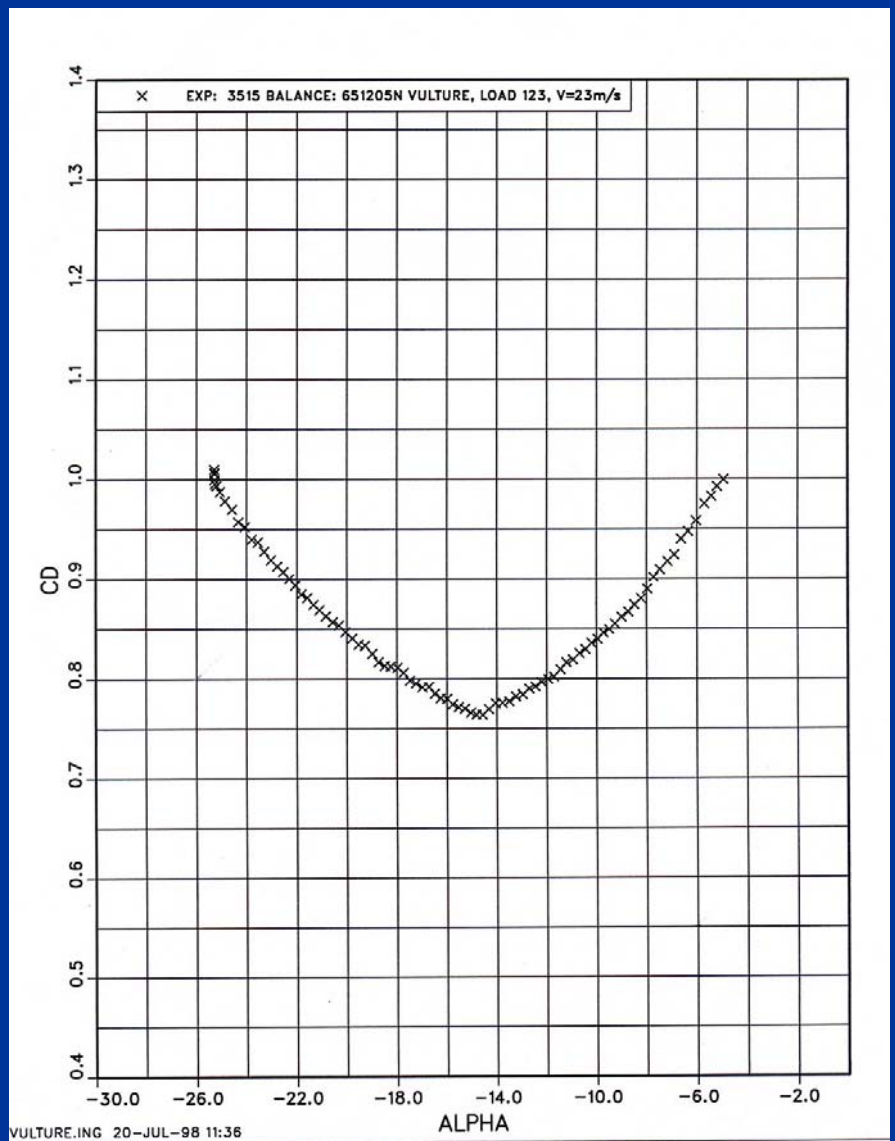
the Drag Increment due to the Datalogger

מקדם הגרר כפונקציה של זווית הגוף , מהירות רוח 23 מ\ש

ללא רתמה



עם רתמה



Vulture Test Range

Conclusions

Heart rate can be correlated CAREFULLY with behavioral pattern.

Heart rate can be used as a measure of energy requirements

Vultures can add up to 15% of their body weight without affecting flight performance

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