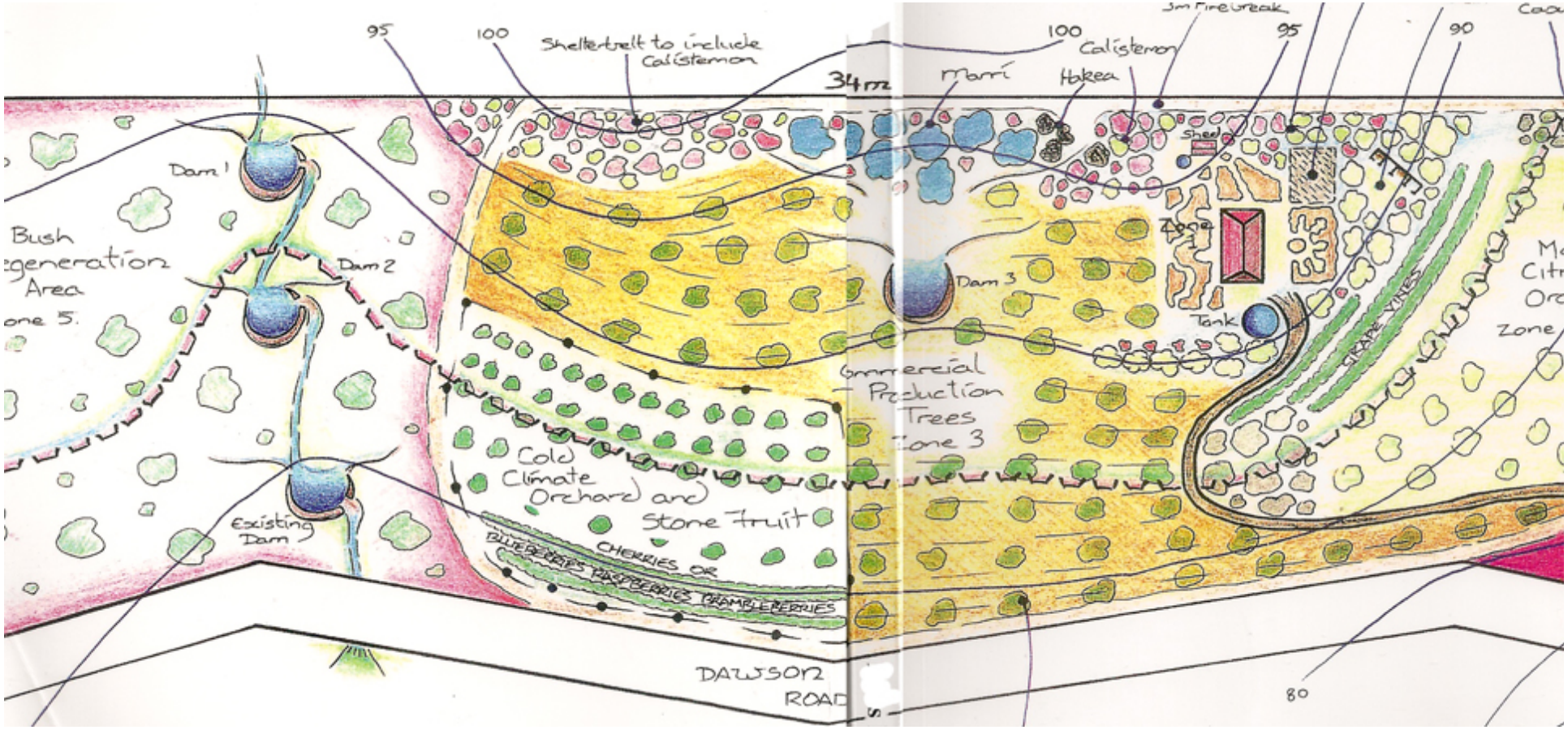
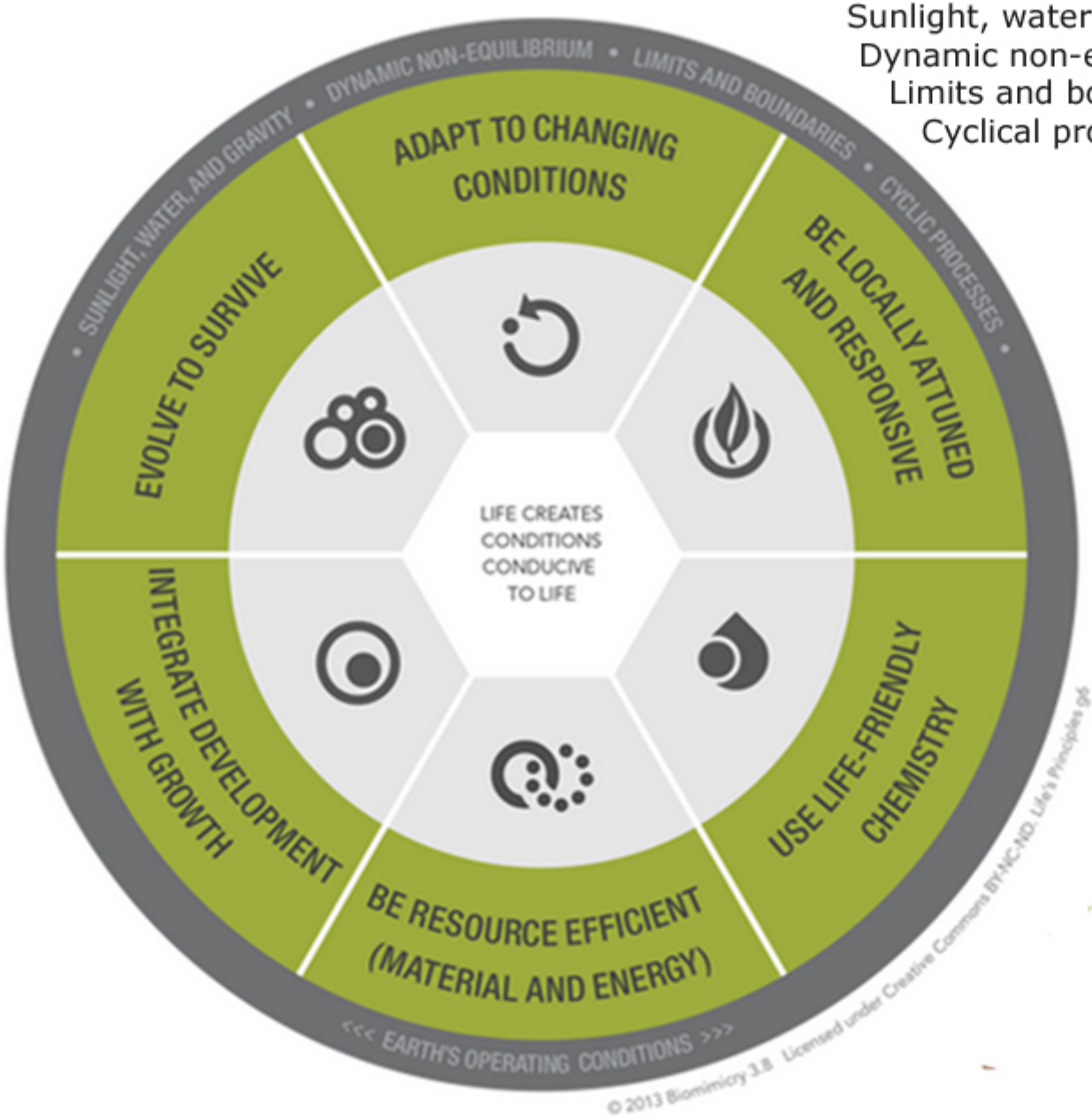
Design in Permaculture

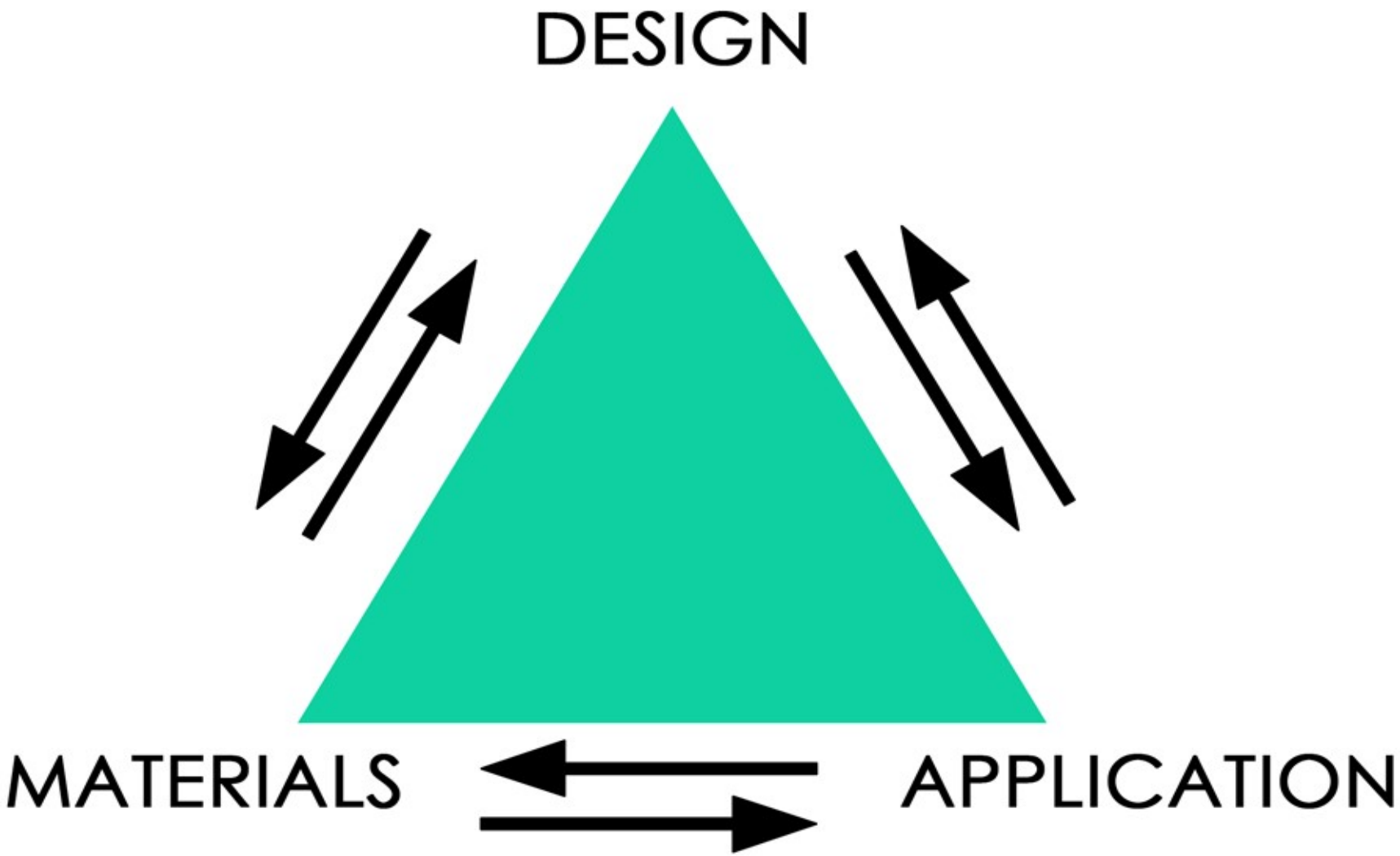


DESIGN IS a process of MAKING DREAMS come TRUE


Janine Benyus:
9 Basic Principles of Biomimicry
1. Nature runs on sunlight.
2. Nature uses only the energy it needs.
3. Nature fits form to function.
4. Nature recycles everything.
5. Nature rewards cooperation.
6. Nature banks on diversity.
7. Nature demands local expertise.
8. Nature curbs excesses from within.
9. Nature taps the power of limits."
PermacultureVisions.com

Sunlight, water and gravity
Dynamic non-equalibrium
Limits and boundaries
Cyclical processes



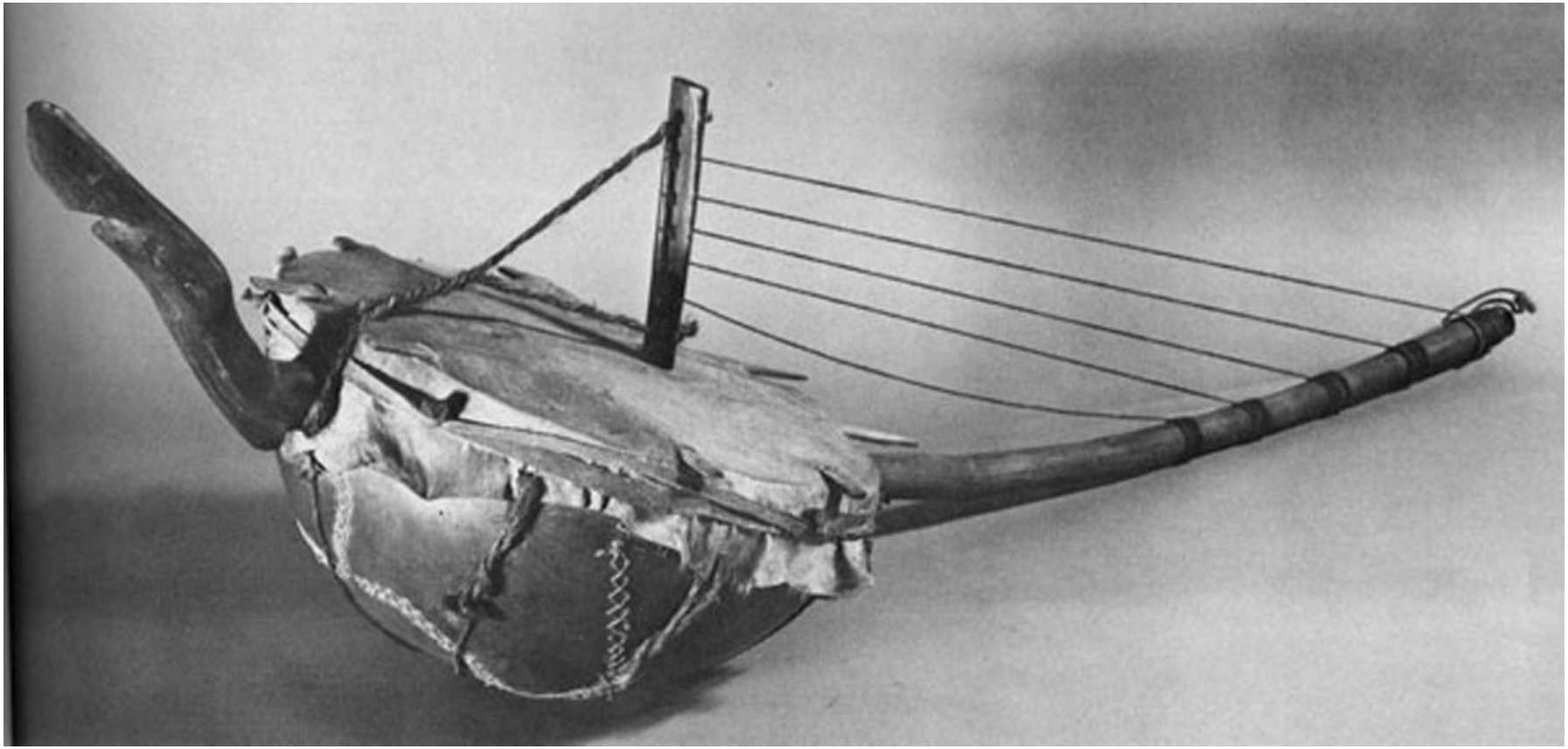


Function

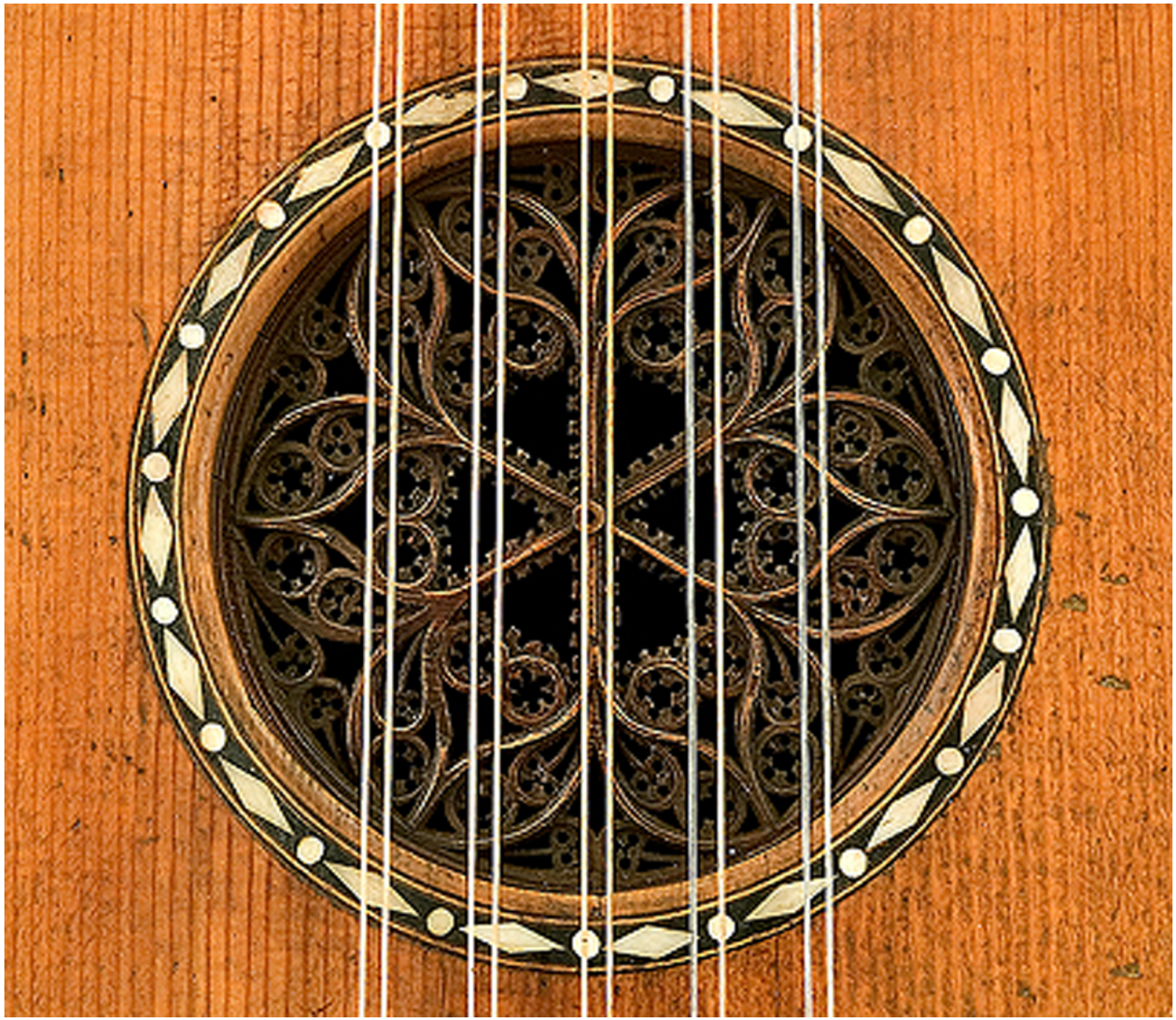
...anything to add?

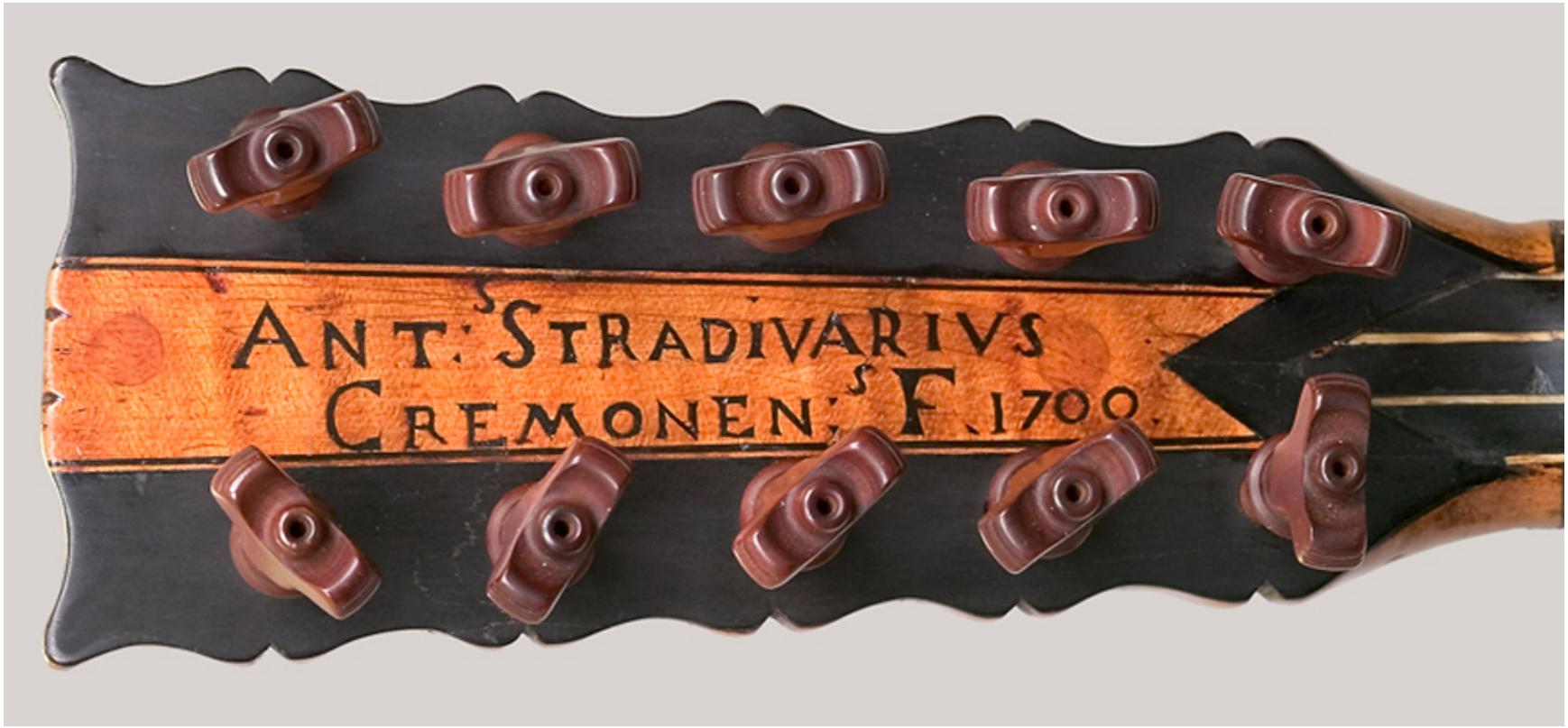
thigh bone flute – about 50,000 years old

- Three berimbaus – still used today in capoeira, Brazilian dance/martial art.

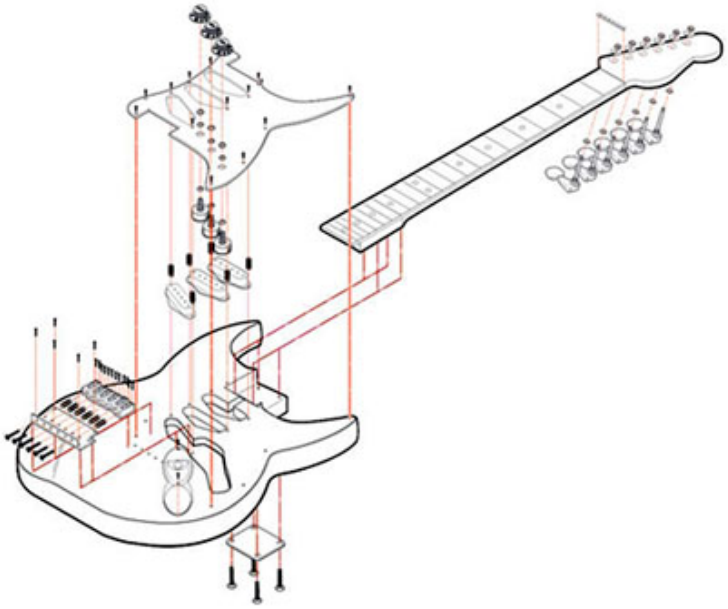


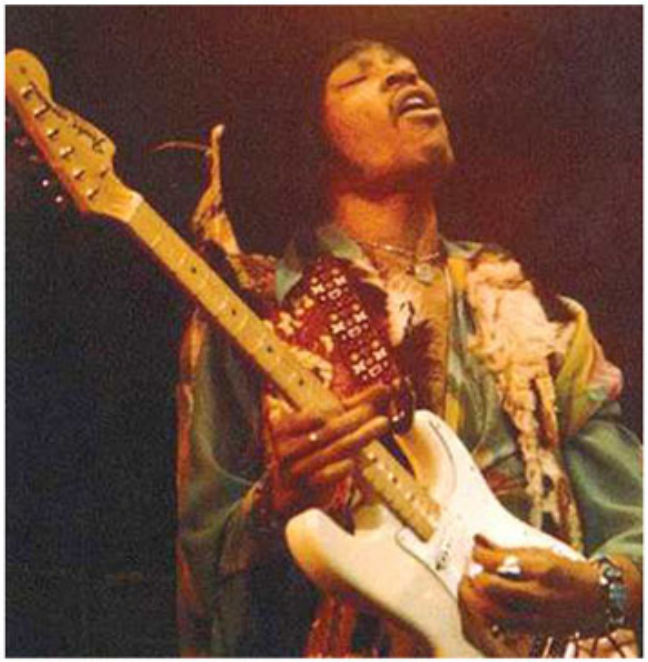
Modern copy of Baroque guitar by Checchucci c.1623



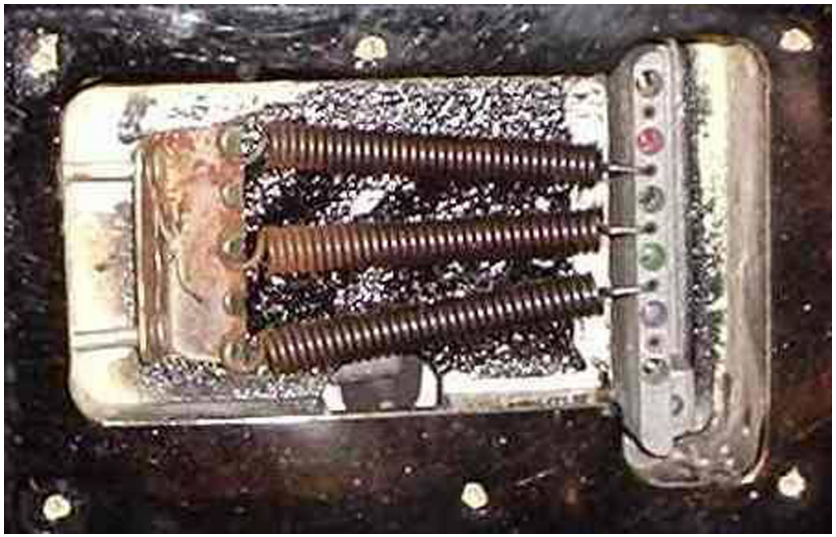

ANT: STRADIVARIVS
CREMONEN: F. 1700.

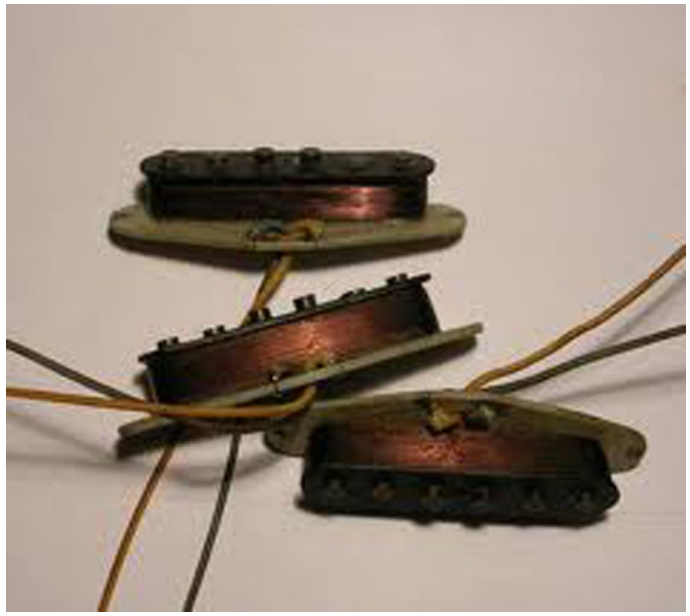
- Guitar by the Martin company, USA, c.1840

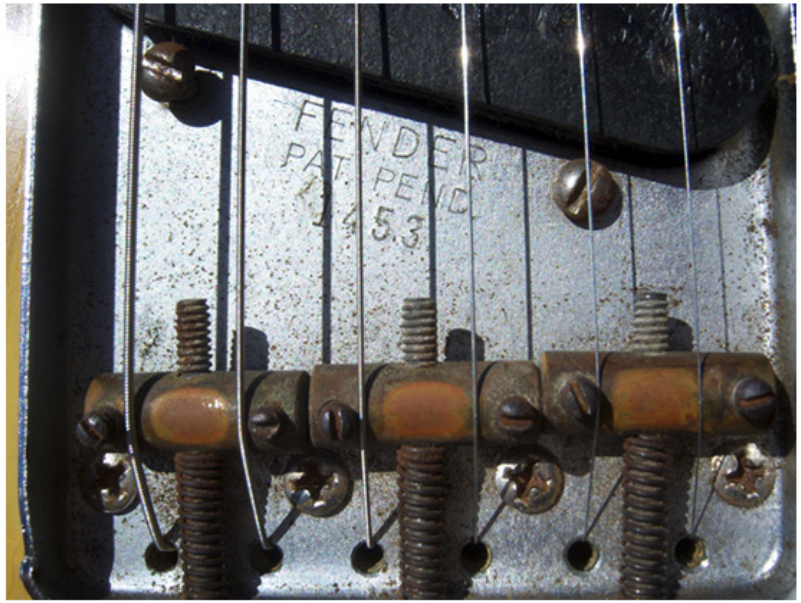


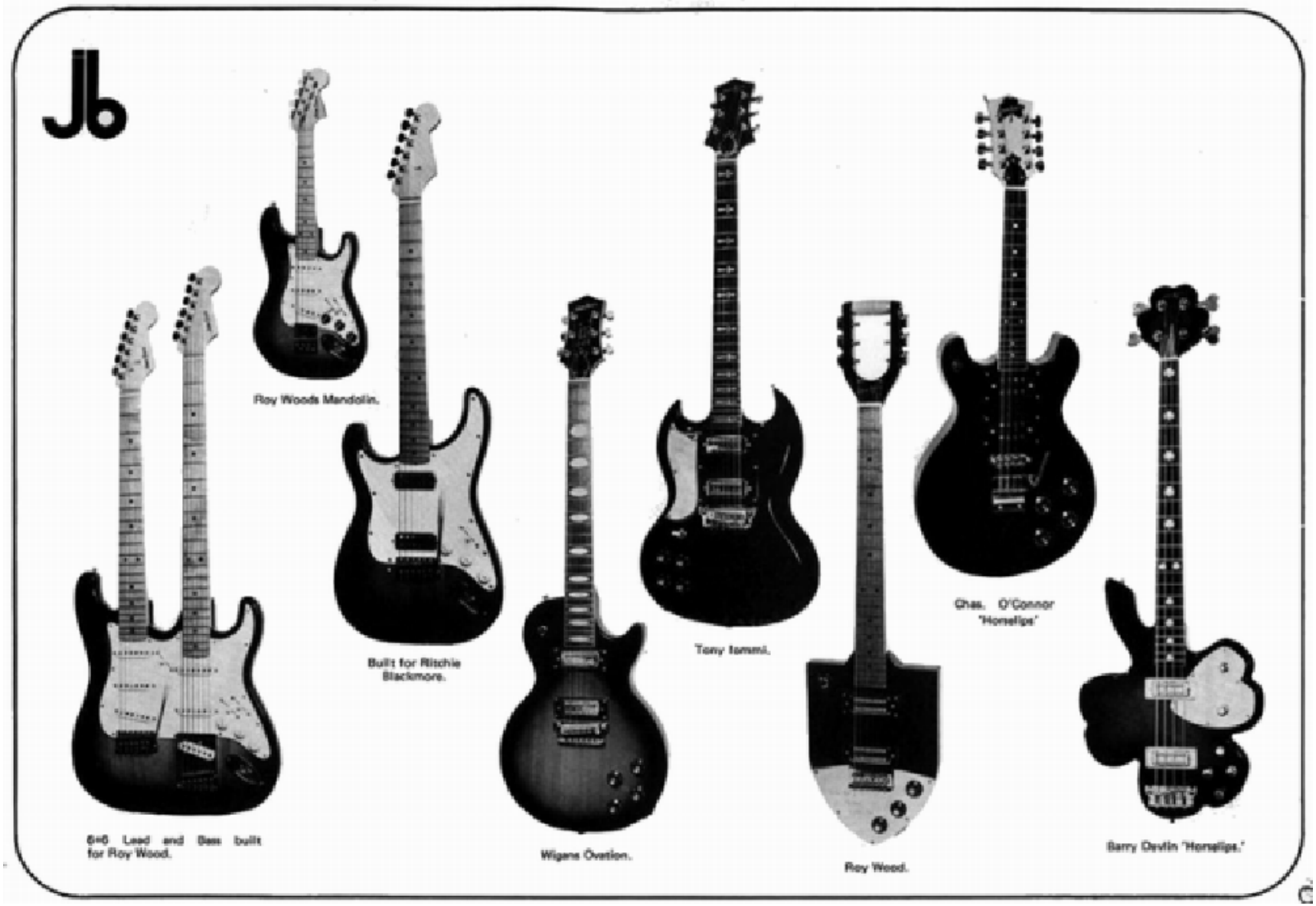



Fender
TREMOLO SYSTEM

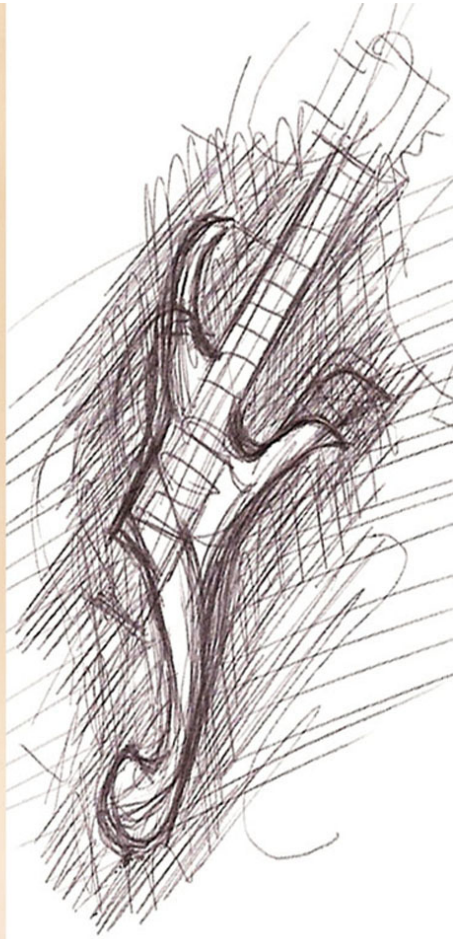





FENDER
PAT PEND
2453


Jb
Roy Woods Mandolin.
Built for Ritchie Blackmore.
Tony Iommi.
Chas. O'Connor 'Horselips'
6+6 Lead and Bass built for Roy Wood.
Wigans Ovation.
Roy Wood.
Barry Devlin 'Horselips.'


BLACK
SABBATH



Design

DESIGN PROCESSES

SCIENTIFIC PROCESS

TOBY HEMENWAY'S PROCESS

KOBERG'S and BAGNALL'S PROCESS

NEW AGE PROCESS

SCIENTIFIC PROCESS

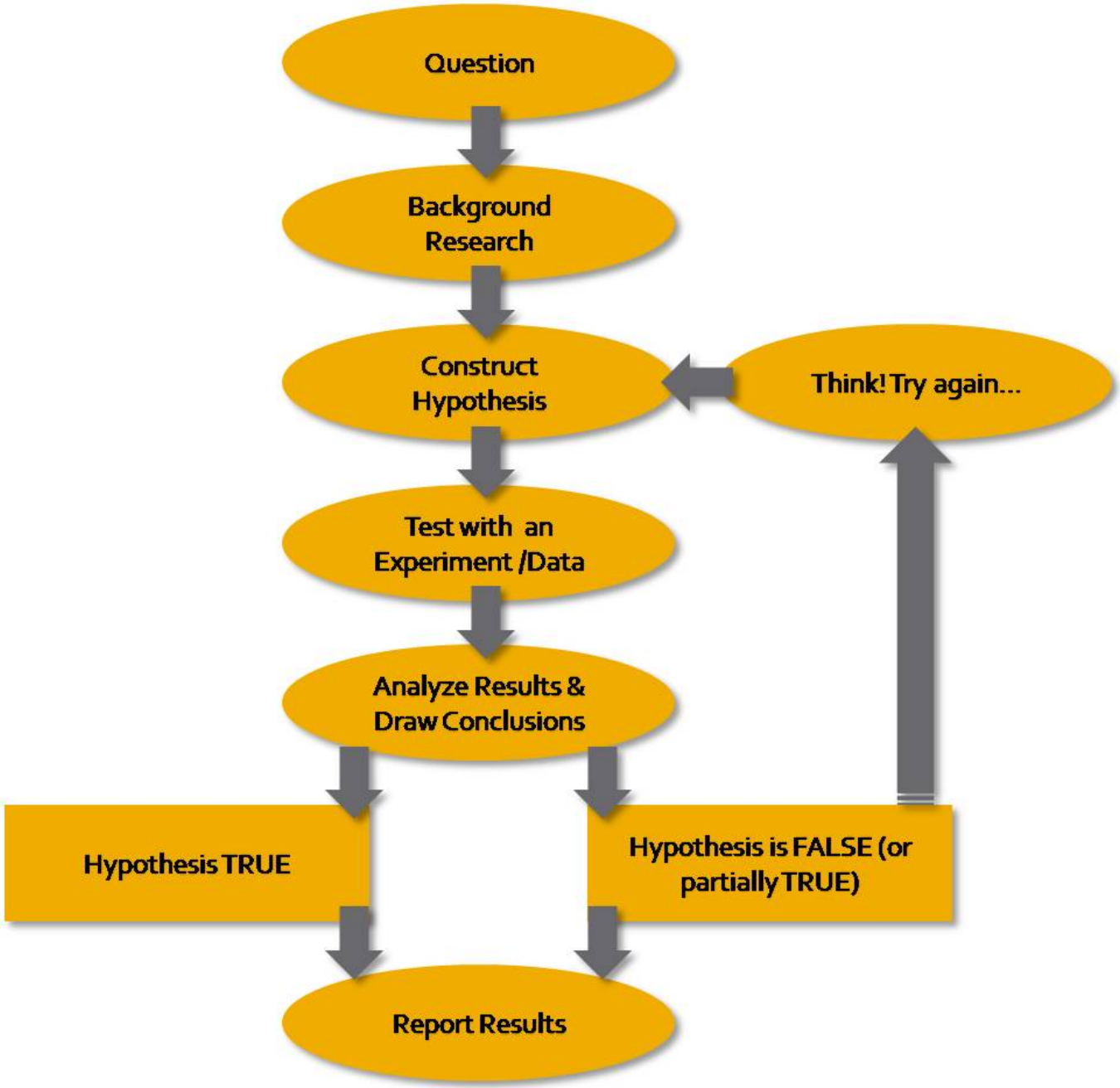
1. OBSERVE

2. HYPOTHESIZE

3. TEST

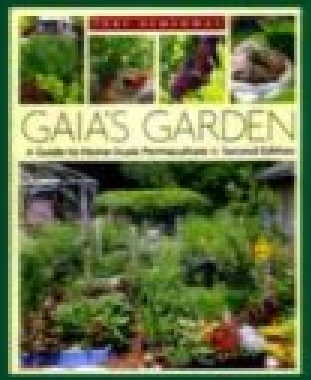
4. ANALYZE RESULTS

5. CONCLUSION


Question
Background Research
Construct Hypothesis
Think! Try again...
Test with an Experiment /Data
Analyze Results & Draw Conclusions
Hypothesis TRUE
Hypothesis is FALSE (or partially TRUE)
Report Results

TOBY HEMENWAY'S PROCESS

From Gaia's Garden, 2nd Edition

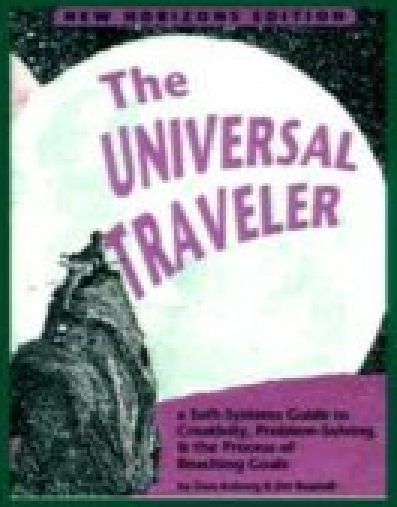


1. OBSERVATION
2. VISIONING
3. PLANNING
    a. Conceptual Design
    b. Schematic Design
4. DEVELOPMENT
5. IMPLIMENTATION

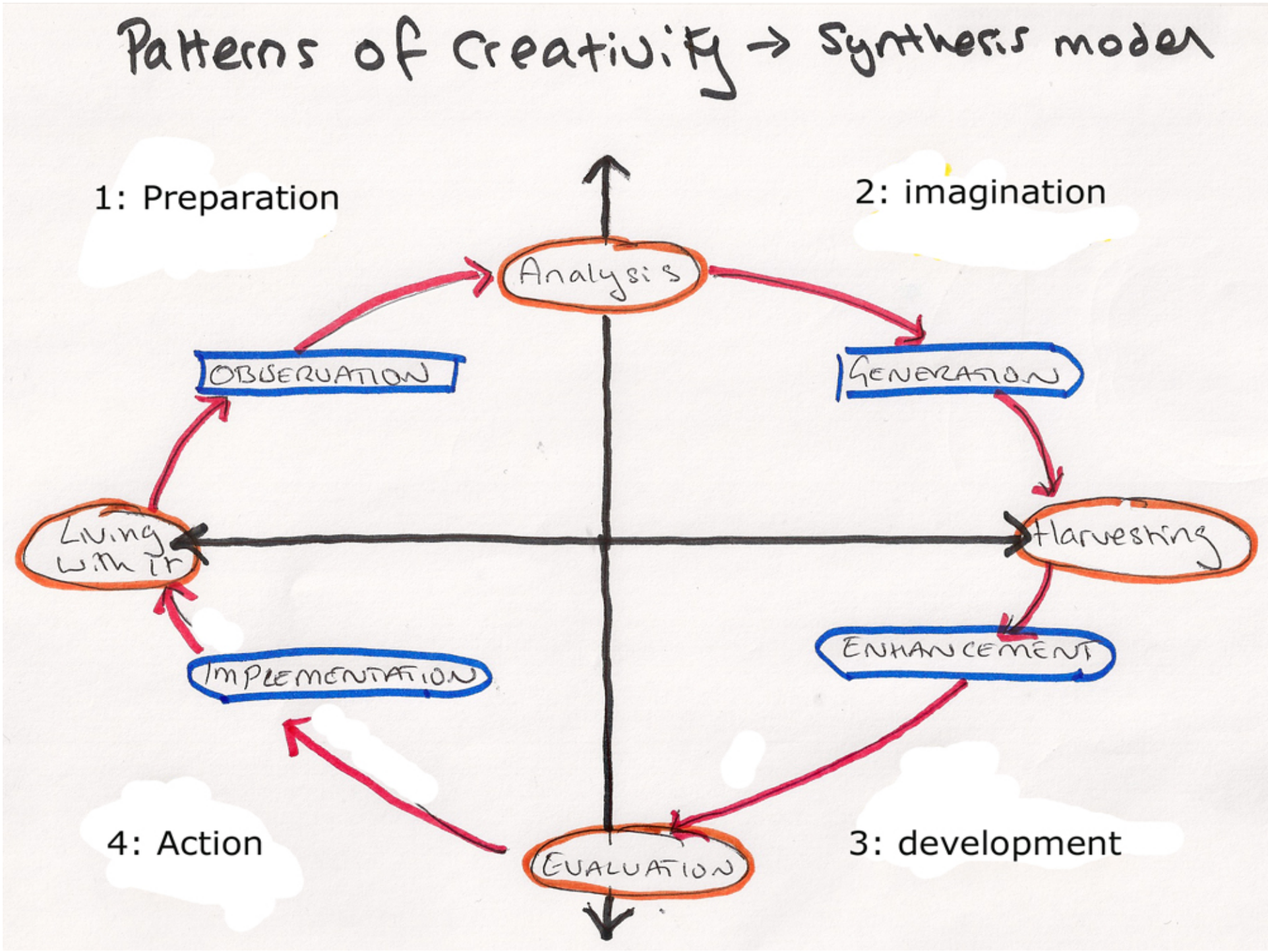
KOBERG and BAGNALL PROCESS

From The Universal Traveler

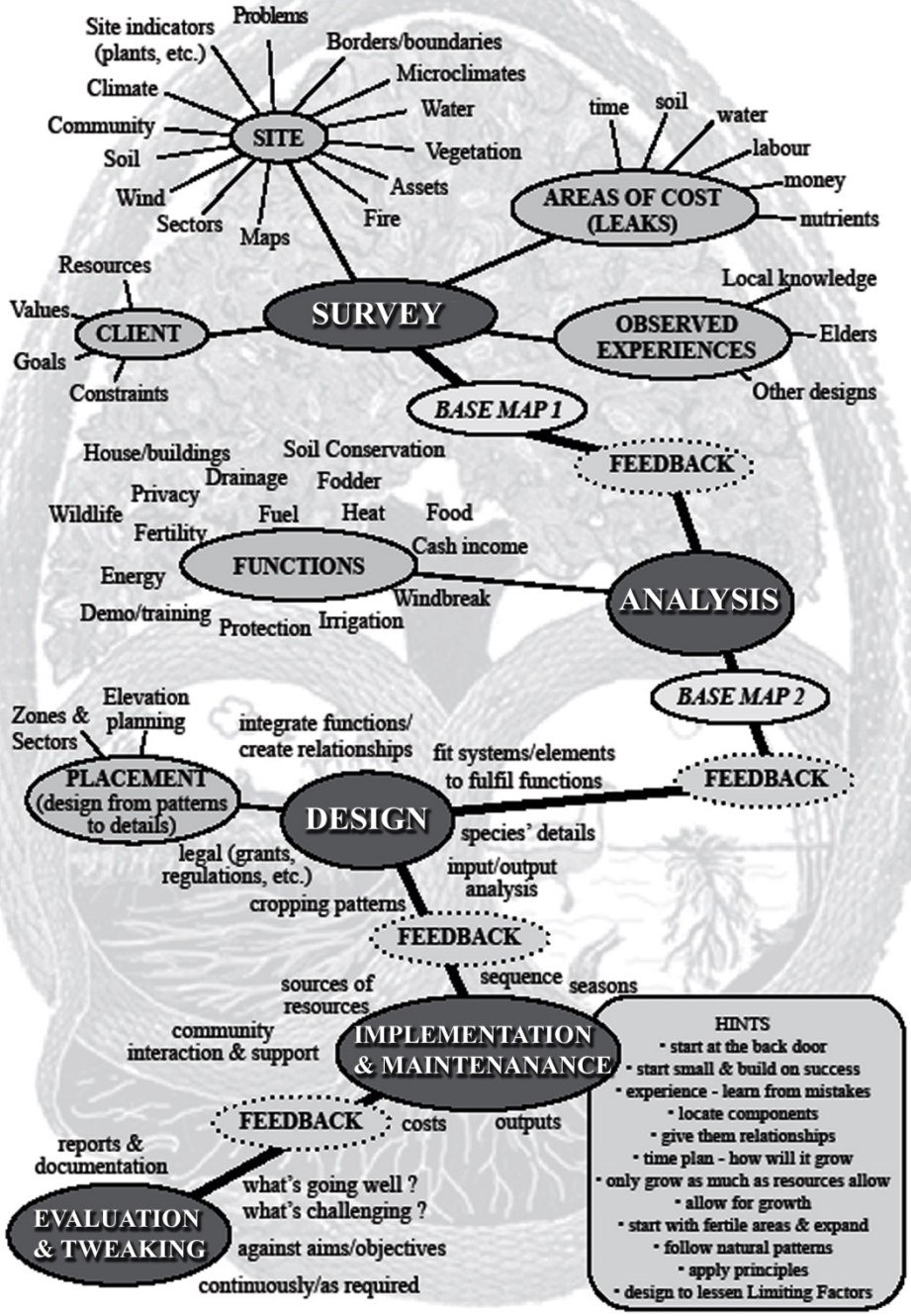
1. ACCEPT RESPONSIBILITY
2. ANALYZE
3. DEFINE THE PROBLEM
4. IDEATE
5. CHOOSE
6. IMPLIMENT
7. EVALUATE



Patterns of Creativity → Synthesis model

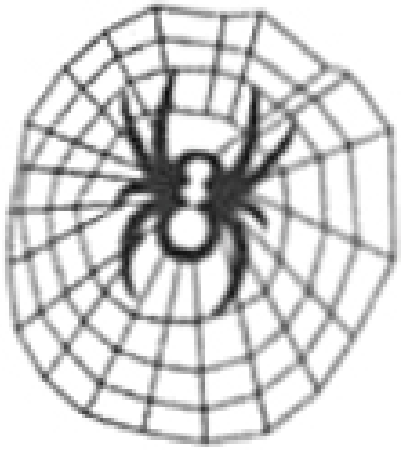


SADIMET DESIGN PROCESS



7 Design from Patterns to Details

Can't see the wood for the trees



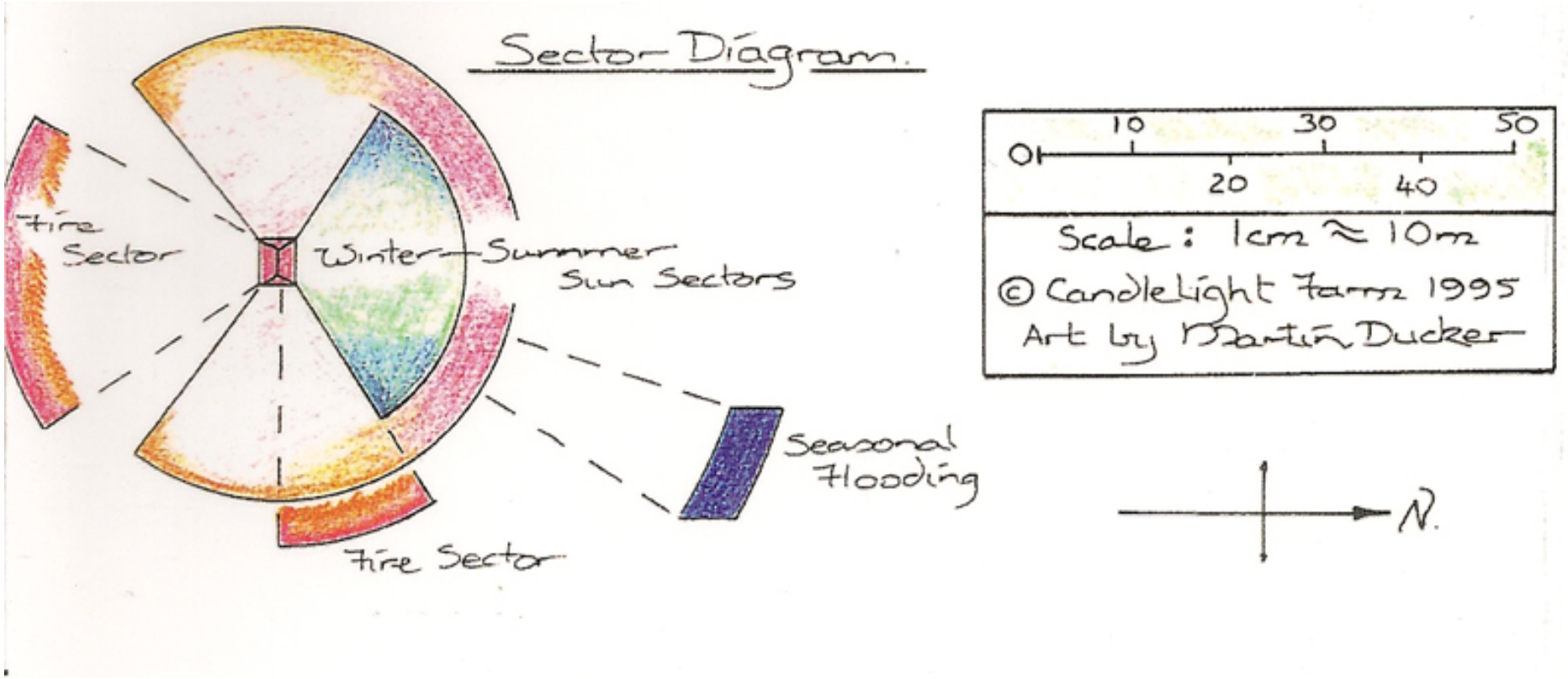
SITE ANALYSIS FACTORS

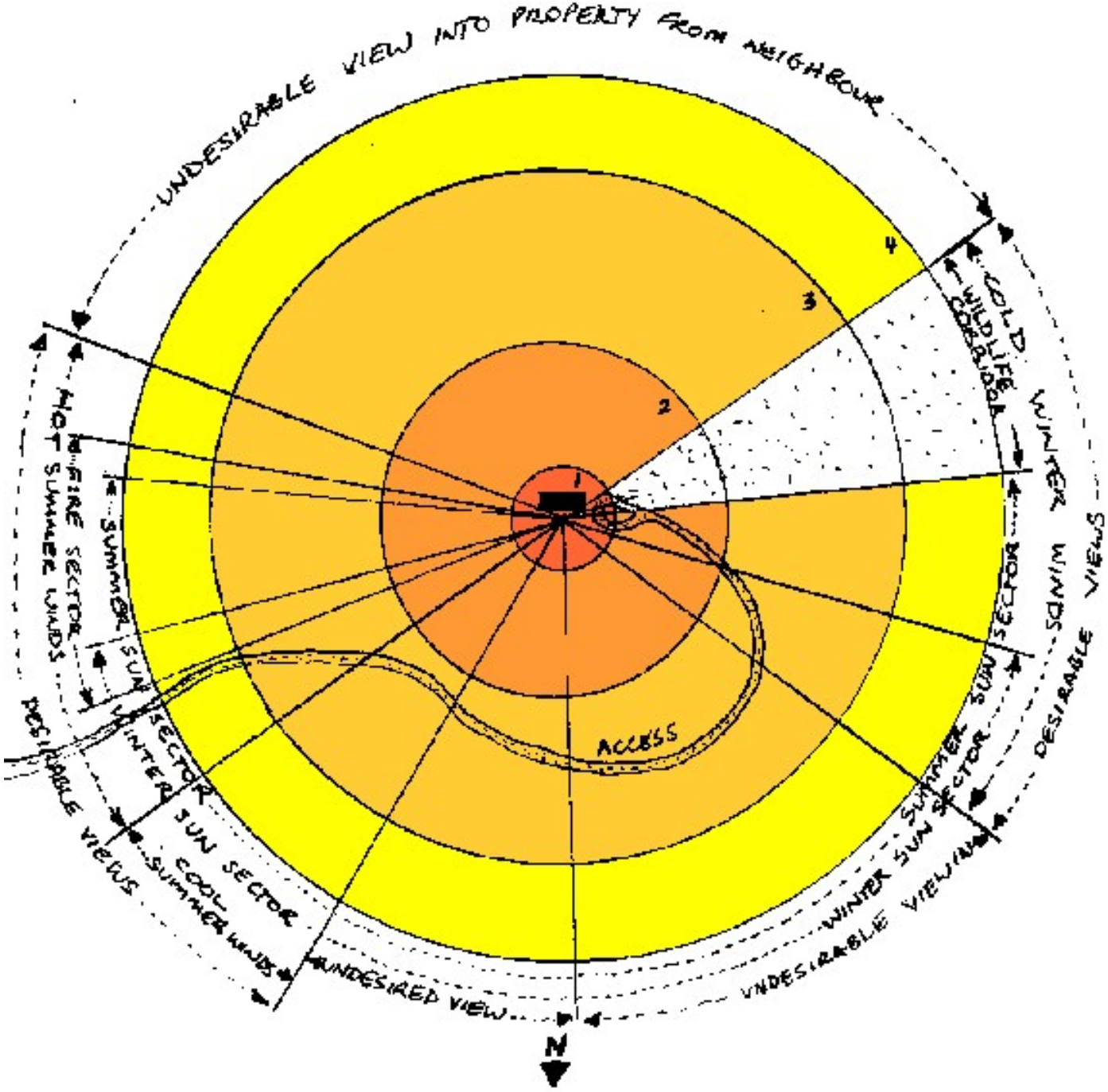
"WILD ENERGIES"

SUN & SHADE
SLOPES
WATER
WIND
NOISE
LIGHT

BEAUTIFUL VIEWS
UNWANTED VIEWS
WILDLIFE
NEIGHBORHOOD KIDS
FIRE

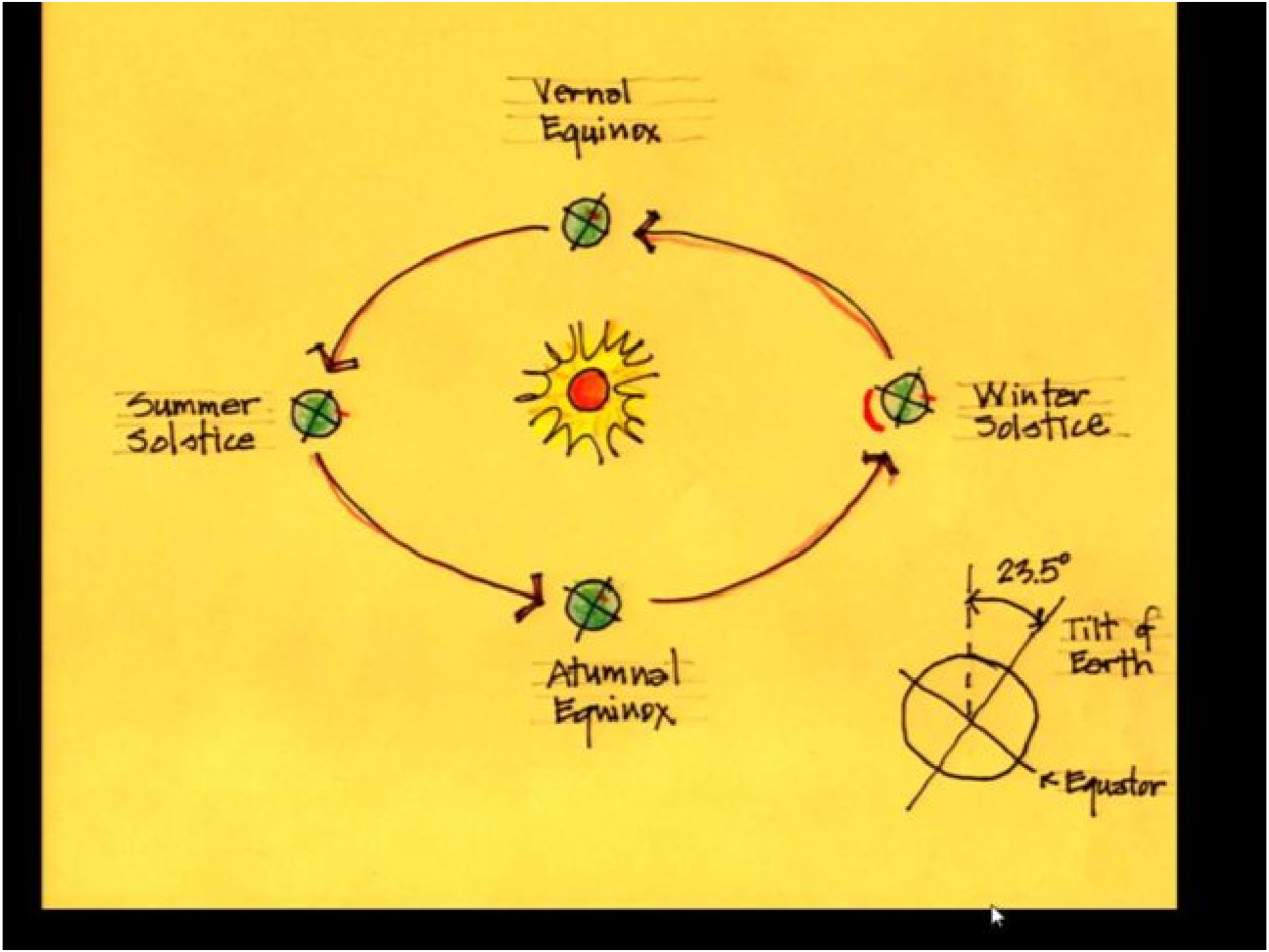
Sector diagram

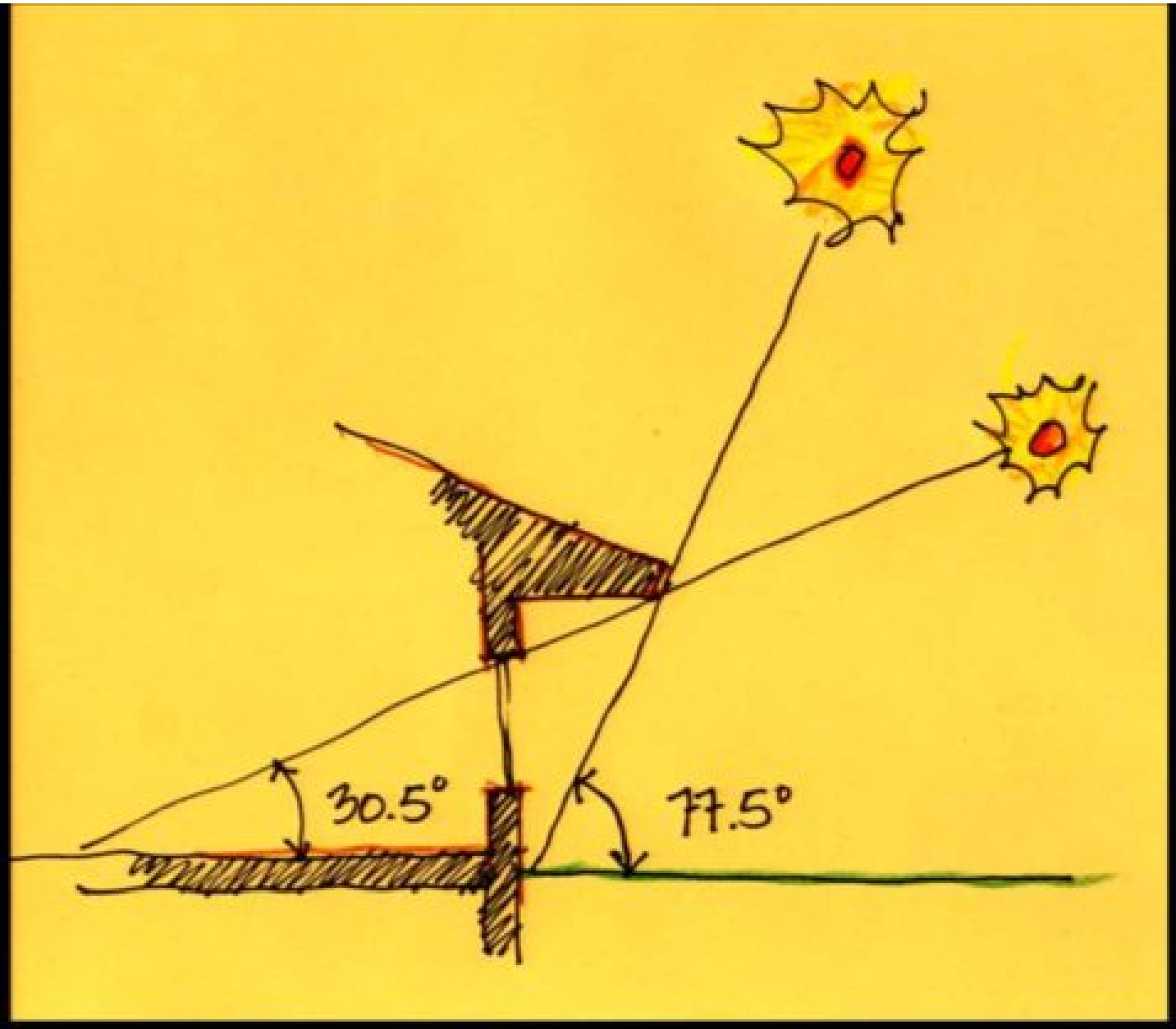



UNDESIRABLE VIEW INTO PROPERTY FROM NEIGHBOUR
COLD WINTER WINDS
WILDLIFE CORRIDOR
BORE SECTOR
DESIRABLE VIEWS
SUMMER SUN SECTOR
WINTER SUN SECTOR
SUMMER SUN
HOT SUMMER WINDS
FIRE SECTOR
UNDESIRABLE VIEWS
COOL SUMMER WINDS
UNDESIRED VIEW
ACCESS
1
2
3
4
N

Design priorities

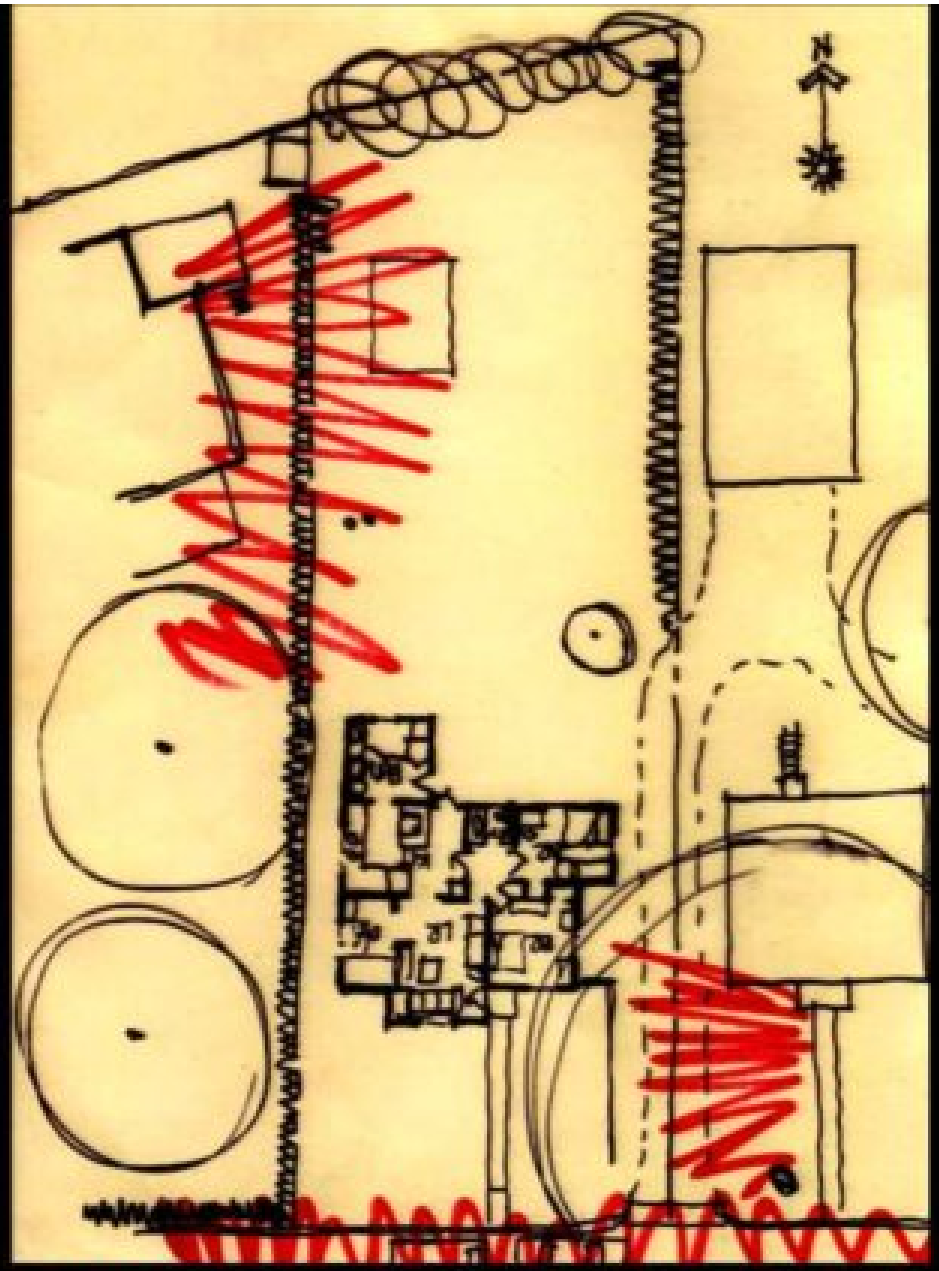
- Water
- Slope
- Pathways
- Strategic placement of key elements, eg buildings


Vernal Equinox
Summer Solstice
Winter Solstice
Autumnal Equinox
23.5°
Tilt of Earth
Equator

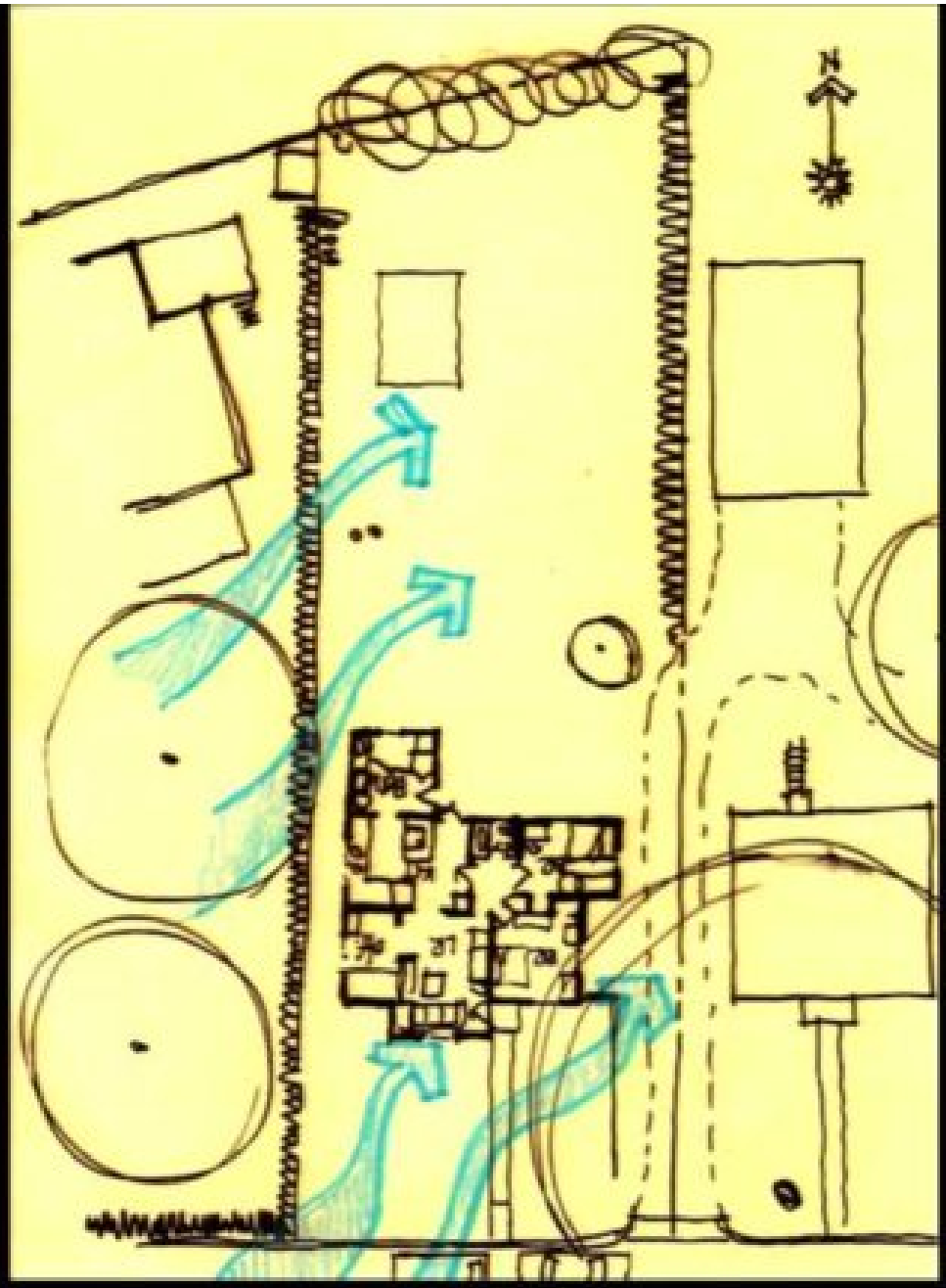


For 36° North Latitude

"Shadow Dance", JC Raulston Arboretum, 1990. By Will Hooker, et. al.

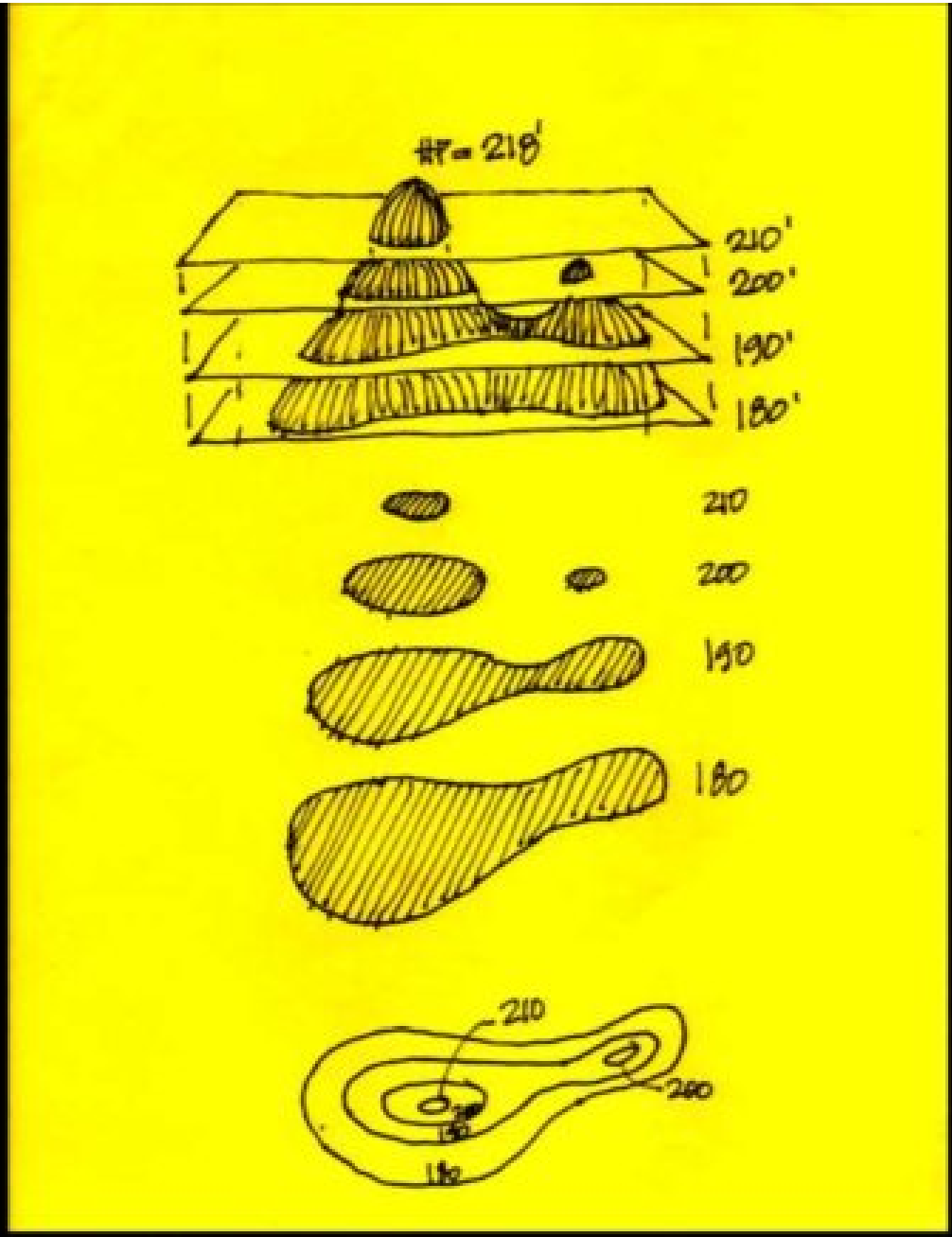


NOISE & NIGHT LIGHTS



WIND

"WATER RUNS DOWNHILL."



After sketch in Grade Easy

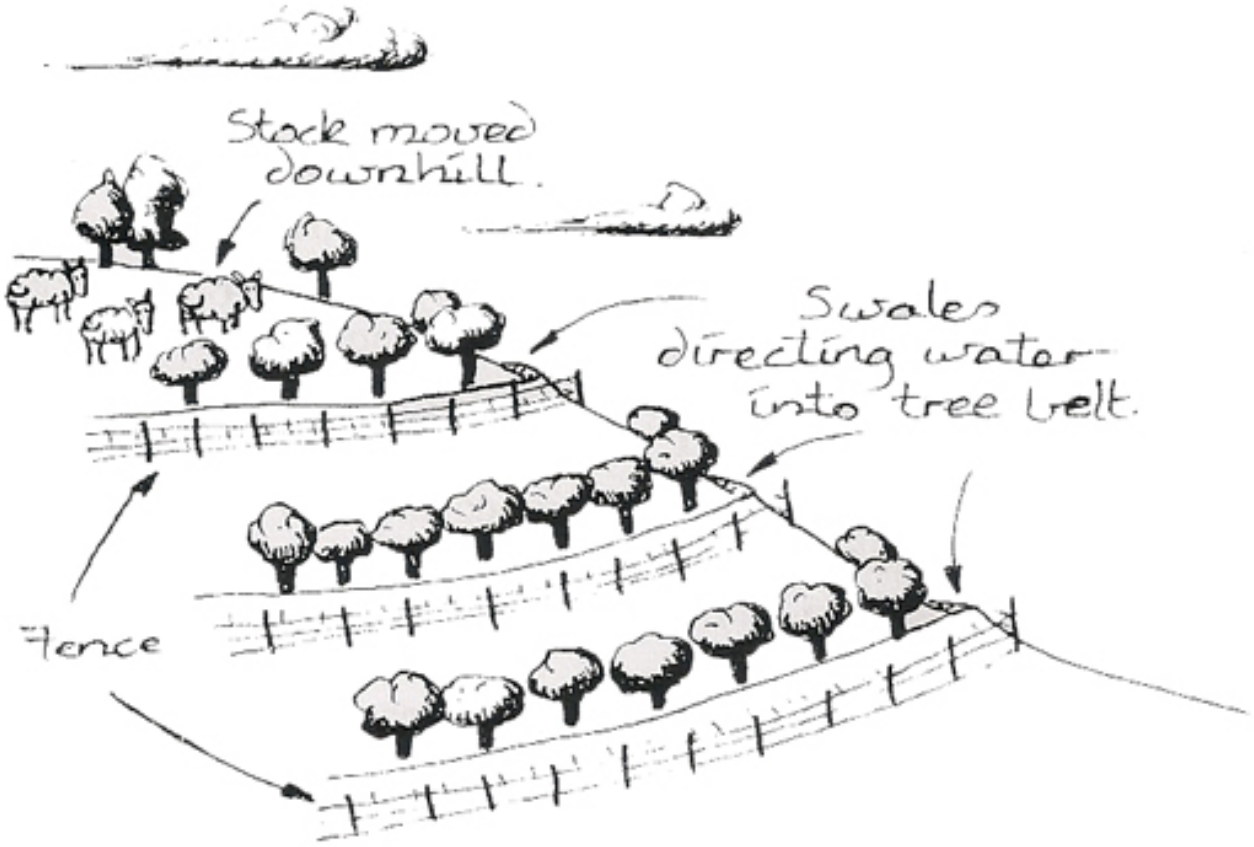


Figure 11.15 Stock start at the top and are directed downhill as the paddock dries up or tree damage is imminent.

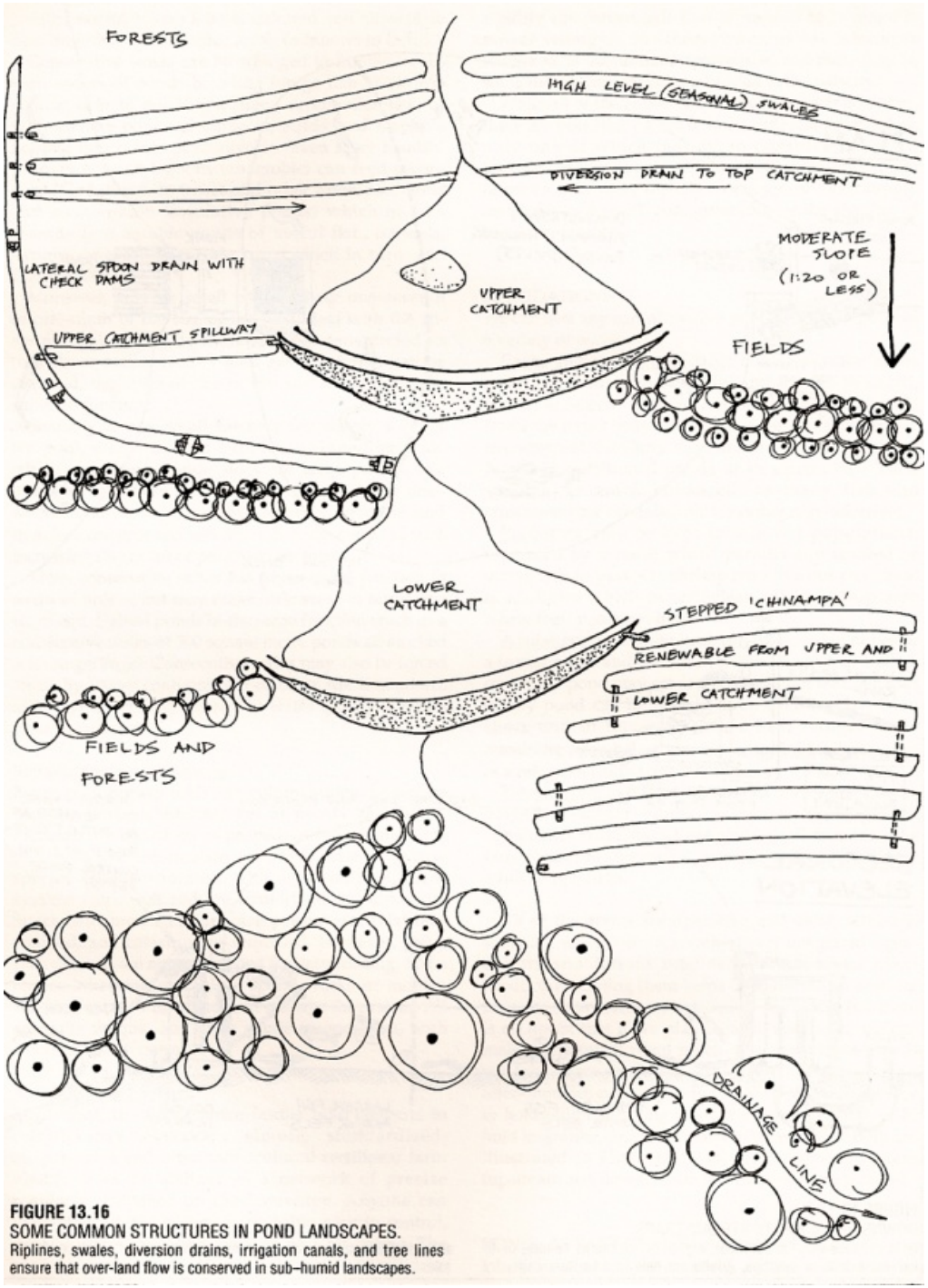


FIGURE 13.16
SOME COMMON STRUCTURES IN POND LANDSCAPES.
Riplines, swales, diversion drains, irrigation canals, and tree lines ensure that over-land flow is conserved in sub–humid landscapes.

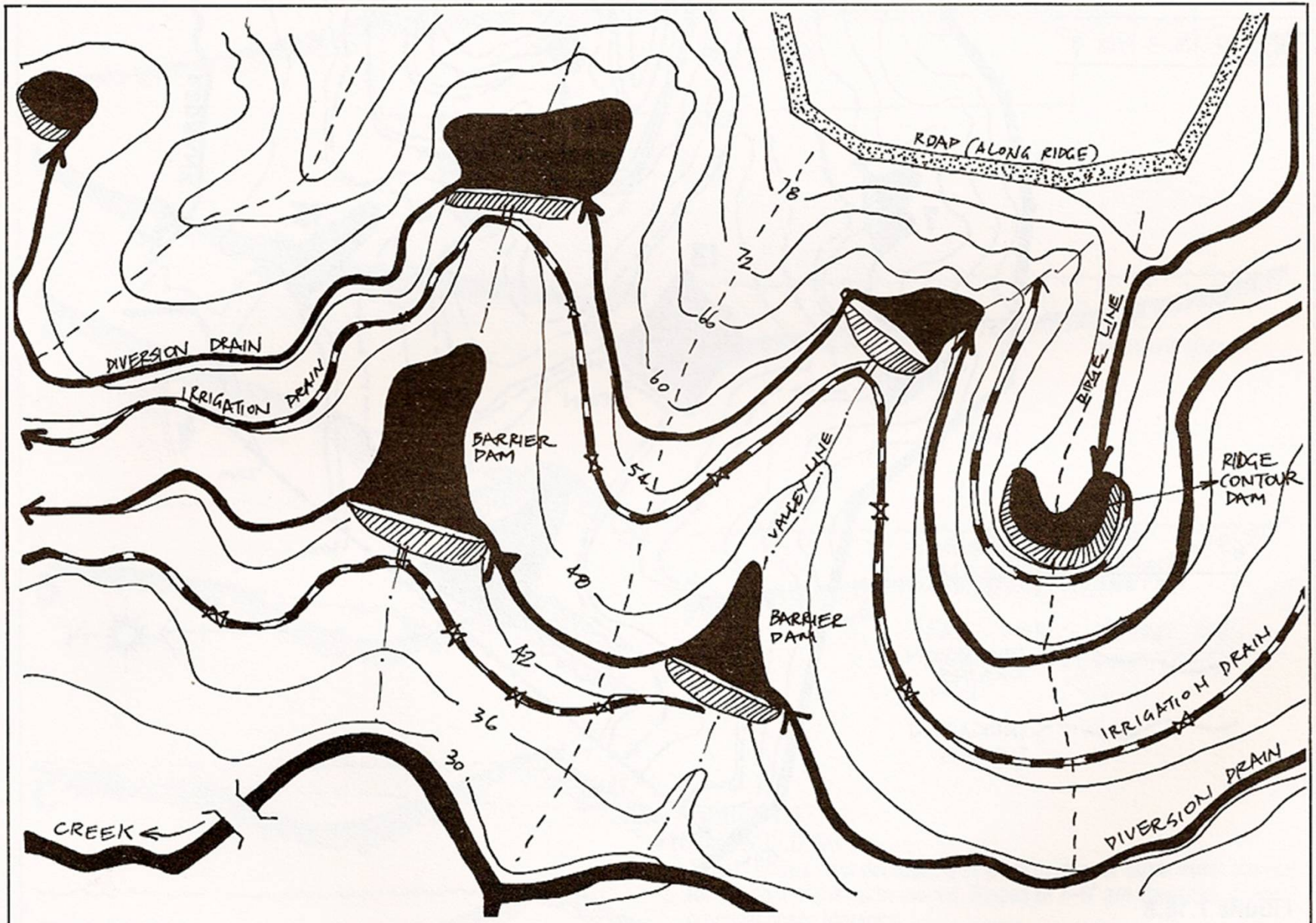


FIGURE 7.16.A

P. A. Yeomans' "Keyline" system provides drought–proofing for farms with very low maintenance and operating costs; his was the first book in English on total water design for foothill farms, access, tree belts, soil creation, low tillage, and creative water storage.

Maximise edges

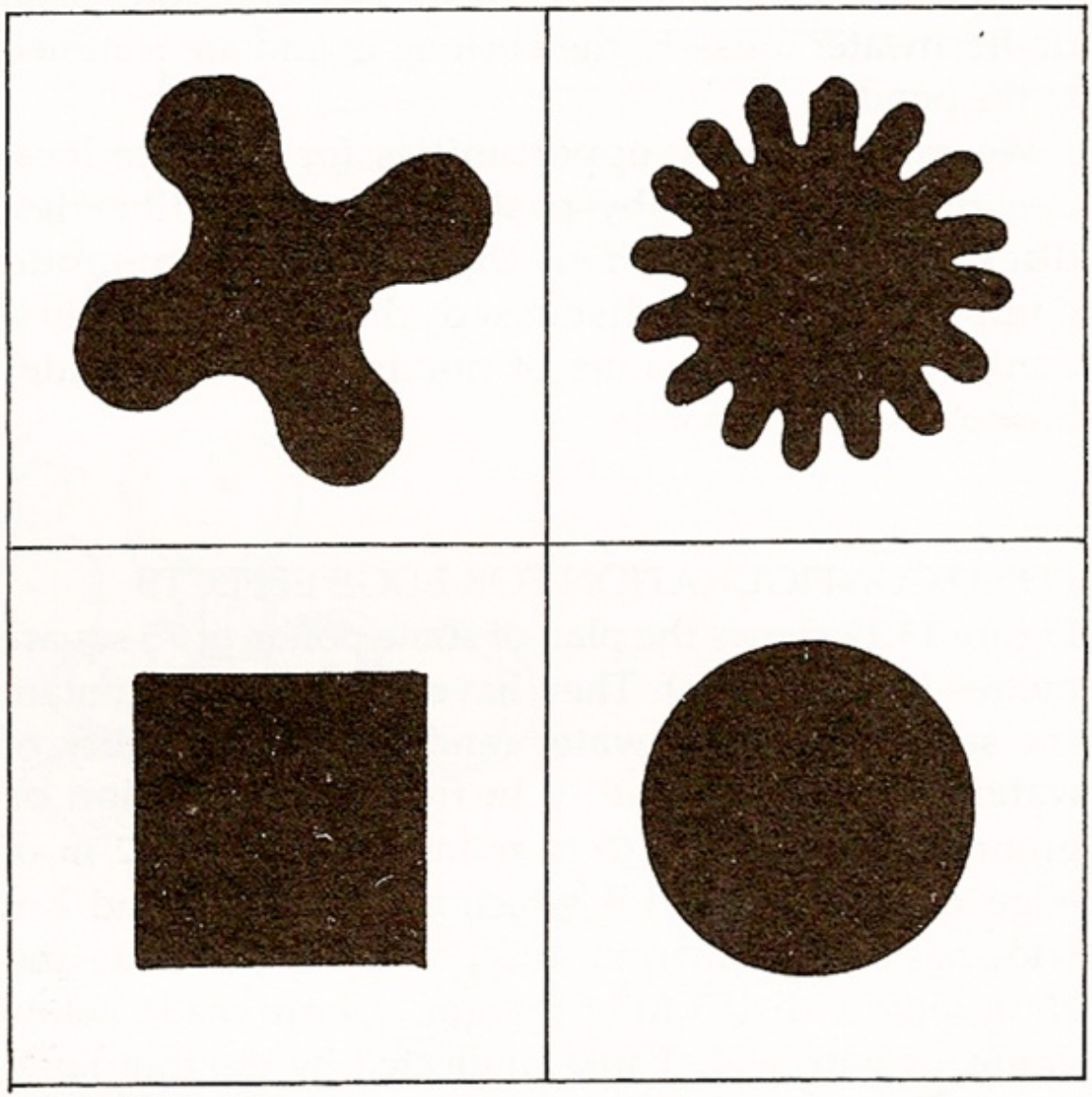


FIGURE 13.19
4 PONDSOF SAME AREA,
but differing widely in their capacity to provide for edge plants such as blueberries, to feed fish from edge vegetation, and to irrigate nearby tree roots.

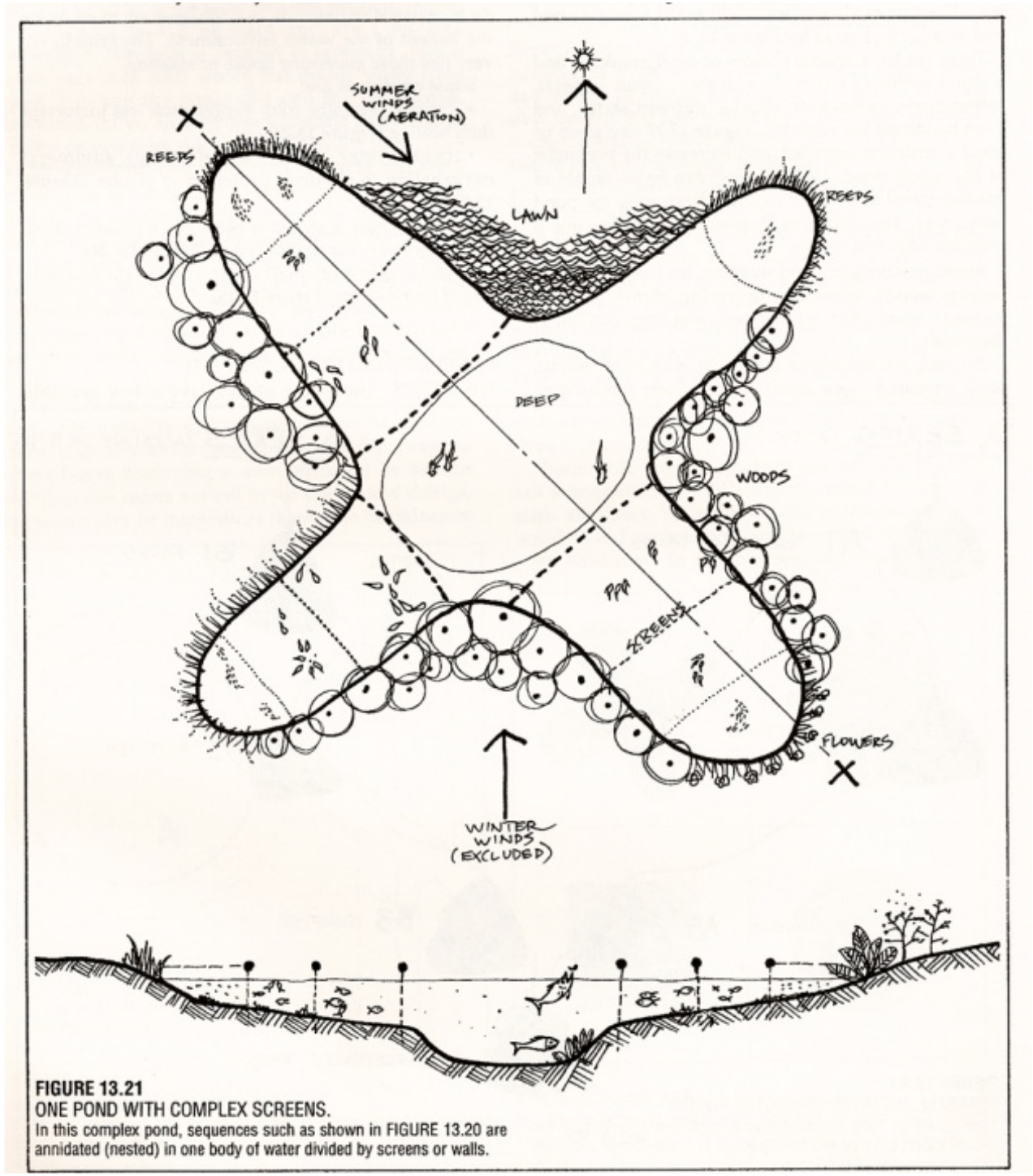
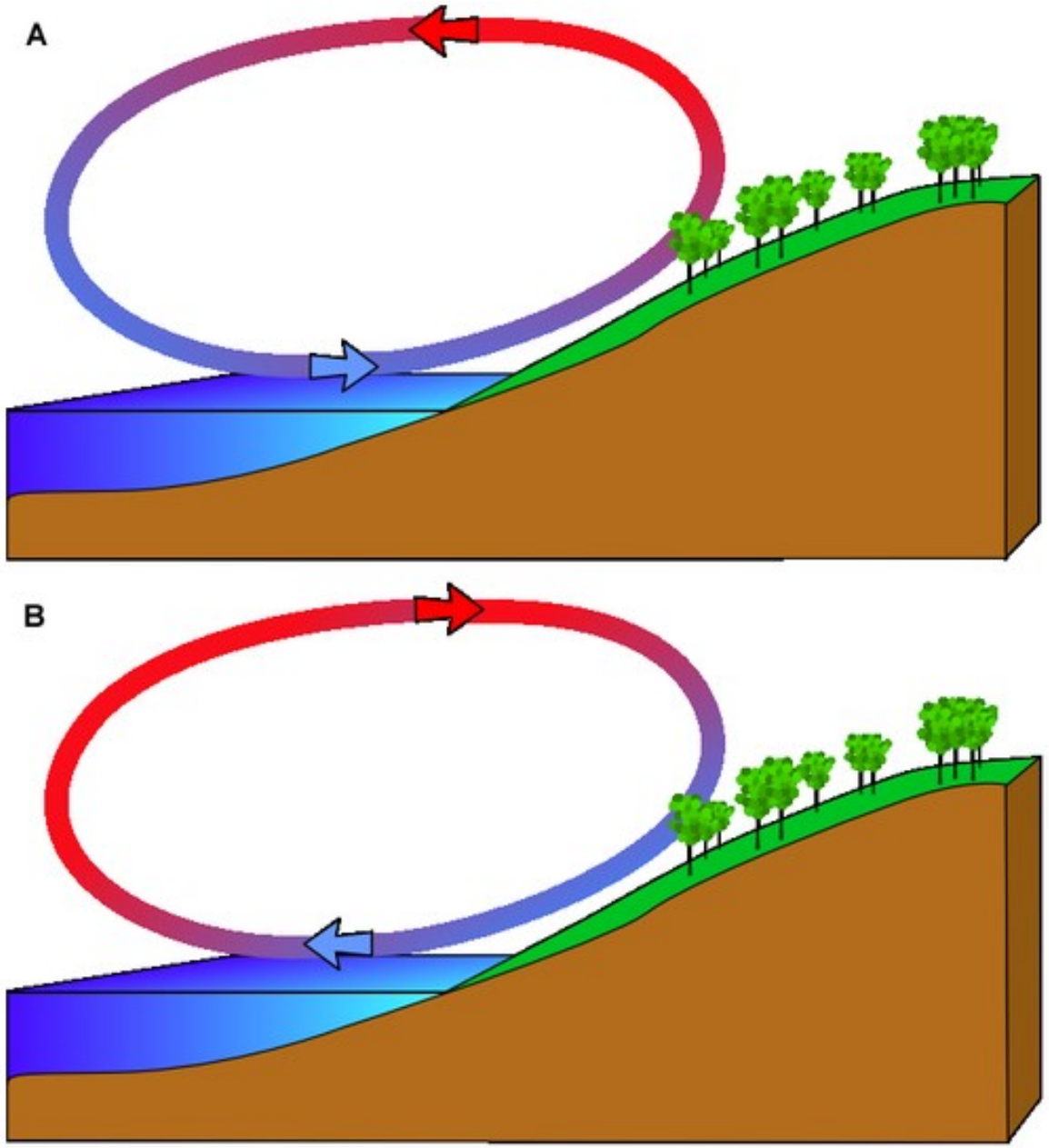
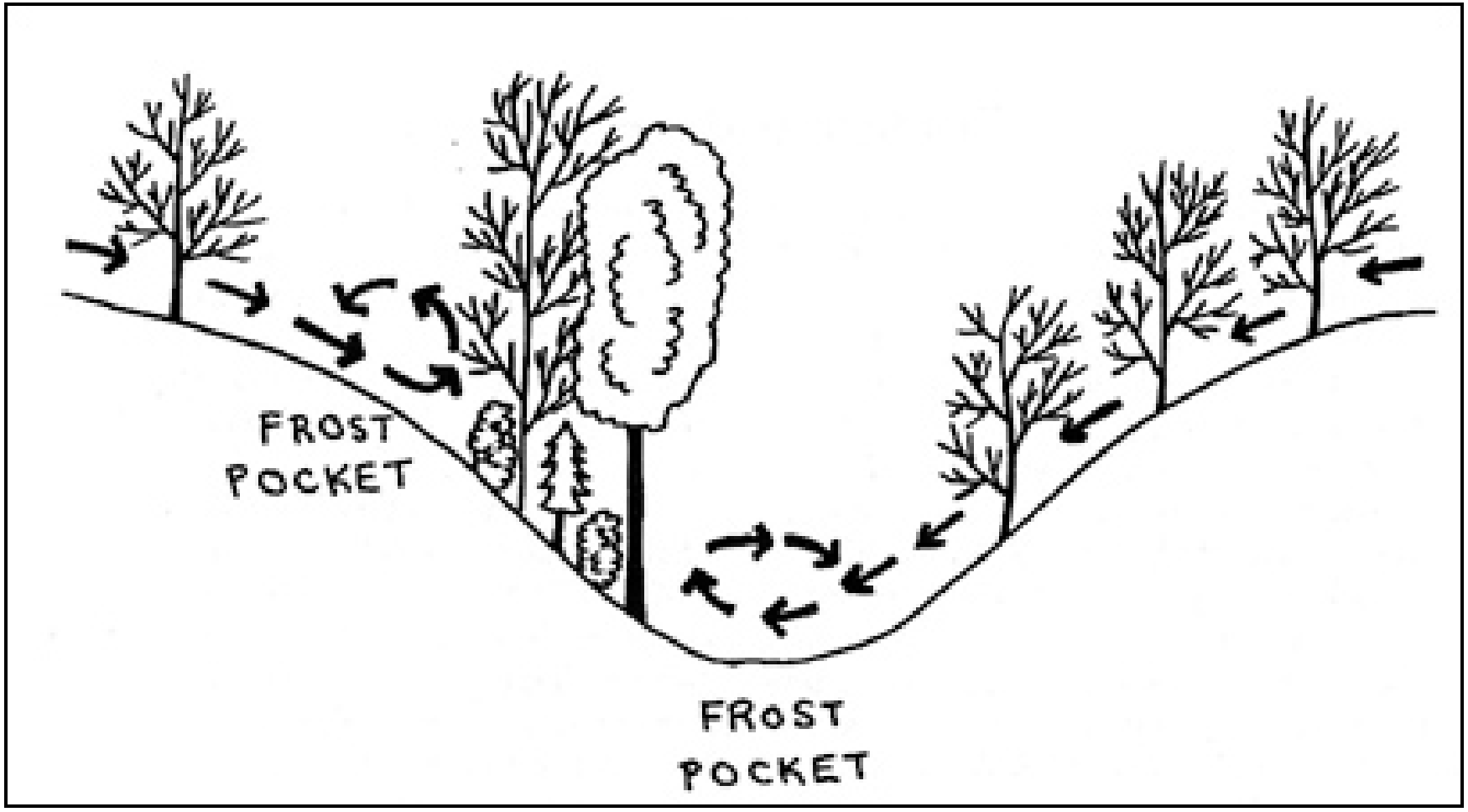


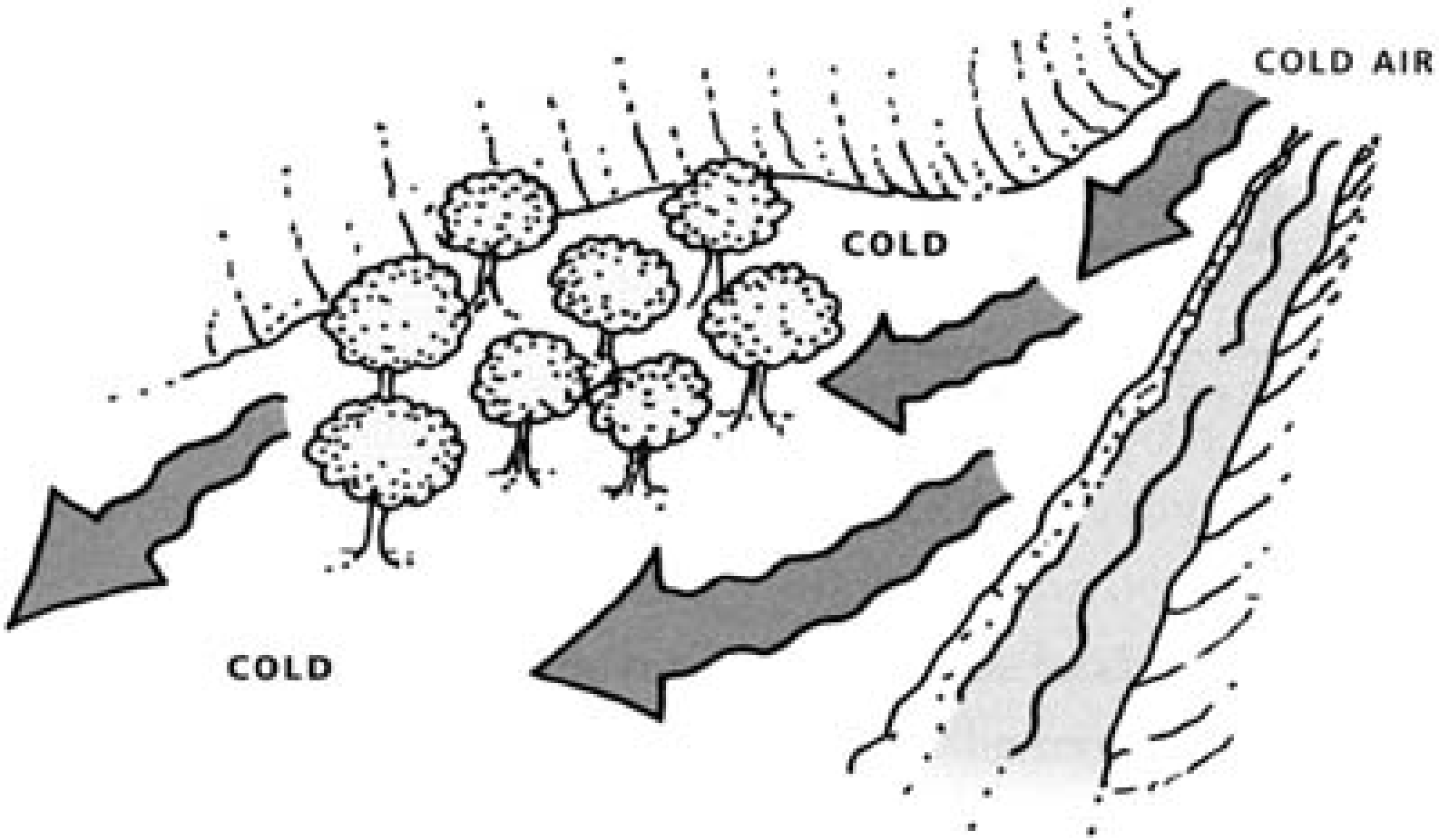
FIGURE 13.21
ONE POND WITH COMPLEX SCREENS.
In this complex pond, sequences such as shown in FIGURE 13.20 are annidated (nested) in one body of water divided by screens or walls.

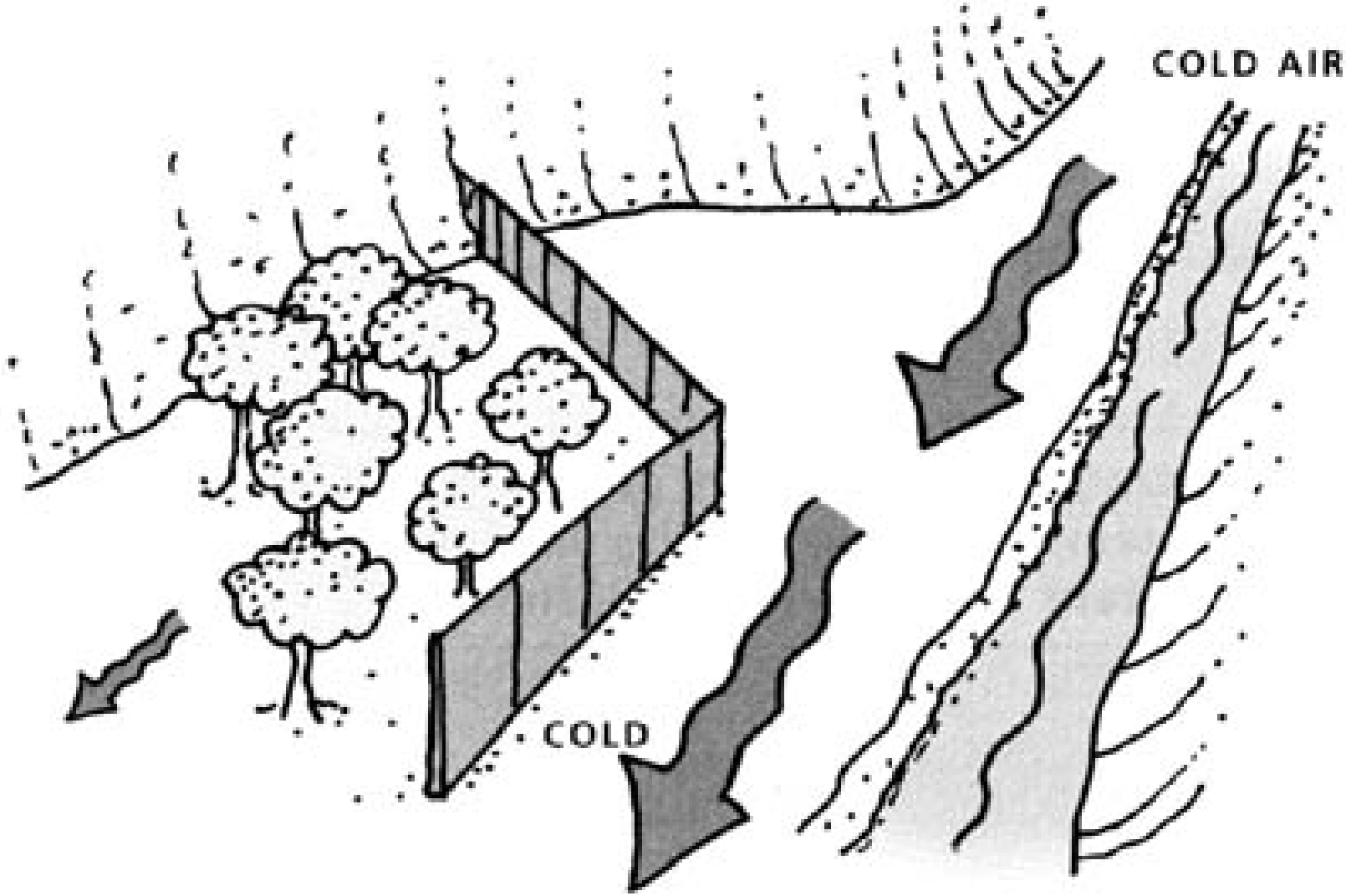
Cold air sinks


A
B

Frost pocket




COLD AIR
COLD
COLD


COLD AIR
COLD

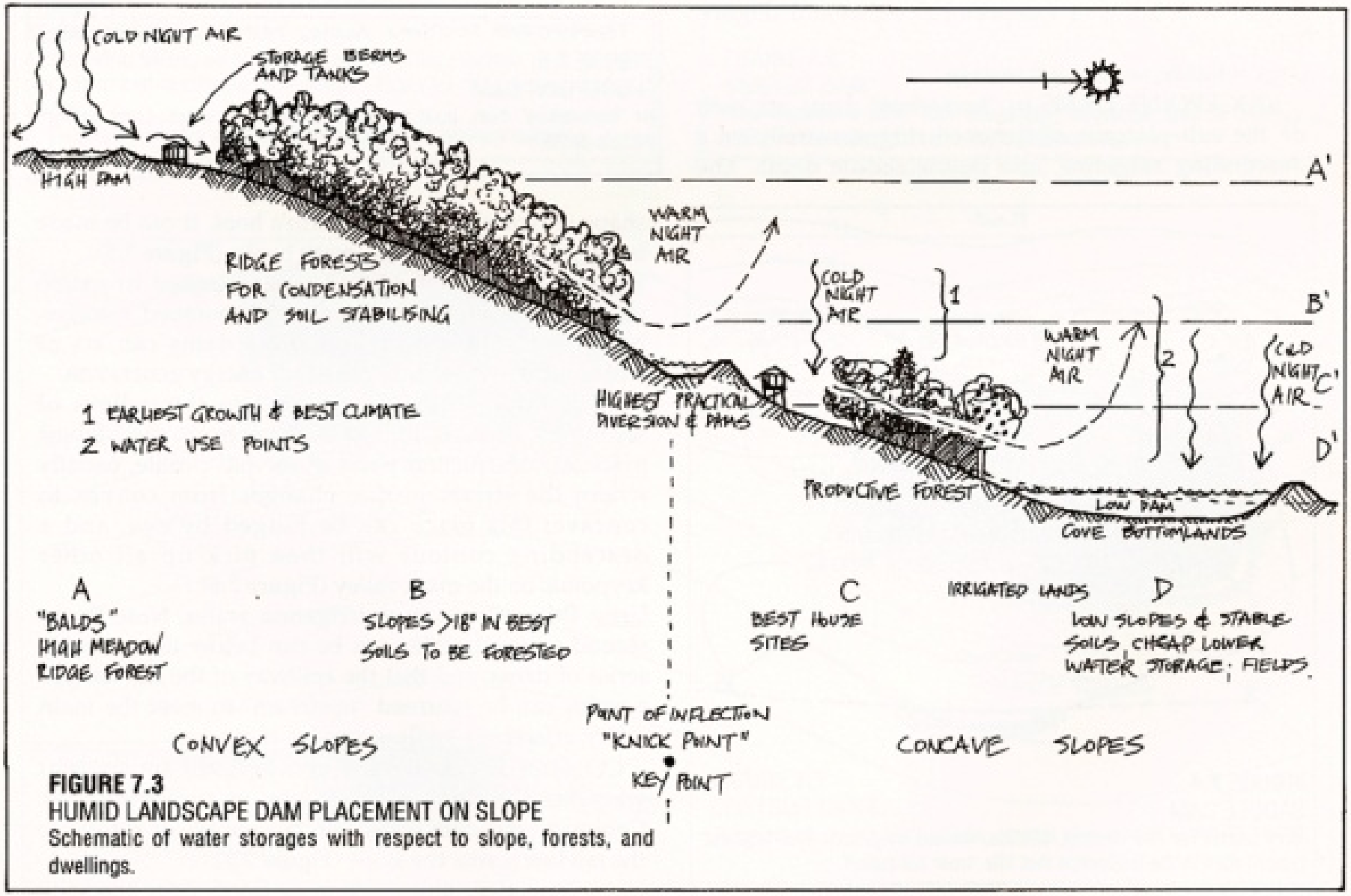


FIGURE 7.3
HUMID LANDSCAPE DAM PLACEMENT ON SLOPE
Schematic of water storages with respect to slope, forests, and dwellings.

PHYSICAL SYSTEMS

- FOOD
- WATER
- SHELTER & THE BUILT ENVIRONMENT
- ENERGY
- MATERIAL RESOURCES & RE-USE ("Wastes")

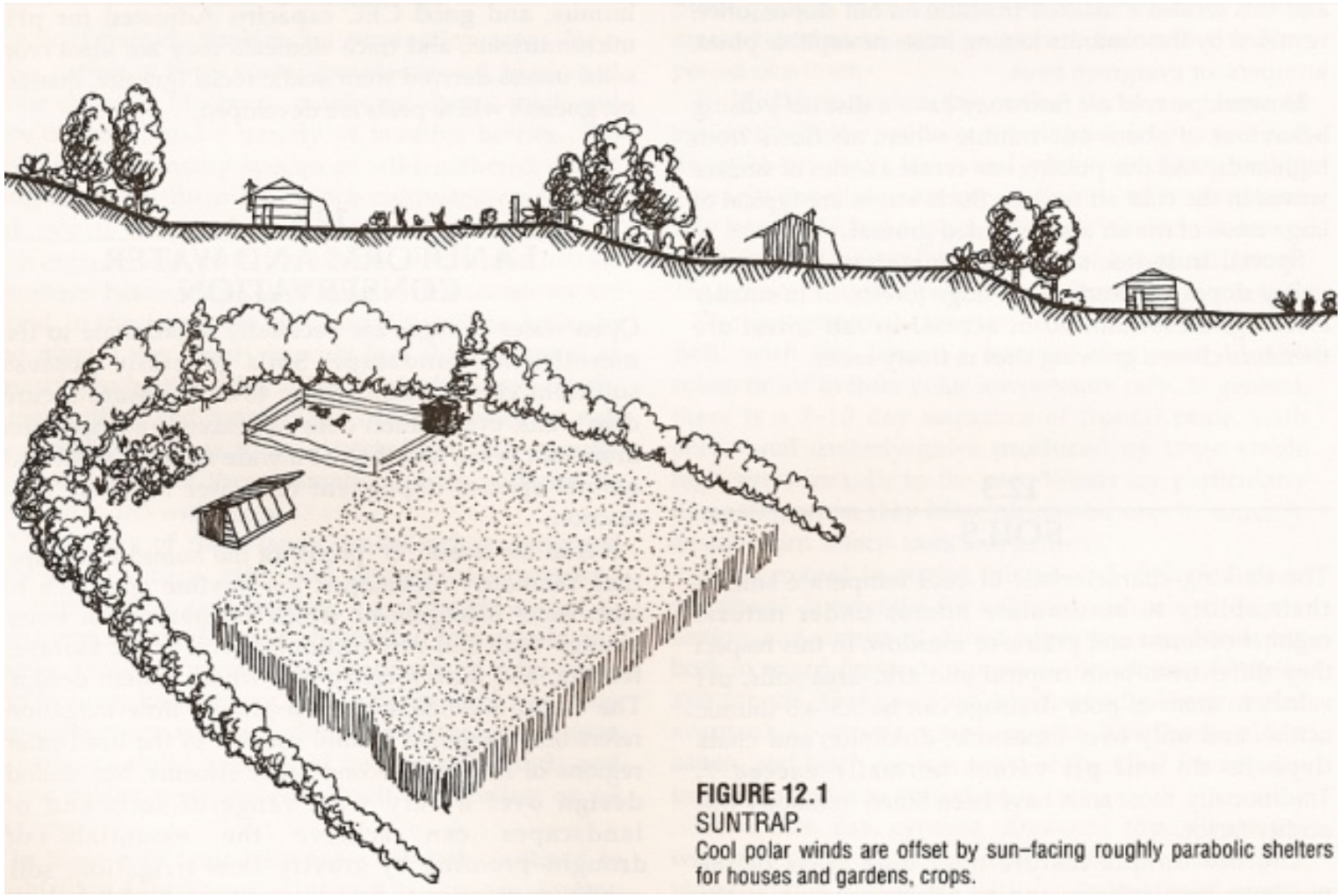


FIGURE 12.1
SUNTRAP.
Cool polar winds are offset by sun–facing roughly parabolic shelters for houses and gardens, crops.

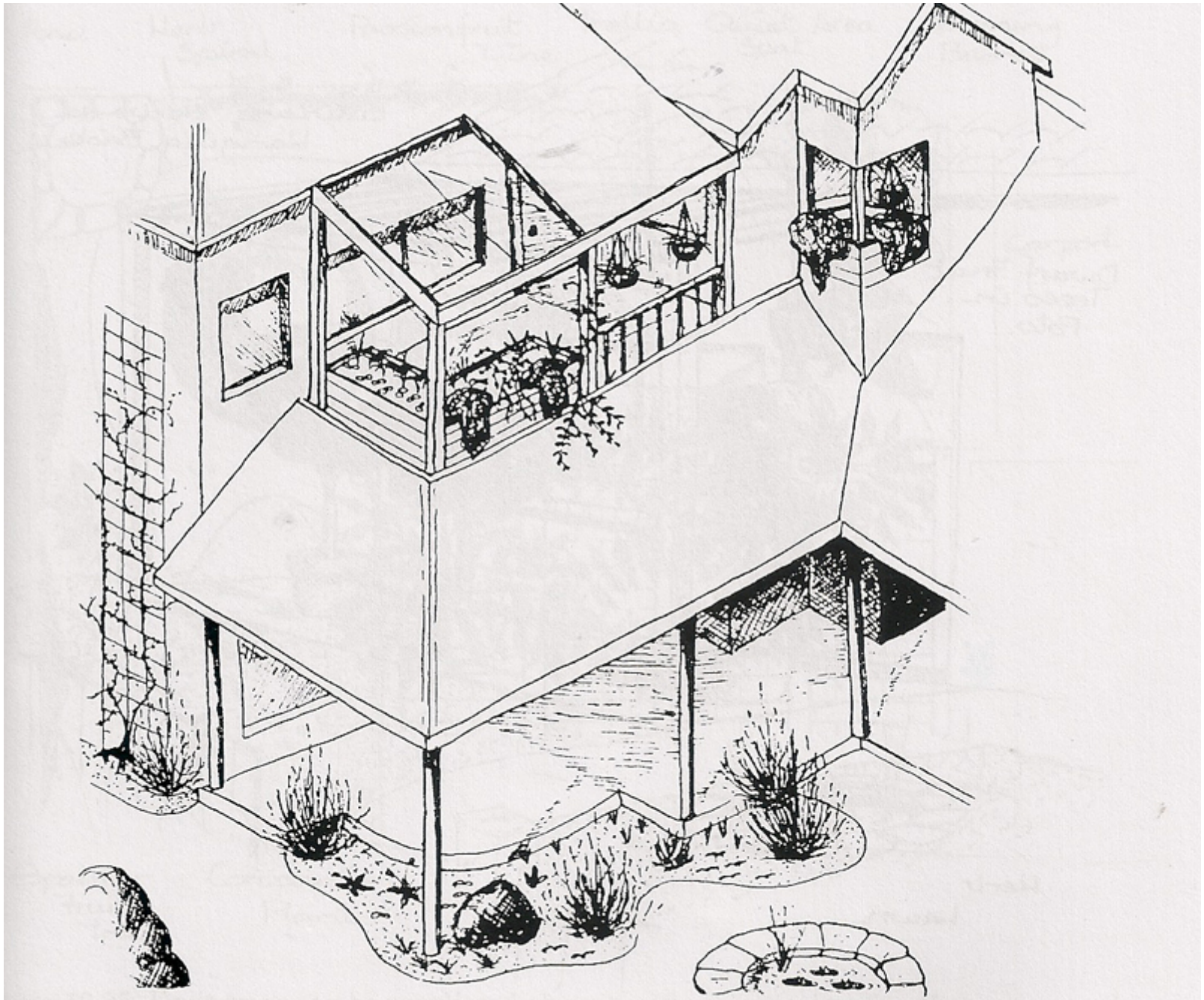


Figure 10.21 Use every available growing space in small areas.

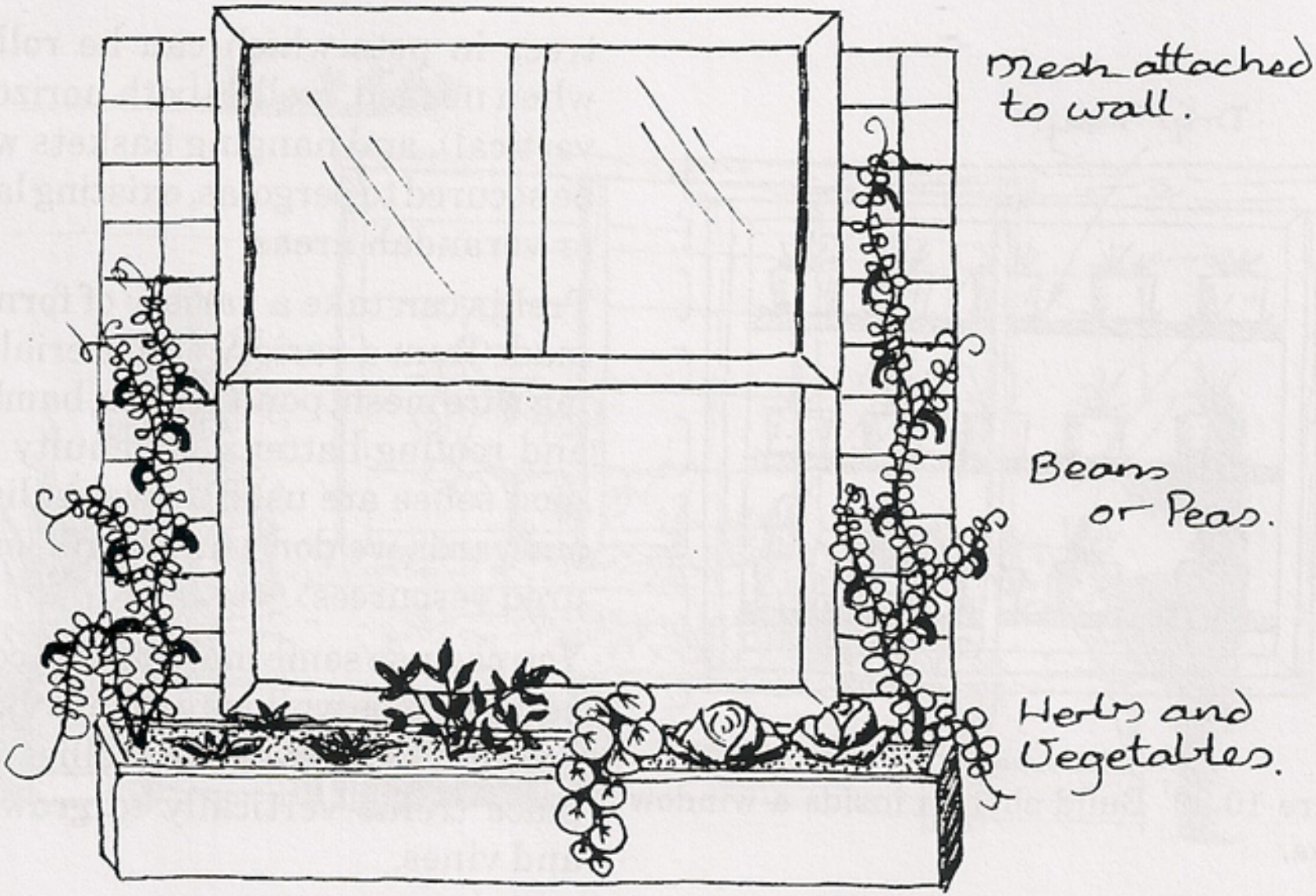


Figure 10.20 A planter box outside a window.

Analysis

- Design objectives
- Fit elements together to build systems
- Inputs linked to outputs

8 Integrate Rather than Segregate

Many hands make light work

9 Use Small and Slow Solutions

The bigger they are, the harder they fall

Slow and steady wins the race

10 Use and Value Diversity

Don't put all your eggs in one basket

Analysis of an element
Inputs and outputs

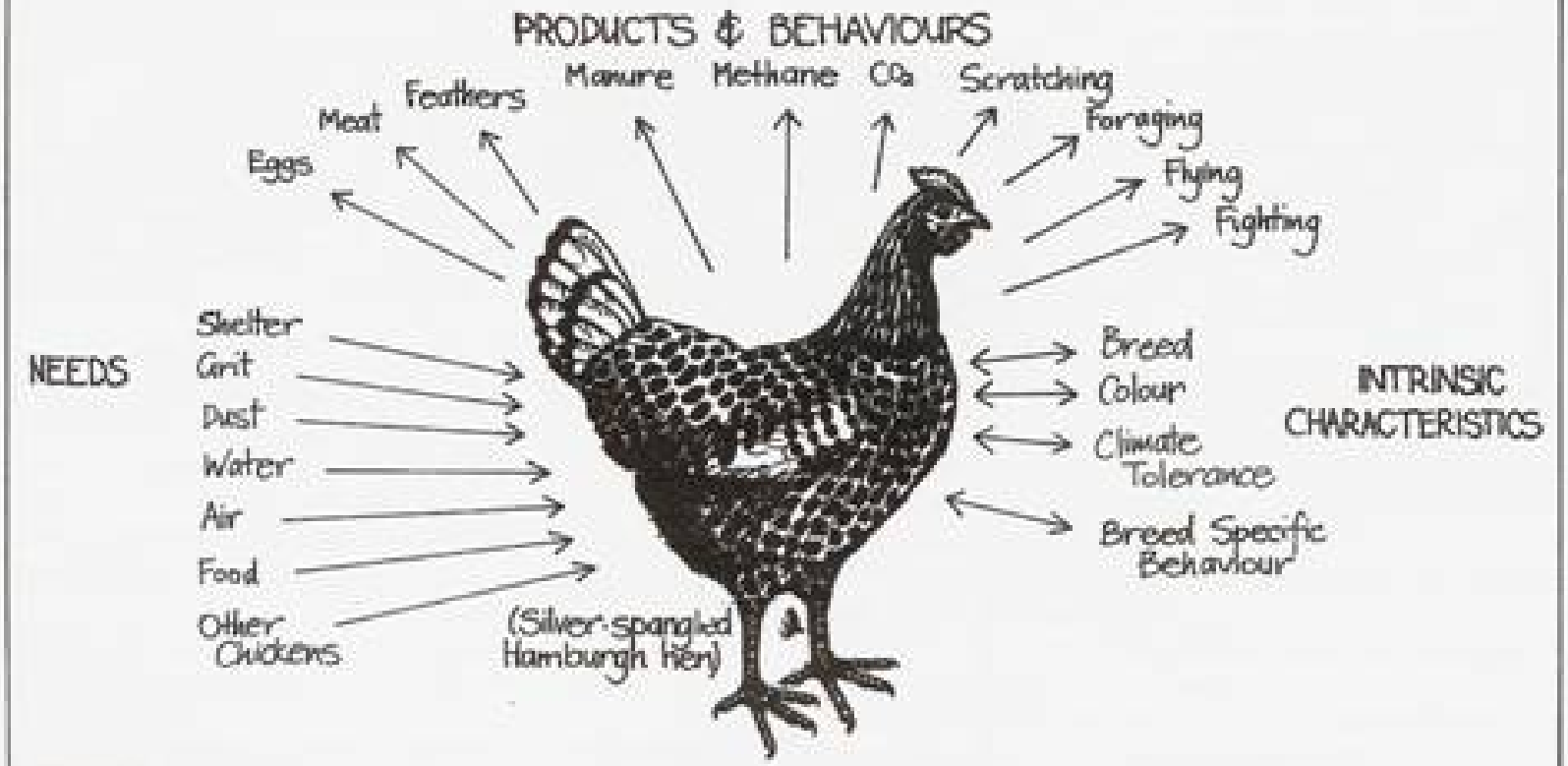
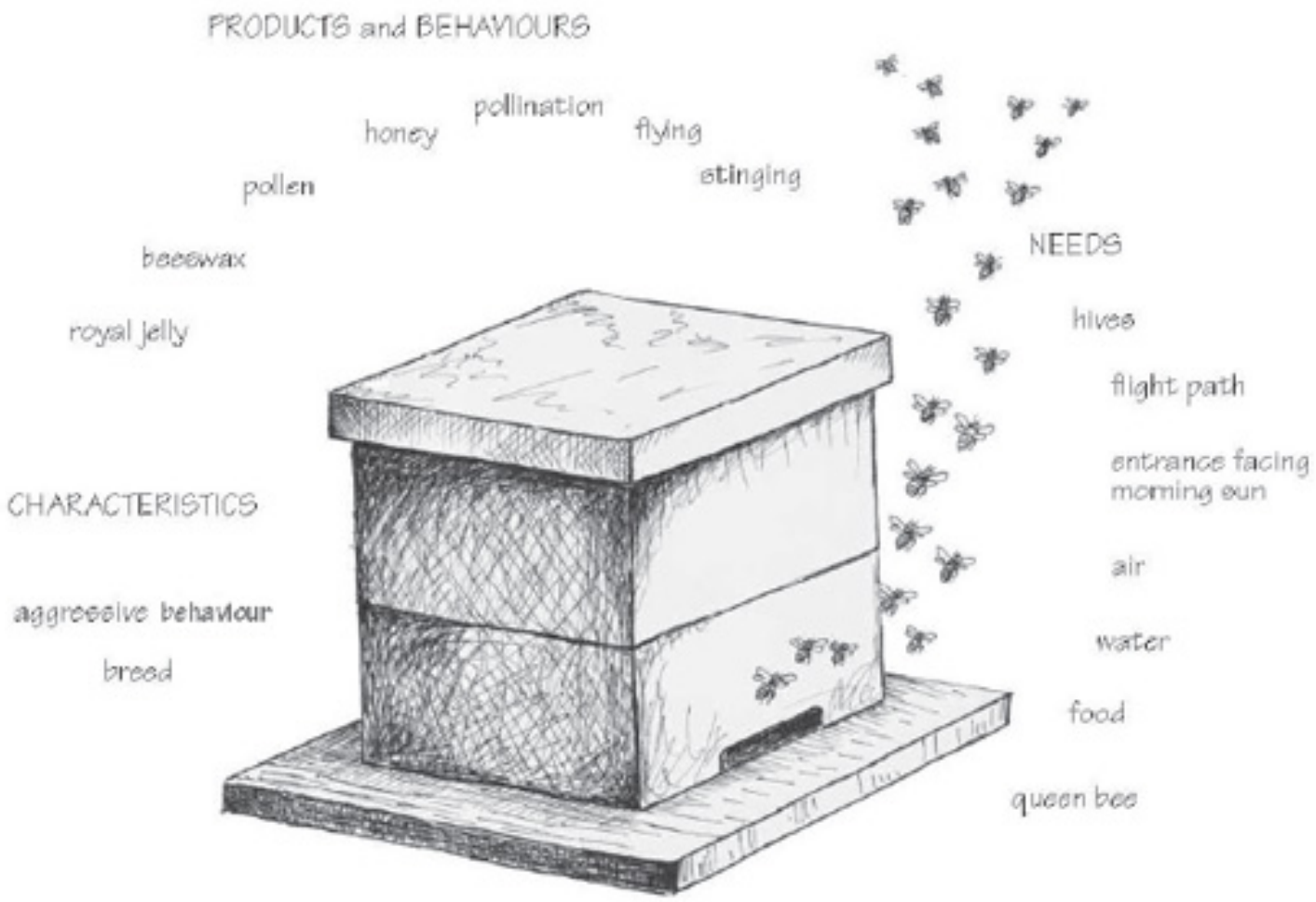
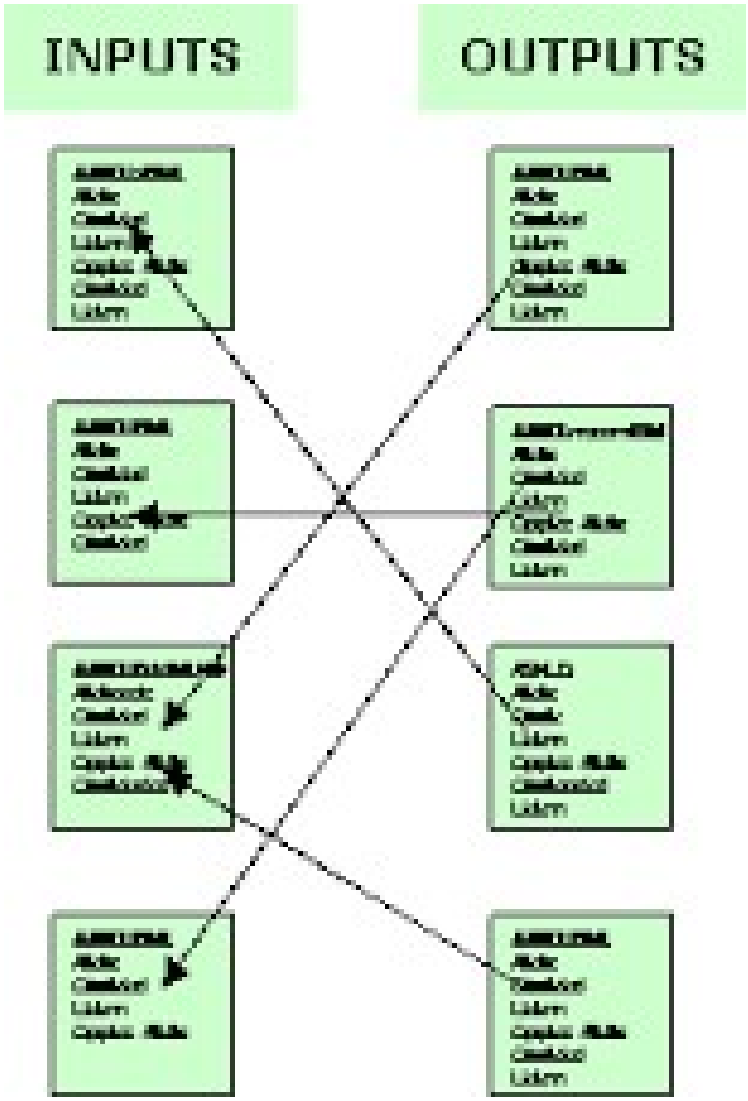


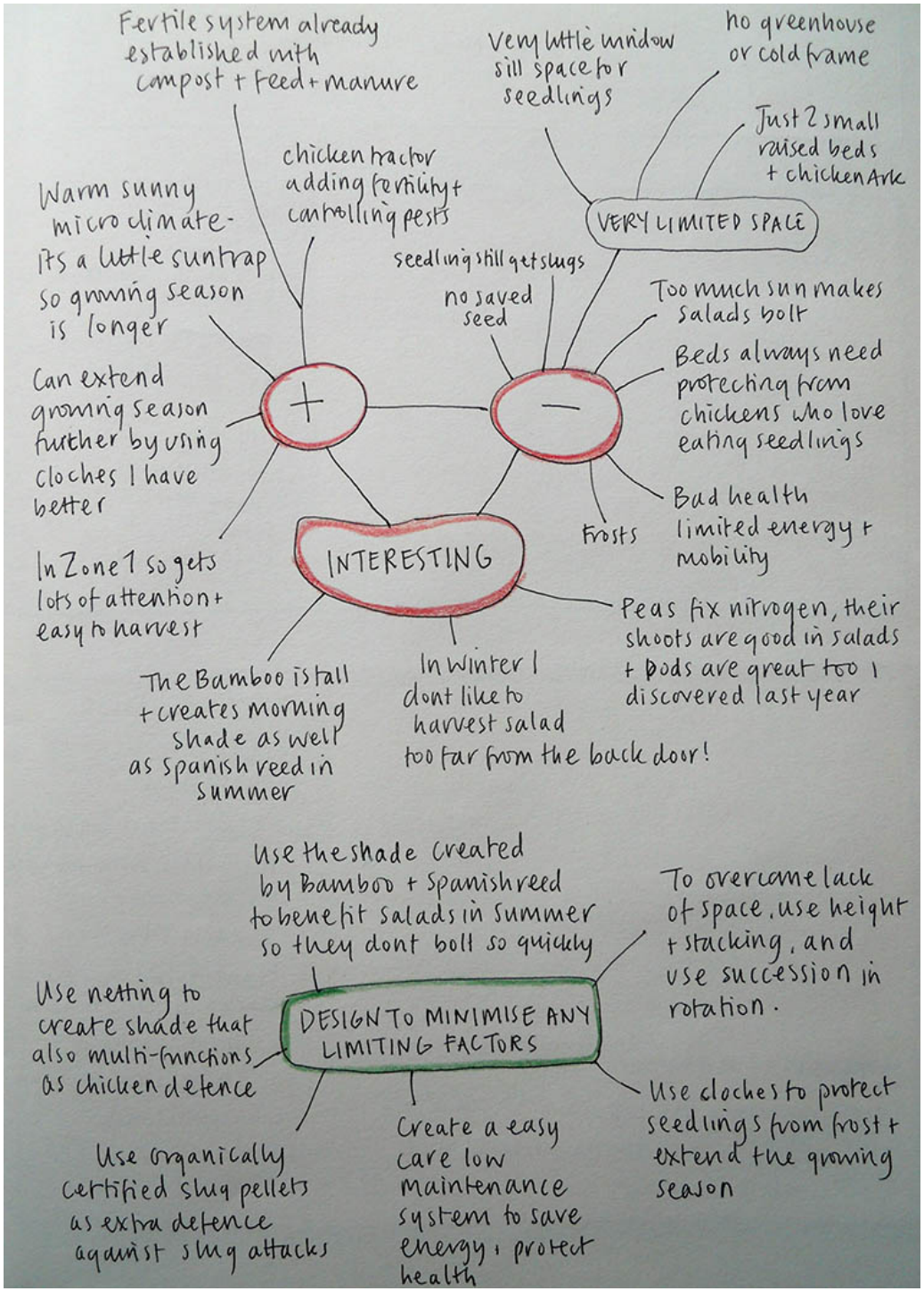
FIGURE 3.1
PRODUCTS AND BEHAVIOURS OF A HEN.
Analysis of these inputs and outputs are critical to self-governing design. A deficit in inputs creates work, whereas a deficit in output use creates *pollution*.

Figure 4. Products and behaviors of bees *(Source: SEED 2010)*

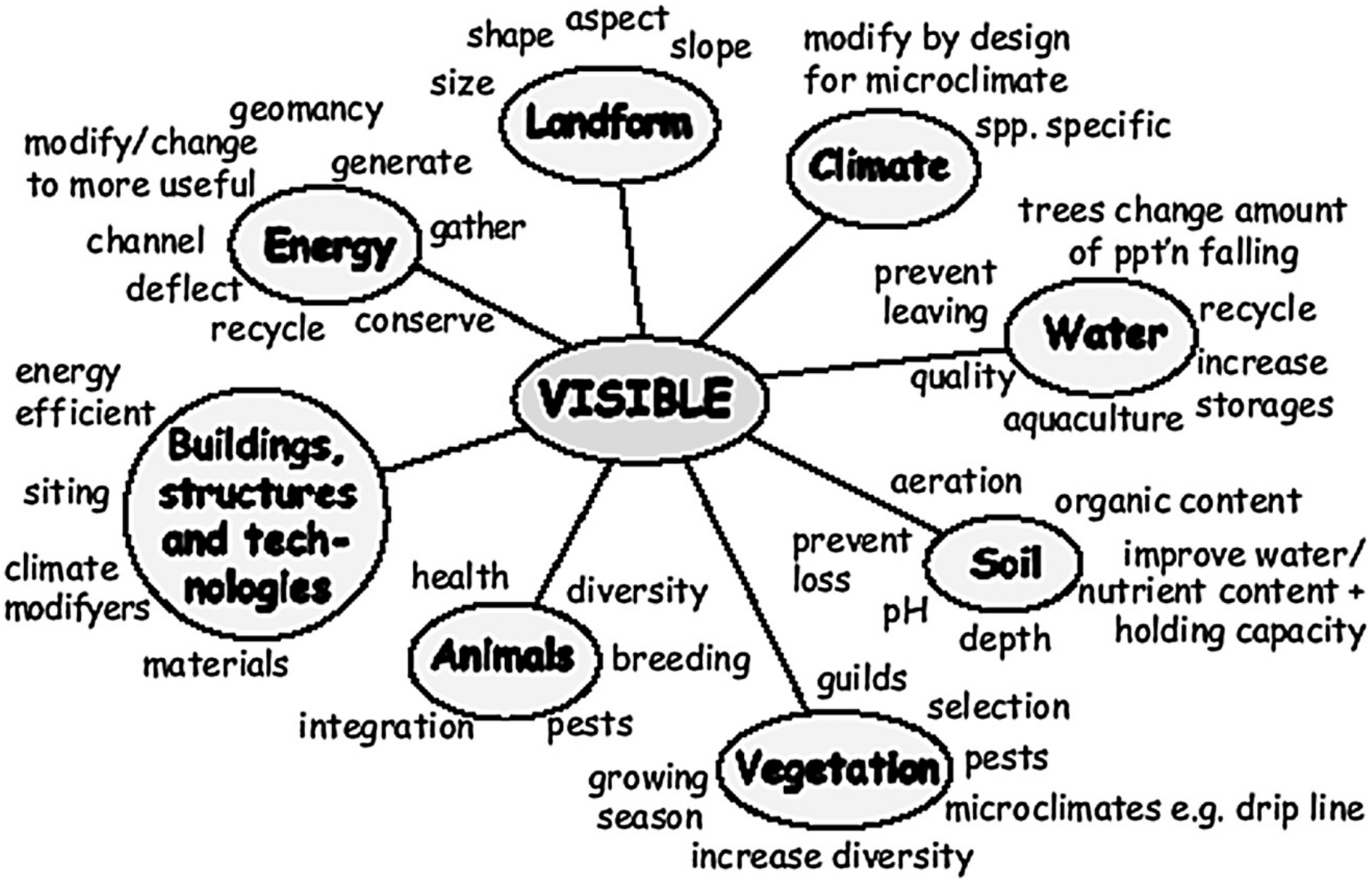


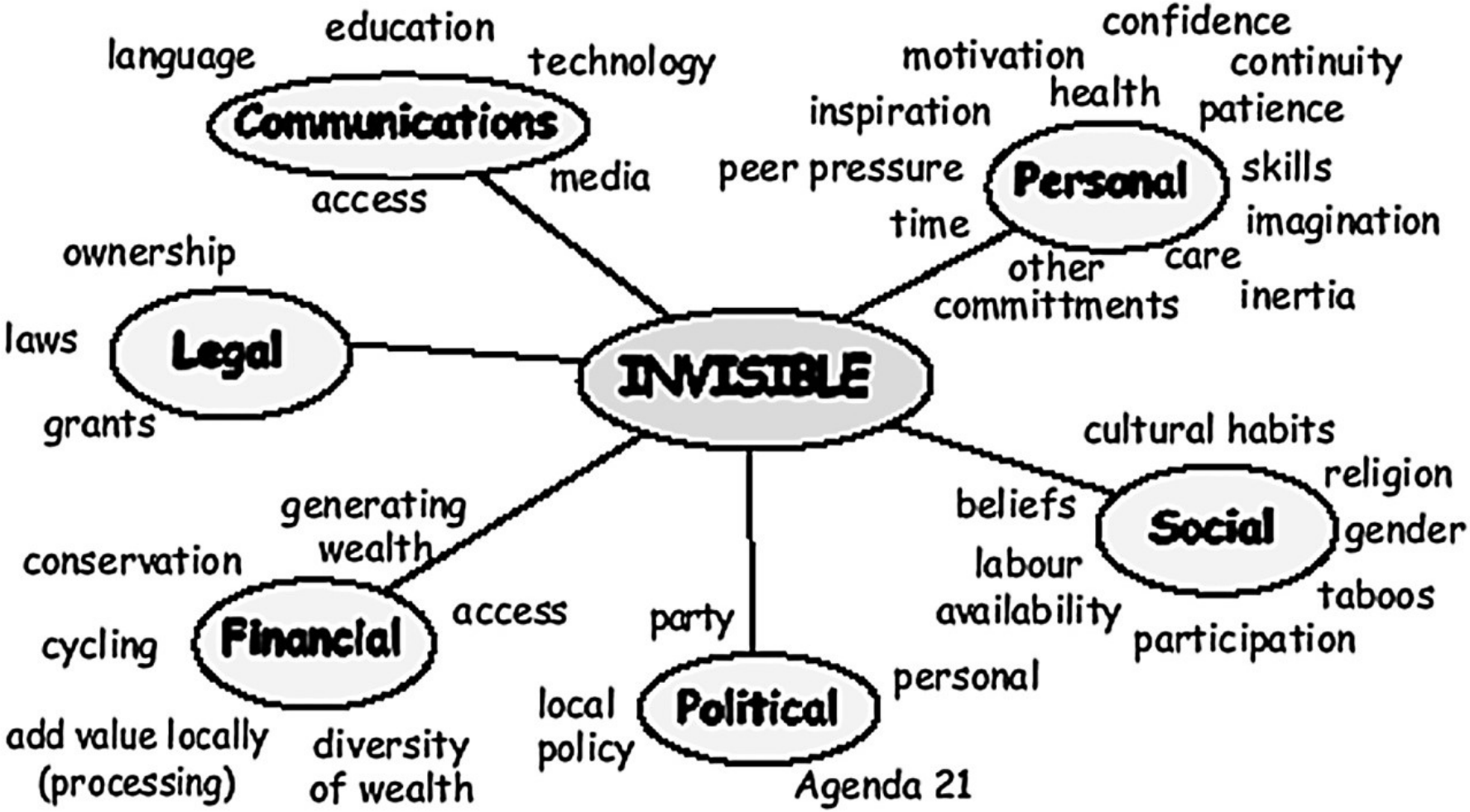
Example of an element (bee and hive) with inputs (needs), outputs (products) and characteristics.


INPUTS
OUTPUTS


Fertile system already established with compost + feed + manure
chicken tractor adding fertility + controlling pests
Warm sunny micro climate - its a little suntrap so growing season is longer
Can extend growing season further by using cloches I have better
In Zone 1 so gets lots of attention + easy to harvest
The Bamboo is tall + creates morning shade as well as spanish reed in summer
In Winter I dont like to harvest salad too far from the back door!
Peas fix nitrogen, their shoots are good in salads + pods are great too I discovered last year
Bad health limited energy + mobility
Frosts
Too much sun makes salads bolt
Beds always need protecting from chickens who love eating seedlings
seedling still get slugs
no saved seed
Very little window sill space for seedlings
no greenhouse or cold frame
Just 2 small raised beds + chicken Ark
VERY LIMITED SPACE
+
−
INTERESTING
DESIGN TO MINIMISE ANY LIMITING FACTORS
Use the shade created by Bamboo + Spanish reed to benefit salads in Summer so they dont bolt so quickly
Use netting to create shade that also multi-functions as chicken defence
Use organically certified slug pellets as extra defence against slug attacks
Create a easy care low maintenance system to save energy + protect health
Use cloches to protect seedlings from frost + extend the growing season
To overcome lack of space, use height + stacking, and use succession in rotation.

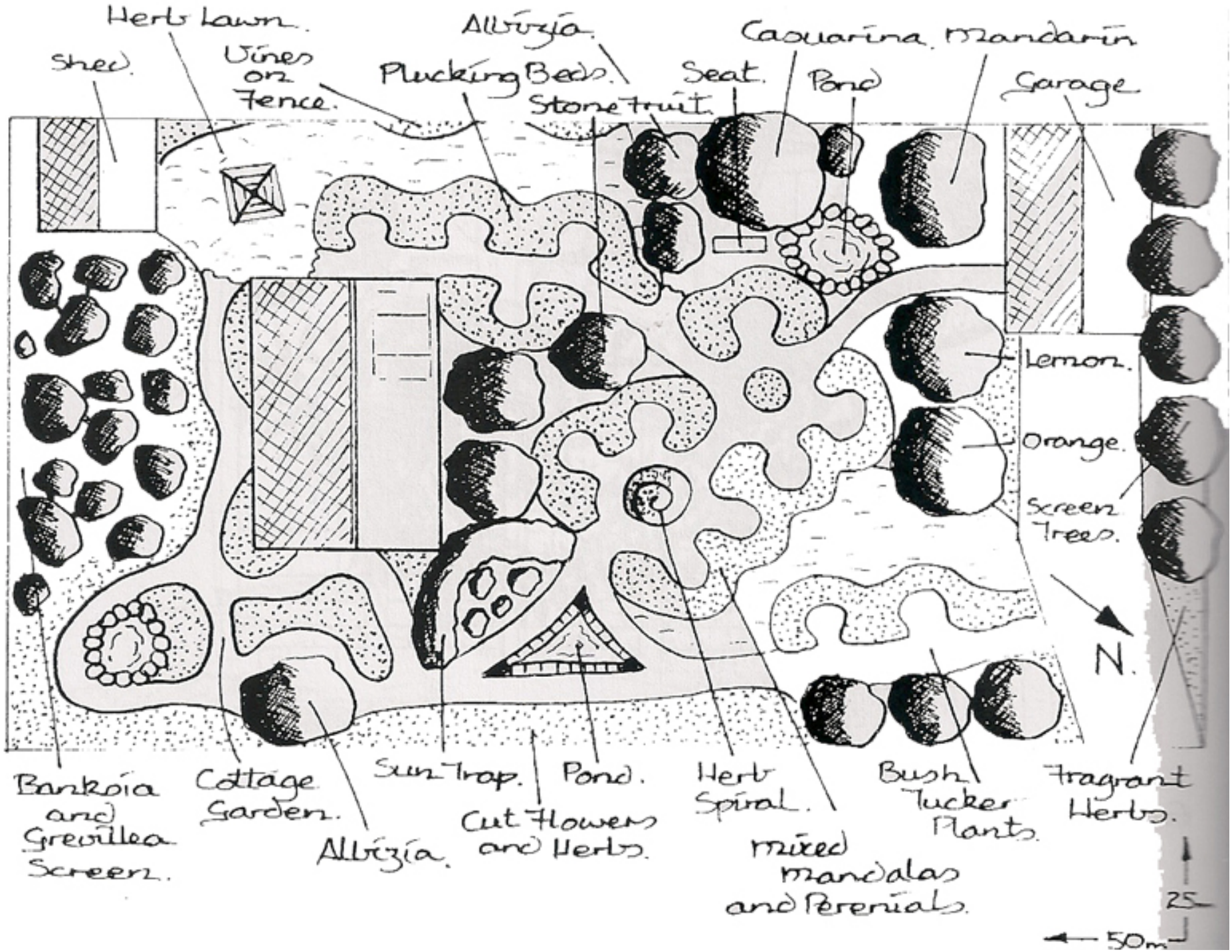
Limiting factors
the building blocks of design

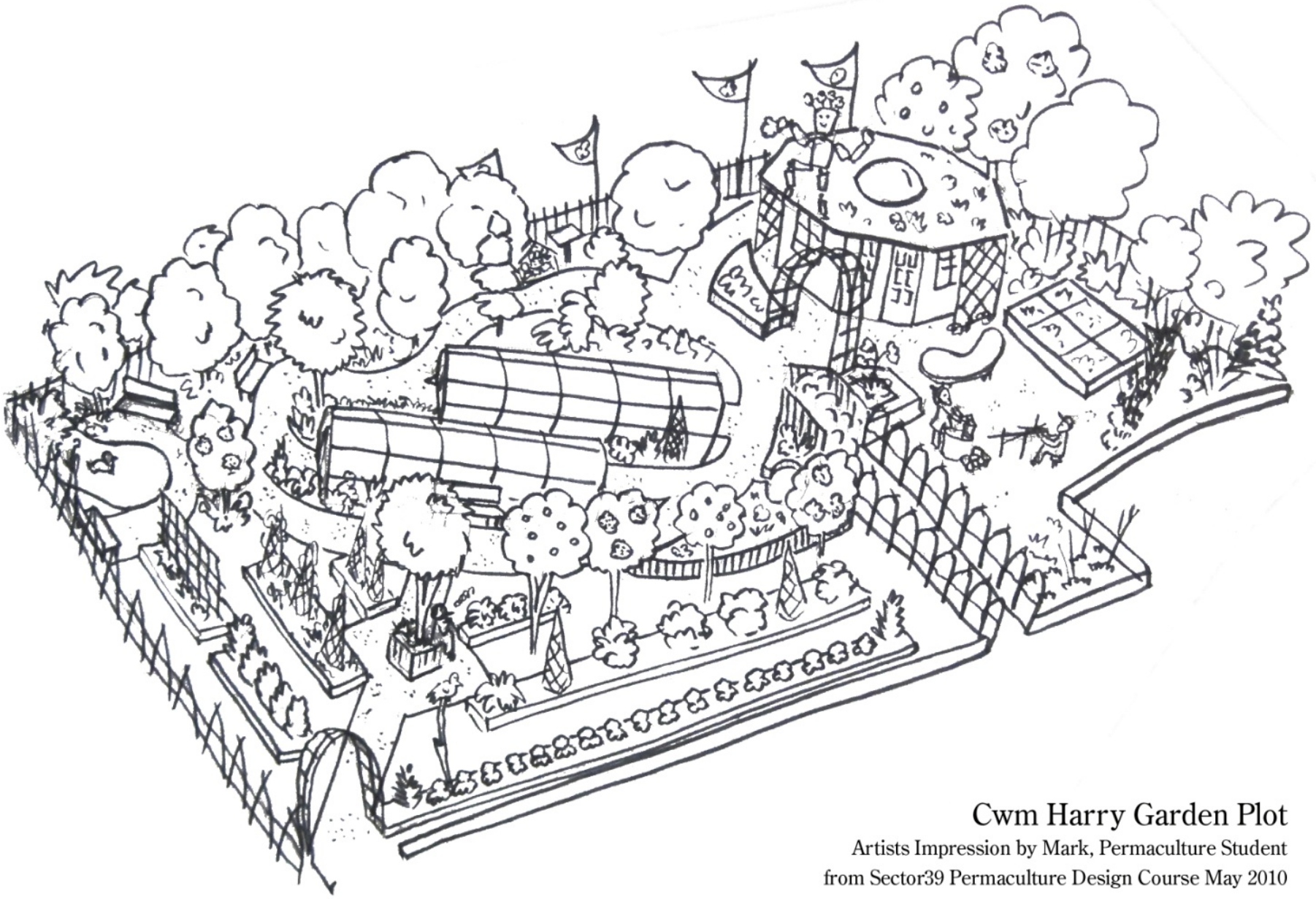

VISIBLE
Landform
shape
aspect
slope
size
Climate
modify by design
for microclimate
spp. specific
Energy
geomancy
modify/change
to more useful
generate
channel
gather
deflect
recycle
conserve
Water
trees change amount
of ppt'n falling
prevent
leaving
recycle
quality
increase
storages
aquaculture
Buildings,
structures
and tech-
nologies
energy
efficient
siting
climate
modifyers
materials
Soil
aeration
organic content
prevent
loss
improve water/
nutrient content +
holding capacity
pH
depth
Animals
health
diversity
breeding
integration
pests
Vegetation
guilds
selection
pests
growing
season
microclimates e.g. drip line
increase diversity


INVISIBLE
Communications
language
education
technology
access
media
Personal
confidence
motivation
continuity
health
inspiration
patience
peer pressure
skills
time
imagination
other committments
care
inertia
Legal
ownership
laws
grants
Social
cultural habits
religion
beliefs
gender
labour availability
taboos
participation
Financial
generating wealth
conservation
access
cycling
add value locally (processing)
diversity of wealth
Political
party
personal
local policy
Agenda 21

11 Use Edges and Value the Marginal

Don't think you are on the right track just because it is a well-beaten path

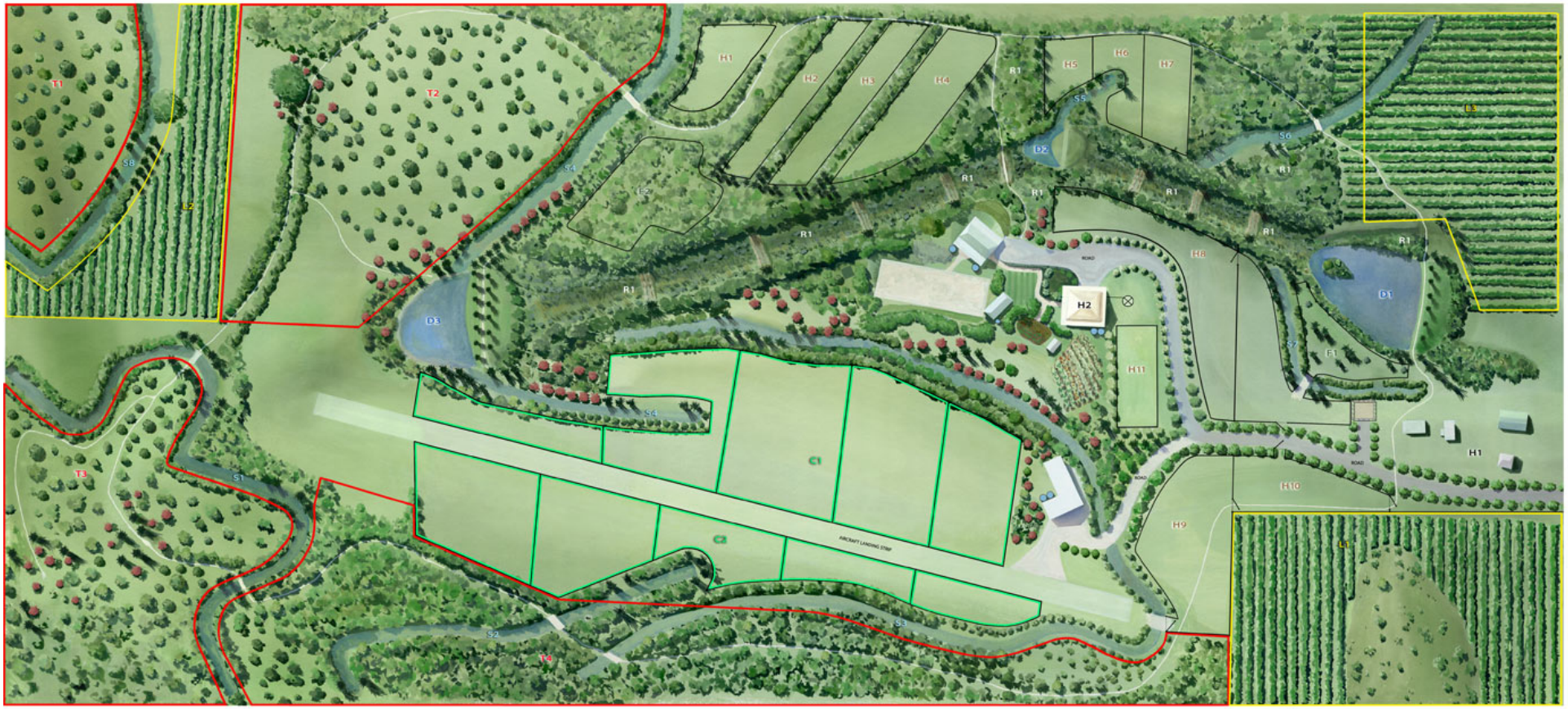

Herb Lawn.
Albizia.
Casuarina.
Mandarin
Shed.
Vines on Fence.
Plucking Beds.
Seat.
Pond
Garage
Stone fruit.
Lemon.
Orange.
Screen Trees.
N.
Banksia and Grevillea Screen.
Cottage Garden.
Albizia.
Sun Trap.
Pond.
Cut Flowers and Herbs.
Herb Spiral.
Mixed Mandalas and Perenials.
Bush Tucker Plants.
Fragrant Herbs.
25
50m



Cwm Harry Garden Plot

Artists Impression by Mark, Permaculture Student
from Sector39 Permaculture Design Course May 2010

Cwm Harry Back Field Garden Plot – 17 Feb 2011 – v10 – Ian Watt/Sector39



Designed by Nicholas Huggins

Terra Australis Permaculture - Designers - Consultants - Education
www.terraaustralispermaculture.com.au
Contour Farm Design - Equine Farm Design - Sustainable Permaculture Developments - Community Design

PERMACULTURE - Certified PDC Teacher & Design Consultant - Permaculture Research Institute Australia
HORTICULTURALIST - DIPLOMA HORTICULTURE 2001 - CERT. 3 LANDSCAPE DESIGN 1999
p: 0417 010 965
a: PO Box 1533, BURLEIGH HEADS QLD Australia 4220

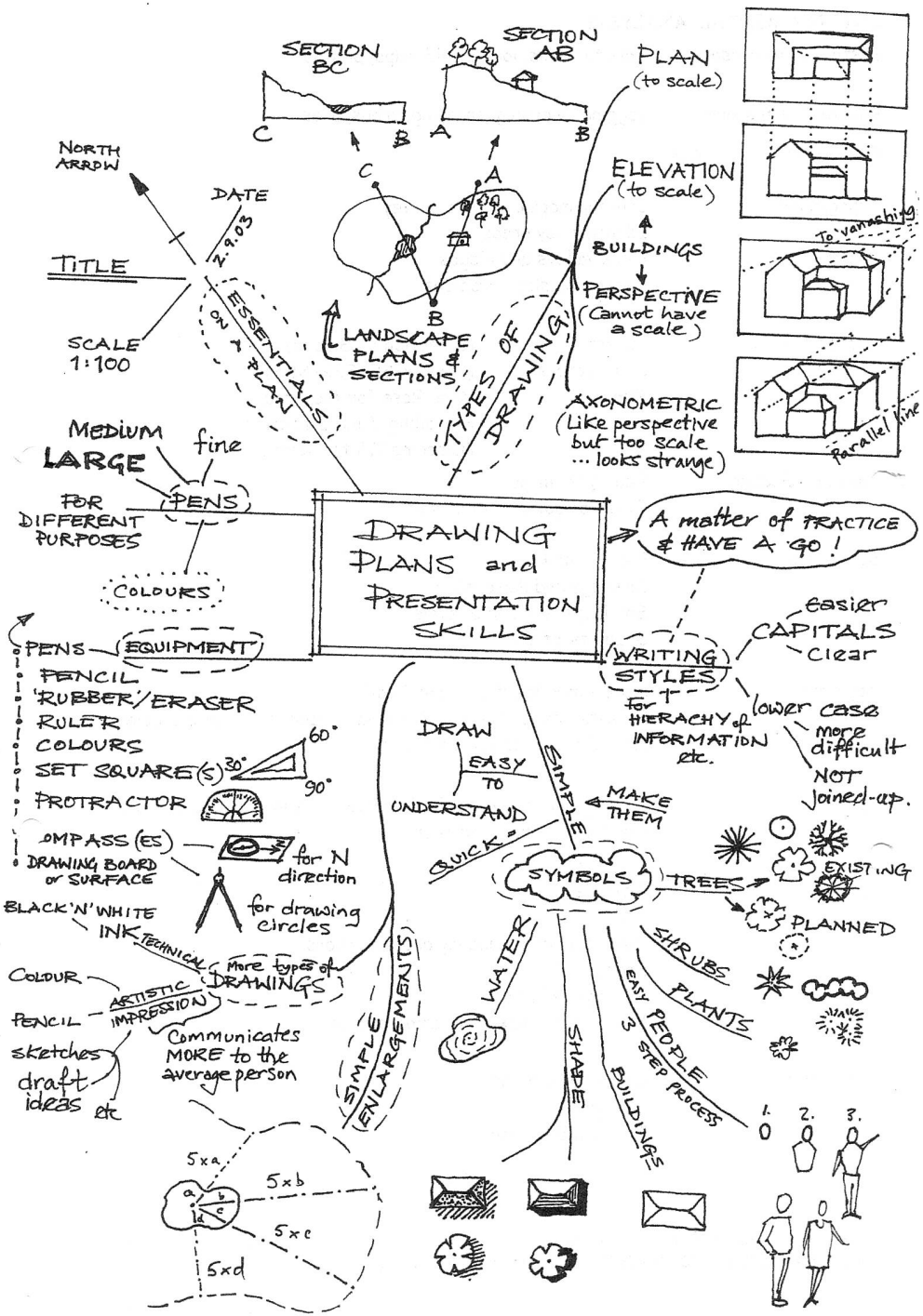
Client : Nicholas and Cristina Wilkins
Gatton, Queensland

Mariette van den Berg B. (Hons), MSc.
Animal Science- Equine Nutrition
Email: mberg@mberg.com.au
Mobile: 0404 849396
Website: www.mberg.com.au

N

LEGEND

- Native timber areas
- Landing strip
- Fencing
- Revegetation areas
- Horse trail
- Farm roads
- Biolytic waste system
- Bio Retention basin
- Water tanks
- Pasture crops L1,2&3
- Bamboo
- Gate
- Swales
- Swale crossover
- Fruit trees
- Reed bed
- Gabion
- Rocks in Gabions
- Dam
- Vegetable garden
- Lawn
- Sand arena
- Cattle yard


DRAWING PLANS and PRESENTATION SKILLS
SECTION BC
SECTION AB
C
B
A
B
PLAN (to scale)
ELEVATION (to scale)
BUILDINGS
PERSPECTIVE (Cannot have a scale)
AXONOMETRIC (Like perspective but too scale ... looks strange)
TYPES OF DRAWING
To vanishing
parallel line
NORTH ARROW
DATE
2.9.03
TITLE
SCALE 1:100
ESSENTIALS ON A PLAN
LANDSCAPE PLANS & SECTIONS
A matter of PRACTICE & HAVE A GO!
MEDIUM
LARGE
fine
PENS
FOR DIFFERENT PURPOSES
COLOURS
PENS
EQUIPMENT
PENCIL
'RUBBER'/ERASER
RULER
COLOURS
SET SQUARE(S)
60°
30°
90°
PROTRACTOR
COMPASS(ES)
DRAWING BOARD or SURFACE
for N direction
for drawing circles
BLACK 'N' WHITE INK
TECHNICAL
More types of DRAWINGS
COLOUR
PENCIL
ARTISTIC IMPRESSION
sketches
draft ideas
etc
Communicates MORE to the average person
WRITING STYLES
easier
CAPITALS
clear
for HIERARCHY of INFORMATION etc.
lower case
more difficult
NOT joined-up.
DRAW
EASY TO UNDERSTAND
SIMPLE
MAKE THEM
QUICK
SYMBOLS
TREES
EXISTING
PLANNED
SHRUBS
PLANTS
WATER
SHAPE
BUILDINGS
EASY PEOPLE 3 STEP PROCESS
1.
2.
3.
SIMPLE ENLARGEMENTS
5xa
5xb
5xc
5xd

“The only limit is imagination”