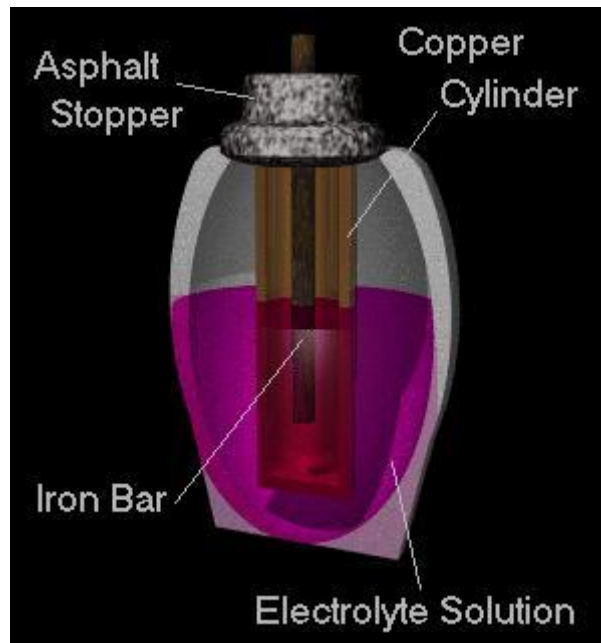


Baghdad Battery



In 1936, while excavating ruins of a 2000-year-old village near Baghdad, workers discovered mysterious small vase. A 6-inch-high pot of bright yellow clay dating back *two millennia* contained a cylinder of sheet-copper 5 inches by 1.5 inches. The edge of the copper cylinder was soldered with a 60-40 lead-tin alloy comparable to today's solder. The bottom of the cylinder was capped with a crimped-in copper disk and sealed with bitumen or asphalt. Another insulating layer of asphalt sealed the top and also held in place an iron rod suspended into the center of the copper cylinder. The rod showed evidence of having been corroded with an acidic agent.

. The artifacts consist of terracotta pots approximately 130 mm (5 in) tall (with a one-and-a-half-inch mouth) containing a copper cylinder made of a rolled-up copper sheet, which houses a single iron or (galvanized nail) rod. At the top, the iron rod is isolated from the copper by bitumen plugs or stoppers, and both rod and cylinder fit snugly inside the opening of the jar, which bulges outward toward the middle. The copper cylinder is not watertight, so if the jar was filled with a liquid, this would surround the iron rod as well. The artifact had been exposed to the weather and had suffered corrosion, although mild given the presence of an electrochemical couple. This has led some to believe that wine, lemon juice, grape juice, or vinegar was used as an acidic electrolyte solution to generate an electric current from the difference between the electrochemical potentials of the copper and iron electrodes.[2]

König thought the objects might date to the Parthian period (between 250 BC and AD 224). However, according to St John Simpson of the Near Eastern department of the British Museum, their original excavation and context were not well-recorded (see stratigraphy), so evidence for this date range is very weak. Furthermore, the style of the pottery (see typology) is Sassanid (224-640).[5]

Most of the components of the objects are not particularly amenable to advanced dating methods. The ceramic pots could be analysed by thermoluminescence dating, but this has not yet been done; in any case, it would only date the firing of the pots, which is not necessarily the same as when the complete artifact was assembled. Another possibility would be ion diffusion analysis, which could[citation needed] indicate how long the objects were buried.

Electrical

Copper and iron form an electrochemical couple, so that, in the presence of any electrolyte, an electric potential (voltage) will be produced. This is not a very efficient battery as gas is evolved at an electrode, the bubbles forming a partial insulation of the electrode so that although several volts can be produced in theory by connecting them in series, their internal resistance from the formation of the gas bubbles becomes so great that it severely limits the electrical current that can be produced from such a simple wet cell.

König had observed a number of very fine silver objects from ancient Iraq that were plated with very thin layers of gold, and speculated that they were electroplated using batteries with these as the cells. After the Second World War, Willard Gray demonstrated current production by a reconstruction of the inferred battery design when filled with grape juice[citation needed]. W. Jansen experimented with benzoquinone (some beetles produce quinones) and vinegar in a cell and got satisfactory performance.[citation needed]

However, even among those believing the artifacts to be electrical devices, electroplating as a use is not well-regarded today. Paul Craddock of the British Museum said "The examples we see from this region and era are conventional gold plating and mercury gilding. There's never been any untouchable evidence to support the electroplating theory." [5] The gilded objects that König thought might be electroplated are now believed to have been fire-gilded (with mercury). Reproduction experiments of electroplating by Arne Eggebrecht consumed "many" reproduction cells to achieve a plated layer just one micrometre thick. Other scientists noted that Eggebrecht used a more efficient, modern electrolyte; using only vinegar, the battery is very feeble.[citation needed]

Non-electrical

Elizabeth Stone, archaeologist at Stonybrook University, says modern archaeologists do not believe the object was a "battery". [4] Skeptical archaeologists[who?] see the electrical experiments as embodying a key problem with experimental archaeology, saying that such experiments can only show that something was physically possible, but do not confirm that it actually occurred. Further, there are many difficulties with the interpretation of these artifacts as galvanic cells:[citation needed]

- The bitumen completely covers the copper cylinder, electrically insulating it, so no current can be drawn without modifying the design.
- There are no wires or conductors with them.
- No electrical equipment is associated with them.

- A bitumen seal, being thermoplastic, is excellent for forming a hermetic seal for long-term storage. It would be extremely inconvenient, however, for a galvanic cell, which would require frequent topping up of the electrolyte (if they were intended for extended use).

The artifacts strongly resemble another type of object with a known purpose — namely, storage vessels for sacred scrolls from nearby Seleucia on the Tigris. Those vessels do not have the outermost clay jar, but are otherwise almost identical. Since it is claimed[by whom?] these vessels were exposed to the elements, it is possible[opinion] that any papyrus or parchment inside had completely rotted away, perhaps leaving a trace of slightly acidic organic residue

I: 20MIN MUSIC CD COOL DOWN - FEEL GREAT!

BREKCS:

2291-545



A: Across. curv down, across.

Solid.

B: Structure.

AOLB
curv!

2291-5451



A: Across.

Hard.

B: Land.

AOLB
Solid!

2291-5451

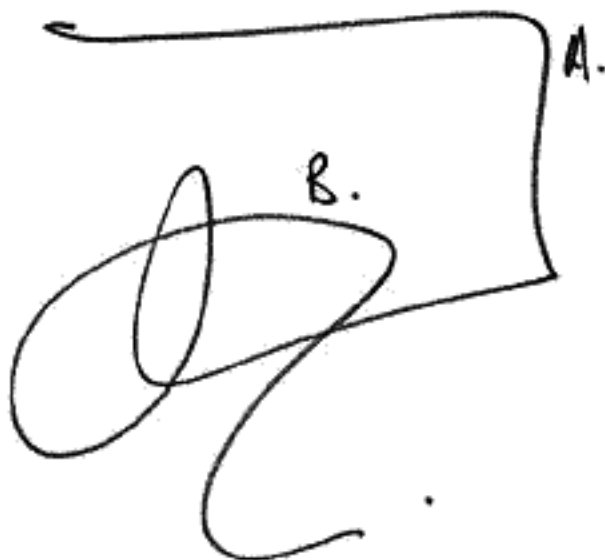


A: Access, Down, Access, Rem 4.

Solid

B: Structure.

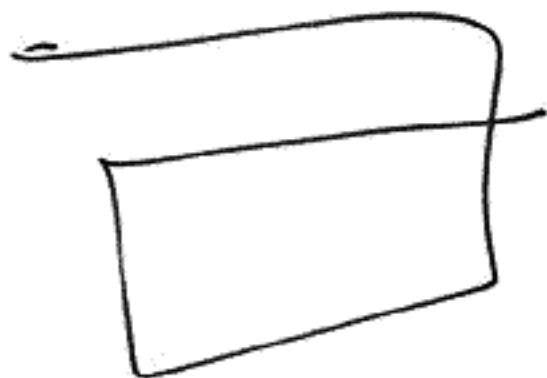
2291-5451



A: Structure.

B: energy.

2291 - 5451

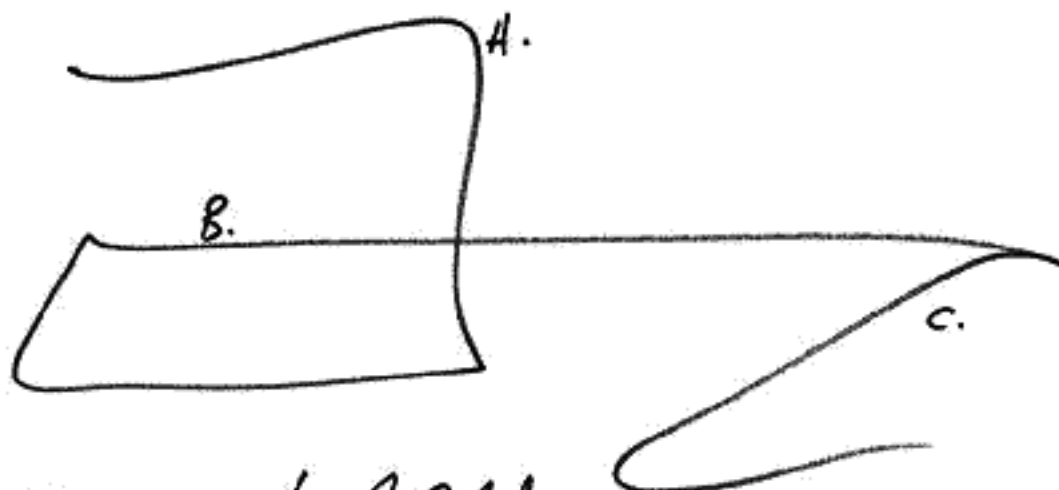


A: Across, falling, Across, rising, Across.

Solid

B: Structure.

2291 - 5451



A. Structure - hard. Solid.

B. Land. long. wide, hard.

C. object. hard. curved.

A: Tapping, rasping, moving.

T1: Hard, Solid, cool, Smooth, regular.

T2: Warm/mild

V-

Colors - green, grey, off white, blue

Lun - medicin

con - medicin - dull.

T3: Butter, bitts rotted, Sour.

Q: Musty, Smoky.

Es: Wide, open, dispersed #.

D.

H - Long, mixed, sizes

V - Linear, tall, edged.

D - mixed within

MDSV: Thick, Solid, Angled, Tall, wide
Sectioned, Squared, edged.

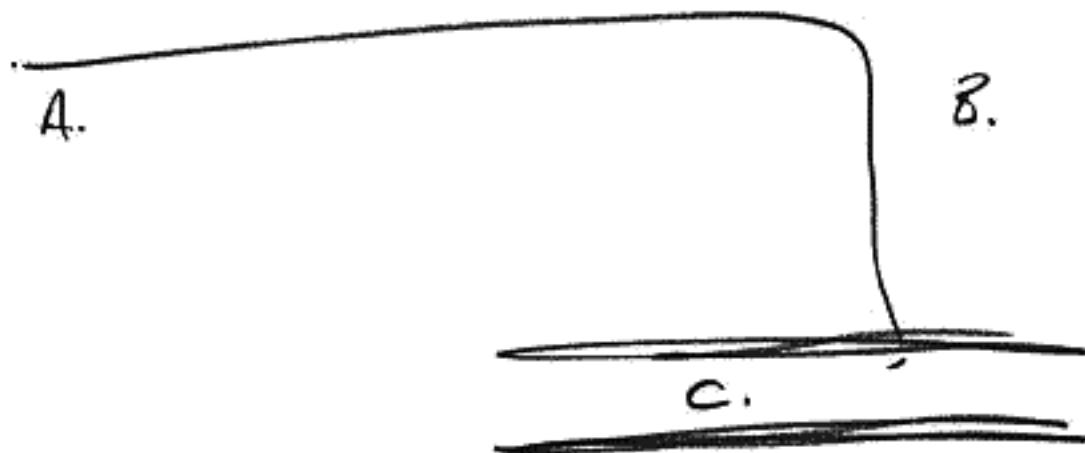
AC: OK! Feel interested - not sure!

AsLB
feels
grey!

AsLB
fire
works!

AsLB
over
think!

2291-5451

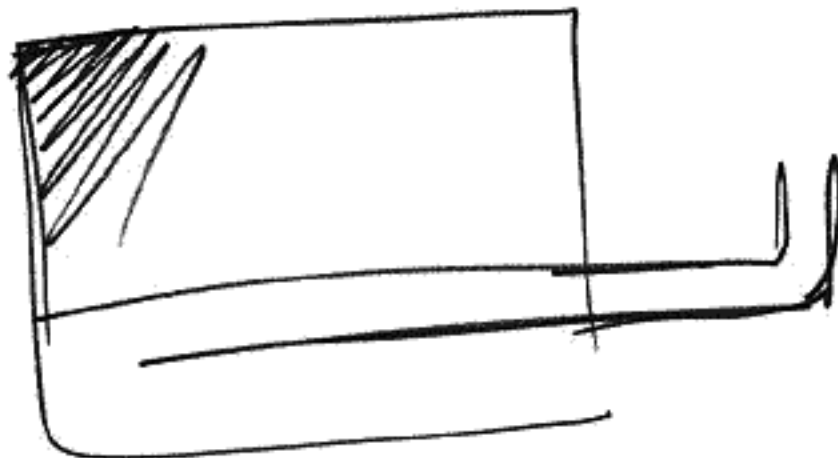


A. THICK, SOLID concrete, INSIDE, SOLID TRM, WIDE surface - walls.

B. Cooler, open, fresh, exposure, Sky.

C. Tall, long, dark, lined, lined, walkway.

2291-5451



Acab
corridor

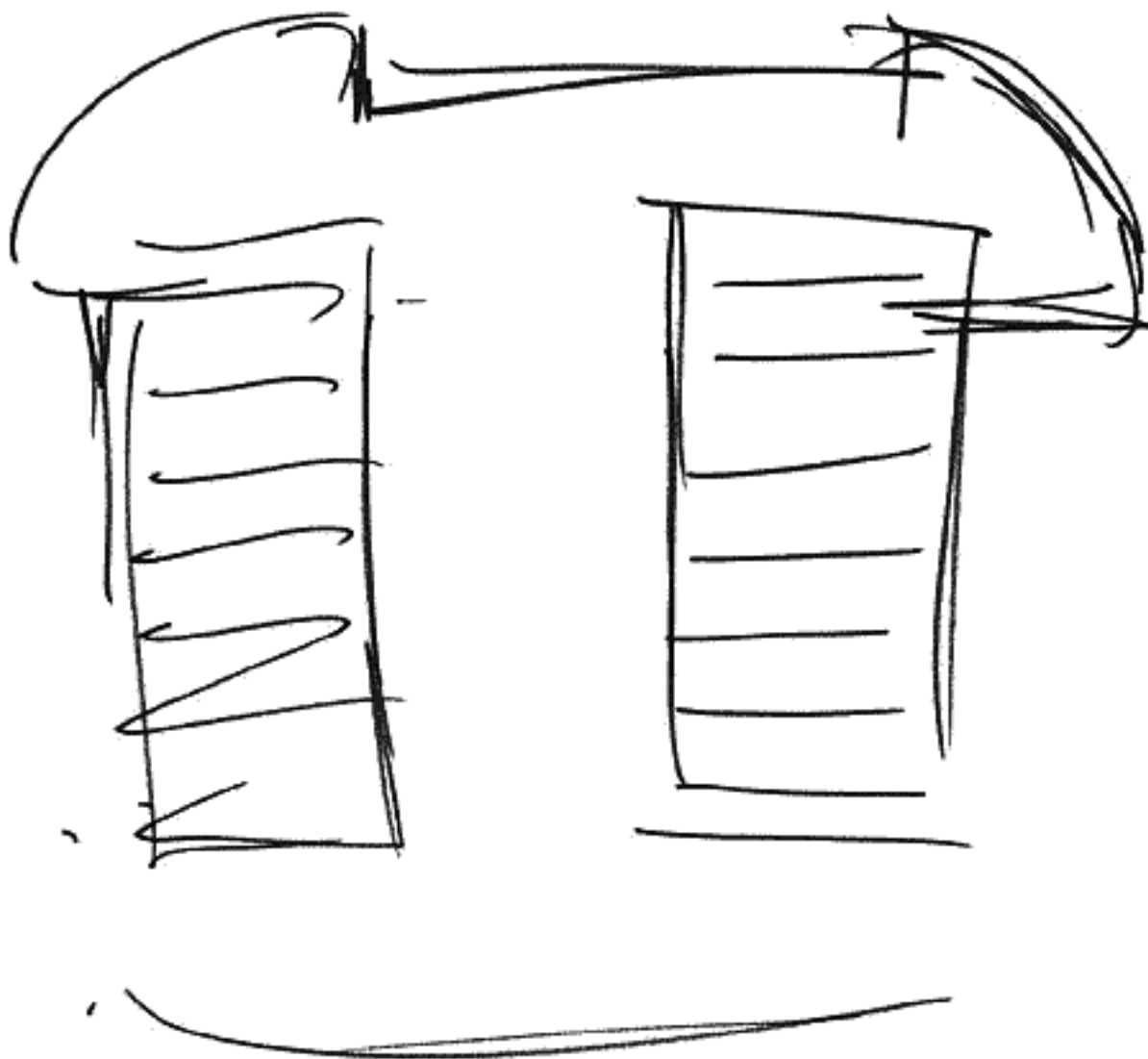
page: 6.

Stage: 3

DAR
BREAKS:

MOVE 400ft ABOVE TRACT TO OPTIMUM
POSITION + SKETCH.

2291 - S4S1



VERY THICK, HEAVY, LAYERS SURFACES
Square - solid + Angled constructed
BUILDING.

AOL
DISNEY
CASTLE

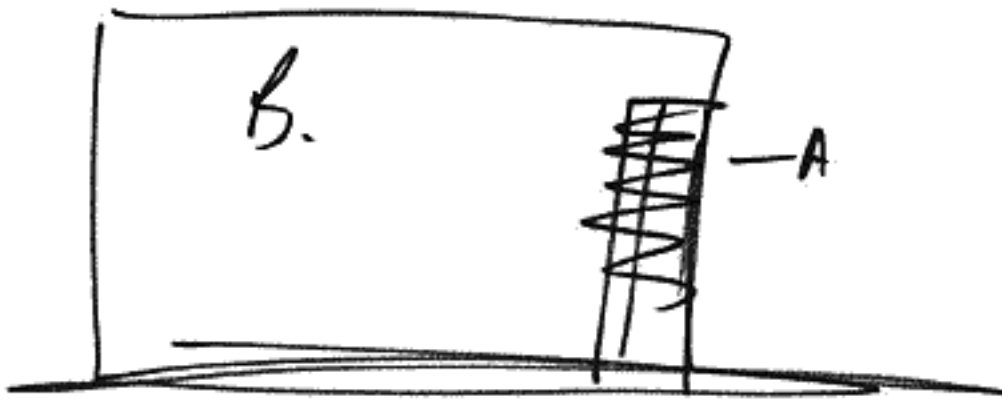
page: 7

Stage 3

DAR
BREAKS:

MOVE TO THE 'PRIMARY' TARGET ELEMENT
& SKETCH/DESCRIBE.

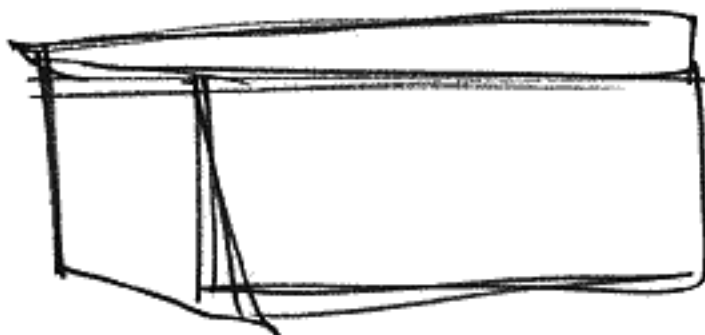
2291-S451



A: Tall. Dark, Solid, heavy. Slatted,
functional, existing. Heavy, old metallic

b. Solid, thick, walled. Central.
CONTAINER/CONTAINING.

MOVE RHT LEFT + SKETCH



- SMOOTH
LINEAR
FINISH
SURFACES!

ADLB
ARTIFACT

ADLB
IMPORTANT

page: 8

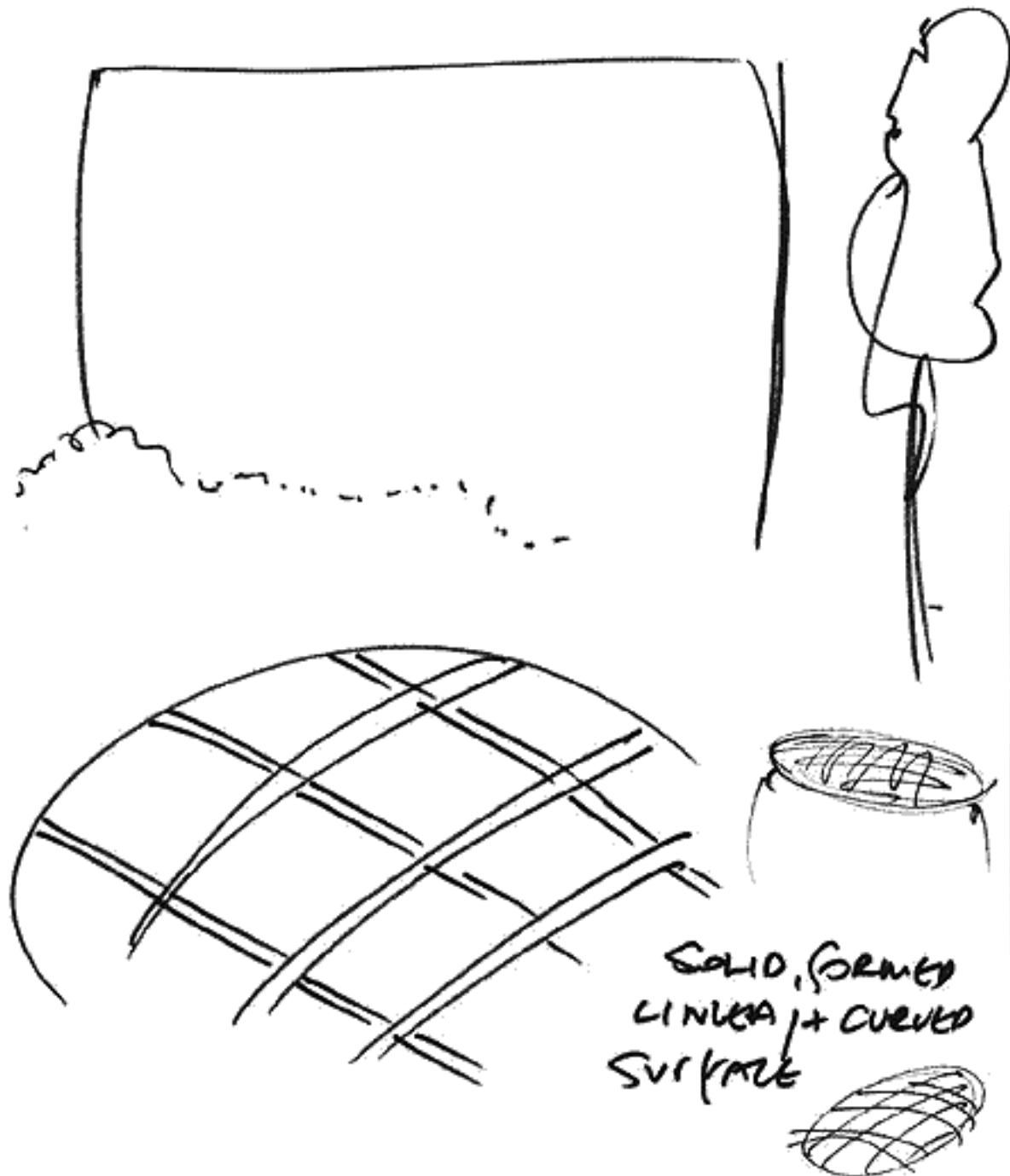
Stage 3

Doc

REMARKS:

MOVE TO AN OPTIMUM POSITION WHERE THE
WHOLE TARGET CAN BE SEEN + SCRUTIN.

22011-5451



SOLID, FORMED
LINEN + CURVED
SURFACE

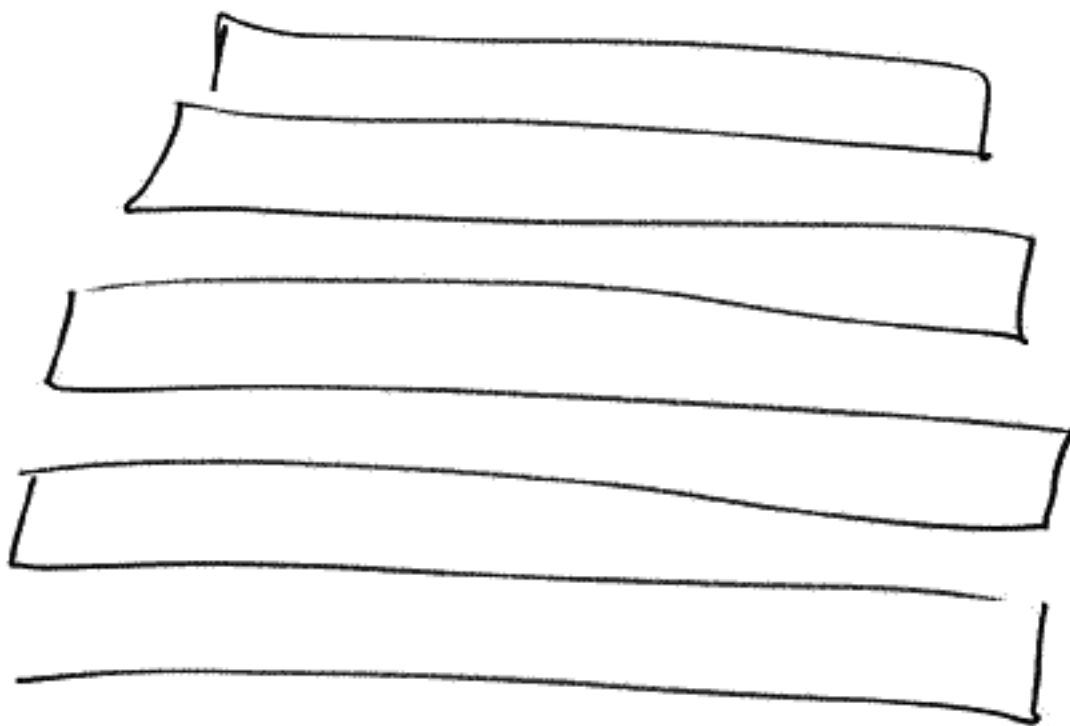
page: 9.

Page: 3

Das
BEAKS:

Aquatic optimum Target data & Sketch.

2291-5451



Long. SOLID, THICK, GREY, OLD, SINGULAR
FOLDS, DIRECTION, MOVEMENT, ENERGY, FLOW.
SECTIONED, SIZED

DE. A FEELING OF STEPS / STEPPED PROCESS!

S2	D	AC	EC	T	I	ACL	AD/S
----	---	----	----	---	---	-----	------

10/10

cool

THICK
Solid
SECRETARY
LINE
TALL

Stepped
pyramid

PERM.

grey
green

THICK
Solid

WAYS

STRENGTH

T

TALL
LINE
SECRETARY

SPACE
purpose
movement
people.

EDUCATION!

S2 D AC EC T I AOL Apys

Talk.

Solid
THICK

ARMED
Rough
regular
Smooth.

WIDE.

Sweeping
Shape and
form

Impressive
MEANT TO
IMPRESS

AC: Movement. - A MOVEMENT OF SOMETHING IS KEY
HERE - BUT, ONE SEE WHAT!

LOW
LEVEL
BUZZ!

FRESH
SPACIOUS

S2 D AC GI T I AOL Acl/s

MOVE TO AN OPTIMUM POSITION ABOVE TARGET + DESCRIBE.

THICK
SAL
SPACE

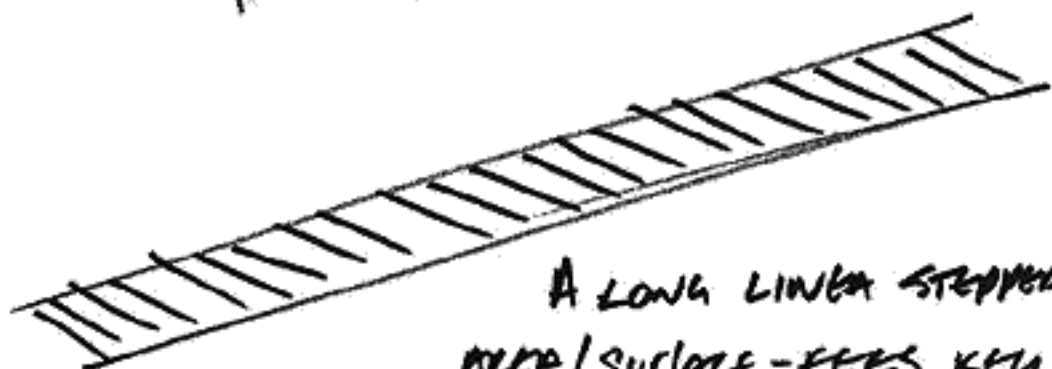
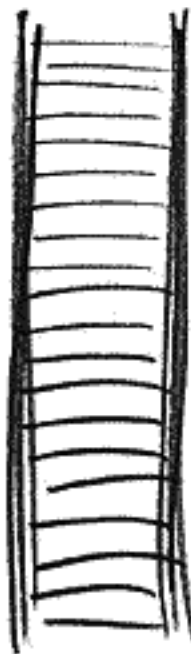
STRUCTURE

LINEAR

GRAY
GREEN

FORMER
LINES

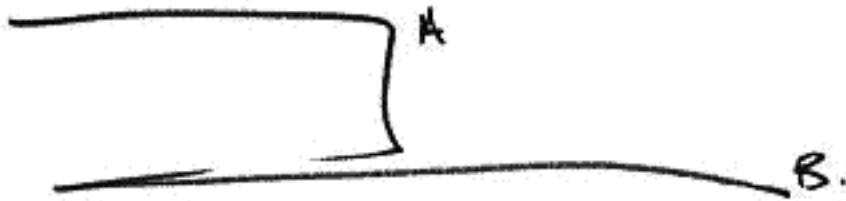
FRAMING
FORM.



A LONG LINEAR STEPPED
NEED/SURFACE - FEELS KEY OR
CENTRAL.

S2 D AC EC T I AD A/S

2291 - 5451



A: STRONG.

B: LAND.

TOUCH THE LAND

soft
Spongy.
moist
Dark

FRESH
open
wide.
Clear.

EXPANSE.

DE. A FEELING OF MIXED LOW VEGETATION AT THE THRESH.

FEELS VERY GREEN!

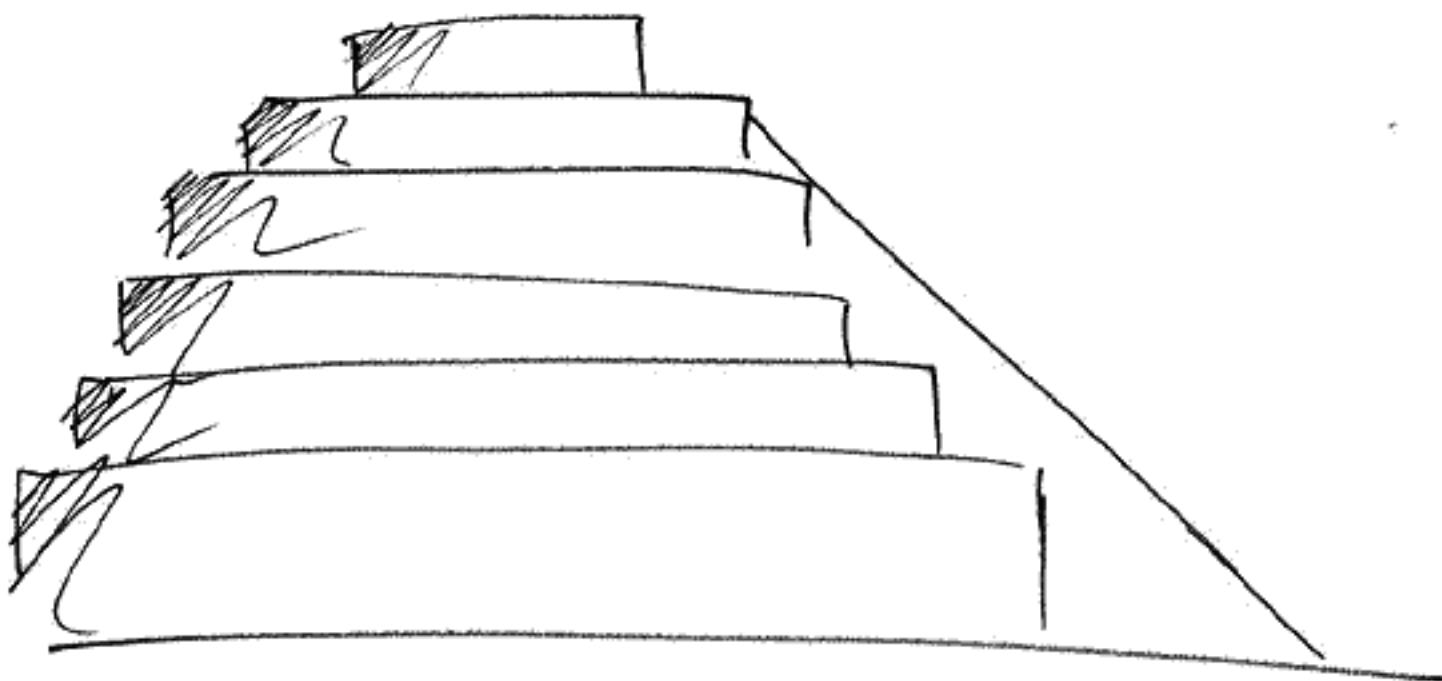
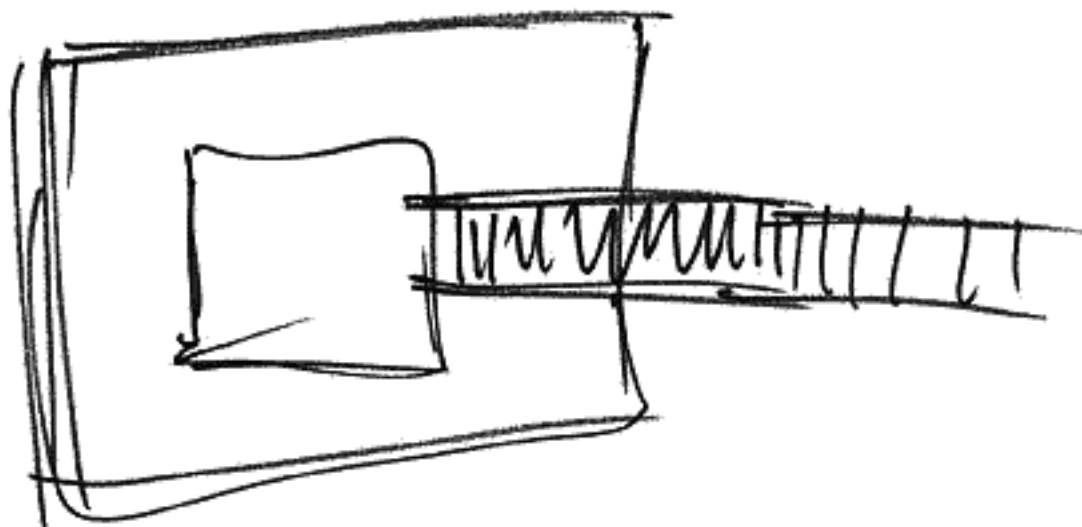
Page: 13.

Stage: 4

DAR.

S2 D AC EL T I AOL Rays

MAKE GOOD ART + DESCRIBE



TEMPLE
OF THE
SUN!



pg:14

IM STOPPING HERE AS IM EITHER WELL ON TARGET OR HAVENT TOTALLY DISPELLED AN EARLIER AGL AND ITS CONTAMINATING MY SESSION!



NOTE

* I DIDNT SEEM TO GET ANY

SOLID LIFE FORM DATA - THIS HAS HAPPENED

IN THE PAST ON ANCIENT TABLETS?