

Digital and immersive technologies for museums and heritage

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Arts & Humanities
Research Council



Innovate
UK



**SENSATIONS OF ROMAN LIFE:
RECONSTRUCTING and EXPERIENCING, A
MULTISENSORY VIRTUAL REALITY ENVIRONMENT
FOR THE ROMAN TOWN OF CALLEVA ATREBATUM
(SILCHESTER, UNITED KINGDOM)**



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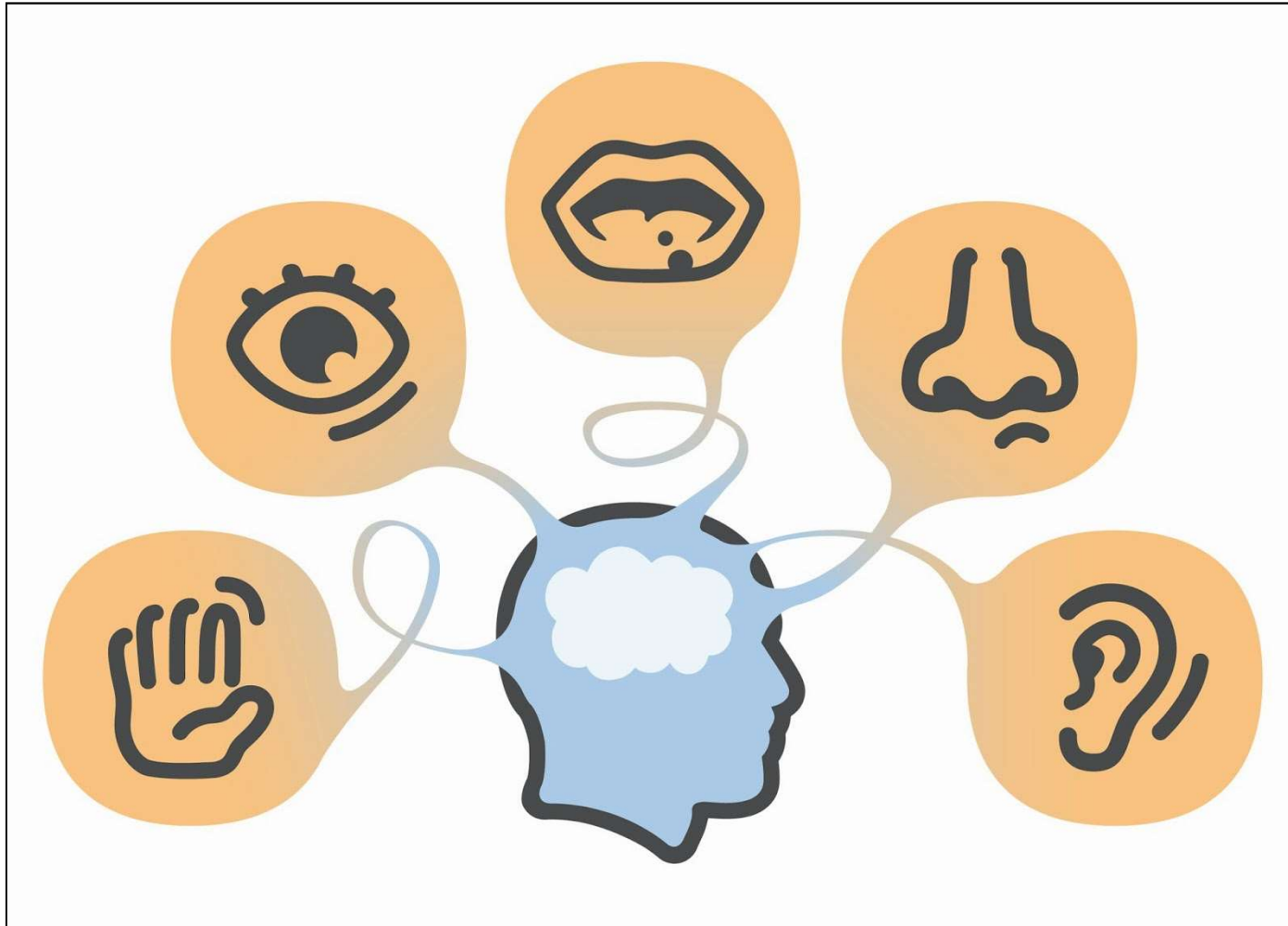


VR in Heritage



VR reconstruction of the Mayflower ship 1612, which sailed the first pilgrims to America

WHAT ABOUT THE OTHER SENSES?



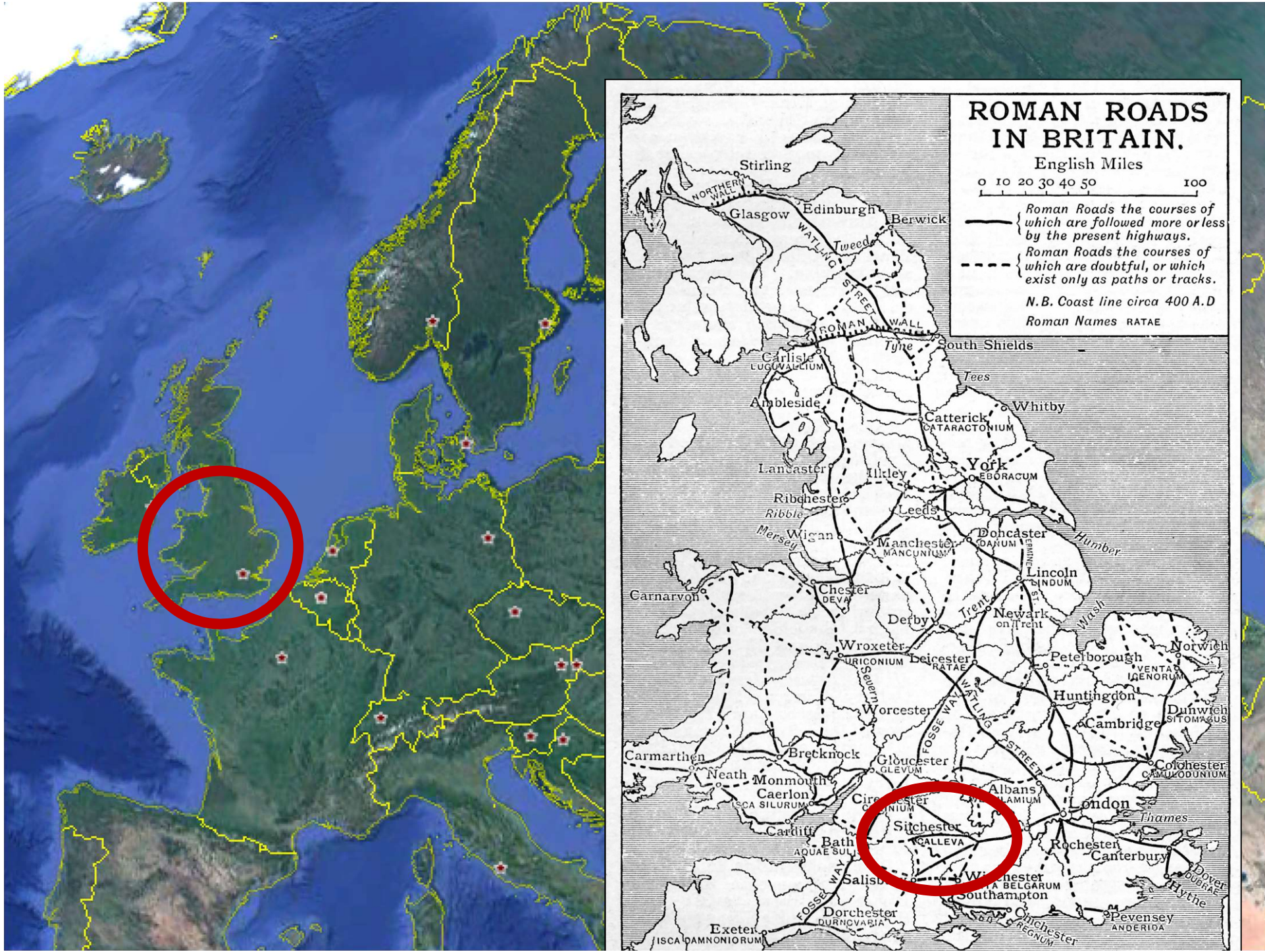


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‘Sensations of Roman Life’

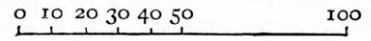
- Hannah Platts – RHUL
- Ian Ewert – Reading
- Tony Krus – Glasgow
- Kate McClean – Canterbury Christ Church





ROMAN ROADS IN BRITAIN.

English Miles



- Roman Roads the courses of which are followed more or less by the present highways.
- - - Roman Roads the courses of which are doubtful, or which exist only as paths or tracks.

N.B. Coast line circa 400 A.D.

Roman Names RATAE





House I, Insula IX

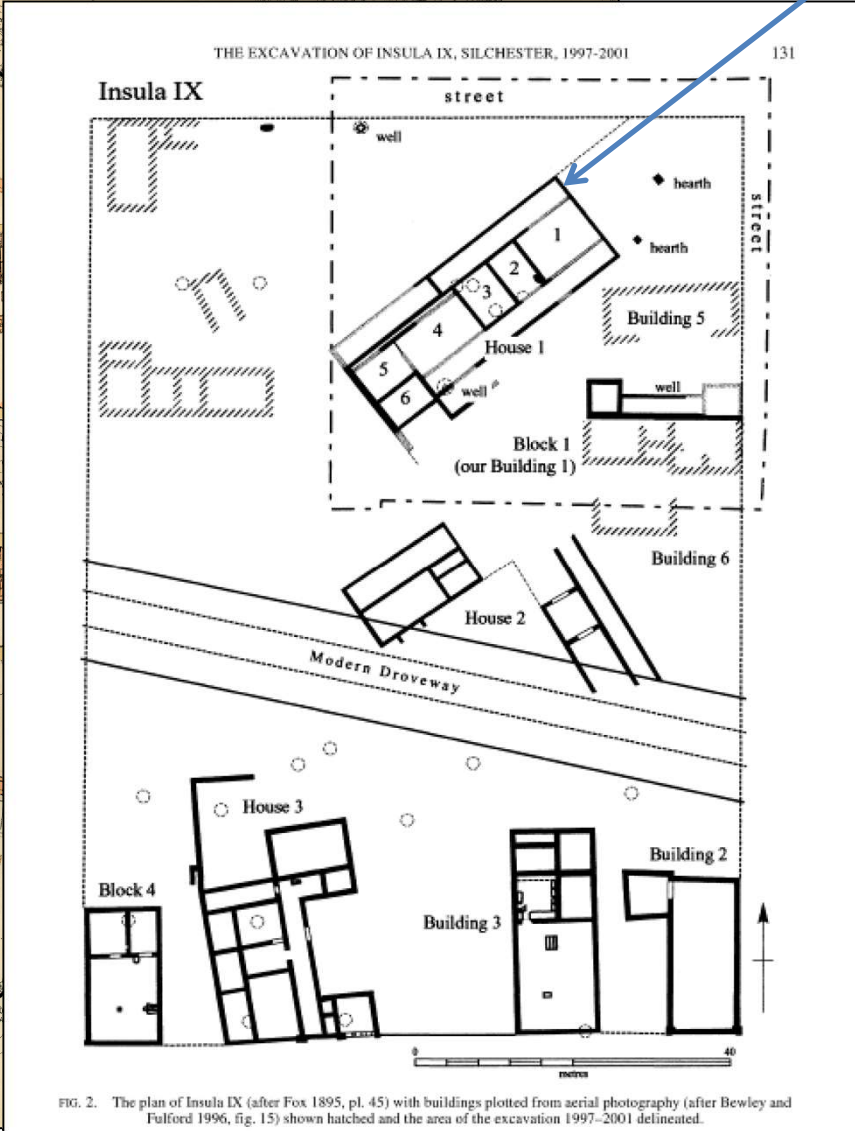
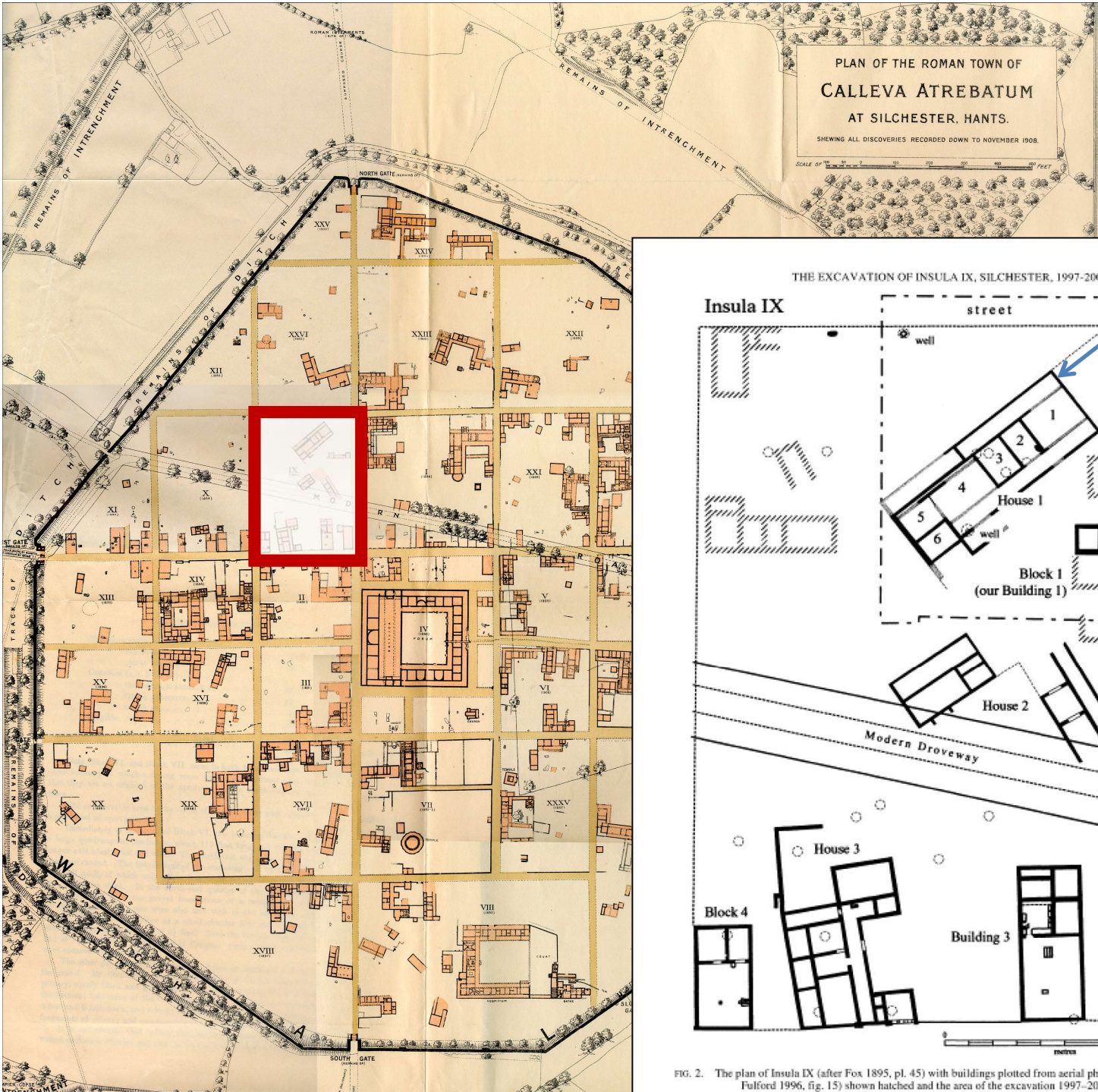


FIG. 2. The plan of Insula IX (after Fox 1895, pl. 45) with buildings plotted from aerial photography (after Bewley and Fulford 1996, fig. 15) shown hatched and the area of the excavation 1997-2001 delineated.

Silchester Insula IX - Today





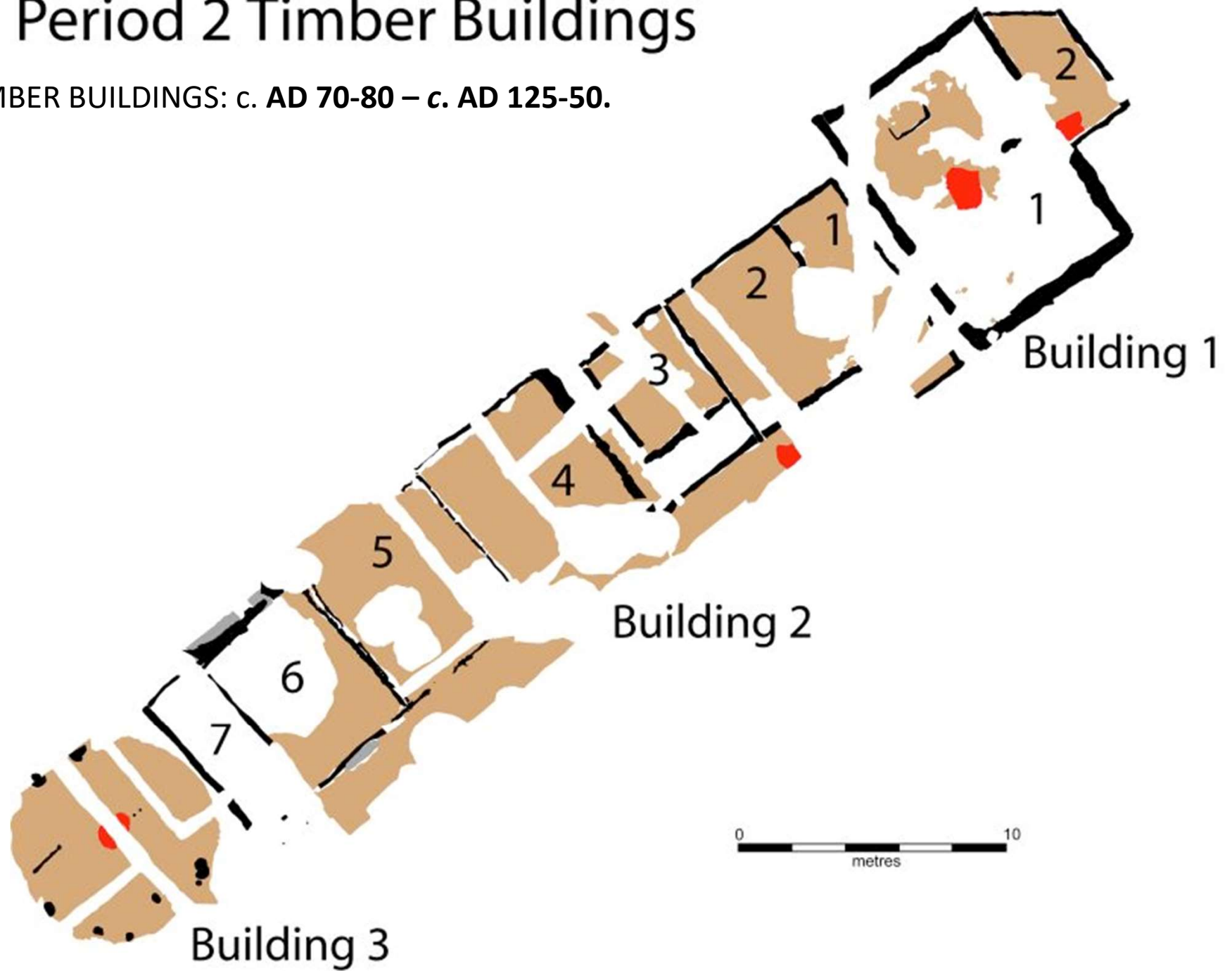
Insula IX

THE VIRTUAL REALITY ENVIRONMENT

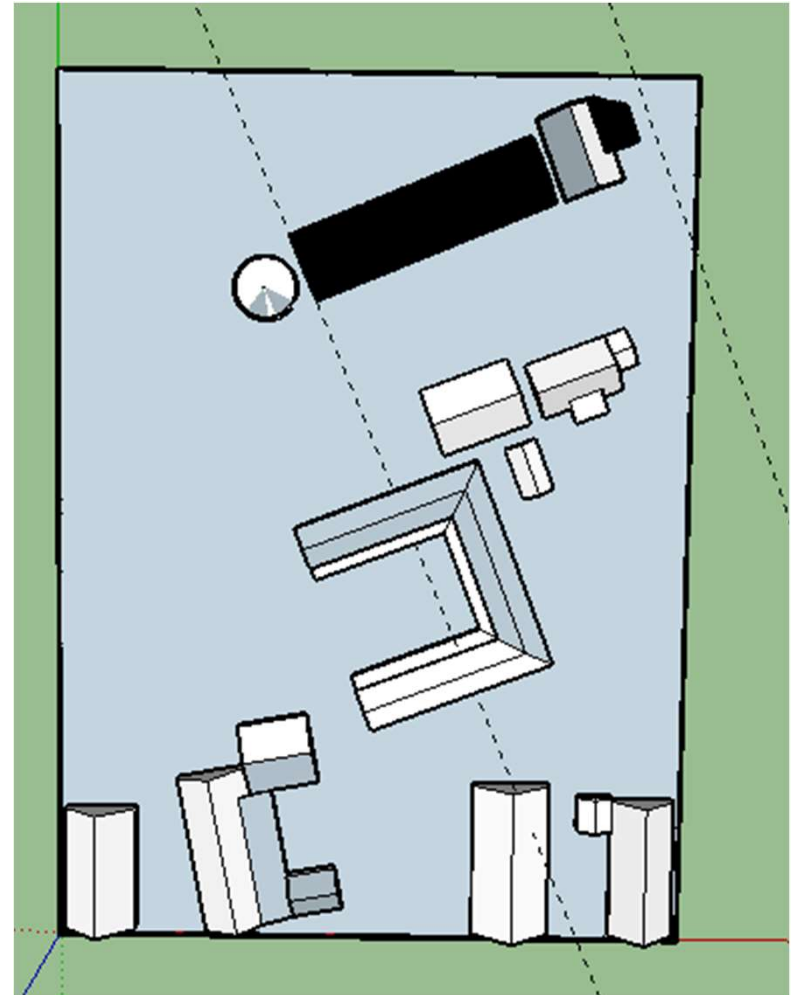
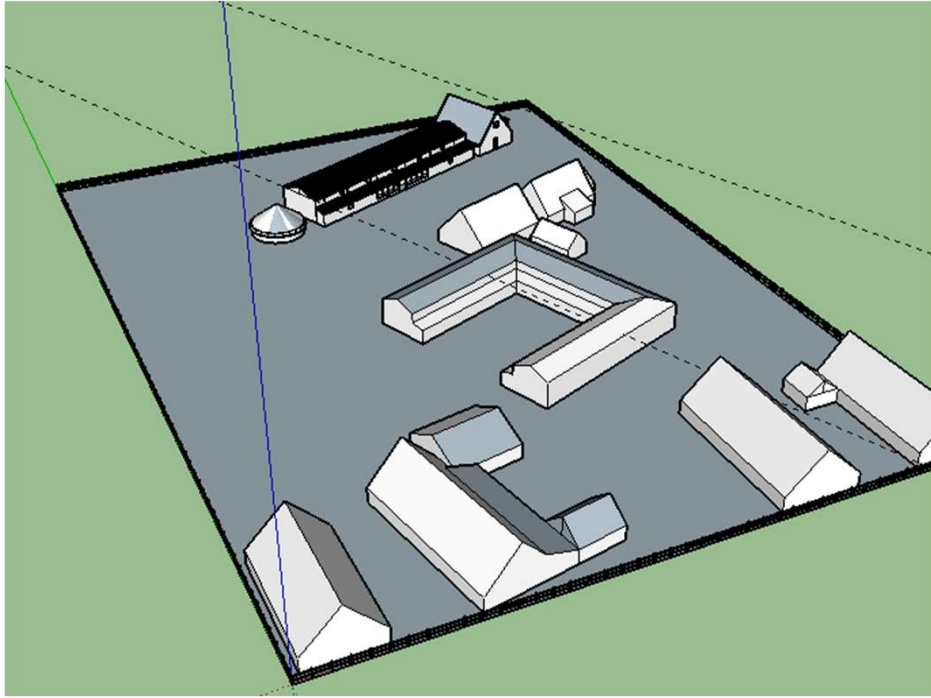


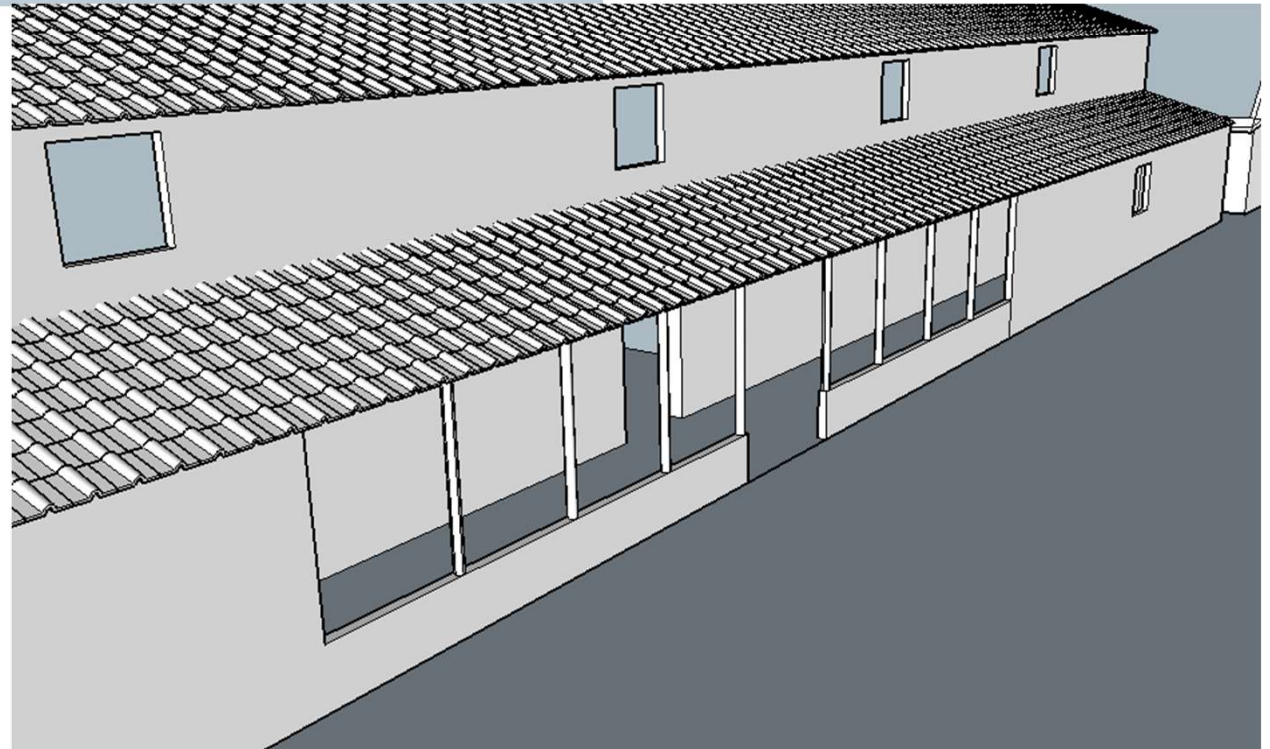
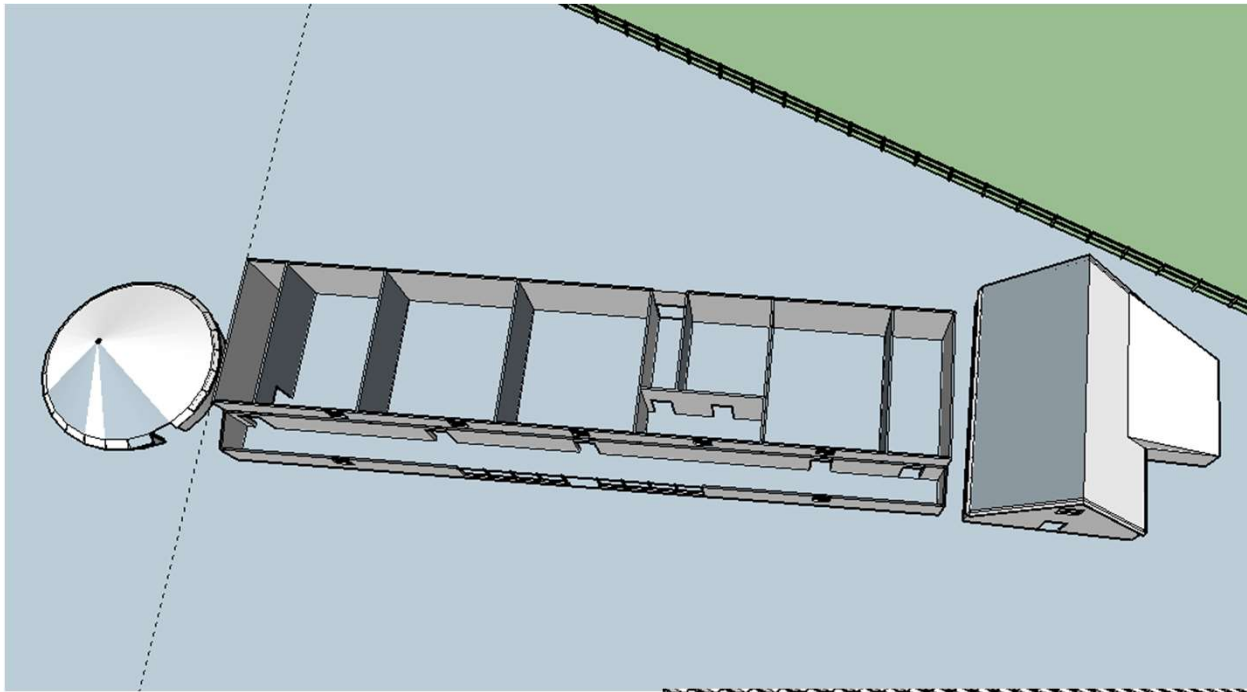
Period 2 Timber Buildings

ALL TIMBER BUILDINGS: c. AD 70-80 – c. AD 125-50.



The Project









Screenshot from House 1 model



Screenshot from House 1 model



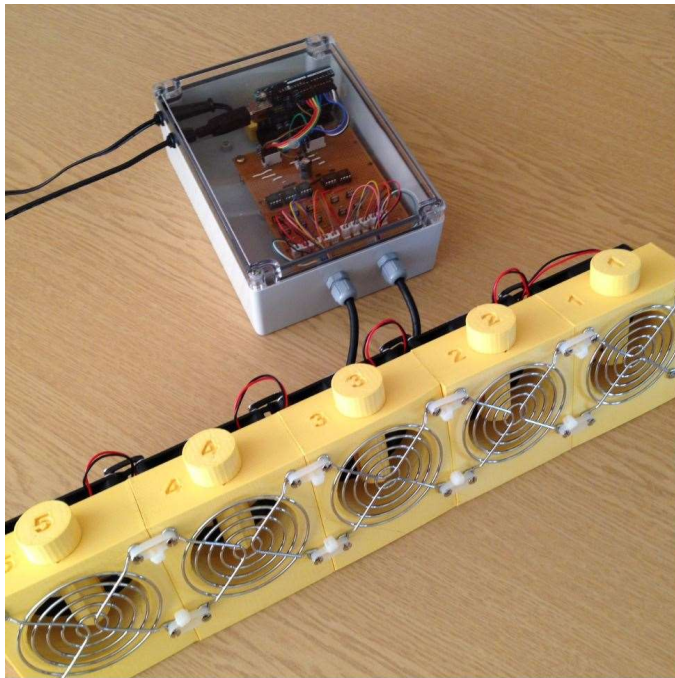
SOUNDS IN SILCHESTER VR

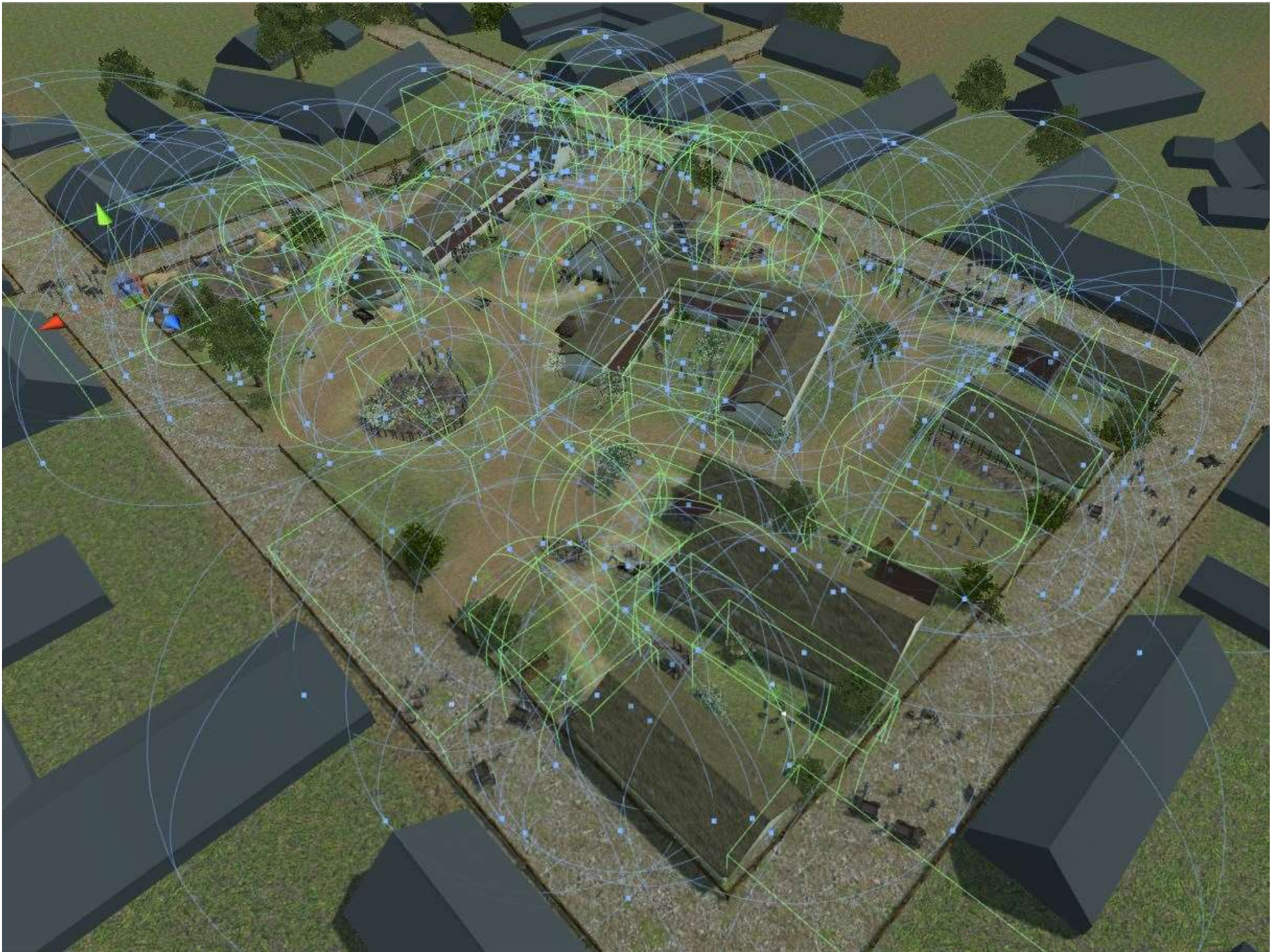


SMELLS IN SILCHESTER VR

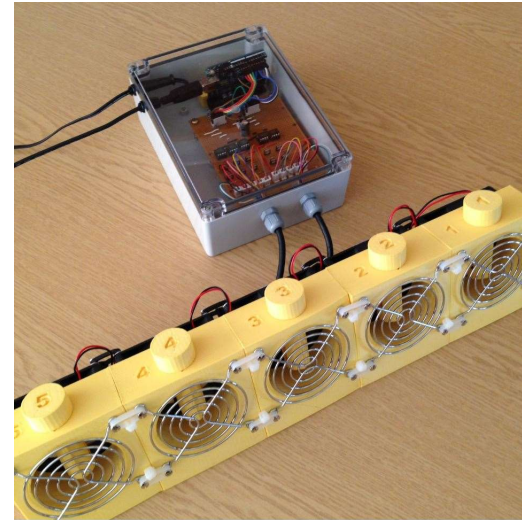
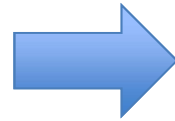


SMELLS IN SILCHESTER VR



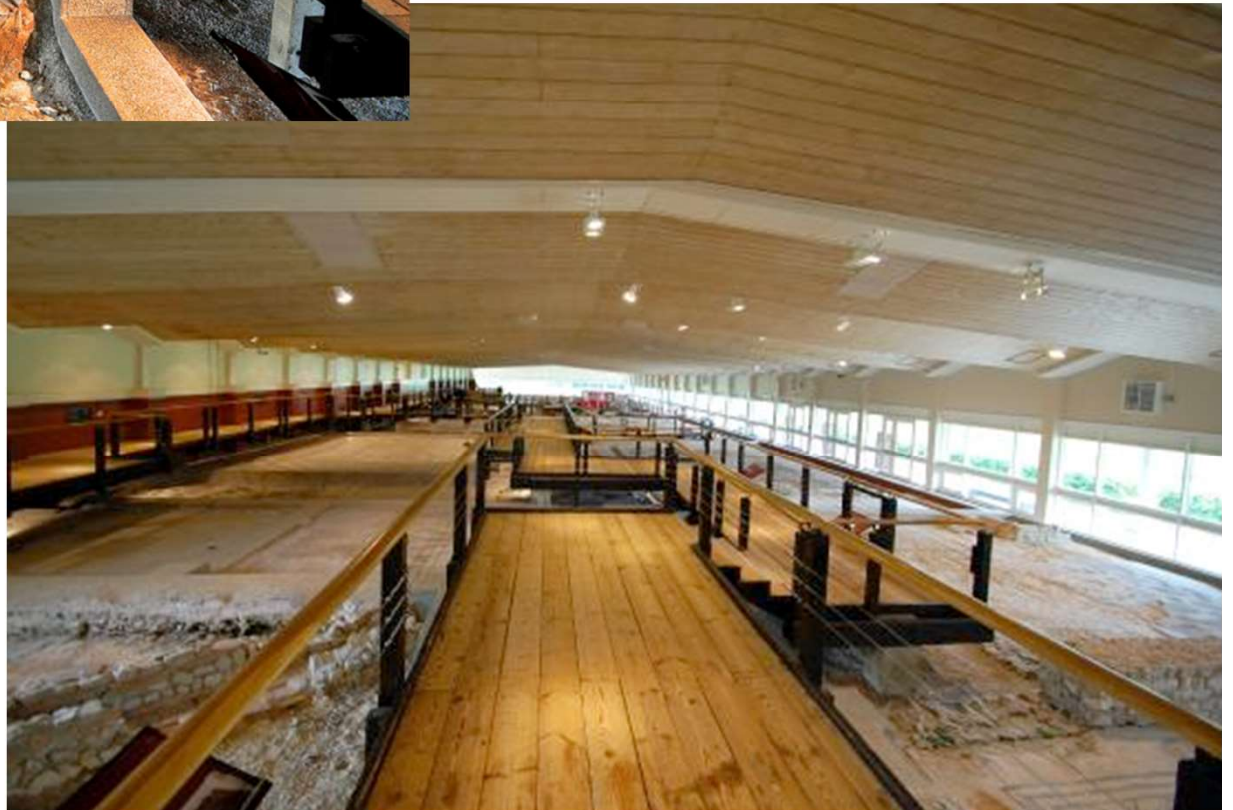


SMELLS AND SOUNDS IN SILCHESTER VR



PUBLIC ENGAGEMENT





COME TO OUR ROMAN HOUSE EXPERIENCE!

WHAT DO YOU THINK A ROMAN HOUSE WAS LIKE?

DIRTY	
COLD	
QUIET	
DRY	
DARK	
WARM	
BIG	
DAMP	
SMELLY	
LIGHT	
NOISY	
CLEAN	



THANK YOU!

Some Results

- 59% of visitors changed their ideas of what a Roman house was like to selecting 'noisy' in the post visit questionnaire.
- 57% of visitors changed their ideas of what a Roman house was like to selecting 'smelly' in the post visit questionnaire.
- Other physical experiences that were impacted were feelings of warmth (perhaps from seeing, hearing and smelling the fires) and an increased perception of dirt and light.
- 73% of visitors reflected on the differences between this model and Fishbourne Roman Palace, which suggests a deeper understanding that there were different types of housing in the Roman world.
- 93 % of visitors felt the multisensory features of the experience added to their engagement with the site.

Unexpected take home points....

- Aim of project: Whether multisensory experiences engaged visitors and helped them learn about different types of Roman housing.
- Unexpected outcomes:
 - Other sensory experiences felt...
 - the impact of multisensory experience on visitors with sensory impairments, ADHD, ASD. In particular the ability to turn off or on sounds or smells in the model and impact of this on their engagement with the model.

TEAM



**CREATIVE
LEAD/EXECUTIVE
PRODUCER
CHARLOTTE
MIKKELBORG**

AWARD-WINNING IMMERSIVE
CREATOR BEHIND 360 FILM THE
JOURNEY AND MULTISENSORY,
INTERACTIVE VR NARRATIVE, FLY.



**SCENT DEVICE
DEVELOPMENT - GLEN
WINCHESTER**

GLEN'S TEAM HAVE RUN SPECIAL
EFFECTS ON BLOCKBUSTER FILMS
INCLUDING SPIELBERG'S READY
PLAYER ONE AND MISSION
IMPOSSIBLE FALLOUT.



**CREATIVE AR
TECHNOLOGIST
AMAURY LA BURTHE**

CREATIVE TECHNOLOGIST ON
MULTIPLE AWARD-WINNING
VR AND AR PROJECTS
INCLUDING, NOTES ON
BLINDNESS; ZAHA HADID VR;
AND SPHERES.



**COLLABORATING
ACADEMIC - DR
HANNAH PLATTS**

SENIOR LECTURER IN
ANCIENT HISTORY AND
ARCHAEOLOGY, RESEARCH
INTO MULTISENSORY
EXPERIENCES IN HISTORIC
ENVIRONMENTS

TUDORS AUGMENTED



PICTURE THIS
PRODUCTIONS



MoCo FX



Follow the trail, find the clues, complete the mission!





PROJECT

Pioneers MULTISENSORY engagement in AR with cultural heritage

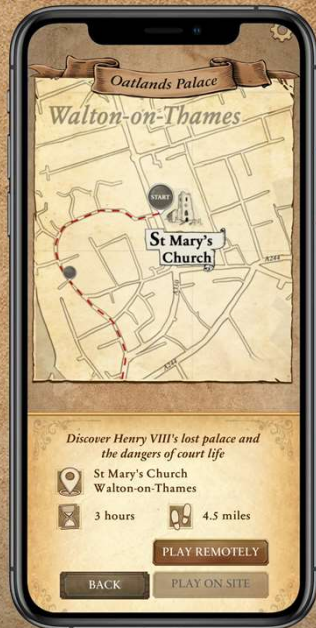
Takes you on both a physical journey AND a journey back in time – giving you a critical role to play in the stories that shaped our history.

Heightens the immersive experience with 3D holographic characters and a first-of-its-kind mobile scent device to augment your reality with the sights, sounds and smells of Tudor life.

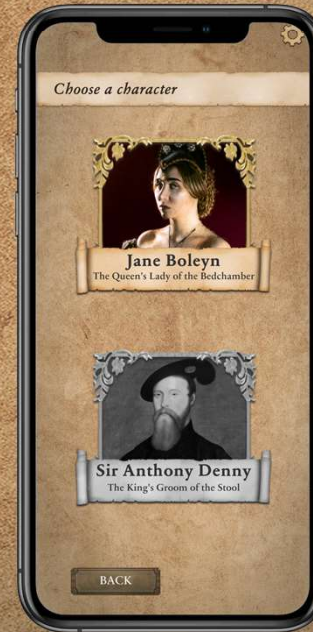
CHOOSE LOCATION



CHOOSE ONSITE OR REMOTE PLAY



CHOOSE CHARACTER



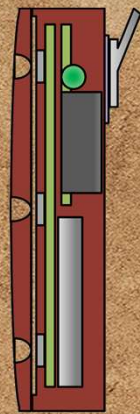
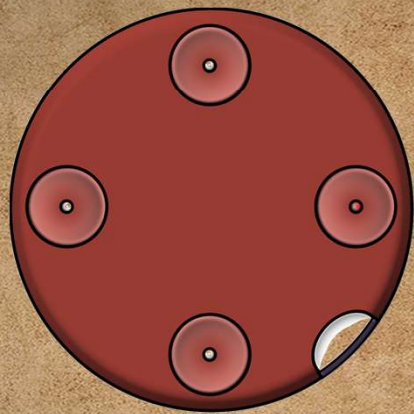
PLAY!



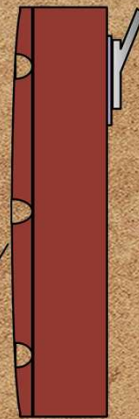
3D holographic characters



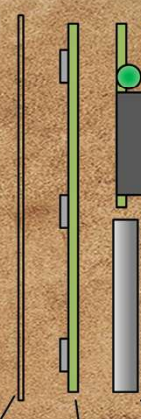
MOBILE SCENT RELEASE DEVICE



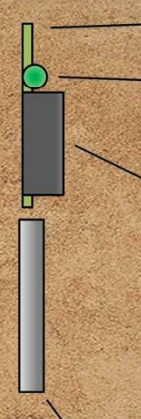
PLASTIC ENCLOSURE & CLIP



REPLACEABLE SCENT DISC



SCENT DISPERSAL CONTROL PCB



RF COMMUNICATOR

STATUS & POWER LED

CHARGING AND CONFIGURE USB PORT

RECHARGEABLE BATTERY



MULTISENSORY NARRATIVE

4 DIFFERENT SCENTS RELEASED AT KEY POINTS
IN THE NARRATIVE
EXAMPLES

- CHURCH INCENSE
- APOTHECARY'S POTIONS
- PERFUME OF QUEEN ELIZABETH I (BASED ON ORIGINAL RECIPE)

CHALLENGE

Cultural heritage institutions

- have seen visitor numbers/turnover plummet
- want to appeal to young & more diverse audiences
- Face Hardware costs if they want new interactive experiences, so how can immersive technologies be used that are cost effective

On a societal front

- Mental and physical well-being has been negatively impacted during COVID

SOLUTION

Tudors Augmented...

ATTRACTS VISITORS
BACK TO SITE &
CONNECTS YOUNG
VISITORS WITH
HERITAGE

EXPERIENCES
GENERATE ON
AND OFFSITE
REVENUES

SAVES
HARDWARE
INVESTMENT
COSTS

PROMOTES
PHYSICAL
AND
MENTAL
WELL-BEING



DIVERSITY & ACCESSIBILITY

ATTRACT FAMILIES FROM MORE DIVERSE BACKGROUNDS THROUGH CHARACTER/STORY SELECTION AS WELL AS BY KEEPING THE APP AFFORDABLE TO ENSURE A LOW BARRIER TO ENTRY.



10% OF SITE VISITORS HAVE A REGISTERED DISABILITY COMPARED TO 18% IN THE POPULATION. USE OF MULTISENSORY TARGETS INDIVIDUALS WITH

- CERTAIN LEARNING DISABILITIES
- VISUAL AND HEARING IMPAIRMENTS
- THE REMOTE GAME HELPS ACCESS TO THE SITES FROM HOME.



Questions of Access....?

- UK: Department of Digital Culture, Media and Sport (DCMS) 'Taking Part Survey' (September 2019): Break down of museum adult visitors:

- 'White' 51%
- 'Asian' 44%
- 'Black' 35%
- Without disability - 52%
- With disability - 45%

NB: presence of a health problem or disability was the third most common reason identified by adults for not visiting a museum, gallery or heritage site

Questions of Access....? Cont....

- 52% of all 16-74 year olds had visited a gallery or museum
- 31% of people aged 75 + had done so.
- 36% of respondents in “lower socio-economic group” had visited a museum in the last 12 months,
- 60% of respondents in “upper socio-economic group”.

Adult and Child Engagement with Technology

- 76 % of adults own smartphones (DCMS 2016)
- 80% of adults regularly use the internet (DCMS 2016)
- 99% of 12-15 year olds go online for nearly 21 hrs /week (Ofcom 2017)
- 83% of 12-15 year olds own smart phones (Ofcom 2017)
- 55% of 12-15 year olds own tablets (Ofcom 2017)



DIVERSITY & ACCESSIBILITY

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User Responses

AMELIE PARKER AND DANI LABELLE BOTH 15 YEARS - **WE LOVED IT!** BECAUSE IT WAS BOTH INTERACTIVE AND REALLY IMMERSIVE. WE FELT AS THOUGH WE WERE THERE, ESPECIALLY WITH THE SCENT.

SARAH ELIZABETH COX 8 YEAR OLD ME OBSESSED WITH HAMPTON IS EXPLODING WITH JOY.

30+ YEAR OLD ME WHO CRIED AT DR LINDSEY FITZ'S TOWER OF LONDON WEDDING BECAUSE I DRANK SOME GIN AND GOT SAD ABOUT ANNE BOLEYN IS EQUALLY EXCITED. OMG 10/10 WOULD PLAY 100%

LIZZIE GILBERT, 39 YEARS AND THOMAS GILBERT, 12 YEARS I ACTUALLY THOUGHT I KNEW SOMETHING ABOUT OATLANDS PALACE BEFORE I TRIED THIS GAME – I WAS BLOWN AWAY! **LIZZIE.**

I WANTED TO CUSTOMIZE THE CLUE SOUND SO THAT IT SOUNDED LIKE A SWORD BEING UNSHEATHED! MY FAVOURITE BIT WAS THE CODED CLUES AND THE REALISTIC CHARACTERS. **THOMAS**

Tudors Augmented: The Mary Rose



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UK



Thank you!

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FINDING ODOUR UNITS FOR ROMAN SILCHESTER

PERSONAL INFO

NAME:

AGE:

HEIGHT (M):

I RATE MY SENSE OF SMELL AS:

Very Sensitive Sensitive Average Poor Very poor

MALE / FEMALE

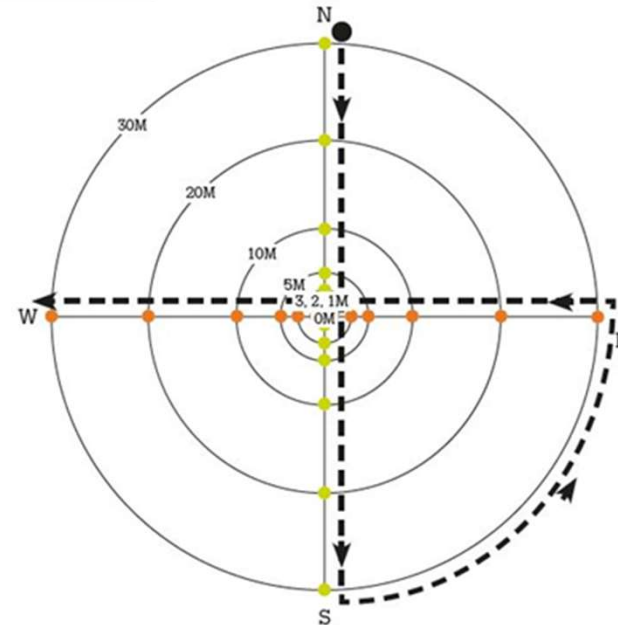
CONTACT INFO:

INSTRUCTIONS

For each smell source:

- Start at the Northern 30m mark (N) and write down the smell intensity in the box, according to the 0 – 6 scale (see INTENSITY SCALE opposite)
- Move towards the source at the centre, stopping at each marker and record the intensity.
- When you reach the source, mark the Hedonic Tone according to the +4 to -4 scale (see HEDONIC TONE SCALE opposite)
- Continue past the source towards the Southern marker (S) stopping at each marker, and facing the source write down the smell intensity.
- When you reach the Southern 30m marker (S), walk to the Eastern 30m marker (E) and repeat the procedure until you reach the Western 30m marker (W)
- Repeat the procedure for the next smell

SITE LAYOUT



INTENSITY SCALE

Odour intensity is measured on a scale of 0 to 6 from Imperceptible to intolerable:

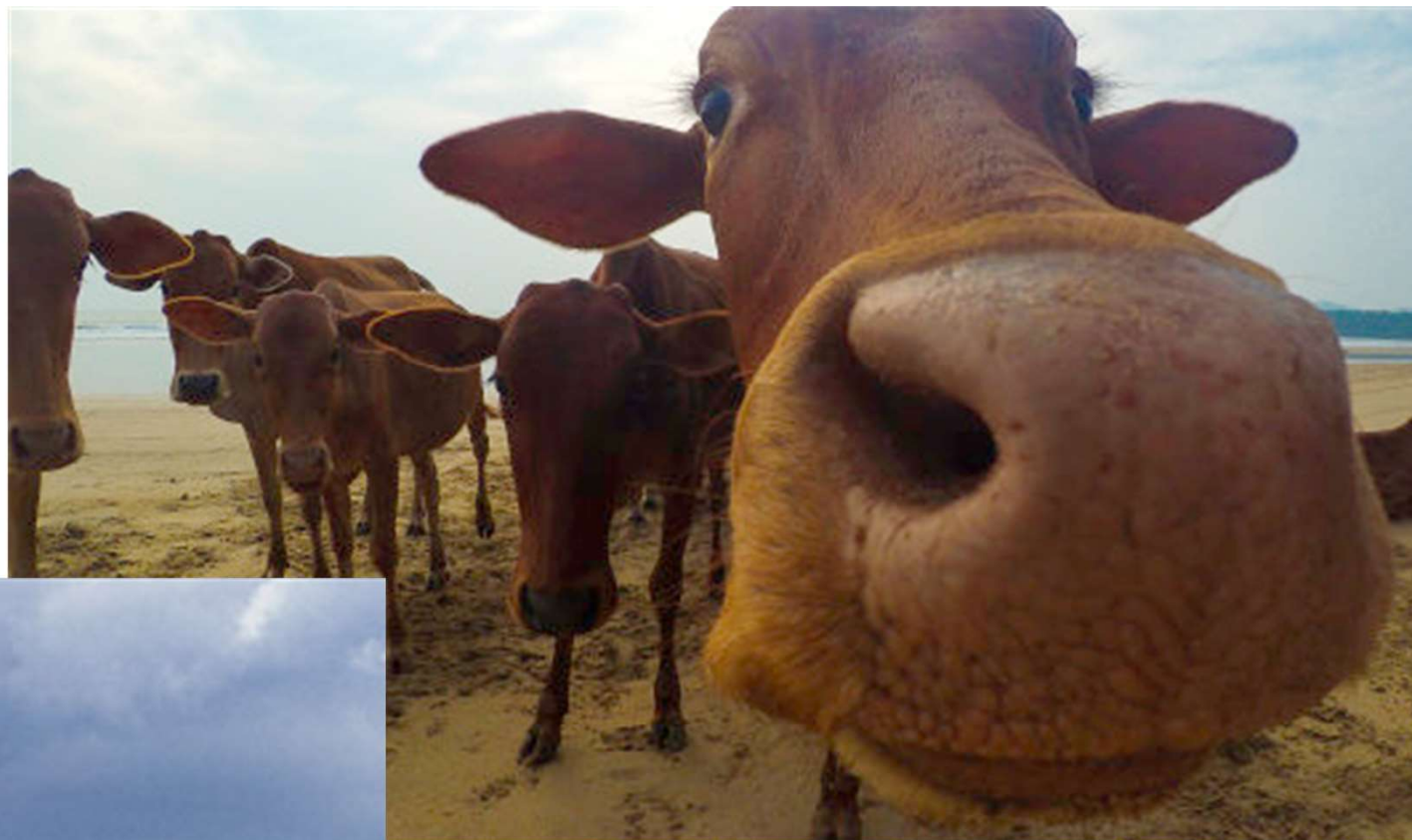
- 0: no odour
- 1: very weak
- 2: weak
- 3: distinct
- 4: strong
- 5: very strong
- 6: intolerable

HEDONIC TONE

Hedonic tone is measured on a scale of -4 to +4 with 0 indicating a neutral response:

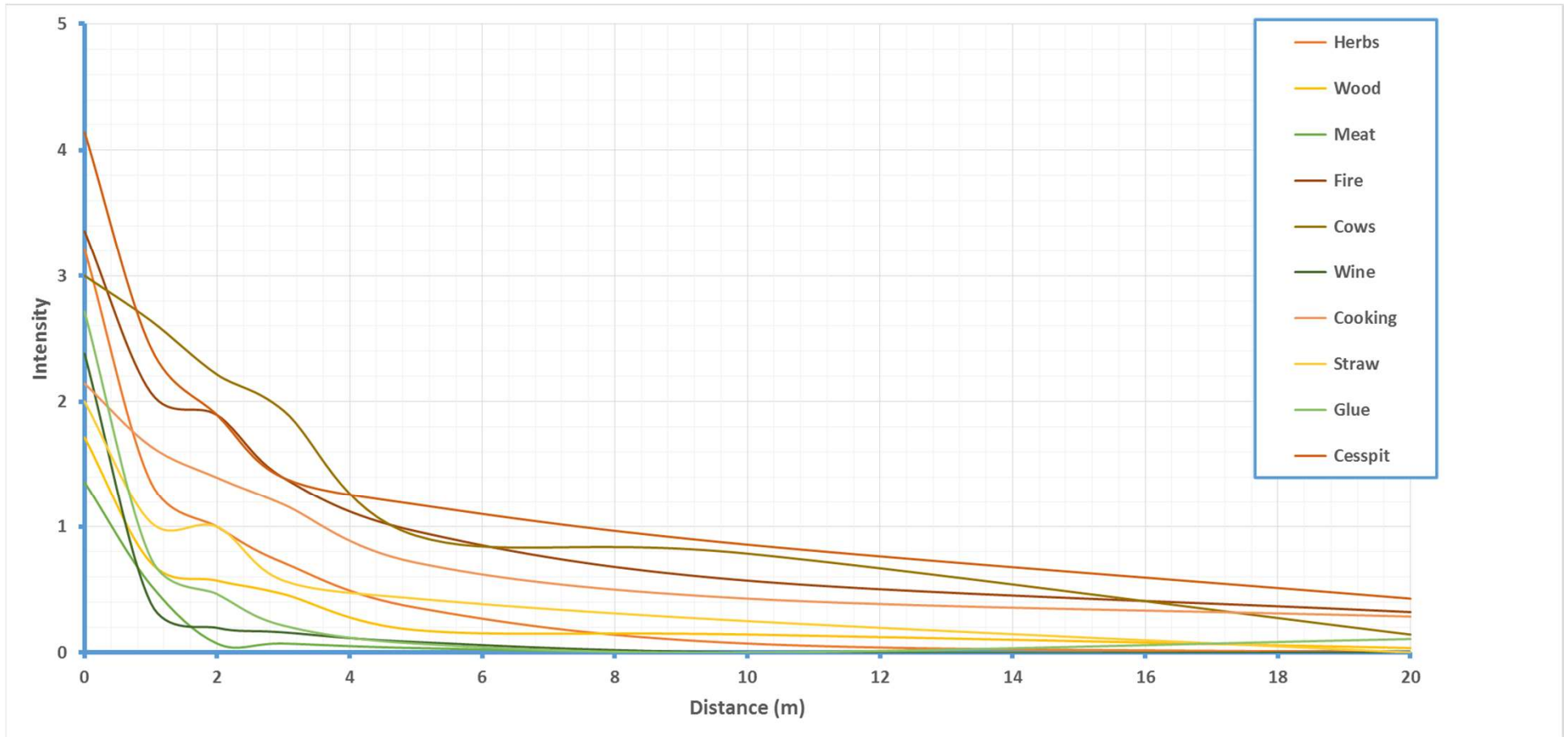
- 4: dislike extremely
- 3: dislike very much
- 2: dislike moderately
- 1: dislike slightly
- 0: neutral
- 1: like slightly
- 2: like moderately
- 3: like very much
- 4: like extremely

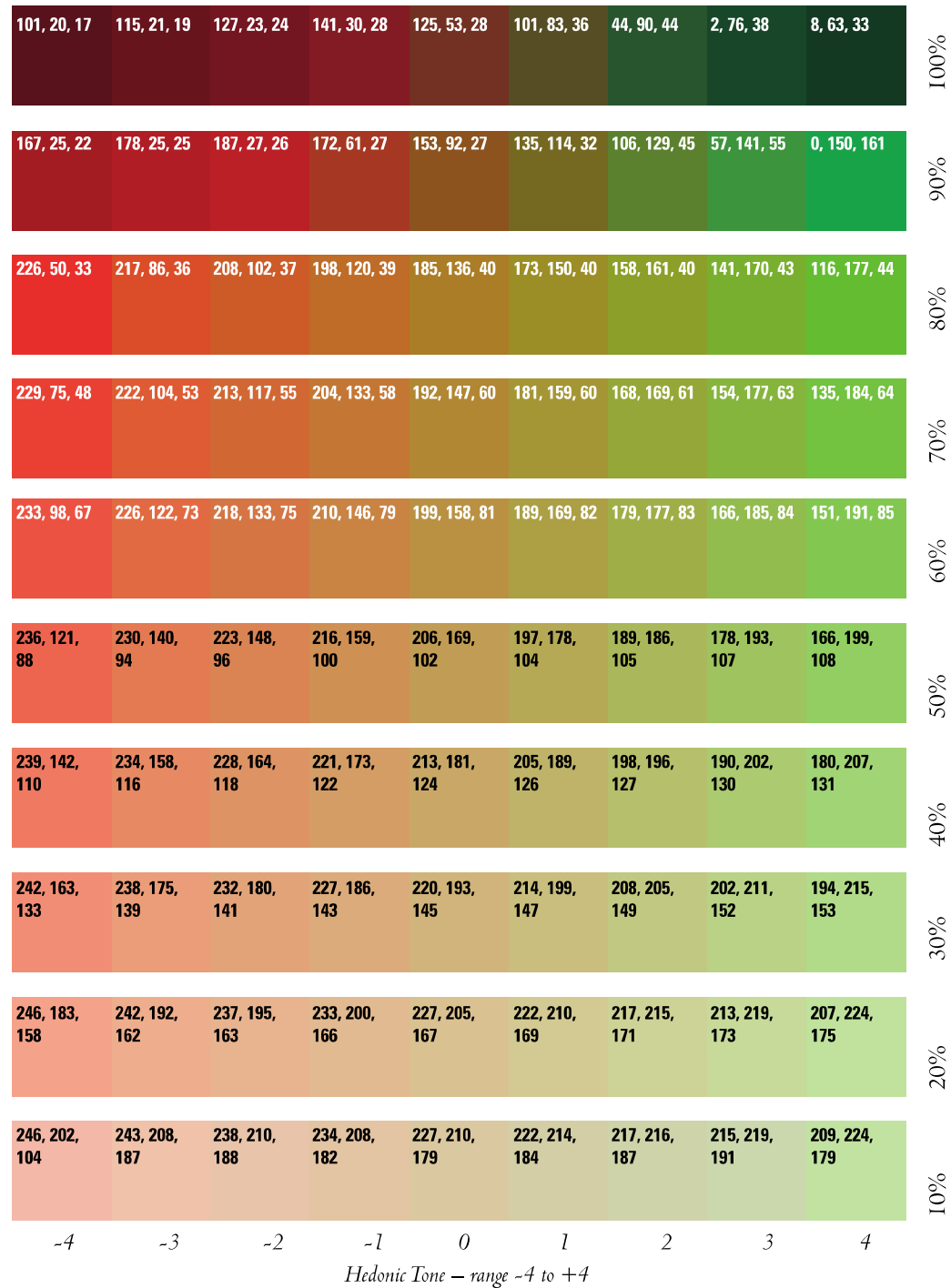
Smells close up...



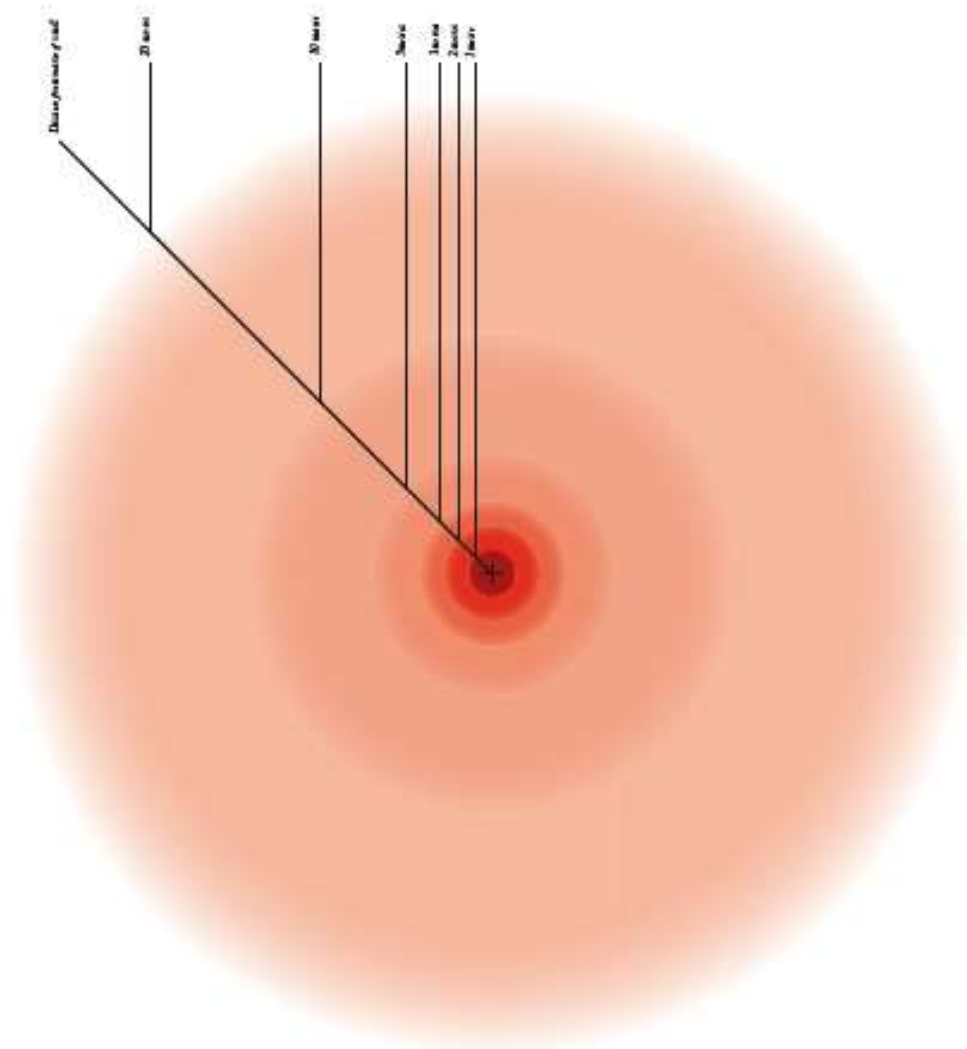
Smells at a distance.....

Distance (m)	Herbs	Wood	Meat	Fire	Cows	Wine	Cooking	Straw	Glue	Cesspit
20	0.00	0.04	0.00	0.32	0.14	0.00	0.29	0.00	0.11	0.43
10	0.07	0.14	0.00	0.57	0.79	0.00	0.43	0.25	0.00	0.86
5	0.36	0.18	0.04	0.96	0.93	0.08	0.71	0.43	0.07	1.18
3	0.71	0.46	0.07	1.39	1.93	0.16	1.18	0.57	0.21	1.39
2	1.00	0.57	0.07	1.89	2.21	0.20	1.39	1.00	0.46	1.89
1	1.36	0.71	0.54	2.07	2.64	0.39	1.64	1.04	0.75	2.43
0	3.21	1.71	1.36	3.36	3.00	2.38	2.14	2.00	2.71	4.14

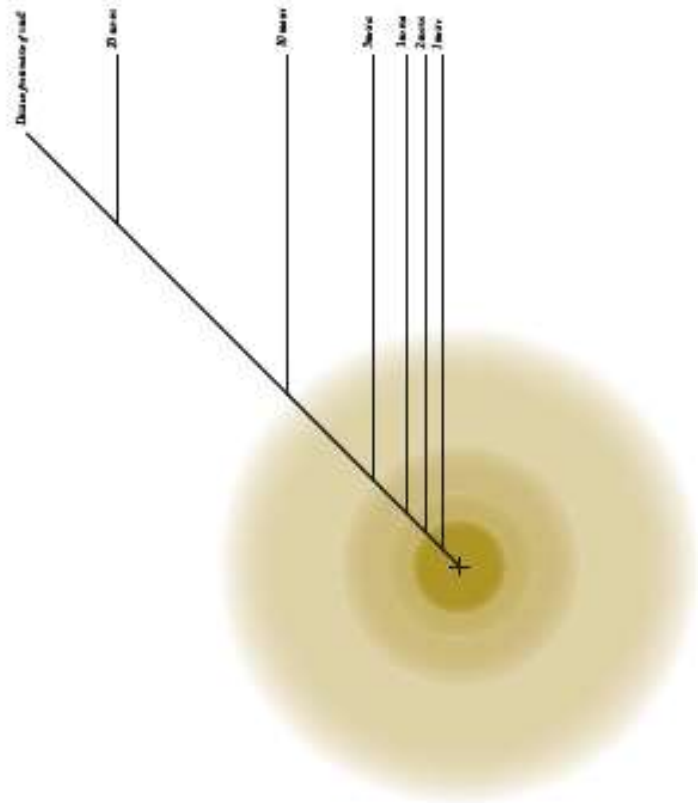




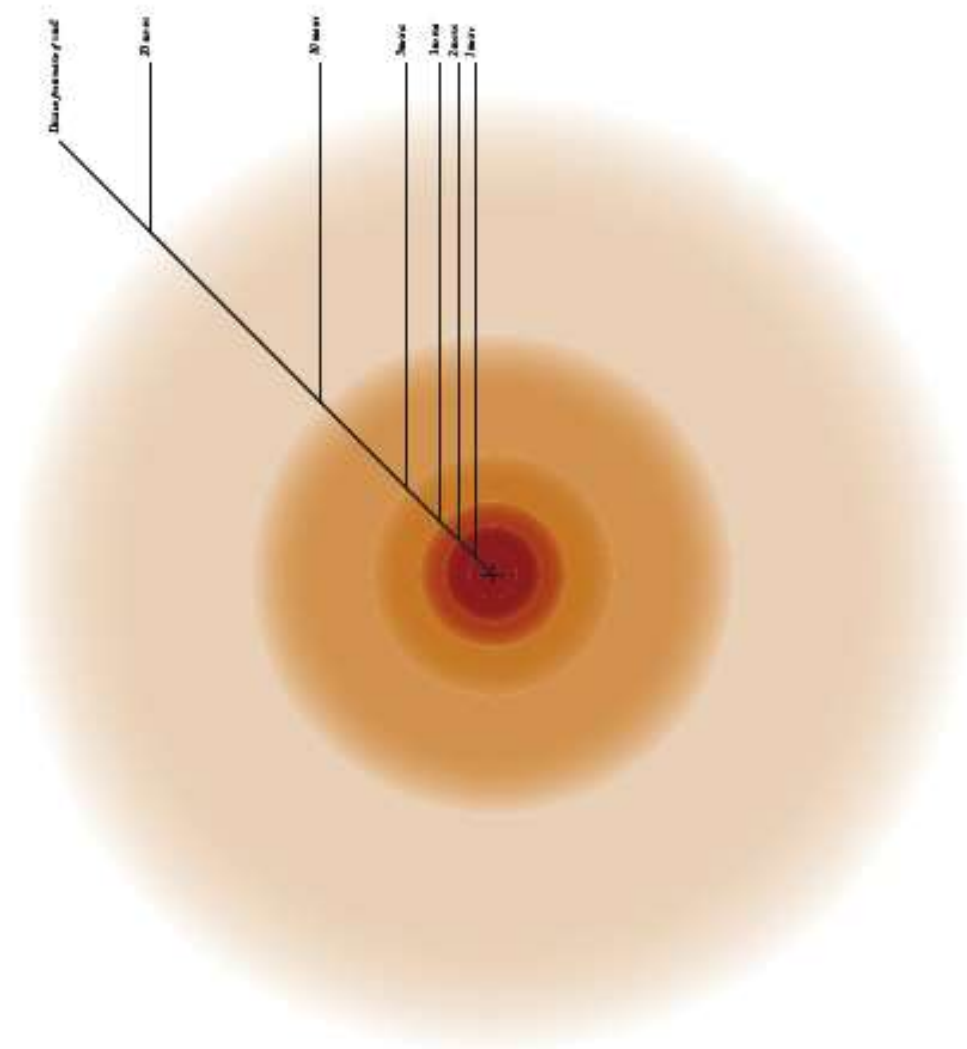
Hedonic Tone - range -4 to +4



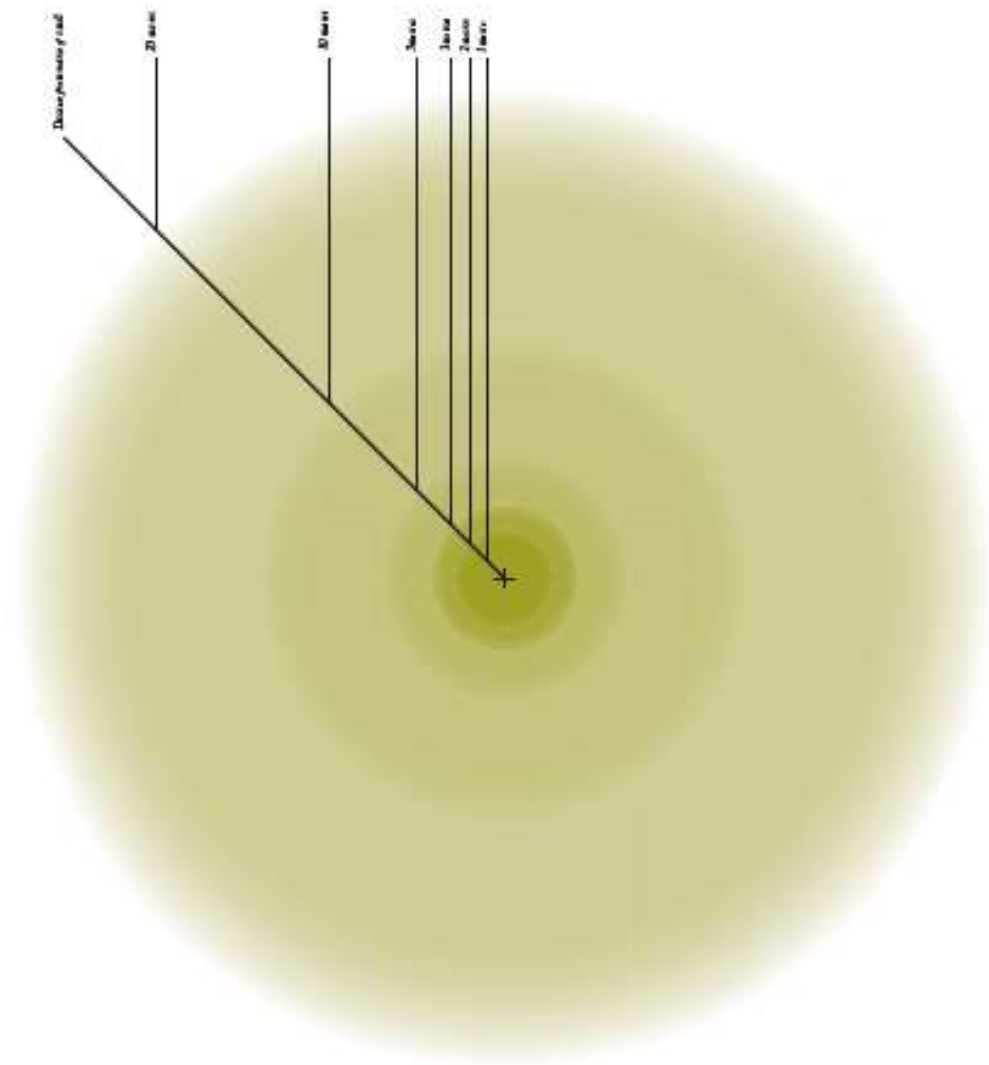
Roman Smells Profile:
Cupri - Hibernia -4



Roman Smells Profile:
 Dany - Habitat: terr 1



Roman Smells Profile:
 Animal - *Hidone ror - 1*



Roman Smells Profile;
 Fig. - *Habitat* 102 2