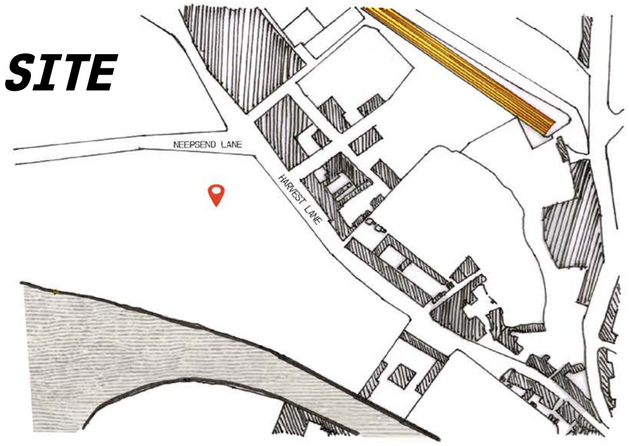
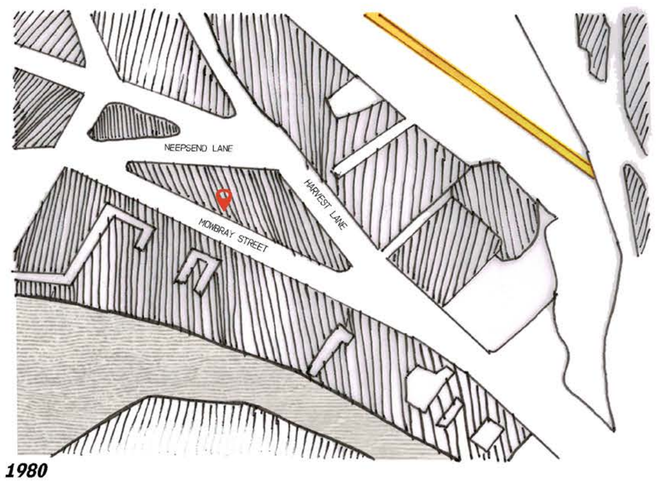
SITE



1850

1890



1980

HOW DO YOU DESIGN A MEANINGFUL EXPERIENCE? :

My project is informed by the history of 118 Mowbray Street, + how parallels can be drawn between the young people of today, the YHA's target audience, + the historical makers of Mowbray Street, through their activism + pursuit of cleaner air.

Inspired by their activism I have designed a youth hostel which aims to offer respite, inspiration + hope.
Being surrounded by materials which are grown, recycled + sustainable, allows users to enjoy their experience, without the burden of guilt which climate anxiety induces.

Using grown materials as an alternative to polluting materials which we currently use in architecture, allows users to see the potential for for a future where the degradation of materials is designed with as much importance as the aesthetic + performance.

"Life is meaningful to the extent that the present is connected to the past"

WILLIAM TOV, 2019

SITE RESEARCH

As I was researching the time period which 118 Mowbray Street was built, I learnt that the area was the home and workplace of local artisans, skilled craftsmen and low skilled labourers.

The descriptions I found of the living and working conditions of the time were shocking. The wages were low, living standards were appaling, homes were overcrowded, and so infant mortality was high.

I was developing a picture of the life of the people who occupied 118 Mowbray Street, but I wanted to understand how they felt, living and working under such pressure. This is when I discovered that my Great Great Grandfather was a man called John Emanuel Davison 1870 - 1927. He was working as a Iron Moulder at the time 118 Mowbray Street was built, he was also a sanitation inspector and saw first hand the living standards people were surviving in, in Sheffield's industrial areas.

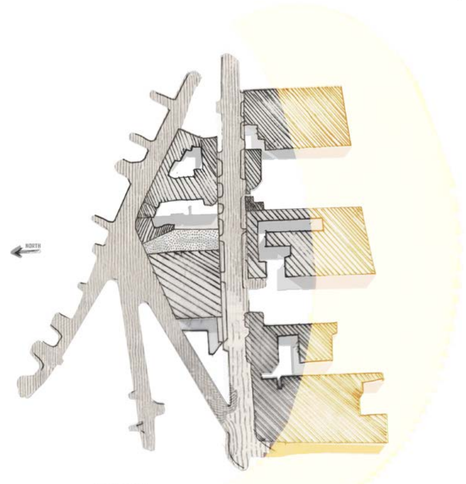
This inspired him to join, and later lead the Friendly Society of Iron Founders and fight for higher wages and better working conditions.

In 1918 he was elected as Labour MP for Smethwick, (where he was born) he fought for the 'pulling down of houses which are unfit for human habitation' he described how 'the smoke nuisance was a crying evil, which seriously affected the health of the working classes'.

This research helped me to identify the parallels between the young activists of today and the makers of Mowbray Street, their battle to improve air pollution +

their anxiexty about the future.

'THE ROWS OF CHEERLESS LOOKING HOUSES, THE THOUSAND AND ONE SIGNS OF GRINDING INDUSTRIAL LIFE, THE INKY WATERS OF RIVER AND CANAL, THE GENERAL DARKNESS AND DIRT OF THE WHOLE SCENE'
-J.S FLETCHER, ON SHEFFIELD, 1899



SUNPATH DIAGRAM

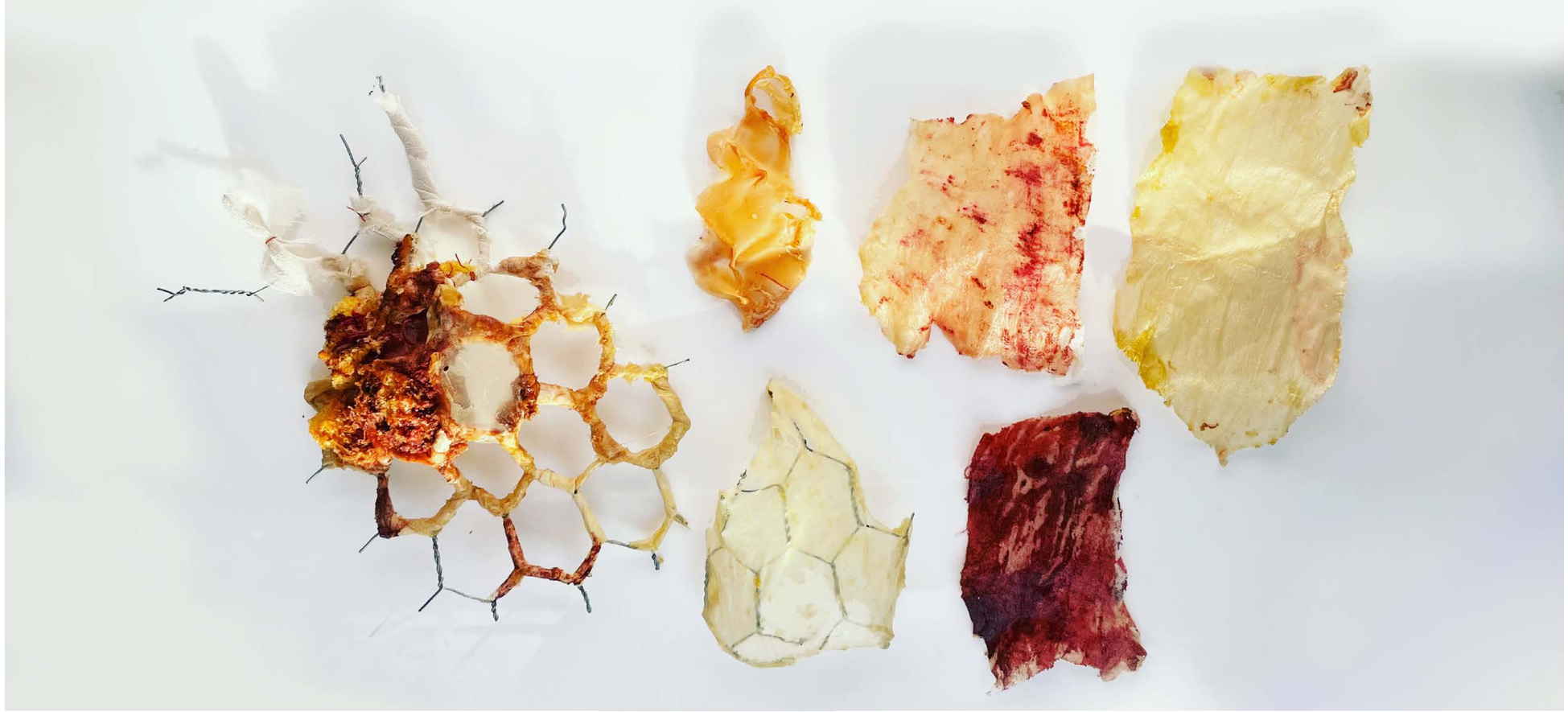
MATERIAL EXPLORATION

"38% OF GLOBAL ENERGY RELATED GREENHOUSE GAS EMISSIONS ARE ATTRIBUTABLE TO THE BUILT ENVIRONMENT" RIBA (2021)

My design explores how bio materials could replace polluting materials currently used in Architecture. Particularly the use of ALGINATE, which can be derived from Brown Algae, as a responsive architectural material. Research by Chin Koi Khoo + Jae-Won Shin, Deakin University.

Using this research as inspiration I grew Bacterial Cellulose, a natural hydrogel, experimented with Alginate + considered the structures which could support these materials.

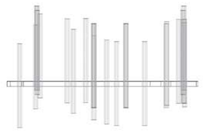
I have used this speculative material as a responsive roof which will insulate the first floor bedrooms, + create an atmospheric environment.



STRUCTURE

Inspired by my initial design + informed by my research into how to efficiently dry the ALGINATE/ CELLULOSE material, I built a 1:50 model of the first floor and used it to dry the material I had grown. This structure forms the responsive roof + support structure for the first floor bedrooms.

APARATUS FOR DRYING MATERIAL IN SPECIFIC FORM, INSPIRED BY IAAC.
THIS HAS INSPIRED MY DESIGN FOR THE FIRST FLOOR SUPPORT STRUCTURE



USING VECTORWORKS I POSITIONED EACH UPRIGHT AROUND BEDROOM STRUCTURES AND ACCESS POINTS TO ENSURE THEY DO NOT OBSTRUCT USERS.

THIS WAS LASER CUT ONTO PLYWOOD

I CUT DOWN 6MM DOWEL RODS + KNOCKED THEM IN AT THE EXACT HEIGHT MODELLED IN VECTORWORKS

DRIED CELLULOSE/ALGINATE MATERIAL

WET ALGINATE + CELLULOSE LAID ON STRUCTURE TO DRY.

BACTERIAL CELLULOSE

This material can be used in many ways, but my research led me to it as a natural Hydrogel. When hydrogels are mixed with less durable materials such as Alginate, they crosslink which strengthens Alginate + makes it able to perform as a reactive architectural material.

"hydrogels respond to heat and water by leveraging its ability to evaporate, which enables temperature regulation of interior space"
[Chin Koi Khool, Jae-Hon Shin, 2018].

(The sugar in this mix can be replaced with organic food waste.)

MIXTURE

1.5L BOILED WATER
2 x BLACK TEA BAGS
STEEP FOR AT LEAST
15 MINUTES

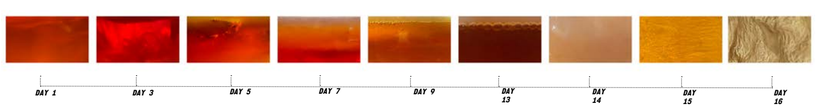
200G SUGAR/ Organic
food waste
ADDED TO BOILED WATER
AND STIR UNTIL FULLY

200ML APPLE CIDER

SYMBIOTIC CULTURE
OF BACTERIA + YEAST
(SCOBY)
ADD WHEN TEMPERATURE

COVER WITH BREATHABLE

BACTERIAL CELLULOSE GROWTH



ALGINATE

Alginate can be extracted from Brown Algae, Brown Algae is known to be responsible for capturing high levels of carbon dioxide.
With air pollution posing serious risk to our environment + Architecture being a contributing factor to the pollution on earth, this material could be beneficial as an architectural material, as it is growing + during it's life cycle.

When Alginate is mixed with Hydrogels it has the potential to create an environmentaly responsive type of architectural skeleton, for existing built environments to regulate temperature and humidity for building exteriors and interiors.
[Chin Koi Khool, Jae-Hon Shin, 2018]

I experimented with Alginate, and also combined Alginate with bacterial cellulose to observe the effect they have on each other.
I observed that alginate dries brittle and is easily dissolved , however it's strength is significantly improved when it is dried in the presence of Bacterial Cellulose [wet] + is easier to manipulate.

ARTIFICIAL LIGHT

NATURAL LIGHT

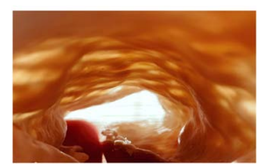
MIXTURE

1 x TBSP ALGINATE

20ML WATER

60 SECONDS AFTER

24 HOURS AFTER APPLICATION TO



BENT AROUND CURVED SURFACE AFTER DRYING WITH WET CELLULOSE IT WAS LESS BRITTLE AND EASIER TO MANIPULATE.

VISUAL OF RECEPTION AREA ON GROUND FLOOR
Showing the stairs and lift to the right, ensuring access to first floor bedrooms.