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**UNIVERSITY OF HUDDERSFIELD**

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**Access to the Aesthetic:**

**Exploring the Roles of the Functional, the Cultural & the Aesthetic  
with Respect to the Production of Tactile Images.**

Partial fulfilment of the requirements for

**PhD**

**By Sean Crumlish**

The candidates confirm that the work submitted is their own and that appropriate credit has been given where reference has been made to the work of others.

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## **Abstract:**

The creation of tactile images as it applies to a blind and partially sighted audience, is a territory which has a tendency to be dominated by a largely functional or utilitarian discourse (Amick & Corcoran, 1997; Spence & Osterhaus, 1997; Presley & Hastings, 2005). This approach prioritises the translation of essential information and the transference of meaning, over broader questions of the aesthetic or socio-cultural dimensions of what we might describe as traditionally visual knowledge. However, in reality the approach and rationale for the creation of tactile works, can be as varied and multifaceted as those underpinning the creation of more straightforwardly 'visual images', and arguably, no singular approach is capable of encapsulating the full breadth of this field of practice. Accordingly, this thesis explores three distinct but interconnecting perspectives, which address the functional, cultural and aesthetic dimensions of tactile image making - examining the contexts provided by each, in an attempt to better understand the interplay between these approaches.

An understanding of the field of tactile image making is developed, that draws upon Walter Benjamin's notions of translation, in a bid to establish a 'collections-based approach' that is derived from Benjamin's ideas of 'fragments' and his conception of 'pure language' (Benjamin, 1968), which are synthesised firstly with Ludwig Wittgenstein's more functional-propositional and cultural approaches to linguistics (Wittgenstein, 1921; Wittgenstein, 1953), and secondly the aesthetic realism of Eddy Zemach (Zemach, 1997). In turn these are drawn into relation with more mainstream, contemporary notions of disability access and art practice (Barnes & Mercer, 2001), in order to develop a rich and holistic approach to a deeper comprehension of tactile imagery.

The practice dimension of the thesis explores the technical, and mechanical understanding of the production of the tactile image, in order to provide a functional base of raised line drawing conventions, which can then be paired with the cultural and aesthetic dimensions of a work, providing access to the mainstream of artistic consumption and production. These ideas are supported by a breadth of practical 3D printed work, as well as collections of previously unpublished archives and an interview with a transcriber, and Braille expert from The Huddersfield Transcription Service.

Ultimately it is claimed that it is only through this juxtaposition of contrasting and in some cases contradictory frameworks that we can fully understand the need for, and diversity of application of the tactile image. The tensions and relationships between established knowledge bases of tactile-kinaesthetic comprehension and the wants and experiences of a blind audience participating in the context of a largely ocular-centric world, serve to frame a discourse that is in equal parts rich and challenging. Ultimately, this enables a more holistic approach that emphasises a broader definition of what constitutes tactile image making, alongside a deep understanding of the conventions associated with best practice, that encompass both professional and amateur modes of production.

A Special Thanks is due to 'The Huddersfield Transcription Service' for Their  
Time & Permission to Publish Their Tactile Works as a Part of This Thesis.

*Image descriptions within this thesis may appear longer than would be conventionally expected.  
These descriptions are intended to make the content of these pictures accessible for a blind  
or partially sighted audience and are included in the body of the text for ease of use.*

All 3D printable works contained within this thesis are available to download for free,  
Through the online sharing platform 'Thingiverse' under the username 'SeanrmCrumlish'

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## **Introduction:**

### **0.1: The Interconnecting Context of Study:**

When considering questions that relate directly to the experiences of blind people in a still largely ocular centric world, we are met with a territory that is oftentimes complex and multifaceted. It is through an exploration of the relationship between some of these aspects, or what this thesis refers to as the functional, cultural, poetic and aesthetic, where this complexity is most apparent. An examination of the different contexts provided by these distinct but interconnected elements, presents us with a range of overlapping and challenging areas of concern, with which we are able to build a more complete understanding of the need for the creation of tactile images.

A severe visual impairment or an absence of sight, presents unique barriers to active participation in an environment that privileges that sight over other sensory input, where in sometimes seemingly small differences can have far reaching effects. In the first instance, a pertinent 'functional' example comes from an inability to view faces which can result in a reduced ability to mimic facial expression, something which serves as a cornerstone to seamless 'face to face' or in person communication. In turn a lack of access to traditionally visual cultural information and ocular-centric histories, can result in gaps within a blind person's available cultural lexicon, someone may know of great works like the Mona Lisa or Eiffel Tower but be unable to participate in meaningful dialogue about these objects because they do not have the additional context that comes from a traditional visual understanding. Lastly, in aesthetic or poetic terms, the appreciation of the makerly and artisanal aspects of aesthetic production, are only available to those actively involved in the process of creation, that is to say, if a person's disability presents barriers to entry into the arts, those barriers must first be overcome if a blind person is to benefit from and further understand the value that comes from the making process.

In order to understand some of these challenges and the questions that surround them, this thesis first addresses and then attempts to synthesise three contexts and approaches which are derived from art, design and critical thinking. Each of these contexts will be given its own specific chapter outlining the functional, cultural and poetic facets of tactile image creation and application, each tackling their own unique but often interconnected challenges.

This thesis begins with a discussion of the 'functional' which concerns the mechanics in which tactile images are understood through touch, how pragmatically, information is conveyed in the absence of sight in addition to questions of the role of simplification in translation. This concerns the information we choose to translate, and perhaps more importantly, the information that we choose to not translate, or to leave behind. Tactile images pertaining to this question include diagrams, maps and graphs, which work with specific, utilitarian information they are designed to convey. This often includes a similarly specific way that information is intended to be utilised, whether that be directions in the case of a map or questions that relate to the information present within graphs and diagrams.

Next, what I have termed the 'cultural' concerns access to traditionally visual information that is broadly understood to be socially and culturally significant, in that those with sight would have little trouble identifying such information, as it would be straightforwardly considered an integral part of a sighted, culturally oriented lexicon. These include a range of both artistic and mundane concerns, to wit we might include in this category the breadth of all two-dimensional renderings of the world as well as that which in the real-world is not tacitly accessible, a blind person may know of works like the Mona Lisa and

understand that the moon is a feature of the night sky, without having a material understanding of how these things appear.

Building upon the functional, this category is concerned with the translation of visual information that might be considered a seminal aspect of human experience. In contrast to the functional, the cultural tactile image does not require a work to have specific practical application in order for something to warrant translation. In other words the 'cultural' does not ask whether information needs to be translated, rather, it is concerned with the social dimension of knowledge, asking instead whether a tactile image should be created in anticipation of a need for access, or in the case of more obscure or unexpected works, in reaction to a request for access. Cultural tactile images include depictions of family or drawings of astronomical constellations, works which translate a different kind of significant or even sentimental information, often without the expectation that this information needs to have a practical or straightforward application.

Finally, the 'poetic' is concerned with accessing aesthetic information and by extension questions of aesthetic equivalency. Building upon the first two chapters, the poetic both posits the limits of tactile images as vehicles for information and in some ways attempts to then go beyond those initial constraints. Rather than asking 'if' or 'when' information should be translated, this chapter asks if it is possible for certain information to be conveyed through tactile-kinaesthetic means, whether the experiential essence of visual art work or other uniquely visual aesthetic experiences like watching the setting sun, even have viable tactile equivalents. Is it possible to create accessible works that transcend mere figurative depiction or ways of offering access to the 'visual cultural lexicon' and that instead, facilitate equivalent opportunities for artistic engagement that the primary instance of a work offers to the sighted. That is to say, does a tactile copy have the potential to enable aesthetic experience within a blind person, in much the same way that a visual piece can evoke powerful emotions within a sighted audience, and by extension, can such translations be considered aesthetic works in their own right. Aesthetic tactile images might include translations of paintings or drawings, where the experience of engaging with the work could be considered the intended application.

Having first indicated the primary concerns of this thesis, it may now be pertinent to address some of the unique problems each category is intended to address. As such we might return to the idea that small things can have wide reaching effects and in turn, offer a number of concrete examples for consideration. By initially highlighting these challenges and by extension outlining the potential ramifications that come from these barriers to active participation, we are able to ground our arguments in a practical, real-world context.

In this way, the discourse we present regarding an ocular-centric world, foregrounds a type of "person-centred" approach<sup>1</sup> wherein "*The focus is on the person and what they can do, not their condition or disability* (NSW, 2022) " where solutions are "*tailored to their needs and unique circumstances.*" That is to say whilst blindness is an obvious concern of this thesis, solutions have been formulated with a tacit acknowledgement that not every solution will be helpful to all those with sight issues, and that we aim to design for blind and partially sighted persons, not 'the blind'. As such a primary aim of this thesis is the creation of tools that allow others to produce bespoke or tailored works, with a particular focus on an amateur or hobbyist audience. In addition, my own creative output favours a collections-based approach of smaller works over singular 'one-size-fits-all' pieces, considering a range of distinct factors in an attempt to create flexible solutions that offer multiple avenues towards comprehension.

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<sup>1</sup> (The Health and Social Care Act, 2008)

In the context of this introduction we will introduce each of its contexts, relating them to some issue of tactile concern. Turn first to a distinctly functional concern surrounding facial mimicry, as those who are blind from birth or who are severely visually impaired from infancy, often lack the ability to adequately observe facial expression in their early childhood. Due to this lack of exposure during key developmental milestones, “early life” blind adults are often less able to mimic facial expressions in response to visual cues.

Duffy & Chartrand (2015) state that mimicry in children, *“has important affective, behavioral, and cognitive consequences”* and facilitates *“affiliation, empathy, and prosocial behavior.”* Whilst other forms of behavioural mimicry might still occur within blind infants, such as verbal and forms of non-visual emotional mirroring, the replication of facial expression is hampered. Duffy and Chartrand go on to highlight the role of facial mimicry in that it facilitates *“emotion recognition”* and argue that such mimicry is *“particularly critical for subtle distinctions in emotions”*.

The absence of this behavioural-visual lexicon changes aspects of a blind person's expression set, meaning that their expressions may not always convey the intended meaning. For instance, a lack of eye contact might be seen as a sign of disinterest, but if an individual relies heavily on hearing in lieu of sight, making *“eye contact and/or turn[ing] their face toward the speaker”* (Willings, C. 2019) is not necessarily an intuitive act. Similarly, it is a knowledge of facial expressions that helps *“people distinguish between true and false smiles”* and without that visual knowledge base, it may be difficult to replicate a smile that looks authentic when the expression is indeed, not genuine. Ultimately, this ability to mask expression is a question of blind people's ability to fully participate in a culture, to be afforded the same tools with which to engage in a broader, often ocular-centric ecosystem. In turn, we can note how functional output has the very real ability to influence cultural and even aesthetic concerns, where an established base which enables mechanical comprehension, facilitates something more.

Such examples represent tangible barriers to real-world interactions, and as a consequence a lack of nuance in regards to one's own facial expression might routinely present obstacles in the context of interpersonal situations. A core concern of this thesis is to translate that information into an accessible format, conveying uniquely visual information into something pragmatically useful for those blind individuals who seek to consciously develop skill sets regarding their own facial expression.

In regards to the exact ways expressions differ, we see *“a decrease in facial activity in smiling and laughing beyond 2 to 3 years of age”* which *“leads to a tendency for the emotional expressions to become stylized”* (Thompson, 1941). This stylisation manifests as a difficulty matching the *“intensity and control”* of their sighted counterparts, and strongly suggests that these differing aspects would traditionally be visually learnt if sight was available.

*“[Blind] children are viewed as good sources of information that may shed light on the extent to which such expressions are innate or acquired through imitation.”* (Charlesworth & Kreutzer, 1973) and indeed as far back as Darwin's (1872) *“The Expression of the Emotions in Man and Animals”* enquiries have been made into this aspect of nature vs nurture. Stating that *“they are innate. That these and some other gestures are inherited, we may infer by them being performed ... by those born blind”* concluding that whilst some expression is taught, those expressed by those born blind offer unique evidence of *“inheritance”*.

Having established these core concerns, it is worth noting the breadth of the territory, and highlighting aspects that will become central to the position developed in this thesis. Gentaz, Theurel and Valente (2017) reviewed 21 studies on blind facial expression, published between 1932 and 2015. Many of these studies concluded that the spontaneous facial expression of blind individuals, to genuine emotional stimuli, was an innate rather than taught response.<sup>2</sup>

If it is the case that certain aspects of facial expression have no learnt component, then we would expect to see little deviation in those expression sets when we compare blind people with their sighted counterparts. As such, any notable difference routinely recorded in blind people, could be seen as evidence that certain facets of facial expression are a by-product of environmental factors and not wholly innate. In this vein, while there is evidence to suggest that genuine emotion in the case of blind people is expressed in much the same way as their seeing peers, it is worth reiterating that some observable expression by blind people can appear stylised with *“differences from the expressive norms”* present within the *“intensity and control”* of *“on demand”* expression (Gentaz, Theurel & Valente, 2017). Therefore, there is a strong probability that these components of facial expression are to some degree a product of nurture and not nature. In this vein, we may ask to what degree it is possible to teach more nuanced expression through *“auditory and tactile-kinesthetic channels”* (Charlesworth & Kreutzer, 1973).

To draw a parallel with what is perhaps a more familiar example, intelligibility and an overall monotone voice are commonly identified issues within D/deaf speakers. Much as those who are D/deaf from early life show notable differences in their speech patterns, so too can we see a difference in facial expression from blind people. It is not so much that a voice or expression differs, but that they differ enough to be clearly denoted as different. Here I wish to make it clear that this thesis is not concerned with correction or “normalisation”, rather, there is a focus on translation and access to information for those who want that access, and for whom providing that access may provide unique challenges.

This provides a context for the more pragmatic question that is addressed by the thesis, namely the construction of mechanisms through which we might teach more nuanced facial expression to blind people, offering clear access to information that a lack of sight may have prohibited.

Gentaz, Theurel and Valente theorise that access to *“emotional codes in the form of models or drawings they can touch”* might allow blind people to better *“learn how to manage the intensity of the expression of their emotions”*. The term “emotional codes” is deliberately ill-defined in order that it might encompass a wide variety of design solutions and whilst the authors offer examples of the possible media emotional code might take in the reference to *“models or drawings they can touch”*, this is by no means meant to be an exhaustive list, even going onto offer more abstract examples in the following sentence by stating that *“being able to touch their own face is a tremendous advantage for the learning process”* (Gentaz, Theurel & Valente, 2017).

In response to this broad definition, one of the practical aims of this thesis is to create a range of tactile responses that populate the spectrum of art and design. Some will allow users to access these “emotional codes” whilst others will aid in assessing the validity of tactile image as an approach to the dissemination of information, exploring the limitations of tactile-kinaesthetic comprehension.

The pragmatic context of the study is distinctive in that it involves a kind of designerly, functional understanding concerning the conveyance of information. However, it is important to recognise that this

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<sup>2</sup> (Galati et al., 2003; Thompson, 1941; Matsumoto & Willingham, 2009).



functional communication is targeted, or intended to facilitate a mode of *emotional* expression for blind people that is, to a degree based upon a translation and understanding of a set of sighted conventions. Accordingly, the functional-emotional context of the study can be seen to have one foot in design and another in the emotional expressivity that is more often associated with the arts and collective cultural experience.

Yet whilst the information contained within emotional codes might border cultural concerns, the creative output used to address those concerns are firmly rooted within a functional context. Indeed, the depiction of anatomy and muscle structure found within my own solutions, are near definitive instances of the functional image in application, in that they are diagrams of the human form in an almost literal 'textbook' style. In much the same way, when highlighting the kinds of challenges the cultural tactile image attempts to address, we might turn to examples that similarly epitomise the category, presenting what might be thought of as an archetypal cultural concern which necessitates a similarly tailored response.

When addressing the cultural dimension of tactile image making, we might first turn to a definition of the aims of 'disability arts' offered by Barnes & Mercer (2001), or at this initial stage of discussions highlight the first facet of that definition, namely that there is a need "*for disabled people to have access to the mainstream of artistic consumption and production.*" It is this concept of access to the mainstream which informs much of the cultural dimension of this thesis, that regardless of the practical application of the information, there is a shared, cultural visual lexicon which might be thought of as 'common knowledge'. In turn, it is not unreasonable to suggest that a blind audience may desire access to specific aspects of that collective understanding and by extension, access to the kinds of connected, seminal or core human experiences that those fragments of visual context can provide.

In this regard a poignant example comes through consideration of the night sky, specifically astronomical and astrological ideas regarding the constellations, a uniquely visual construct that is intimately entwined with more numinous ideas of stargazing and looking towards the heavens. Indeed, in multiple, distinct ways constellations allow you to understand your place in the context of a much larger universe, they represent fragments with which we might orient ourselves and ground an understanding of the natural world. Yet, in a functional context the basic information we need to convey is that there are collections of stars which various cultures have ascribed pictorial meaning to, often connecting the stars with imagined lines and linking those depictions to stories of myth and legend. This descriptor which whilst not inaccurate, might be thought of as insufficient when compared to the actual experience of looking at the stars, and whilst complete parity of experience may not always be possible, there are still distinct facets of sighted experience that we are able to facilitate access to by finding solutions that we might consider broadly analogous.

In her project 'Figures in the Sky' (2018) Nadieh Bremer refers to these connections as 'sky cultures', where oral histories and storytelling have shaped our understanding of the world above in ways that are firmly rooted in the zeitgeist of a specific time and place. In this she goes on to state that "*It is innately human to see and use the figures in the night sky. To dream, to tell stories, to navigate, and more.*" (Bremer, 2018) A western audience might be familiar with the star Betelgeuse for its place within Orion, and in turn the connection it offers to the mythos and heroes of ancient Greece, yet around the world Betelgeuse is an integral part of no fewer than seventeen other ascribed formations all of which are no less valid or culturally significant. Indeed, it is posited that the Lascaux cave paintings depict the Pleiades Cluster or the 'seven sisters', an asterism which in part contains the stars along Orion's belt. This in turn would date the practice of noting formations in the night sky, to at least 17,000 years ago (Plotner, 2016). To this end, offering an understanding of the constellations is, in reality, an attempt to offer access to the

broader experiences associated with that knowledge, a connection to some of humanity's most ancient practices.

Building upon this, many tactile images provide a degree of access to aspects of the mainstream, offering fragments of context that are a part of a wider, visual cultural lexicon. These works in conjunction with other accessible features like written description, aid not only in a theoretical understanding of a traditionally sighted world, but often, allow for a greater participation within ocular centric aspects of that world. In this I am reminded of the words of Helen Keller, specifically those found within the chapter 'Seeing Hand' of her collected essays, where (Keller, 1904, p.13) states that her *"fingers cannot, of course, get the impression of a large whole at a glance; but I feel the parts, and my mind puts them together. I move around my house, touching object after object in order, before I can form an idea of the entire house."* In this way, the importance of the cultural tactile image is more clearly put into focus only when it is thought of in terms of one object of many, for the absence of knowledge in regards to constellations may not be thought of as significantly detrimental, until we consider the litany of other fragments that might be similarly inaccessible.

In this way, these potential gaps in knowledge link back to the recurring idea that small things can have wide reaching consequences. In turn, it may be pertinent to proffer other 'real-world' examples of mainstream ocular centric information, that are potentially inaccessible to a non-sighted audience. That is to say, by highlighting some common but perhaps surprising gaps in understanding, it may be easier to grasp the impact of a systemic absence of visual context.

To this end, I wish to draw from Appendix C<sup>3</sup> an interview I conducted with members of 'The Huddersfield Transcription Service'. During the interview staff mentioned a tactile image workshop, in which one of the presented images was *"an old style English bobby with the bell hat and a police crest."* This idea was straightforwardly recognisable to most of the sighted individuals who were engaging with the work, yet the instructor went on to ask *"but what if you had never seen a police hat, is it still obvious then?"* This in turn leads to the overarching point, that without an ingrained visual understanding of the subject *"it wouldn't be [obvious] for many students who would never have seen it before."* It is not merely that there are gaps in visual knowledge that are a direct result of an absence of sight, but that this information by virtue of its ubiquity and integration within the collective consciousness, may not even register as something that needs to be taught. As such, it may be unreasonable to suggest that blind people would need to request this information in order to have it made accessible, as to request access one must first be aware of that which they cannot already access.

In a connected vein, we might liken some experiences of blind people to the difference between having a cursory understanding of something and having a practical knowledge of the same topic. On one hand a blind person might understand that our ancestors saw *"figures in the night sky"* but without accessible works they may not be able to access those forms, to connect those figures to myth and in turn, be able to engage in constructive dialogue, adding that understanding to their own available lexicon. Similarly, there are a wealth of core or seminal human experiences that are distinctly ocular-centric, and often, when providing access through culturally focused accessible images, we are attempting to enable an understanding that goes beyond description or diagram. A photograph of a loved one who has since passed or a keepsake image of an ultrasound, are commonplace examples of visual artefacts that represent more than the information contained within the image. Rather, they are important, emotive experiences which many blind individuals might reasonably want access to.

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<sup>3</sup> (Interview with Huddersfield Transcription Service, 2023)

At this juncture it is perhaps important to note that established artistic terms such as work and artefact, might appear to have been used somewhat interchangeably within the confines of the thesis, in reference to a wide variety of tactile images. This is a conscious decision and one that is in part a reflection of the multifaceted nature of the work in question, as unlike their non-tactile counterparts we are less able to differentiate between the physical object and the pictured image. That is to say, that a visual representation of a tactile object does not encode the necessary tactile-kinaesthetic information required to mechanically understand the work on its own terms. Whilst a print of the Mona Lisa may be thought of as an aesthetically good version of the 'type' Mona Lisa, one which can be separated from the real artefact, the nature of touch based compression requires some sort of presence within physical space.

It may now be more apparent that the functional information contained within a tactile image, especially one that deals with primarily cultural concerns, is only a small part of what we intend to facilitate access to. Figurative depiction of form and shape convey a wealth of straightforward information, but the circles and lines that epitomise graphic interpretations of constellations, must be paired with a broader context to enable active participation. Each fragment of translated visual knowledge helps build a more holistic image of the world, and, briefly returning to words of Helen Keller, it is only by "*feeling the parts*" we might "*form an idea of the entire house*".

In turn the cultural tactile image goes on to inform poetic concerns about the role of aesthetics, more specifically the role of haptic-aesthetics within the context of blind experience. Considerations of the nature of aesthetic encounter in regards to non-sighted audiences, draw on wider questions of disabled access to beauty and the politics that surround those questions. In turn, once we accept the need for parity of access to ocular-centric information, then it does not seem unreasonable to suggest that the 'cultural' includes access to the visual arts. Where the poetic tactile image deviates from its cultural counterpart, and thus where the need for distinction in terms arises, is in what information the accessible image could be thought to be a vehicle for. Whilst the cultural facilitates access to the mainstream and in turn offers access to experiences that are connected to those works, the premise of an aesthetic tactile image, is that the aesthetic experience is the very information it is attempting to translate.

In turn, when attempting to highlight a typical example of an aesthetic concern as distinct from the cultural or functional, it is perhaps unhelpful to proffer the idea of 'any artistic work' without highlighting some of the nuances that should be considered in our solutions. Indeed, the distinction is not so much the subject, but rather the fact that the work attempts to invoke an aesthetic encounter, in this way some tactile translations of artworks or more nebulously 'beautiful things' could easily be positioned as functional or cultural works if their primary intent is to convey information distinct from aesthetic experience.

For instance, with reference to the aforementioned constellations, a tactile image depicting them may offer access to a great deal of significant cultural information and by extension facilitate broader cultural experiences. However, it is unlikely that the same work would attempt to parity the full emotive experience of looking towards the night sky, in this regard the fact that the image does not attempt to encode an aesthetic encounter within the confines of the work, is the defining aspect of what separates the cultural from the poetic image. In other words, a cultural tactile image may grant access to beautiful things, whilst an aesthetic tactile image *is* a beautiful thing.

To this end, when referencing a poetic concern that might be considered archetypal, we must in some form address the solution, for the intent of the translated work plays a significant role in the definition of the concern. In this way it is perhaps fitting to proffer an aesthetic work that may be considered obscure, for such a piece does not have the strength of connection to a collective visual lexicon which identifies it

as culturally significant. For instance, the Mona Lisa is certainly an aesthetic work, but the rationale for the creation of a translated form cannot be wholly separated from its cultural impact and connection to the zeitgeist.

With this in mind, it is perhaps more appropriate to draw on smaller, community projects, something which has a degree of local significance but which can still be divorced from its broader cultural context. In this way I wish to highlight a collection of ceramic murals found in the foyer of Huddersfield Library and Art Gallery, for the work is highly resonant with tactile translation, in that both pieces are already constructed with harsh delineation and segmentation of form. Yet, more than this, an important part of the rationale for proffering these ceramics as archetypal of aesthetic concerns, is the problematic manner in which they are displayed. Both works are hung at the top of down facing stairwells, where a front facing viewing of each piece would require you to stand in the flow of pedestrian traffic, meaning that if we approach either work as we would expect to view a gallery painting, we would be placing ourselves in a difficult possibly even dangerous position.



*Fig. 1: Pictured above are two ceramic murals which hang in Huddersfield Library and Art Gallery, each of which flank the stairway into the gallery on the upper floors. Each work is composed of many smaller tiles, which means that every object is segmented in such a way that individual colours and textures are self-contained within heavily striated lines.*

*The mural on the left pictures a male figure in a green coat, sitting down on a wooden pier looking away from the viewer towards a body of water. Behind these blue and green wavy tiles, is a collection of yellow stone buildings that is atypical of architecture around Huddersfield. The structure on the furthest right of the scene has scaffolding in front of it, criss crossing over many rectangular windows. The central building features arch-shaped windows and a pointed roof, with smaller square details framing these primary features. The final structure on the furthest left is depicted as a blank space, giving the impression that we are looking at a side view of the building, which contains no windows or notable features. Above everything a slatted roof with skylights and a series of thin rectangles which seem to show a glass fronted structure.*

*The mural on the right features a young boy feeding swans, he wears a bobble hat and a yellow coat, facing towards the audience and holding a roll of bread in one hand, scattering crumbs with the other. Two swans wait in the water, facing towards the boy and seemingly waiting for food. Behind the body of water is a single large building, with a central peaked roof section and more scaffolding on the left hand side. The building is covered in rectangular windows and a larger central glass doorway at the top of a small flight of stairs Above this is a single large connected roof, with large tiles denoting a flat area. Above this is a row of blue tiles denoting the sky, which correspond to the tiles on the other mural.*

Both works hang in the foyer, meaning that they are the first images most people see as you enter both the gallery and the library. In addition, each mural measures in at 7.5ft x 4.5ft, meaning they are substantial pieces which occupy large areas of real estate above two sets of stairwells, flanking the main staircase of the building and seemingly depicting areas in and around Huddersfield. Both works are metres from the main office for Huddersfield Transcription Service and perhaps most importantly, no additional information is located in and around the work that would grant insight into its authorship and origin.

With this information in mind, it is perhaps more apparent as to why these works might be considered uniquely inaccessible, not only because they are distinctly visual arts, but because many alternative avenues of exploration that one might attempt to better know a work, are to some degree problematic. To wit, the work cannot be touched by virtue of its inaccessible hanging, similarly it cannot be observed for a long period of time by virtue of its placement within a distinctly liminal, transitory space, where long term engagement with either piece would require an onlooker to stand atop a flight of stairs in a busy walkway. In addition, the context that should be readily available for a work on permanent display within a gallery environment, is absent to such a degree that even rudimentary information such as the artist name or date of installation is not present.

Indeed, the work presents an archetypal aesthetic concern not only because any solution addressing its failings should necessarily attempt to evoke an aesthetic encounter, but because by virtue of their current situation at the top of down facing stairwells, the original pieces are currently ill suited to providing such an encounter to any audience, not simply those with specific accessibility requirements. In turn, the creation of a tactile image or other disability solution, has the potential to make the original itself more accessible to all audiences, to offer context and novelty that might reposition the work as something worth viewing or revisiting.

Accordingly, consideration of the poetic or aesthetic tactile image enables a broader examination of the purely functional tactile image, in order to highlight what might be perceived as its limitations in other contexts. As we explore the tension between the pragmatic and the poetic, we must acknowledge that both the medium and audience present challenges and restrictions. Mechanically, in the production of tactile images in a context of design functionality, we are pushed towards simplicity and established rules sets, in order that the figurative depiction can be clearly understood through a haptic register.

Traditionally, consideration of tactile image is heavily directed towards the schematic, reductive and diagrammatic, as such it stands to reason that much of the advice on their construction would be similarly tailored.

However, when we consider poetic or non-utilitarian tactile works that cater to a blind audience, we might frame such encounters in more haptic aesthetic terms, something which could be considered a fundamental modal shift away from ocular-centric aesthetics. In turn, it should acknowledge that to a sighted audience, *“any attempt to think about the visual is fraught”* and that it is fundamentally *“difficult to escape the ocularcentric mode of thinking”* (Willis, 2000, p.2). As such tactile images might not necessarily ‘speak’ to a sighted audience, for an over reliance or privileging of visual input often prevents a more holistic appreciation of the haptic. Indeed, experiencing a tactile image as it was intended to be understood, first requires a sighted audience to discount or ignore how a piece looks and consider the work purely in its own terms, not as a visual picture but as a tactile model.

Yet these kinds of aesthetic experiences are important in the broader exploration of aesthetic works, precisely because they do not concern themselves with traditional visual aesthetics. Studies of haptic perception questions the primacy of a culturally prevalent ocular perspective, framing an over reliance on the visual or ‘ocular-centric’ as to some degree, limiting<sup>4</sup>. In turn, haptics and the repositioning of the proximate senses more broadly, allows for further consideration of how we experience the world, highlighting the intimately entwined nature of perception by foregrounding the interplay between senses. This in turn, might enrich our understanding of the nature of experience, presenting fragments that are better understood as connected parts of a larger whole.

## **0.2: Haptic Perception & its Connection to the Study:**

In this regard the term haptic perception, *“may describe a number of different sensory processes.”* (Lee, 2014, p.1) and indeed *“the definition of what haptic perception in fact is tends to vary from one theory of perception to the next”* partly because there are many instances where a clear delineation between senses is not forthcoming. In turn, tactile images reframe works we have a significant visual familiarity with, allowing for novel and newfound appreciation of those works that has the potential to strengthen an already existing understanding. By presenting additional fragments we are granted a greater understanding of the whole, and by foregrounding haptic experience we may gain new insight into other modes of perception and aesthetic encounter.

When mentioning the variety of definitions that are encompassed by the haptic, it may be pertinent to address what is meant by the concept of haptic perception within the confines of this thesis. Whilst it is tempting to think of touch and haptic perception and one in the same, there is a subtle but necessary distinction, for the term usually denotes the sensations surrounding touch, focusing on an examination of those qualities that can enrich our understanding of our other senses. In this regard *“The term haptic emerges in Deleuze and Guattari’s description of “smooth space,” a space that must be moved through by constant reference to the immediate environment”* (Marks. L, 2002, p. xii) and any discussion of haptics, must include an exploration of movement. In this way, we might think of the haptic as the difference between placing a hand on an object or running your hand across that same surface, not merely the sensation of touch, but the experience of feeling.

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<sup>4</sup> (Åhlberg. L, 1996; Willis, 2000, p.1; Marks. L, 2000, p.113).

To blind people tactile images represent a way of providing clarity and meaning to concepts that are difficult to explain in non-visual terms. This is something which is all the more relevant in regards to the visual arts, where the information the work intends to convey might not be entirely straightforward, as such it is difficult to point to simple accessible equivalents as one might with information contained within a chart or diagram. Alternatives like written descriptions often fall short in that they rarely facilitate an experience of the work when describing its visual components, a list of features of a landscape might not capture the experience of viewing the work, what Walter Benjamin a theorist who's thoughts on translation will be considered in greater detail in chapter two of this thesis, refers to as the *"the incomprehensible, the secret, the "poetic"?. That which the translator can render only insofar as he — also writes poetry?"*. (Benjamin, 1988, p.152.)

In contrast, a haptic exploration offers room to slowly engage in a sophisticated dialogue, enabling a haptic-aesthetic experience that in some ways might be thought to parallel its visual counterpart. This thought is resonant with the way in which many blind people discuss their own tactile perception, as in some ways analogous to the function of other senses. In this way Helen Keller offers us the concept of the 'seeing hand' giving her own account of haptics from which we might glean insight into a non-sighted experience, and in turn understand its true value, in part because of the value we ascribe to our own vision.

*"My hand is to me what your hearing and sight together are to you. In large measure we travel the same highways, read the same books, speak the same language, yet our experiences are different. All my comings and goings turn on the hand as on a pivot. It is the hand that binds me to the world of men and women. The hand is my feeler with which I reach through isolation and darkness and seize every pleasure, every activity that my fingers encounter."* (Keller, 1904, p.6)

Between the extremes of the poetic and the functional, lies a broader question of haptic translation that concerns the interplay between the various facets of tactile image making. By embracing the cross-modal context of sighted and haptic perception, we might provide a form of access for blind people to the canonical works that encompass the domain of visual culture. In turn, tactile works have the potential to enrich a sighted audience and by facilitating access to the mainstream of visual culture, we might similarly aspire to offer access to aspects of a blindness perspective and further, to a more complex understanding of haptic experience. In this way, we might proffer a harmonious pairing to Keller's words in the writings of John Hull, where different notions of the haptic and by extension, the understanding each perspective offers, are presented within the context of his own acquired blindness.

*"In my own experience - perhaps I am not alone in this - one passes through three stages in the learning of tactile beauty. First, there is a stage when, with our hands, we learn again to do. There is the second stage when, with our hands we learn to know. Finally, there is that stage when with our hands, we learn to appreciate beauty"* (Hull, 2013, p.1)

Within this, we might note that Hull's notion of learning to do again, presents a functional understanding of the haptic, one that surrounds the mechanical aspects of touch, where *"so accustomed are sighted people to think of the eye and hand as being interlocked that the separation of the eye from the hand, which is the condition of blindness, causes considerable puzzlement"*. In this way, *"learning to brush your teeth or put on your tie"* can be thought to be re-familiarising yourself with the world through touch, to understand the world in a functional, pragmatic sense.

The second of Hull's stages of tactile understanding, is a more complex state of affairs, not simply learning again to do but rather, to engage with. To "*Learn to play games with the hand*" to play piano not through imagined images of black and white keys, but through a knowledge of one's own movements and their relation to sound, to "*have a tactile brain which will match my tactile form of knowing*" (2013, p.2). Finally, Hull's third stage emerges through a foundational understanding of both prior stages, where a concrete "*beauty of ordinary things*" supplants previously held ocular conceptions, where the "*loveliness of cups and saucers, of milk bottles and tea spoons*" is known in part because of the concreteness of touch, a sophisticated haptic register wherein the ordinary returns anew.

To this end, one way in which we might consider the different dimensions of the field of tactile image and synthesise an understanding of its various facets in relation, is to examine the variable dimensions of a specific tactile work. As such, I will begin each chapter with an exploration of a single piece, albeit contextualised within different frameworks or epistemes, those being the functional, the cultural and the poetic. In this regard, to demonstrate the complex and often multifaceted nature of such works, I have chosen a model which may be considered challenging, not least because even its definition as a tactile image is a position which requires explanation, that being, a keychain of the Eiffel Tower.



*Fig. 2: The image above shows a small, silver keyring denoting the Eiffel Tower. Separated into four sections and standing on four legs, the tower's third section is much longer than the others, creating a tall structure that gets thinner towards the top before being capped by a small floor at the point. The edges of the tower curve inwards and the legs are connected by arches, and a criss-cross pattern across the cast metal surface is intended to evoke the scaffolding-like structure of the original. The keychain ring itself is also pictured, and is connected to the top point of the statuette.*

Such translations may appear crude when consumed by a sighted audience, if that audience only considers it through an ocular-centric register, where choosing such a seminal work may appear quaint or obvious when considered through the lens of contemporary practice or the aesthetic innovation of the avant-garde. In turn, presenting a keychain as something which has the potential to evoke a genuine



aesthetic encounter is no small claim, and yet over the course of this thesis it will become apparent that the keychain of the Eiffel Tower is a sophisticated, nuanced model of the original work, that such tokens represent a wealth of readymade tactile images, that not only serve as substitutes for those unable to access the original, but which have real value to any audience that is capable of engaging with the model in haptic aesthetic terms.

It could be said that the Eiffel Tower is an archetypal concern of all three categories, that the need for functional or straightforward figurative depiction, combined with a significant cultural connection and its status as a widely established aesthetic work, necessitate a consideration of all three approaches. Indeed, as a cross-modal solution, a keychain of the Eiffel Tower can be thought to synthesise the approaches of all three categories and through this synthesis of these individual facets, we are better able to understand both the parent work and the nature of each approach in relation to the others.

### **0.3: Defining the Tactile Image:**

If pushed to distil the essence of what defines a “tactile image”, then the first point must be that it invites touch, that it is presented with the express purpose of being felt and being understood through that interaction. That is to say, that the audience must be allowed to touch the image and that positioning must play a role in our definition. In this way a tactile image cannot be positioned behind glass without losing that title, and a seemingly innocuous object may be thought of as a tactile image if presented to aid in comprehension through tactile-kinaesthetic means.

It is worth noting that theorists use graphic, illustration and other terminology interchangeably when referring to tactile images, which may result in discrepancies in terminology through quotation. Paths to Literacy uses the term “*tactile graphic*” to refer to the broader field of tactile image making, whilst Philippe Claudet (2014) in writing for the Journal of blindness innovation and research, chooses the term tactile illustrated books in lieu of graphic. Whilst none of the terminology used here is wrong, terms like graphic and illustration refer to distinct schools of image in art and design and are thus inappropriate in discussions where those fields may be used in relation to tactile pieces. As such, I choose the term tactile image as it can be thought to encompass a large range of works and applications without the potential confusion of using such terms in relation to art.

In addition, within the context of my thesis, I use this definition to refer to any accessible image for which touch is only a facet of user interaction. This includes works where additional sensory factors are at play, as is the case for instruction or companion led images, that being said, more specific terminology may be used when referencing specific applications. For instance, a discussion of “raised line” illustration refers to an established style of tactile image, one that is particularly mainstream in textbook and diagrammatic work, with its own unique and well established rulesets.

It would be a fair assertion to state that tactile images are commonly used to allow for access to the visual, when sight or indeed touch is not available. In the case of the latter, it would be inappropriate to offer something dangerous to a young learner in order that they might understand its shape, similarly many objects operate on a scale inappropriate for touch, neither the galaxy nor a single celled amoeba can be understood through tactile-kinaesthetic channels without abstraction.

In a connected vein, it is worth differentiating between when sight is not available, and when language is not available. For instance, an object of reference or “OOR is a (typically) tangible, multi-dimensional, multi-sensory 'symbol' that is used to represent a POLE [Person, Object, Location or Event].” (TalkSense, 2015). As such an OOR could certainly be positioned as a tactile image, but instead of focusing on parity of the visual they are almost exclusively used when written, spoken or sign language is not yet (or will potentially never be) at an advanced enough level to communicate fluently.

In the case of very young blind learners, tactile image is usually a precursor to other modes of communication including the development of more complex structures of expression, offering the “*first step to familiarity with Braille and holistic teaching of Braille reading*” (Paplinska, 2009). However, perhaps the largest audience for objects of reference are those with profound multiple learning disabilities, a fact which prevents us from defining tactile image as purely an attempt to parity visual experience, as whilst those with Profound Multiple Learning Disabilities (PMLD) can have visual problems, that is not necessarily the case.

While this does not fundamentally change what a tactile image is, it does highlight an important distinction about how tactile images are defined. Whilst we can state that a tactile image is understood through touch, we cannot easily define what should be understood outside of specific examples, whose effectiveness can be assessed on a piece's ability to convey the information it was intended to convey.

As such, the definition of tactile image as “offering access to the visual when none is available”, does not give us a truly complete picture, as whilst the translation of the visual is a common application of tactile image, it is not always the primary goal of tactile image creation. Indeed, there are schools of thought that explicitly reject this rationale for translation, for reasons in harmony with those that might omit tactile image altogether. “*The purpose of a tactile illustration is to communicate an idea or information—not to reproduce a visual picture in a tactile form.*” (Wright, 2008). In other words, you are not attempting to reproduce an image, you are attempting to translate the information that image contains. This notion of propositional translation is explored in chapter two of this thesis, when we look at Wittgenstein's logico-propositional notion of ‘picturing’, or what became known as the picture theory of language.

Whilst this statement is straightforward in academic translation, it does not always fit harmoniously alongside ideas of tactile translations in other areas. Within the visual arts, some might say a more reverent approach is required, for the image itself might be thought to be the focus of translation, and in this context some consideration of reproducing the visual in pictorial form would become unavoidable. In this way, we might highlight a need for compromise between utilitarian philosophies of tactile image making, and the need for access to the mainstream, part of which requires sensitive reproduction of “*a visual picture*”.

In light of this, there is a need to clarify intent of use in our definitions, for no one school of tactile image creation is suited to all things. Tactile emotional codes will rightly be judged by very different standards than experiential or artistic works, in that their goals are largely removed from each other, even if the techniques used in their creation are intimately entwined. Arguably, in outlining a view of tactile image making that focuses purely on comprehension and the diagrammatic, we misrepresent the territory and those areas that find themselves in need of a more sensitive approach. As an aspect of this thesis is the creation of tactile image making tools, it does not stand to omit areas in which such applied tools could be well utilised. For the tension between utility and beauty is never so apparent as when discussing work for a blind audience.

*“Beware, if someone says your graphic is “pretty” or “beautiful”, take a second look, your student may not be able to understand it at all.” (Spence & Osterhaus,1997)*

#### **0.4: Methodology:**

The scope and purview of this thesis is broad, with each chapter broaching unique challenges within the context of intentionally distinct frameworks, namely the functional, the cultural and the aesthetic. In this regard this thesis utilises a range of methodologies that are tailored to the needs of each concern, with the tensions and juxtaposition of these unique epistemes emerging as a notable motif throughout.

In regards to the initial functional chapter, we begin with a comparative literature and process review into the nature of modern tactile image making, combining this with an archival project cataloguing previously published tactile works from ‘The Huddersfield Transcription Service’. Additionally, the second half of the chapter begins by focusing on the translation of RNIB swell paper texture swatches into harder substrates, utilising experimental and rapid prototyping to develop a range of raised line objects of reference. This culminates in a 3D printing tactile image making toolset, aimed at an amateur and hobbyist audience, which in turn lays the foundation for our practice-based output in later areas of the thesis. The latter half of the initial chapter, combines small sample qualitative interviews with broader literature on emotional codes and facial expression, leading onto a range of practical 3D printed output that utilising established raised lines conventions to explore the viability of tactile images in regards to facial mimicry amongst blind people.

The second chapter, which broadly concerns the cultural tactile image, begins with a range of design-led practice, accompanied by a comparative cost and material analysis. These 3D printed works focus on common constraints of home printing, attempting to lower or remove a range of barriers to entry for both a disabled and non-disabled audience. This is followed by a comparative philosophical enquiry into the nature of translation in respect to the work of Walter Benjamin, the writings of Ludwig Wittgenstein placing them into relation with the more focused literature surrounding the nature of access to the mainstream of traditionally ocular-centric cultural concepts, including the status of disability translation as what Rittel and Webber have described as a wicked problem. That is to say, in its simplest terms, a problem which in its mode of solution, generates other more complex problems.

Finally, the last chapter begins with a body of practical 3D printed practice-based output, this time with a focus on the nature of the aesthetic encounter and the distinction between cultural and poetic access to beautiful works. Reinforcing these notions is a philosophical context borne from both haptic and realist aesthetics derived from the Deleuzo-Guattarian influenced work of Laura Marks and the realist position of Eddie Zemach, reframing the nature of art away from ocular-centric notions of the primacy of the original. After which we return to Wittgenstein, in order to develop a collections-based understanding of art objects, synthesising notions of family resemblance from Wittgenstein, fragments from Benjamin and types from Zemach. A detailed description of all these methods are explored in more detail in their respective chapters, wherein they are integrated into the body of my argumentation and become an integral aspect of both my written and artistic practice.

## **0.5: Research Questions:**

The primary research question of this thesis can be defined by the nature of its core territories, namely *“Why is it necessary to consider the functional, cultural and aesthetic dimensions of the tactile image, in order to adequately define its parameters?”*

Beyond this each chapter attempts to answer a set of auxiliary questions relating to their respective areas of concern. In regards to the functional we attempt to answer the questions *“can the RNIB swell paper texture swatches be converted into a form that makes them viable in harder substrates, in order that we might create viable 3D printed tactile works?”* and *“can tactile images be effectively used in the creation of emotional codes for blind people, in order that they might better understand and mimic facial expression?”*. In turn, the cultural dimension of the thesis initially poses the question *“How should we provide access to traditionally visual information to a non-sighted or partially sighted audience?”* before moving onto the questions of the value of tactile works, namely *“what is the cultural or sociological value of translating non-essential visual works into a tactile or accessible format?”*

Lastly, discussion of the aesthetic dimension of tactile image making, is oriented by the subsidiary questions, *“can a translated tactile work be considered a beautiful object capable of evoking an aesthetic experience?”* and *“what are the limitations of remediated accessible works in regards to conveying a true sense of the work it depicts?”*. These questions form a basis with which to answer the broader question of the place the field of tactile image making has within a modern accessibility context, and the importance of works which attempt to facilitate access to the mainstream of artistic consumption and production in a disability context.

## **0.6: Original Contributions to Knowledge:**

The scope of this thesis contribution to knowledge reflects its interconnecting contexts of study and the breadth of its research methods. In a practical sense that contribution can be understood through the body of practice-based output contained within, including a previously unpublished collection of tactile works courtesy of The Huddersfield Transcription Service. This has been translated from Braille into non-tactile written formats, organised and collated in such a way that it now represents a substantive archive of real-world tactile solutions, granting insight not only into their application but their production.

Additionally, my practical output includes an in-depth examination of RNIB texture swatches, wherein the textures have been translated into plastic and in some cases adapted for the harder substrate. This culminates in 12 distinct texture swatches which go onto form the basis of later practical output and which constitutes both a robust toolset and framework for the creation of future 3D printed tactile works.

Interviews with members of staff at The Huddersfield Transcription Service and a small sample of qualitative recorded interviews of blind volunteers, represent a collection of usable material for future study, including visual documentation of facial expressions and available transcriptions of the staff interview. This is paired with a collection of 3D printed tactile works which seeks to enable more nuanced facial expression within blind people.

The translation of two ceramic murals by the German artist Marion Brandis, resulted in both a tactile output of 3D printed tactile images and the recovery of the works province, whose creator, age and purpose were unknown to the Library and Gallery which housed them. This culminated in the tactile recreation of a third panel which was lost or destroyed sometime after installation, and the addition of an

artist placard to preserve this recovered information for the future. This is one part of a body of 3D printed tactile works, including depictions of the constellations, The Mona Lisa and The Oldest Image of Venice.

Finally, the philosophical context laid out within the body of my thesis, explores the notions of accessibility in regards to access to the aesthetic dimensions of human experience in a form that I believe is novel, and in this sense the mode of exploration itself constitutes a contribution to knowledge. The division of the field of tactile image making into three distinct but overlapping territories, highlights the tensions and breadth of approaches found within the creation of accessible works. In turn the interplay between the concepts of Walter Benjamin, Ludwig Wittgenstein and Eddy Zemach in regards to the notion of translation and accessibility thinking, represent a slightly tensile grouping of theorists, which result in a refraction of the traditional problem space, which in turn generates a variety of novel conclusions.

## Chapter 1: The Functional Tactile Image:

*“Beware, if someone says your graphic is “pretty” or “beautiful”, take a second look, your student may not be able to understand it at all.” (Spence & Osterhaus, 1997)*

Despite my own objections to the way in which the warning of Spence and Osterhaus is phrased, it is important to realise that this aversion to the *“pretty” or “beautiful”* is not intended to be malicious. Rather, when understood through a purely functional register, and in the context of creating educational or academic resources, a focus on clarity above all else can be thought to be both a logical and even reasonable stance.

In this way, the functional dimensions of tactile image making, might be thought to embody the established ideas contained within this school of thought. The functional is concerned with clarity, simplicity and the creation of work that has both specific information it wishes to convey, and straightforward intended applications for that information. The functional is diagrammatic, and functional images are often only created when other avenues of translating information for a blind audience are lacking or ineffectual. As such *“a map, figure, or graph”* (Presley & Hastings, 2005) would be thought to be archetypal of functional works, and are amongst the most common kinds of created tactile image, for they often present access to the most essential aspects of learning.

As mentioned previously, I wish to begin each chapter with an exploration of the same tactile piece, one that is contextualised by the framework presented in the upcoming section, and which can later be understood in relation to previous chapters. Employing the methodology outlined in the introduction, I wish to begin this, and every other chapter with an exploration of the same tactile piece, namely *“The Keychain of the Eiffel Tower”* whilst contextualising it in relation to distinctly, functional, cultural, or aesthetic criteria. Therefore, in the context of this chapter, we will focus upon the work's functional dimension.

Whilst to a sighted audience a keychain of the Eiffel Tower is perhaps a crude visual token of the original, it nevertheless has the potential to function as a sophisticated tactile model. That is to say, from a functional and pragmatic standpoint, the keychain acts as a vehicle for a broad range of features contained within the Eiffel Tower itself, which enables it to function as a representation for both blind and sighted people, whilst requiring relatively few layers of abstraction in terms of figurative depiction.

We see shape, material, and relative dimensions presented in a straightforwardly tactile-accessible form; with the notable exception being an abstraction in size which is necessary when attempting to discuss large objects through tactile-kinaesthetic means. For a blind person, the concept of the tower is better and more holistically conveyed by the keychain-model and its handleability, than it would be if they were confronted or presented with the massive scale of the tower itself.

For instance, when discussing the shape of a tree, presenting a blind user with the real object, that is to say an actual tree, gives an incomplete mental picture given the consideration of scale. However, a syncretic, multi modelled and more fragmented approach, such as presenting leaves, tactile images and three-dimensional renders, offers a far more complete image and thus a far more complete understanding of the concept.

Returning to the words of Helen Keller in the context of her account of her own experiences within *The Story of My Life*, she states within the chapter *The Seeing Hand* that *“My fingers cannot, of course, get*

*the impression of a large whole at a glance; but I feel the parts, and my mind puts them together. I move around my house, touching object after object in order, before I can form an idea of the entire house.*" (Keller, 1904, p.13) In much the same way that Keller used 'parts' contained within a house to understand the building as a whole, so too can other concepts like a tree or the Eiffel Tower, be better understood through the exploration of its various fragments.

In turn, whilst a blind person could reasonably be expected to infer certain things from a visit to the Eiffel Tower, like the scale of the structure in relation to themselves, the material makeup as denoted by the feel of metal, or the lack of solid walls through the feel of the wind on their skin. What it fails to convey in the absence of visual information, is a straightforward, figurative depiction of the tower in the visitor's mind. Considered as a model, the original is ill equipped to facilitate a functional understanding of the concept Eiffel Tower to those unable to see, as when reliant on imaginative vision alone, there is not enough information present to reasonably expect a blind person to walk away from the experience knowing such essential information as the Eiffel tower has arches and culminates at a point.

Keller later writes that *"a house with which I am not familiar has for me, at first, no general effect or harmony of detail. It is not a complete conception, but a collection of object-impressions which, as they come to me, are disconnected and isolated. But my mind is full of associations, sensations, theories, and with them it constructs the house."* (Keller, 1904, p.13) In this way, presenting a blind person with an actual tree or the actual Eiffel Tower, can be thought of as strongly analogous to Keller's own example of a house, for feeling and in turn understanding the frame of the door, does not give you a similar understanding of the shape of the roof. In turn, a tactile model can go some way to compensate for the parts of the larger object it is not possible to feel, by abstracting size we give an opportunity to engage with many other fragments of information, many parts with which we might construct the house.

A more contemporary example of this kind of multifaceted practice, comes in the form of mainstream early learning literature for blind students, in which this idea of offering parts to understand the whole, is both commonplace and intimately entwined into the philosophy of disability teaching. Paths to Literacy<sup>5</sup> suggest activities that train maths skills, tactile discrimination and to some degree even epistemology through their Positive Eye initiative. These activities have titles such as The Metalness of Metal, The Whiskness of the Whisk and The Woodness of the Wooden Spoon, all of which are deceptively simple workshops that open the door to complex questions and practical understanding through touch. Collections of objects are presented to young learners, and used to establish what defines the "type" whisk and spoon, or the properties of metal, wooden, even offering collections of things that roll and perhaps surprisingly, the property of "silver" and "shiny".

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<sup>5</sup> (Paths to Literacy, 2021; Positive Eye, Spoon-ness of Spoons, 2021)



Fig. 3: The image above shows a collection of Wooden Spoons on a wooden counter background, replicating the Positive Eye exercise “The Woodenness of the Wooden Spoons”.

Yet, upon reflection, it should not be surprising that such properties are taught, for indeed, in teaching a lexicon for use in a visual world, one must inevitably teach visual concepts; even if a student, lacking the relevant qualia<sup>6</sup>, may never be in a position to have the experiential knowledge that some might argue is needed for complete understanding of said properties. It is also worth noting that those with no light vision or those that we might define as “completely blind” make up only a very small percentage of blind people.<sup>7</sup> Even those that can be considered to have “no useful vision” may still be able to understand visual concepts such as shiny if they are able to perceive some degree of light. Accordingly, the positioning of the Eiffel Tower keychain and objects like it, as tactile vehicles for providing information to blind learners, even for such visual properties as shiny or silver, is non problematic, and has to some degree, become standard practice.

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<sup>6</sup> “...the term ‘qualia’ (singular ‘quale’) to refer to the introspectively accessible, phenomenal aspects of our mental lives.” Stanford Encyclopaedia of Philosophy.

<sup>7</sup> (Working Group on Mobility Aids for the Visually Impaired and Blind, 1986)





*Fig. 4: The image above shows a collection of Eiffel Tower keyrings and statuettes on the same wooden background as the previous image, this collection was acquired exclusively through UK charity shops over the course of a few months. The relative frequency and ubiquity of these encounters, combined with the low cost associated with such objects, not only highlights the Eiffel Towers status as an icon, but presents us with another reason an Eiffel Tower keyring is an effective tactile image.*

Yet such artefacts raise the question of the haptic image's poetic as well as factual potentials. It is straightforward to think of a keychain as a vehicle for information, yet perhaps more difficult to think of it as a vehicle for aesthetic information or appreciation. There is a sense in which the model of the Eiffel tower could be said to offer an equivalent access to a blind person as a photograph does to a sighted person, in that it represents many of the facts of the original but is nonetheless incomplete. In the context of a photograph, we sacrifice materiality, reduce scale, mediate colour, and see the object from a very particular vantage point. Thus, we translate a three-dimensional object into a somewhat reduced, two-dimensional form.

Conversely, in the context of a three-dimensional model of the Eiffel tower, we see an alternative set of shortcomings. For instance, the keychain model abstracts and reduces structural detail, and lacks the contextualisation and the site-specificity of the Champ de Mars, which to a certain extent are offered by a photographic representation.

In this sense, each medium provides information that the other lacks, and as a consequence they might be considered one aspect of a multiplicitous whole. Whilst to sighted people it may be difficult to regard the keychain model as anything but a crude token of its source, and as a bad stand-in for a photograph, it

nevertheless draws attention to the crux of the issue, that from the perspective of an audience with an absence of sight, a photograph is in fact, as bad a stand-in for a model.

Looking at a model of the Eiffel tower through a purely ocular centric lens misses the point of repositioning and rethinking the keychain as an object in terms of a haptic-centred experience. Tactile interaction offers a kind of engagement that a visual representation does not, a materiality that isn't present in a digital image or a two-dimensional render. The keychain of the Eiffel tower is a model, but if we consider it in habitually photographic terms, then we are locked into a sight-based mode of thought. For as (Keller, 1904, p.13) says "*My fingers cannot, of course, get the impression of a large whole at a glance*" and to consider a tactile model as a photograph, is to think in terms of first glance when glancing is either unavailable or inappropriate. Instead, we might think in terms of first touch, with the understanding that even a cursory understanding of form derived from tactile-kinaesthetic works, is considerably and deliberately slower.

In summary, it is important to remember that the parameters of the medium of material translation are broad. In the context of everyday tactile illustration as it occurs in blind instruction, the highest degrees of professionalism and artistic sensitivity, sometimes come from those utilising the simplest everyday objects and materials in order to fashion their drawings. This became evident in my creation of Huddersfield's "Transcriptions Service Archive". Huddersfield's transcription service is a council led operation which provides accessible formats for blind and partially sighted people (e.g. braille, audio, large print and electronic documents). In my documentation and archiving of their archive materials, which forms part of this thesis, I discovered that many of their artefacts were composed out of innocuous and seemingly simplistic paraphernalia, such as string and lentils. These are real-world examples that come from a place of great expertise, accumulated knowledge and engagement with the end user, yet if thought of in purely visual terms, they could mistakenly be thought of as crude photographs.

### **1.1: The Need for Access & The Value of Tactile Image Creation:**

In the discussion of tactile image and access to visual information through tactile forms, it becomes a point of apparent contradiction that many authorities on the subject, include within their resources on the creation of tactile image making, questions of whether an image should be created at all<sup>8</sup>.

The creation of tactile images has the potential to be both prohibitively time consuming and expensive, if a diagram or illustration could be better explained through description, or if an image simply restates information already present in the text, it is reasonable to assume that it need not be translated.

In addition, if an image "*require[s] the reader to use visual discrimination or visual perception*" (Presley & Hastings, 2005) it may be wholly inappropriate to translate it for use in a classroom setting, and questions of the relevance of an image to a student's learning, must be considered if resources could be more effectively deployed elsewhere. For instance, as the cover of a book can rarely be included in the analysis of a text, the translation of cover art may be deemed non-essential, as it does not straightforwardly help a student deconstruct the work.

Similarly, as previously mentioned, if an object is already available, it does not hold that a diagram should be created in lieu of using the object itself. Whilst an image of a tree may be useful in its abstraction of

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<sup>8</sup>(Amick & Corcoran, 1997; Presley & Hastings, 2005; Tactile Graphics, n.d)

size, one would not argue the same relevance in a tactile drawing of a pencil or similarly ubiquitous and easily tactically discernible object. Indeed, in this instance, we might argue a real-world object can offer a more holistic understanding, in that it allows for an exploration of the object's function and demonstrates a relation to the ergonomics of the hand.

Given the plethora of reasons to not create a tactile image, it is not unreasonable to question the need for the practice as a whole. Yet, whilst there are many instances where it may be easier to omit images, there are nonetheless many situations where tactile representations of the visual are the most appropriate way to convey information.

Similarly, whilst attempting to assess what is essential, we should not ignore the voices of the intended recipients. If there is a consistent want for tactile equivalents of the visual coming from blind people, this should be enough to justify that particular instance of tactile image creation.

With this in mind I draw from Appendix E an archive of tactile images collated and translated as part of my research<sup>9</sup>. The original material was supplied by “Huddersfield Transcription Service” and contains previously unpublished tactile works, all of which were commissioned by and created in conjunction with local blind people. The archive contains a breadth of developmental work and “master” copies of thermoform pieces, all of which go some way to offering actionable insights into the creation of tactile images, whilst giving us tangible justification for the want and apparent need for tactile pieces in the community.

In addition, the archive has a conservation aspect as many of the pieces pictured have already started to show signs of deterioration. Much of the archive was not designed to survive long term, and with the single use nature of many of these pieces, there is a real danger that such bodies of creative work risk destruction through a lack of function in these commercial spaces. The archive itself is supplemented by an interview with staff, who have kindly shared their personal insights into the field.

The work documented in this archive offers a sampling of real-world application, which I believe demonstrates two important lessons. Namely, that certain varieties of tactile image are routinely used as the most appropriate way to convey information, and that the range of information wanted by those without access to visual equivalents, is surprising, varied and to a degree largely unpredictable.

The first is demonstrated by charts, scientific diagrams and instructions, all of which are straightforwardly relevant in academic contexts and don't have simple equivalents in purely textual forms, as the location and relationships between parts are an essential aspect of the information that is being translated. For instance, the “*structure of the human eye*” as depicted on the cover of our archive and further elaborated on in the section “*Diagrams of the Human Eye and Ear*” are labelled as such that the reader is expected to not only recognise parts of the eye, but understand the structural relationships between those aspects.

Similarly, a large portion of the works contained within are maps and depictions of spaces, where we might reiterate that an understanding of aspects in relation is essential. It is far easier to show the layout of Queensgate Shopping Centre in pictorial form, than to attempt to offer directions to every location that a reader may wish to visit, especially if the map is intended as an introduction, and the location is somewhere likely to be visited regularly. As such the aim would be that the map would no longer be

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<sup>9</sup> Translated from Grade 2 (Standard English Braille) into non-tactile English, as well as translated from a collection of tactile works, into a collection of non-tactile photographs.

needed once the reader is more familiar with the space, and so the map doesn't offer directions but helps facilitate that initial understanding of the area.

Yet some projects showcased within the archive, if offered outside this context of already proven works, might seem overly conceptual or at the very least non-essential. "Scholes Village 20mph Zone" is a tactile map, but what differentiates this project from other examples, is that this map and accompanying directions are intended to be used by a blind person whilst in the passenger seat of a car. In lieu of visual indicators, landmarks that can be felt by a non-sighted passenger are used, "the first of 2 plateaux of white chapel road" and "after the second hump" offer up a unique picture of the route, one where a blind person may lead a sighted driver.

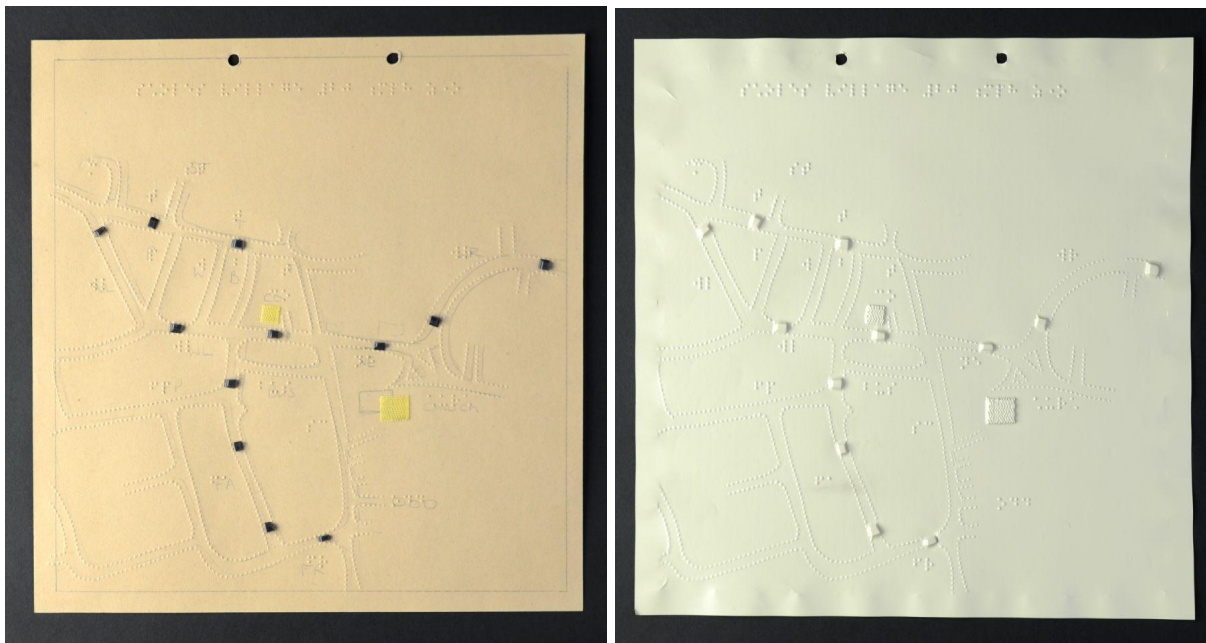


Fig. 5: The two images above are taken from Appendix E 'Huddersfield Transcription Service Archive' with these excerpts coming from the section named Scholes Village 20mph Zone pg.63 -72, both depict Scholes village with one being the collaged original and the other a thermoform plastic version taken from the original collaged master. Velcro squares indicate landmarks, "bump-on" stickers indicate speed humps, plateaux and cushions and the final vacuum form version is also a part of the archive and is documented alongside the collaged master copy. The transcribed version of the accompanying Braille text is included here within the body of the text, for the benefit of blind people reliant on e-readers:

"With the map in front of you and the title at the top, locate the first speed plateaux at the right edge of the diagram. This is the first of 2 speed plateaux on whitechapel road. follow the road along to the 2nd speed plateaux just off the junction. Turn right onto New Road east where about half way along there is a speed cushion. continue to the crossroads and go straight across onto westfield lane. Outside the co-op there is a new zebra crossing. take the next road on the right, Brighton terrace. At the end of Brighton Terrace turn left onto Tabbs Lane there are 2 flat top speed humps on this lane. The first right is Brighton terrace and Wickham street on the left and the second is Stoneleigh Court and Meadowlands on the right. after the second hump take the next sharp turn on the left onto Westfield lane. There are 2 speed cushions on this lane. The first just after you turn onto the lane and the second is after the bend. after the second cushion take the next turn right onto foldings avenue. There are 3 flat top speed humps on this avenue the first between the turn for the bus thoroughway and foldings parade; the 2nd and 3rd after foldings parade. at the junction turn left onto foldings road where there is the final flat top speed hump. (end)"

It's important to recognise that this was a requested work, and that this solution worked for the individual for their specific needs. In turn, there is a kind of credibility to the works within the Huddersfield

Transcription Service Archive that might not be as apparent in works that did not come directly from the community. It is through these kinds of examples that we understand the value of a grass roots approach to tactile image making, that rather than only focusing on a preconceived notion of the 'essential' we instead lay the foundation for the creation of tactile works from an amateur and hobbyist audience.

Feeling speed bumps to discern your car's location on a map, is an unexpected solution to an unexpected problem. It is not obvious that a blind person would seek to direct the driver of a car, and many bespoke arguably un-anticipatable tactile images, will be created with similarly specific uses in mind. In this way, a fundamental concern of this thesis is to offer information and toolsets in regards to the creation of tactile images. By creating demonstrable, example solutions, we do not attempt to solve the wicked problem of access, but rather, present ways in which we might respond to newly emerging needs and wants. In this way, we create images not purely in anticipation of a need for access, but in tandem with similarly important requests for access, where a community voice works alongside a broader effort to offer access to the mainstream of visual culture.

In a connected vein, it may be pertinent to address another collection of work found within the Transcription Service Archive, namely the pieces entitled "Computer Screen Display". It is important to note, that due to the age of the works and the style of description present, that these are not a set of instructions intended for a blind person to follow. Rather, the piece describes what is pictured on a computer display of the time, and as such, the intended use was to give the reader an understanding of what others saw, so that they may apply such concepts when they are brought up in conversation.

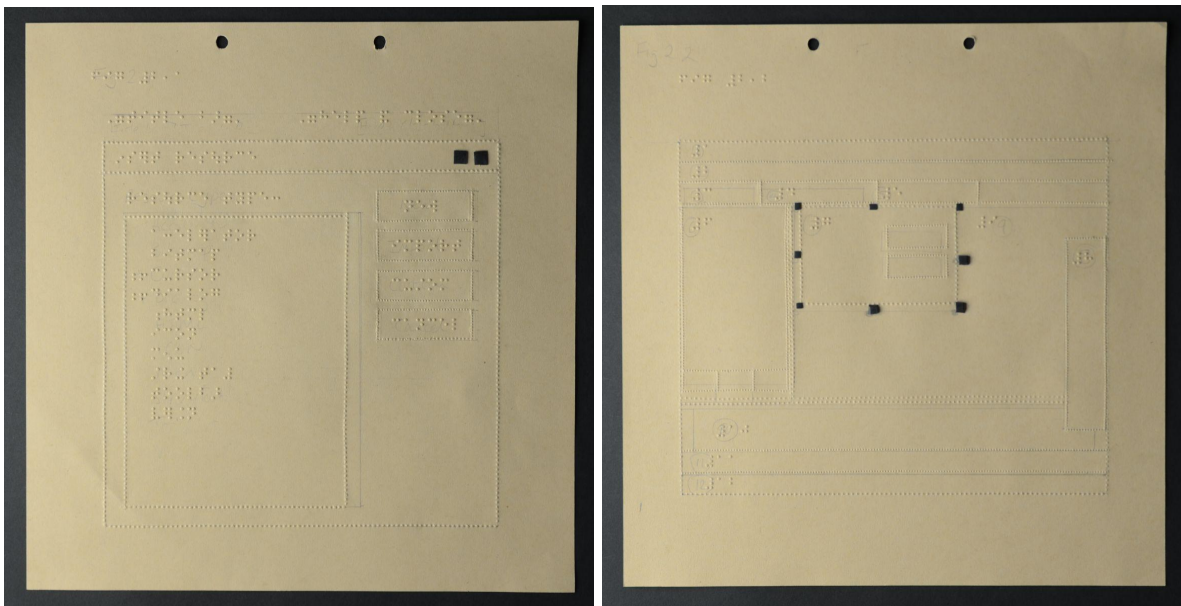


Fig. 6: The two images above are taken from Appendix E 'Huddersfield Transcription Service Archive' with these excerpts coming from the section named Computer Screen Display pg.29-46 and depict early visual computer displays. Braille is used to indicate the placement of equivalent non-tactile text, and 'bump ons' are used to indicate buttons like 'close window' in the top left hand corner of the screen. Dotted lines denote the edge of each window and larger drop down menu buttons, with three pages of accompanying Braille text, a sample of which is shown here:

"key for fig 2.2

1. title bar: ktext: first; SDI-- microsoft visual c . . -- (first SDI-- dialog 1 (dialog)).right.hand.side: minimise, restore down and click buttons.

2. main menu bar: ktext-file; edit; view; project; build; layout; tools; window; help; insert. .right.hand.side: minimise, restore down and click buttons.”

It could well be asked whether there is a need for a blind person to have an understanding of visual concepts they do not intend to utilise, information they will not straightforwardly apply and as such the tactile diagram provided would offer merely a theoretical understanding. Yet, the pedigree of the archives as a body of applied practical work, allows us to rebut this question in numerous distinct ways, for one, the need is somewhat irrelevant in light of the want. It is not unreasonable to suggest that requesting access to commonplace, widely available information, is all the reason that should be required to consider translating that information into an accessible format.

Another, arguably less obtuse answer, is that whilst the translated visual information is not used directly, insofar as the user did not intend to use this work to follow instruction, the cultural context and theoretical knowledge offered by this particular kind of access, has the potential to offer access to mainstream knowledge contained within an ocular centric lexicon. Namely, that the knowledge offered by giving a reader the sense of something, offers access to part of a conversation from which they had previously been excluded.

Similarly, there is other visual information one could reasonably expect a blind person might request, which does not neatly focus on instruction or pragmatic dissemination of atomic fact. For instance, it is not unreasonable to expect a want for access that encompasses translation of visual creative works, and that whilst the information contained within such artistic output is not as straightforward as that on show within 'computer screen display' it nonetheless goes towards a wider point that only translating visual information when absolutely necessary, in a way that might be described as hyper fixated on functional objectives at the exclusion of all else, is sometimes needlessly restrictive. Here the value of tactile images becomes the broader access they can offer, not merely the value of the information a specific work translates.

Barnes & Mercer (2001) offer a definition of the aims of “disability arts” the first dimension of which is perhaps relevant to this discussion, namely that there is a need “*for disabled people to have access to the mainstream of artistic consumption and production.*” In questioning why any one piece should be made accessible, we might, as we have already mentioned, rebut that it is not the value of the individual piece that is in question, but rather that the mainstream should be accessible. It is necessary that we question the creation of tactile works when exploring the diagrammatic and purely educational, if a piece would not aid in understanding or an alternative is better suited, then tactile image creation for its own sake is not a worthy justification. Yet within other areas of tactile image making, such as in the creation of tactile transitions of art works, the value of that which is being translated is less straightforward. In that the access to the mainstream of consumption is of value with respect to social and cultural inclusion, regardless of the value of the experience of the work itself.

It is this access to culture and to a cultural visual lexicon, which warrants further inquiry, not merely alongside my work on the creation of “emotional codes” but as an inherent aspect in justifying their creation. Creating the tools to more widely disseminate tactile image making, has the potential to offer a greater impact than if we were to create a tool set on tactile facial mimicry in isolation from the rest of the territory. Similarly, in working with traditions of tactile image making that have a proven foundation as

“legible” and reproducible, it is my want to create not only individual works, but access to a means of artistic production.

Whilst defining the nature of access to the mainstream as it applies to tactile image making, it is perhaps not practical to opt for any definition which would include such niche examples of “Computer Screen Display” as essential. But it is nonetheless relevant to say that some experiences can be thought of as core or “essential” human experiences; amongst those is a connection to art. That is not to suggest that tactile versions of works are the only way one might access this connection without sight, but in defining access to artistic consumption, tactile image versions of seminal, culturally significant works, are an aspect of access to the mainstream.

Yet, whilst the need to request the creation of “Computer Screen Display” seems appropriate, the need to request a tactile version of “The Mona Lisa” in order that a blind person may view it, and who is therefore already aware that they wish to view the work, is not a wholly satisfactory answer to access to the mainstream.

To briefly allude to a point I explore at length in the next chapter, the UK Equality Act (2010) states that “The duty to make reasonable adjustments in goods and services is anticipatory.” (Citizens Advice, 2022). Whilst access to artistic works would not be covered by this, it is nonetheless important to note that many reasonable adjustments for access, are meant to be installed in anticipation of those who might require access. Whilst access upon request to niche or unexpected visual information is non-problematic, there is a great deal of visual information that might be argued should instead be accessible in anticipation.

## **1.2: Existing Applications & Manufacturing Techniques:**

*“It is likely that better tactile maps could be supplied if basic theoretical information underlying design, production and tactile reading were more readily available. It is not suggested that detailed physiological and technical documents are needed, just a broad outline of why something works well.”* (Gardiner & Perkins, 2001)

Just as the definition of tactile image can be broad, so too are the methods used to create them. In this way, rendering a comprehensive list of rules becomes folly, as both process and intended application can alter best practice dramatically. However, there does appear to be some consistent, more general advice offered for the creation of tactile images:

1. Decide whether an image is needed.
2. Objects and labels should be spaced at least  $\frac{1}{8}$  th of an inch apart from each other. This may need to be  $\frac{1}{4}$  of an inch for young learners or in the case of capsule paper.<sup>10</sup>
3. Adjacent textures should be significantly different from each other to be discerned as such.<sup>11</sup>

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<sup>10</sup> (Wright, 2008; Braille authority North America, 2012; Tactile graphics, n.d).

<sup>11</sup> (Tactile graphics, n.d; RNIB, 2010; Wright, 2008).

In addition, we have repeated calls for simplification, though this may be seen as a by-product of the intended use. As previously discussed, many tactile guides focus on the creation of images for diagrammatic work, as such simplification is not always as critical in certain applications.

Equally, while cataloguing every method of tactile image making is beyond the purview of this thesis, it seems pertinent to address border 'schools' of image making which are relatively pervasive. For while the method of production may change, overarching territories remain relevant.

The first notable category is raised line images. These images are to a certain degree self-explanatory, pictures are reduced to lines and patterns, which are raised to create an image which can be felt. The approach results in unambiguous outlines with colour and texture translated into tactile discernible patterns, as such they are well suited to maps, diagrams or work which needs to convey information clearly.

The most prevalent examples are swell or micro capsule paper, which uses heat reactive capsules that "burst" when exposed to both heat and carbon heavy inks. This creates an image where inked areas are raised and areas that are left blank stay two-dimensional. The process creates a consistent height raised area, which is able to roughly achieve the height required for Braille dots<sup>12</sup>, allowing for both text and image to be printed in the same piece. In a connected vein, Braille specifications offer us a baseline from which we can infer the required line height of raised line images for legibility, ranging from heights as low as 0.2mm in the case of pharmaceutical Braille<sup>13</sup> to the more prevalent standards of ~0.5mm in general application.

Designs are digital and therefore easy to replicate, and the cost of individual prints is relatively low. Combine this with the paper-based format and it's clear why it is pervasive in textbooks and classrooms. However, the need for heavy carbon inks and in some cases, the belief that the intended audience does not require colour, means that such work is almost exclusively monochromatic. Equally, swell paper and to a lesser extent raised line drawing as a whole, work in terms of a binary flat or raised areas, in contrast to other processes which are sometimes able to take advantage of more varying verticality.

To offer a visual example of such work in application, I return to the archive of tactile works from Huddersfield Transcription Service, listed in the thesis as 'Appendix A'. Here I am more specifically referencing a swell paper 'Floor Plan' contained within the archive, a body of both finished, partial and rough tactile works which I have collated, documented and translated for the purposes of educating potential tactile image makers, showcasing real-world application and the methodology applied within such work.

Whilst this floorplan is simple even by the standards of raised line images, this intentional simplicity is broadly indicative of the school, with this example clearly demonstrating a few key features of capsule paper raised line drawings. Namely, a binary tactile expression of either raised or flat, 'softer' Braille dots than produced through traditional embossing, and harsh black colouration indicative of high carbon ink on the raised surfaces of the images.

It is worth noting at this point, that other images of the style also include 'texture swatches' wherein raised lines and dots are used to create uniquely 'tactility differentiate-able' patterns, still operating within the

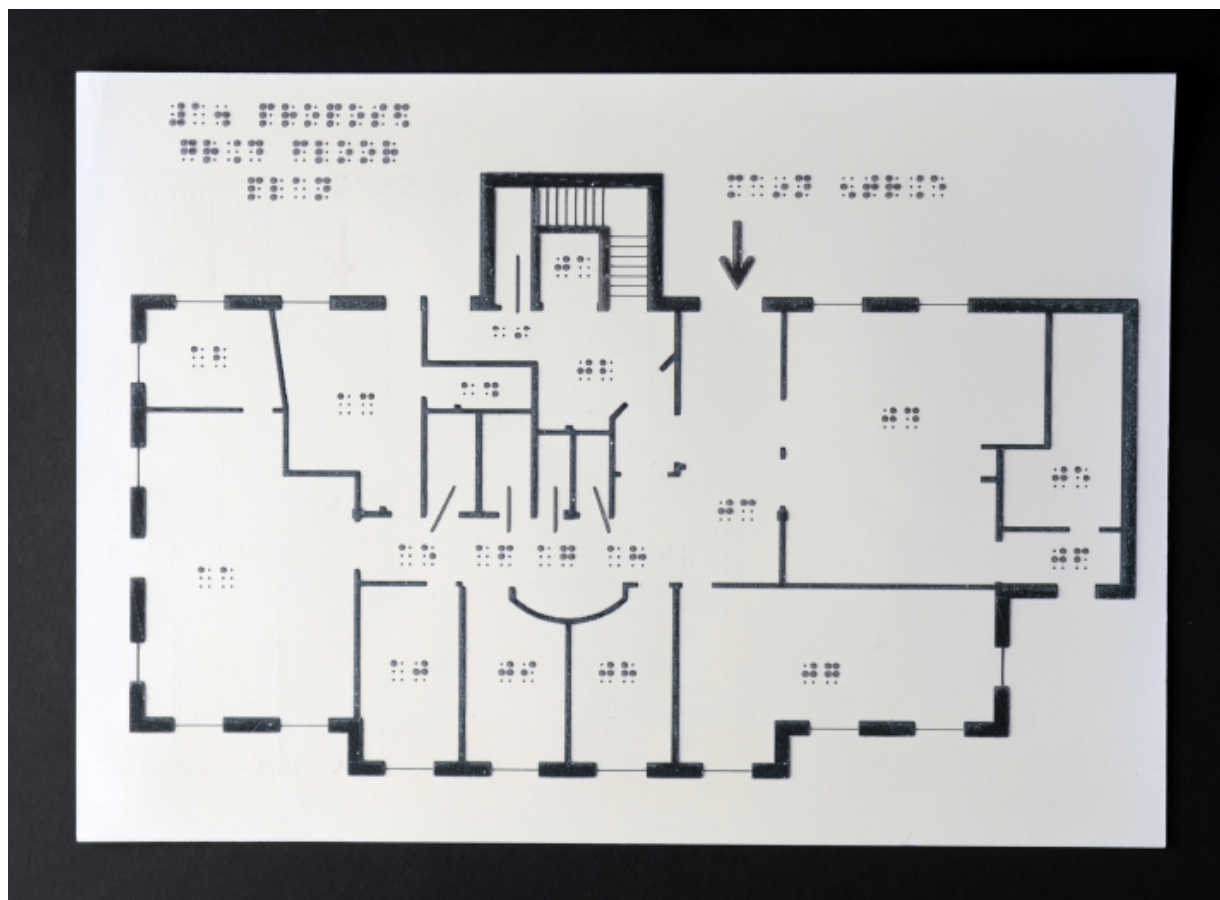
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<sup>12</sup> (Cryer, H., Jones, C., Gunn, D., 2011)

<sup>13</sup> (Pharmabaille.com, 2017).



framework of binary raised and flat areas. Whilst not explored within this section, a more comprehensive explanation of tactile swatches is present later on in this chapter, where specific textures and their application are explored at length. As the subject of swatches is somewhat more nuanced and substrate specific, it may be unhelpful to address the territory more fully when attempting to give a general overview of raised line drawing, as specific swatches are not always appropriate for all material applications.



*Fig. 7: The image above is taken from Appendix E 'Huddersfield Transcription Service Archive' with this excerpt coming from the section named "swell paper" image of a floor plan p.25. The image depicts a basic floor plan for a building using thin lines for interior walls and thick lines for outer walls. Rooms are labelled [01-19] and all black areas are raised and tactile thanks to the heavy carbon ink used in this kind of swell paper work.*

The second category of note comes in the use of forms, vacuum form, thermoform and other form processes, cast impressions of an object or image. A key feature of form images is their need for a master copy, this might be as simple as an object, or as complex as a completely different tactile image. In this way, techniques such as a collage, 3D printing or raised line, can be seen to have "hybrid" versions in some 'form' images.

The primary benefit of form images is that they are able to work with a much wider, analogue spectrum of heights, indeed some examples resemble fully realised three-dimensional objects. Equally, forms are usually lighter than the master copy, which can be especially relevant if you are creating casts of wooden masters. Forms often allow images to be standardised, which can be important if you wish to create a

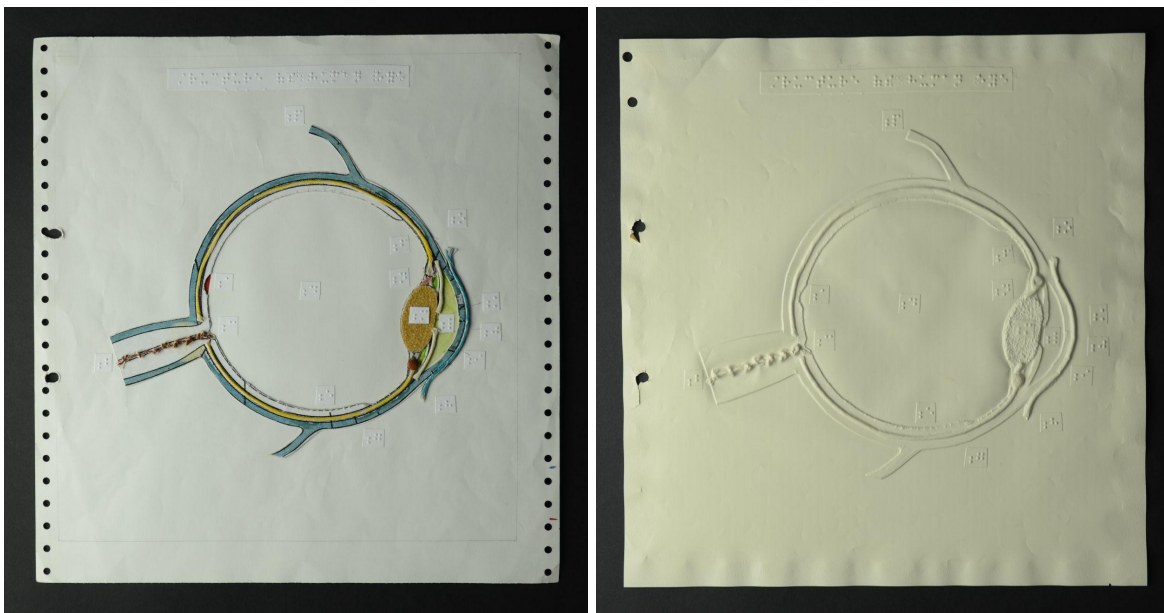
series that has the feel of a cohesive whole, and they allow less durable images, say collages made from throw away or unsecured materials, to be translated into something more stable.

However, as is the case with many tactile images, many forms are created using only a single material, which creates less tactile variation and a tendency to create monochromatic designs. Equally, any process which requires a master copy, requires the master to be stored in order to make duplicates, this becomes prohibitive if there isn't space to store the works. On a related note, changes to the master might not be simple to implement, as they are not as straightforward to edit as a digital file would be.

Turning back to Huddersfield Transcription Service for an example in practice, we might consider their vacuum form diagram of an eye and its original master. Perhaps counter intuitively, when contrasted with the collaged image, its thermoformed counterpart appears more visually sophisticated, a uniform, designed image. In this way, it might be tempting for those with a visual bias, to view form images as the 'proper' way of creating work, a step beyond collage rather than a parallel form of image creation.

Whilst it is true that collaged works are instrumental in the creation of many form images, it does not follow that said form images are uniformly superior. It is here that we might acknowledge the benefits and challenges of the practice, for whilst the form diagram is more uniform, more durable, simpler to replicate and more visually acceptable to environments that might be hostile to the idea of the "touchy feely" image as something perceptually childish, some very material aspects might be thought to be lost in translation. In this way, we might point to two such prominent aspects, namely, colour and materiality, for in the harmonisation of form we lose some textural differentiations that come from a multi-material work, a mediation that bars the use of certain textures that would lose their unique textural features in the process, where soft, tacky or perhaps even noisy does not translate.

Here we see the use of sandpaper, which would be an admittedly extreme texture swatch for use in a collaged piece, and yet, when translated into plastic the texture loses some of its roughness, making it a more viable inclusion. Not more or less sophisticated, but rather a different process to be created and applied differently.



*Fig. 8: The two images above are taken from Appendix A 'Huddersfield Transcription Service Archive' with these excerpts coming from the section named A diagram of the human eye p.13 &14. The various parts are labelled [a - p] in Braille with the master copy being collaged and the later version being made from thermoform plastic. Various textures indicate different anatomical parts of the eye, the materials used include: sand paper, string, cord, beads and card. The final vacuum form version is also a part of the archive and is documented alongside the collaged Master copy, showcasing how the textures transfer from collage to plastic.*

Extrapolating from this it behoves us to discuss the process of collage on its own terms. By far the most ubiquitous and widely recognised method of production, collage offers a low barrier to entry both in terms of cost and technical skill. In addition, the method offers significant, some might say unparalleled tactile variation and the ability to utilise colour. Whilst it may seem counterintuitive to discuss colour for a blind audience, as mentioned briefly at the beginning of this chapter, only around 20% of blind people possess 'no useful vision'<sup>14</sup> and that for many, colour may be an important tool in aiding comprehension.

Most collage is bespoke, which allows the creator to focus on texture and materials suited to the user, omitting materials that might elicit a tactile defensive response, particularly valuable in regards to users with sensory processing issues or reduced finger sensitivity. There is even some evidence to suggest that utilising materials with substantially different levels of thermal conductivity, for instance, using tinfoil in conjunction with fabrics might aid in tactile recognition. It is thought that this slight temperature change may be of benefit to some tactile readers, engaging an additional facet of touch to aid in object differentiation.

However, the process does not allow for the kind of reproduction offered by digital techniques. Additionally, pieces are rarely as durable as alternatives, and because the work can be time consuming to make, it often isn't easy to replace if damaged.

The nature of collage presents an unfortunate reality in regards to drawing examples from the archive, if a work was intended to be collaged from the outset, all that would remain in the collection were rough drafts or mistakes. These images were not intended to be displayed or catalogued in this manner, they were working documents made for specific real-world briefs, both the time and associated cost required to recreate collage 'back-ups' would have been prohibitive and largely unnecessary. What the archive does possess, are a wealth of master copies for thermoforming, each of which showcases the benefits and sophistication of properly considered collage, albeit with the caveat that these masters were not final outcomes.

The example shown here is the other half of the diagram of the human eye, similarly labelled the diagram of the human ear. Both showcase a straightforward methodology in regards to labelling, both are functional diagrams with clarity as a primary aim, and both rely on segmentation of texture to highlight distinct parts of the organ. Yet with more distinct parts in close proximity, the diagram of the human ear necessitates a broader range of materials in its initial assemblage, which perhaps makes it more suitable when discussing collage in practice.

In this regard, we might reasonably note the loss of colour in the translation of the master copy, a fact that becomes more apparent when it becomes apparent that different colours of card seem to have been deliberately chosen for different sections, despite no textural differences between those raised areas carrying over into the final piece. Similarly, the inclusion of hessian, string, beads and other paraphernalia

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<sup>14</sup> (Working Group on Mobility Aids for the Visually Impaired and Blind, 1986)

demonstrate both the low barrier to entry in terms of means of production, and that said ease of access does not detract from tactile reading comprehension in application.

Here it may be pertinent to reiterate a point from my introduction, one which I believe bears repeating. In the context of everyday tactile illustration as it occurs in blind instruction, the highest degrees of professionalism and artistic sensitivity, sometimes come from those utilising a diverse array of materials, and artefacts composed out of innocuous and seemingly simplistic paraphernalia, such as string and lentils. These works are no less effective because of the considered choice to utilise this rich, haptic materiality.



*Fig. 9: The two images above are taken from Appendix E 'Huddersfield Transcription Service Archive' with these excerpts coming from the section named A diagram of the human ear p.11 &12:. Various textures indicate different anatomical parts of the ear on the collaged version, the materials used include: hessian, sand paper, string, cord, beads and card. The final vacuum form version was also a part of the archive and is documented alongside the master copy, showcasing how the textures transfer from collage to plastic.*

Finally, as outlined through my example of the Eiffel Tower Keyring, objects can be defined as tactile images when positioned as such. Many objects can be easily accessed and offer a fully realised three-dimensional object with appropriate colour, scale and texture to the real thing, namely because it is the real thing. This also allows a user to look at an object's function, movement of parts, relation to the ergonomics of the hand, and even the object's smell, taste and sound.

Other objects such as models of animals or buildings, might only abstract the size of that which they depict as opposed to abstracting many features to create a two-dimensional image. In an example offered in Appendix A interview, the abstraction of four legged animals to show only two legs, resulted in the misconception that chickens had four legs as they were shown to have two legs in the image alongside four legged animals that were also shown in profile with two legs.

The fewer levels of abstraction we have, the less room we have for confusion or misconception. Yet an object is not always an appropriate option, especially if the original is hard to access or won't explain a key feature you want to convey. Explaining the make-up of an eye or the components of a cell, are better shown in abstracted larger forms, where parts may be labelled and first be understood as distinct components of a whole. Similarly, if the image is designed to be accessed alongside a text, having it separate from the text might be impractical.

### 1.3: Comprehension of Tactile Images:

As we noted earlier, the reading of tactile images is often described as learned as opposed to an innate skill<sup>15</sup>. Indeed, even those with particularly developed haptic skills in other areas, may struggle to understand tactile image if they have not been regularly exposed to it<sup>16</sup>. Yet while more complex work may be seen as problematic *“There is little doubt that a raised-line form that is similar to a flat shape such as a circular plate or a knife can readily be understood as a picture”* (Kennedy & Juricevic, 2003).

Additionally, it would be a mistake to identify simplicity as the primary goal of abstraction for tactile image. John Kennedy identifies multiple areas of complexity which one might mistakenly identify as inappropriate, especially if we are solely focused on reduction. These include an understanding of perspective, depth, foreshortening and indicators of motion<sup>17</sup>. Kennedy's work and his focus on blind creators is particularly relevant when calling for access to the means of production, as in discussing comprehension we must not only examine how the blind might comprehend tactile image, but how they might create their own and subsequently comprehend their own community's work.

Whilst there is a significant consensus that *“Learning to interpret and read a tactile graphic is a skill that must be taught”* (Charlson, 2011) Kennedy argues that this is a matter of degrees of proficiency. Indeed, if we find a significant want from blind people for tactile images of visual equivalents, which are then proven to be effective in application, then we must not equate comprehension being a taught skill to the idea that tactile images are inappropriate for those without formal training. In assessing need we must also concern ourselves with the wants of the intended user.

The Huddersfield Transcription Service Archive offers us a practical resource with which we might evidence such a want, for the pieces contained within were not created for a single individual, nor were they created in isolation from their audience. This collection primarily shows a want for translations of the visual into non written forms, which comes from the community who are being given access through this production.

While the archive does not give us carte blanche to declare any tactile approximation of the visual as inherently valuable, it does present us with work which has not only seen use, but which was designed in conjunction with those who asked for it. In turn, thanks to the breadth and variety of work shown, along with the range of audience, age and content, we can reasonably conclude that many of those asking for “visual equivalency” did not have formal training to read such work.

We also see that tactile images are more commonly used at an early age, in part because early stage tactile skills in one area can help develop essential haptic skills more holistically. For instance, Paplinska

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<sup>15</sup> (Paplinska, 2009; Presley, I. & Hasty, L., 2005; Theurel et al., 2016; Shimizu, Saida & Shimura, 1993; Charlson, 2011)

<sup>16</sup> (Wright, 2008)

<sup>17</sup> (Kennedy, 2003; Kennedy & Juricevic, 2003; Kennedy & Juricevic, 2006; Kennedy & Gabias, 1986).

(2009) states that “*Using of tactile graphics is the first step to familiarity with Braille and holistic teaching of Braille reading*”. In this way we see a prioritising of the written over the “visual” that parallels the experiences of sighted learners, in that it echoes the cultural shift away from visual aids when transitioning from early learning to next stage education. Where images are used as a way to reinforce meaning, up until the point where imaginative vision and understanding allow the reader to progress to purely written works.

In this way, there is a propensity to think of books that contain illustrations as the exclusive purview of younger learners, and that the eventual aim for those young people should be to progress to non-illustrated works. Indeed, there is evidence to suggest that a decline in the manufacture of picture books is partly because parents are under pressure to advance their child's reading age and “*are encouraging their younger children to leave picture books behind in favor of more advanced chapter books.*” (Wonderopolis, 2011) and perhaps more anecdotally, a recurring theme of “*I was told, adults don't need them.*” (Brett, 2013) is found within the writings of many who talk on the subject.

Yet, whilst a hallmark of young adult fiction is a decrease in visuals comparative to texts aimed at younger audiences, and a degree of illustration that is not commonplace in adult texts, it does not hold that the aim should be to get rid of illustration. For whilst fewer images might be a broad indication of the age of a text's target audience, vilifying the use of pictures as childish is to misunderstand their role in aiding comprehension. For an advancement in reading ability is the progression towards more complex topics and expressions of thought, not the move away from pictures, and it is perhaps a notable tension, that the modern human experience is becoming increasingly ocular-centric, whilst the veneration of text over image still persists in the classroom.

Within the framework of an academic climate that shows a decline of explanatory or illustrative imagery in reading material, it is perhaps more understandable that there is a similar decline in tactile imagery as a learner progresses through education. As such, at least in regards to the comprehension of a specific tactile image, it is important that we acknowledge the wider context of an individual piece, whether as we have already mentioned, that be as an intermediary step towards other modes of tactile literacy, or whether the image is intended to be a vehicle of information in its own right.

For instance, not all tactile images are designed to be felt independently, as such we cannot assess the potential effectiveness of an image without knowing if it is designed to be companion led, instruction led, or understood without external assistance. Simply put, companion led<sup>18</sup> images are designed to be felt in conjunction with another person who can guide you through the process, in contrast to instruction led images which often use audio description to direct you, in order that you might methodically process more complex scenes; one is a dialogue while the other is a ruleset. It becomes not a question of whether an image of a horse can be understood as a horse, but whether after being told that it is a depiction of a horse, can we understand it as such.

We might opt to use instructions or companions for any number of reasons, but both have their place and their reliance on the external does not make them less valid. Indeed, it might well be argued that there are cases where context supplies a meaning which could otherwise not be easily discerned, as is often the case when dealing with translations of images that were not originally intended to be felt. As such, there is often an inherent compromise between retaining a sense of the original and creating something that can be understood through touch, which when paired with an external assistance allows us to create a

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<sup>18</sup> Sometimes referred to as “Live Audio Description” in a gallery context.

technically poorer tactile image that nonetheless gives the viewer a more accurate understanding of the original.

Yet, there are other arguments to which we may defer if equating tactile works to the 'original' parent is to some extent unconvincing. To which I return to established definitions of "disability arts" offered by Barnes and Mercer, where we find a referenced tenet of the movement to be "*for disabled people to have access to the mainstream of artistic consumption and production.*" In turn, we can begin to re-define accessible translation not as disability art, but as "*access to the mainstream of artistic consumption*" (Barnes & Mercer, 2001). This is by no means to say that the translations produced would not be art, only that they would not be encompassed by the term disability art as it is applied here. Equally, here we find an argument for access which does not rely on parity of experience, only in parity of access.

#### **1.4: Prototyping Investigation into Converting RNIB Swell Paper Texture Swatches into Plastics.**

With the rise of affordable 3D printing, it is no longer improbable to think that a member of the general public could gain access to three-dimensional prints. Equally, with the corresponding prevalence of such printers in educational environments, it is equally possible that schools might already have appropriate facilities to utilise 3D printing, even if they have yet to do so outside the design classroom.

In 2010 the RNIB compiled a list of "texture swatches"<sup>19</sup>, raised line patterns to aid in the effective creation of tactile images on micro-capsule paper. Certain textures, while visually distinct, are not sufficiently tactilely discernible from each other to be used in conjunction. As such, patterns identified by the RNIB were separated into groups according to which of the swatches can be presented alongside each other whilst still being readable as different. In total 38 textures were identified, with a maximum of 21 textures being usable in any one image, a comprehensive list and explanation of which is present within Appendix A.

To this end, the accompanying practical study attempts to translate a portion of these swatches into 3D printable forms, focusing on an amateur or hobbyist printing audience and the use of the most common domestic printing materials, predominantly PLA. Yet, the move from a reasonably pliant base material like swell-paper towards a significantly less forgiving substrate, namely plastics, presents unique and complex challenges to conversion. In this regard, 12 swatches were eventually translated into a form that we might confidently assert is consistently replicable on a commercial home device, in a way that is both tactilely differentiable and comfortable on lower quality prints. This experimental study was by no means intended to provide an exhaustive list of swatches, but rather, it represents a large enough body of work to function as a tactile image making toolset, a foundation from which to create additional work that originated from established traditions of tactile imaging making.

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<sup>19</sup> (RNIB, 2010)



Fig. 10: Is an image of all twelve successful swatches, each model and printed by myself as their own OOR. A variety of colours of PLA and 'head shapes' are present which is reflective of the prototype nature of these test prints.

Some patterns were altered to remove harsh terminator points, whilst others were still deemed unsuccessful if altering the swatch further would present a texture that is no longer significantly different enough from another. In this way, consistent issues surrounding the catching of the finger, sharp angles and the stepping present when working with multiple elevations within an individual raised line, have dictated the form of the collection of patterns we deem successful, with the myriad of failed or problematic prints also detailed in the subsequent appendix. Through this broader explanation of why textures do or do not work, it is hoped that this resource will facilitate a better understanding of raised line tactile image printing, allowing for a more sensitive approach to image creation, even amongst those with limited or no prior experience of modelling and production.

Whilst it might certainly be the case that additional textures may be useable on higher quality machines, the 12 presented within our collection are designed to be used and adapted for a lay audience, requiring no printing supports<sup>20</sup> and subsequently no additional 'clean up' when printed. In turn, we utilise established theories of "*Objects of Reference*" to create a set of functional products with which to frame the practical output of our tactile raised line swatches. To this end, an object of reference can be defined as any object used to systematically represent a person, object, location or event (P.O.L.E)<sup>21</sup> or else acknowledged as "*Objects that have special meanings*" (Ockleford, 1994) . In this way, objects of

<sup>20</sup> Printing supports consist of extra material that is designed to 'support' areas of a print which either overhang or bridge sections. This additional material is usually printed in such a way that they are considered 'break away' and can be removed from the model as a part of post-production clean-up.

<sup>21</sup> (TalkSense, 2015)



reference or (OOR) are closely linked to multisensory strategies and are commonly used as priming or cueing devices.

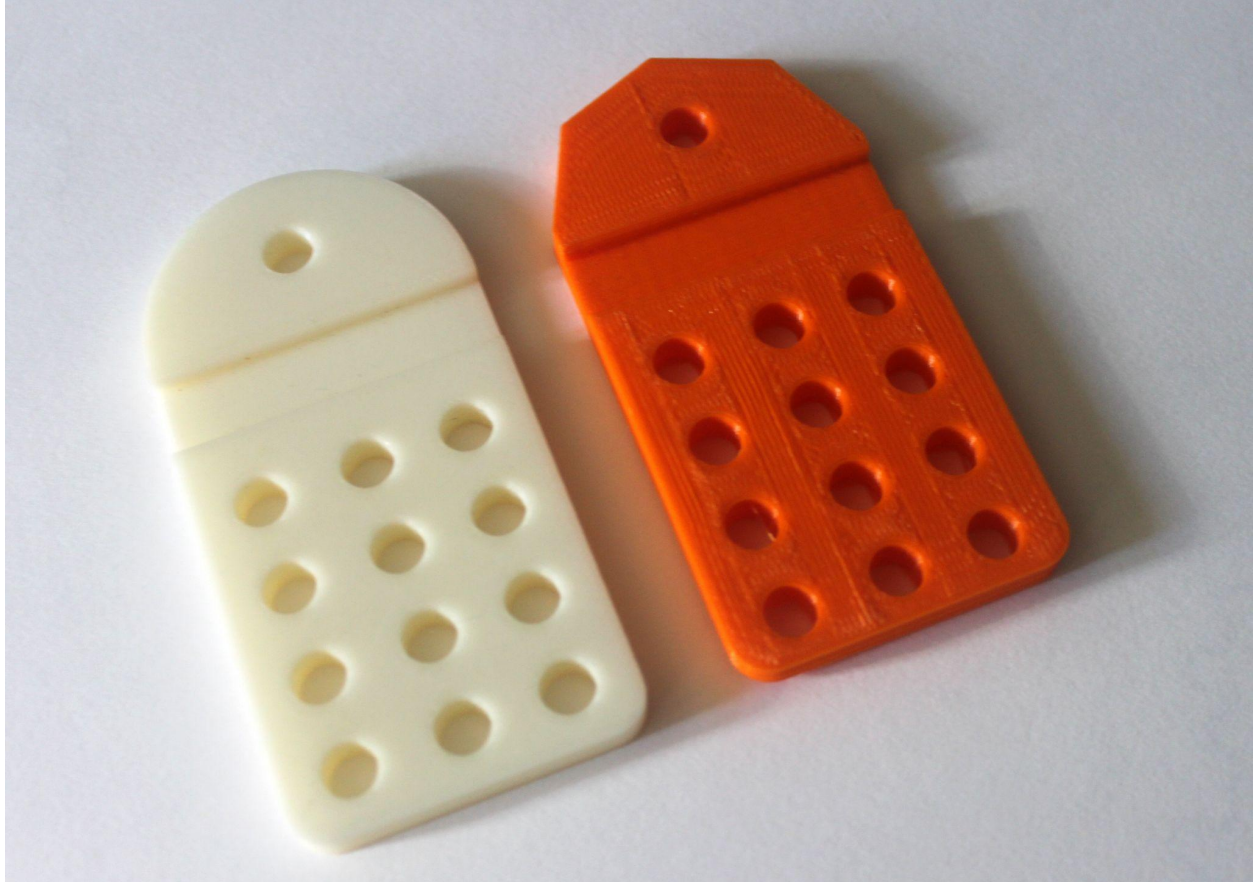
For instance, a plastic fork might symbolise meal time, through this priming the user is better able to understand that there will be a change in location and activity, indeed a primary function of OOR is to mitigate issues that sometimes surround transitioning between events for those with profound multiple learning difficulties (PMLD).

Additionally, if language or comprehension skills are not yet, or potentially will never be at a stage where the user is able to articulate their wants in other ways, then turning objects into symbols can help facilitate non-verbal communication. In this way, as the object is linked to previous occasions, holding the object allows the user to connect future events with a past experience. As such, the user has a better understanding of the activities that concern them, which can, in turn help them convey their own wants and needs. To wit, a stick might reference “park” or an object from a gift shop might represent “museum” wherein offering both objects present a user with a choice, one that allows carers and educators to take their individual wants into account.

This example may appear simple, yet if we are relying purely on verbal or sign language, then the presentation of such choices is reliant on an comprehension of the form of the question, a relational understanding between word and meaning that is not always straightforward in those with PMLD and which is largely bypassed with objects of reference. In this way, OOR strengthen the connection between object and meaning, working in a symbolic, sign based register which can offer those not completely proficient with other forms of language, a significant mode of expression.

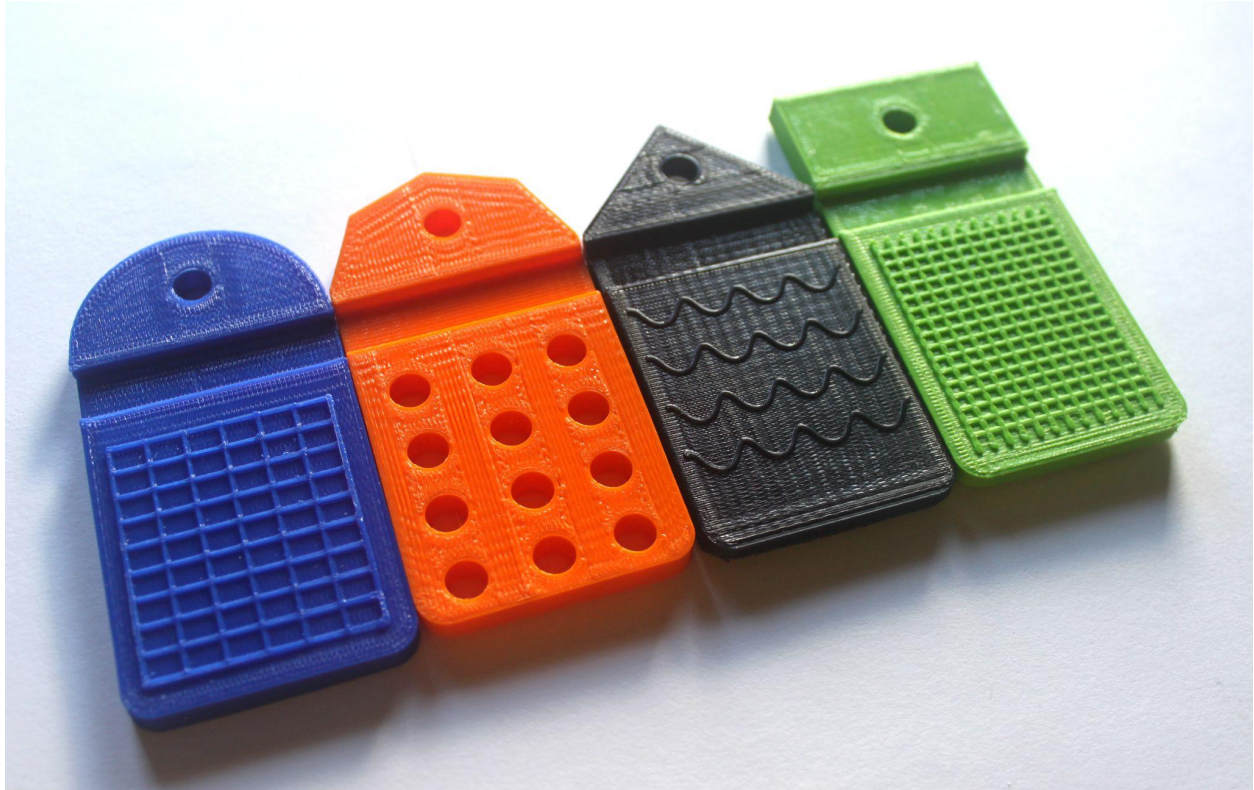
Yet, whilst OOR are most closely associated with the complex disabilities, such collections of objects can be useful to users of many ability levels. In the case of young learners with visual disabilities, OOR can reinforce the connection between object and meaning, a precursor to other modes of language rather than a supplement or replacement, a form of object based tactile image. As such, while one group may not benefit from every aspect of objects of reference, or will potentially only use them as a transitory tool towards a broader proficiency, this does not preclude them from being a viable audience for such devices.

However, OOR as a broader disability solution, often requires a degree of tactile recognition, as such, those with more profound mobility issues might more readily benefit from other forms sensory cueing, such as the use of scent or in the case of those with notable vision, flashcards may operate as a non-haptic analogue to objects. In this regard, it is important to note that a significant facet of disability design is the need to tailor solutions towards the individual, where a person-centred approach relies on a sensitivity towards the specific situation of its audience.



*Fig. 11: An image of two 'blank' OOR templates, produced by myself. Each contains twelve evenly spaced holes though the one on the right hand side is of notably poorer print quality and has been printed in a bright orange PLA, contrasting the matt white of the other print. This can be partly attributed to the entry level machine the piece was printed on, as opposed to the university's industrial printer that was utilised in the creation of the other blank template. The lower quality piece has visible print lines and there are a few areas where the print simply doesn't look as 'clean' and whilst it is worth noting that the piece is more than suitable for its intended application, it is still useful to show these prints side by side, to demonstrate the difference in expected outcome between commercial and home printers.*

In this way, OOR or even tactile images, may not be appropriate for everyone with a specific range of conditions or impairments, the counter to which is that just because something is thought ineffective for one person, does not mean that they might not be useful to another. Equally, whilst the system presented within this thesis shows a degree of standardisation, it should not be thought of as a replacement for existing libraries. Indeed, in some ways 3D printed raised line textures do not offer the range and material variety of common objects, instead relying on more abstract use of pattern, shape and colour. Yet, whilst my own designs account for the want to include non-standardised objects with the use of 'blank' OOR where holes allow small objects to be attached, such a system fills a specific niche, one that is perhaps more tailored towards audience that will use them as a precursor to other modes of linguistic expression.



*Fig. 12: Is a collection of four objects of reference produced by myself. Each has a different tactile swatch and shaped 'head': a semicircle, hexagon, triangle and square. Similarly, each is printed in a different colour PLA, blue, orange, black and green respectively. The first OOR uses a grid swatch, the second uses holes to allow others to attach objects to the 'blank, and the last two utilise a wave pattern and smaller grid pattern respectively.*

As such, this framework operates in a similar fashion to the common practice of label or card mounted libraries of OOR<sup>22</sup>, where a level of uniformity is used to denote objects as significant and a relational part of a collection, wherein, the ability to add text in conjunction with a focus on colour and shape, reinforce language concepts and notions of relational meaning. Working with the P.O.L.E system, different shaped heads and colours can be thought to represent different subjects, where person, object, location and event, can be assembled together to form sentences and reference distinct categories. In a connected vein, indented spaces have been left at the top of the objects, to attached printed or Braille labels, allowing for both Braille users and visual learners to develop their reading skills, with the additional benefit that objects can be repurposed if a subject ceases to be a regular aspect of a person's daily life.

In a connected vein, abstraction can be a useful tool for blind or visually impaired people, where a haptic experience is more representative of the event in the absence of a visual understanding of the object. A toy car has little tactile resemblance to the experience of being in a car, in that the figurative depiction is not something that can be readily understood from a routine touch-based interaction with a car, instead the interaction with the door handle, the material of the seats or the raised pattern of a tyre tread, are all better representative objects from which to connect the experience to a known touch point.

This toolset, developed from the RNIB swell-paper guidelines and tested through this system of OOR, represents the foundation for much of the practical work featured in later sections. By developing our 3D

<sup>22</sup> (Queens mill school,. Objects of Reference; Parsons, L., 2015; Turney School, 2019).

printing techniques from established and proven traditions of tactile image making, we might assure a degree of tactile legibility and readability, that allows for a more complex exploration of other territories that are less focused on the reproduction of meaning whilst still relying on a certain amount of haptic comprehension.

### **1.5: Interviews with Blind People & Their Application in Regards to Facial Mimicry:**

*“Permanent records of expressions are superior to on-the-spot judgements, since they open themselves to repeated evaluation and analysis. However, such records can only be of maximum value if they include as much of the contextual clues as possible as well as the many nonfacial responses that accompany the facial expressions.”* (Charlesworth & Kreutzer, 1973)

In previous sections I highlight facial mimicry as a directly functional concern, a subject that requires the translation of uniquely visual information, for which there is a similarly specific intended application. Namely, the translated information is the genuine facial expressions of sighted people, and the intended application is the imitation or mimicking of those expressions, so that blind people are better able to incorporate those expressions into their regular expression set.

Additionally, the importance of facial expression and the effect an absence of consistent visual feedback has upon a blind person's ability to accurately mimic those facial cues, has a substantive effect on a person's ability to effectively communicate in face to face situations. Helen Keller (1903) states that *“a look is often the very soul of what one says”* and that those without sight are substantially disadvantaged in not being able to *“watch the expression of the speaker's face”*. Whilst teaching aspects of facial mimicry does not elevate all aspects of that disadvantage, it is one facet for which we may offer some insight.

As part of a study within my research, and as a balance to the generalised mode of experience that becomes suggested by overtly functional approaches, I have conducted a series of qualitative interviews with blind participants, attempting to document facial expression and potentially identify areas where stylisation or deviation from the expected responses has occurred. These interviews have in turn, helped me identify areas that may benefit from access to emotional codes to aid in facial mimicry and masking amongst blind people.

This aspect of my research focuses primarily on the mechanics with which blind people might learn rather than comprehensive comparative analysis of facial expression. I concern myself both with the ethics surrounding the nature of translation for access, and the limitations of tactile translation in application. This being said, outlining points that have been “stylised” and focusing on teachable areas of the face, is a key aspect of this exercise. As such, I intend to follow best practice in regards to documenting facial expression, which includes making the body of interviews available through publication, so that others might review any claims I make towards stylisation and difference, which in turn may allow others to utilise the body of interviews as a resource for their own work. The nature of this data collection and the intent to publish recordings that show a person's face, voice and potentially personal stories, mean that I will be supplying access to identifiable personal data for living individuals that does not already exist in the public domain, and that this lack of anonymity has been clearly outlined to participants before any interviews began.

It is worth noting that my sample size is smaller than I had initially hoped, this is in part due to the scarcity of suitable candidates and in part due to the unforeseen limitations concerning access to participants during the COVID-19 outbreak. In regards to alternative collection methods i.e. video conferencing; the nature of both the study and the intended volunteer group, presents significant barriers that make these methods at the very least impractical.

Reference images of participants will not be included in the body of the thesis. This is in part a good faith effort that should a participant notify the university of a want to withdraw their interviews from record, that process need only involve the removal of data from the accompanying hard drive. File names do not refer to a participant by name, instead they use a unique identification number. For cataloguing purposes and for ease of removal should the need arise, these numbers are the interview date, followed by either LL or EL to refer to whether the participant is considered early or late life blind. This commitment is outlined in detail throughout my ethical compliance and was made apparent in the forms participants were offered and which were, after enquiring each person's preferred format, universally read aloud before proceedings began.

This absence of referencing images is also in part, due to the more specific concern that an explanation of facial expression is better demonstrated through an understanding of the context of that expression rather than in isolation. Snippets of expression do not demonstrate broader themes that may be apparent in conversation, i.e a reduction in eye contact and are therefore oftentimes less useful than simply referring to the body of interviews and more general observations.

The "Ekman model" defines the six basic emotions as "*Anger, Disgust, Fear, Joy, Sadness and Surprise*" (Shen et al., 2020). The exercise I conducted started by asking volunteers to express these emotions using facial expressions as naturalistically as they were able. The remainder of the interview focused on attempting to elicit these emotions by asking participants to discuss moments in their lives, in which the relevant emotion was expressed, in turn, a complete version of the questions posed to participants can be found in Appendix D. Finally, I asked the volunteers to repeat the first exercise and concluded the interview, often with more general discussion.

All participants sampled could be described as "late life blind", in my ethics forms I outline a want for a range of both early and late life blind participants, but in practice only late life participants came forward. Yet even from this small sample group, a few distinct observations can be made that appear to corroborate the general consensus.

We see a general reduction in eye contact, something that whilst not entirely unexpected was not guaranteed to be prevalent amongst those who had lost their sight later in life. Secondly, we see a reduction in the intensity of general expressions in the casual conversation portions of interviews, and more specifically a reduction in the engagement of the muscles surrounding the eyes. Both of these markers, as mentioned in previous chapters, usually denote those who have been blind since childhood. Whilst my sample size is not significant enough to conclude too much from the interviews, it might be suggested that the length of time one has been blind plays a role in facial mimicry, and that some deviation from conventional expression sets emerges from a lack of continuous facial mimicry in response to visual stimuli. Regardless, we can say that the interviews demonstrate at least one area in which emotional codes might be straightforwardly thought to be helpful to a wide variety of blind users, that being the concept of smiling with your eyes.

## 1.6: Emotional Codes & the Limitations of Tactile Images:

*“Congenitally blind children (without form vision) have no visual opportunity to imitate expressive behaviors in others. Thus any strengthening of their expressive behaviors is limited to auditory and tactile-kinesthetic channels, a highly ineffective way to learn expressive behaviors compared to visual imitation” (Charlesworth & Kreutzer, 1973)*

As mentioned in my introduction, Gentaz, Theurel and Valente (2017) theorise that access to *“emotional codes in the form of models or drawings they can touch”* might allow blind people to better *“learn how to manage the intensity of the expression of their emotions”*. However, haptic or “tactile-kinaesthetic” modes of learning come with their own limitations and challenges. As I have outlined in the section on comprehension of tactile image, learning to read such images is a taught skill, and whilst Kennedy may highlight areas of complexity and innate ability in blind users, the prevailing wisdom still tailors tactile image towards simplicity.

The question becomes not whether we can create something that can be understood by blind people, which is evidenced enough through the existence and broad application of tactile images that cater towards such audiences, but rather, can sufficient information can be easily conveyed, in order that these tactile images might be effective as emotional codes.

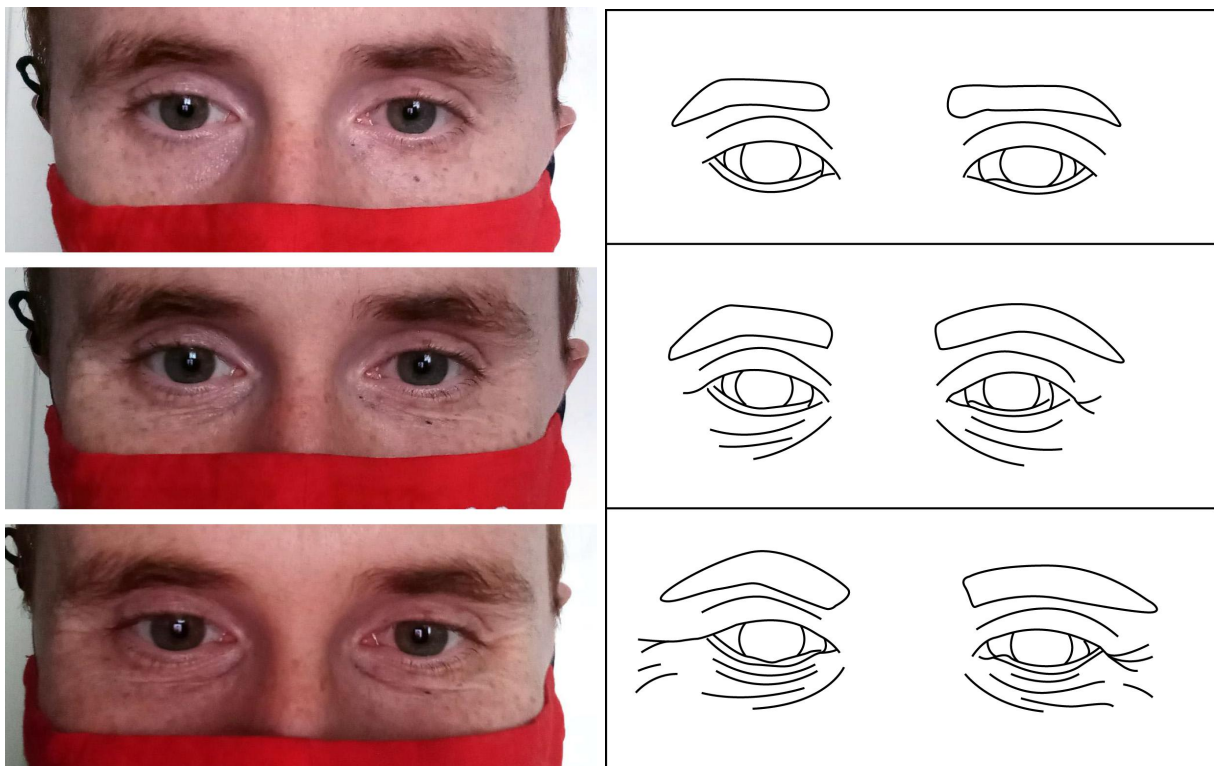
As previously mentioned, a knowledge of facial expression can help us distinguish between true and false smiles, and may to some degree allow us to replicate aspects of true expression in order to better “mask”. One measure of a true or false smile, comes in the form of Duchenne markers and the “Duchenne Smile”, where in *“the orbicularis oculi muscle, which surrounds the eye, is recruited in smiles that occur with spontaneously experienced enjoyment but not in smiles that are posed.”* (Ekman, 2009)

Its counter, colloquially known as the “Pan Am” smile, is perhaps more easily recognisable. Named after the false smiles of air hostesses of the era, the smile demonstrates that when the expression is forced it often does not involve the muscles around the eye. This idea of “smiling with your eyes” is well studied and to some degree even mainstream, yet in light of the current climate surrounding COVID-19, we have perhaps never been more acutely aware of the role expressions concentrated around the eye play in the understanding of emotion. For when the world wears masks, we are left with only a snapshot of their facial expression, a state of aspect seeing that could be thought to parallel the understanding afforded to those without a visual lexicon of facial expression to draw from.

Thus, the importance of facial cues in regards to the translation of thought and meaning, has been brought to the fore of the post epidemic collective consciousness. Much as the Deaf community face challenges for masks prevent lip reading, so to do blind people face potentially less obvious challenges in conveying emotion and intent using a limited facial expression set; both in terms of expression being limited to one third of the face, and in terms of a weaker understanding of facial expression in the absence of a visual lexicon regarding facial mimicry. Without the knowledge that a genuine smile incorporates the muscles around our eyes, one can’t reasonably be expected to engage those muscles when attempting to replicate that expression. Similarly, without the additional context cues that come from the lower half of the face, your audience cannot be expected to tell that you are smiling beneath the mask.

In this there is an obvious and practical need for this expression set to be understood, what's more, Duchenne markers represent a fairly self-contained, comparatively straightforward concept in which we might present a singular application of tactile image in the creation of a series of emotional codes. Such diagrammatic work operates in a particularly functional register, with clear aims in regards to what information it seeks to convey and how it intends for that information to be applied. In this instance, the work offers information on the Duchenne smile, in order that the audience may attempt to replicate that expression with the ultimate aim of improving the quality of the audience's masking and incorporating 'smiling with their eyes' into their regular expression set.

To this end, one of the most straightforward emotional codes we might hope to produce, focuses purely on the notion of smiling with your eyes when the lower half of your face is covered. My own attempts utilise basic raised line depiction and little to no texture swatch elements, an option that is only viable by virtue of the simplicity of the subject. These images focus on a very specific area of facial mimicry, one that emerged in response to the changing attitudes and increased prevalence of facemasks in a post pandemic era. With that reduced information set comes the option to provide a simplistic and surface level understanding of the Duchenne Smile, a comparative image for those who do not require the in-depth knowledge of facial muscles later tactile diagrams offer.



*Fig. 13: The images above show three close-up photographs of my eyes whilst I am wearing a facemask. The first close-up is a control image where I am not smiling, whilst in the second image I am smiling with my mouth but attempting to not engage my eyes in any significant way. The final image shows me smiling with my eyes, and all three are accompanied by simple vector drawings showing the key elements of the eyes and areas around them, whilst omitting details like the bridge of my nose and the line of the facemask.*



*Fig. 14: This image showcases the 3D printed version of the vector drawing, where three versions of my eye expressions are shown. The top pair of eyes depicts my control where I am not smiling, the second where I am smiling without attempting to engage my eyes still shows some creasing and the final pair shows notable creasing around the areas that might be colloquially referred to as the crows feet and bags of the eye, namely the outer corners and the under areas of the eyes.*

The result is a single image that shows three distinct versions of my own eyes when wearing a mask. The first is a control where I am not smiling, the second shows my eyes when I am smiling with my mouth but not actively attempting to engage my eyes, and the third shows a version where I am attempting to smile with my eyes to convey the smile that is under my mask. These are simple depictions aimed at a quick understanding of the mechanisms involved, namely the creasing of the areas around the outer corners of the eye and the raising of the lower areas that sit above the cheeks and below the eyelid. Whilst not exceptionally complex, this image set represents an easy to print work in response to a prominent and recent challenge for those without a practical knowledge of facial expression. The print is designed without printing supports and subsequently does not require any kind of 'clean-up'. It can be printed on almost any home printer by virtue of its small size and simple construction, and attempts to solve a very limited issue for those who are confronted with an immediate problem and for whom a written description or explanation of the issue is either insufficient or difficult to understand.

Here it is worth highlighting that this mode of image creation parallels many of the 'functional' examples from The Huddersfield Transcription Service archive, with much of the literature regarding tactile image creation focusing on this style of functional image. Graphs present information that is to be applied to questions regarding that dataset, maps and directions offer spatial information that is designed to be followed or offer understanding of a specific area, and perhaps most straightforwardly applicable are



diagrams of the eye and ear, which are labelled in such a way that individual components can be taken in conjunction with text to explain their function.

From this, we might infer that other similarly constructed emotional codes might offer avenues into other more complex or multifaceted aspects of facial expression, indeed by utilising the same techniques and established principles of raised line and 'tactile swatch' based image creation, we present a template with which to create additional works that is not limited to purely functional or diagrammatic output. The techniques and guidelines offered throughout this initial chapter, attempt to give creators the best possible opportunity to create work that can be understood through touch, with the minimum requirements for tactile comprehension outlined in such a way that they are not limited to 3D printing.

Similarly, whilst Duchenne markers can be indicators of genuine emotion, there is evidence to suggest that such smiles can be consistently and convincingly feigned and that *"...doubts about the reliability and validity of the D smile and question the usefulness of facial descriptions in identifying true feelings of enjoyment"* (Krumhuber & Manstead, 2009).

Whilst this might be counted against Duchenne markers as evidence of true feelings, the fact that a widely recognised symbol of genuine emotion, can be feigned to a reasonable degree of proficiency, only works in our favour. Indeed, Ekman asserts that the smile mask *"is the most frequently employed of the emotional masks"* (Ekman, 2009), and in teaching the replication of emotional cues, we are looking to, at least to a certain extent, teach emotional masking.

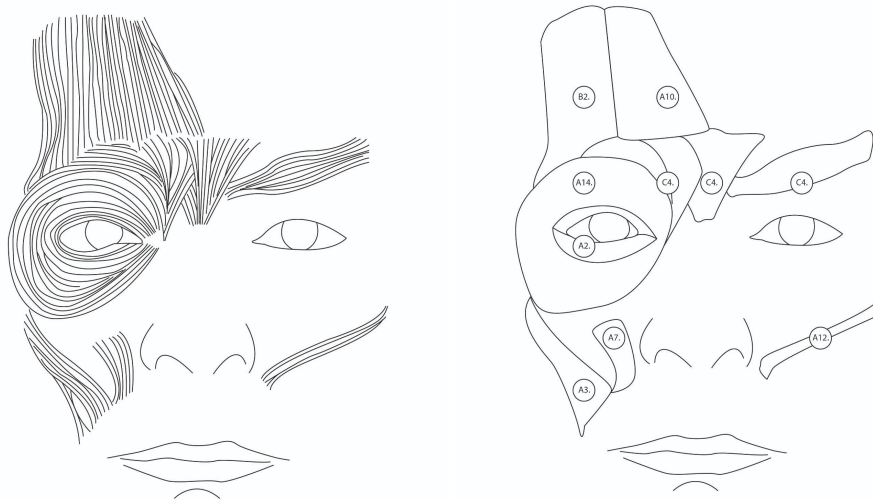


Fig. 15: This image shows the initial vector drawings that I created for the 'Vandevanter and Patterson' inspired tactile illustrations of muscle structures. The first shows directional lines that demonstrate muscle fibres, in groups that show specific muscle groups. These are present within the original Vandevanter and Patterson diagram but fewer lines are included in this translation to make it tactilely discernible when printed. The second vector image omits the lines but makes the muscle grouping easier to discern by using texture swatches and a key in place of the layered labels of the original work. The swatch-based drawing is labelled with preliminary swatch names such as B2 and A10, this allows for quick reference once the file is imported into 3D modelling software, in order that the textures can be quickly added.

In regards to the creation of tactile emotional codes, it could be argued that the most effective way to offer access to information regarding the Duchenne smile, is to translate seminal, established depictions that are already used in the education of sighted learners. In this way a substantial aspect of my work into emotional codes concerns the translation of images contained within Vandeventer and Patterson's *"Differentiating Duchenne from non-Duchenne smiles using active appearance models."* (2012)

In Vandeventer and Patterson's original, the two images that concern the structure of the face are separated in such a way that the diagrammatic elements have been given more visual space, with the muscle groupings in the upper and lower half of the face being separated into two distinct images. This is in part due to the fact that the photo-sketches are part of a series discussing facial structure more broadly, as demonstrated by the numbering convention of the two pieces, where certain numbers are omitted as they correspond to groups not pertinent to this discussion but part of the wider collection. Whilst this separation works well in a visual format, in consideration of certain haptic concerns some aspects become problematic and require adjustment or alteration. To wit I have opted to merge these two images together, primarily because without the extraneous detail of the photograph behind it, the muscle groups offer additional context that aid in recognizing the broader form of the work, namely that when these groups are presented alongside each other the structure of a face is more apparent and as such it is easier to recognise that the tactile work depicts a face.

Part of my decision to translate these images as opposed to say, the original photographs presented by Duchenne in *Le Mécanisme de la Physiologie Humaine* (1862), is the belief that the segmentation of the face through line drawing that is presented here, is highly resonant with the style of raised line drawings I am already engaged with. Equally, whilst this example of line drawing is not striated enough for all elements to be tactilely discernible in isolation, a tactile version of the work could be paired with a more traditionally stylised example to give both the clear information required to pair it with the text and a broader sense of muscle structure offered by the more expressive directional lines of the original.

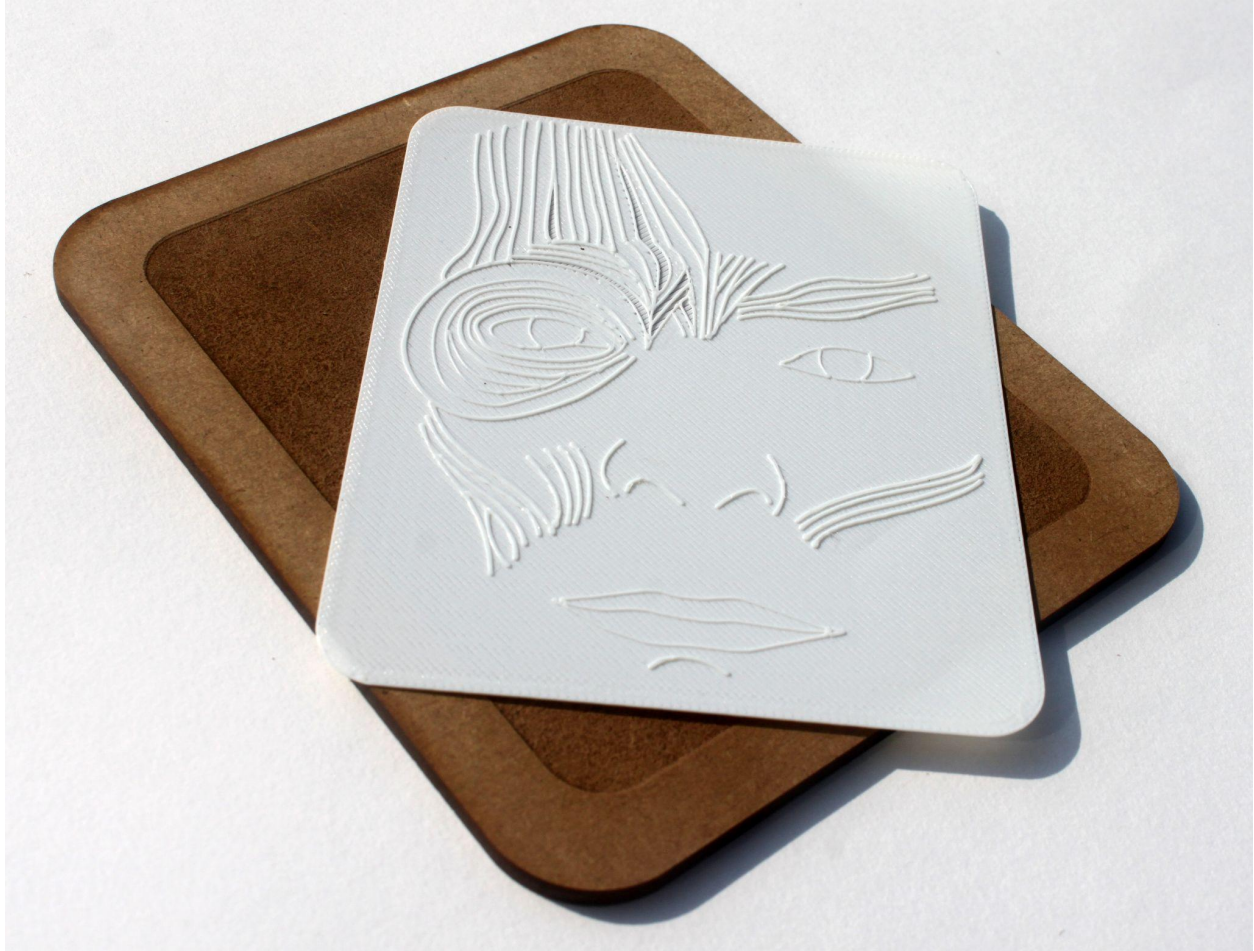
This style of approach to tactile image making, is present within the creative output of Menena Cottin and Rosana Faría, more specifically their children's book of tactile illustrations 'The black book of colours' (2010). The text uses raised lines in a uniquely artistic and expressive manner, and whilst the book is not always straightforwardly concerned with figurative depiction as it is an emotive exploration of texture and the concept of colour from those with no visual point of reference, the raised lines contained within are still capable of conveying a broad sense of a 'type' of object. Images of feathers, waves and raindrops, ape the texture swatches we apply in a much less rigid or dogmatic way, with both the pros and cons that such a freer approach provides, namely, that a loss of clarity in form facilitates a looser and more experiential engagement with texture. In reference to my tactile versions of Vandeventer and Patterson illustrations, the directional lines that indicate muscle structure offer a different kind of understanding of the makeup of the face in much the same way that the directional lines of feathers and waves are pictured in the black book of colours. In both examples haptic experience is prioritised over easily discernible figurative depiction, to highlight a particular facet of that which they represent.

In turn, whilst this broad textural experience sacrifices the clarity of form required to easily understand sections as distinct parts, it instead offers a less straightforward depiction of structure that presents another aspect of a face's construction, drawing attention to the directional nature of muscle fibres. The clear segmentation of muscle groups that is present in the original work would not be tactilely discernible in an image with lots of textually similar adjacent raised lines, as they function in much the same way as pairing identical texture swatch to describe multiple adjoining areas. To this end, this aspect must be

either omitted, simplified, or as we have done here, presented separately as part of a collections-based approach.

Whilst the primary aim of tactile emotional codes is to translate often distinctly visual information into an alternative sensory format, it does not hold that such translations need be one to one. Working within the confines of a distinctly functional framework is often highly restrictive, and yet, when we remove ocular-centric concerns for visual equivalency and instead focus on the experience of the end user, we are perhaps less precious about the form of the information.

To emphasise an earlier cited point “*The purpose of a tactile illustration is to communicate an idea or information—not to reproduce a visual picture in a tactile form.*” (Wright, 2008). Whilst I have deliberately chosen examples that I believe are resonant with raised line school of tactile image making, the illustrations of Vandeventer and Patterson convey a lot of information in a relatively small space. This feature of the work, whilst typically an obvious credit to the original, does not necessarily work tactilely for one to one replication. For even with something as functionally diagrammatic as depictions of the structure of facial muscles, the conventions that surround such visual depictions do not always lend themselves well to tactile renditions. Indeed, as the initial sketches were designed with a sighted audience in mind and attempt to convey multiple distinct concepts in a single work, some of those facets must be presented alongside rather than within the work in order to be understood. For instance, the application of directional lines denotes muscle structure whilst 'brace bracket' labels isolate certain sections for discussion. In regards to tactile depiction these two elements are in conflict, for whilst the overlaid bracket and labels are easily discernible to a sighted person, they become tactilely indistinguishable when transcribed verbatim.



*Fig. 16: Depicts a printed version of my smaller line-based 'Vandeventer and Patterson' inspired tactile image of the muscle structures in the human face. The print is placed atop an etched piece of MDF wood to account for any issues regarding the thickness of the base plate.*

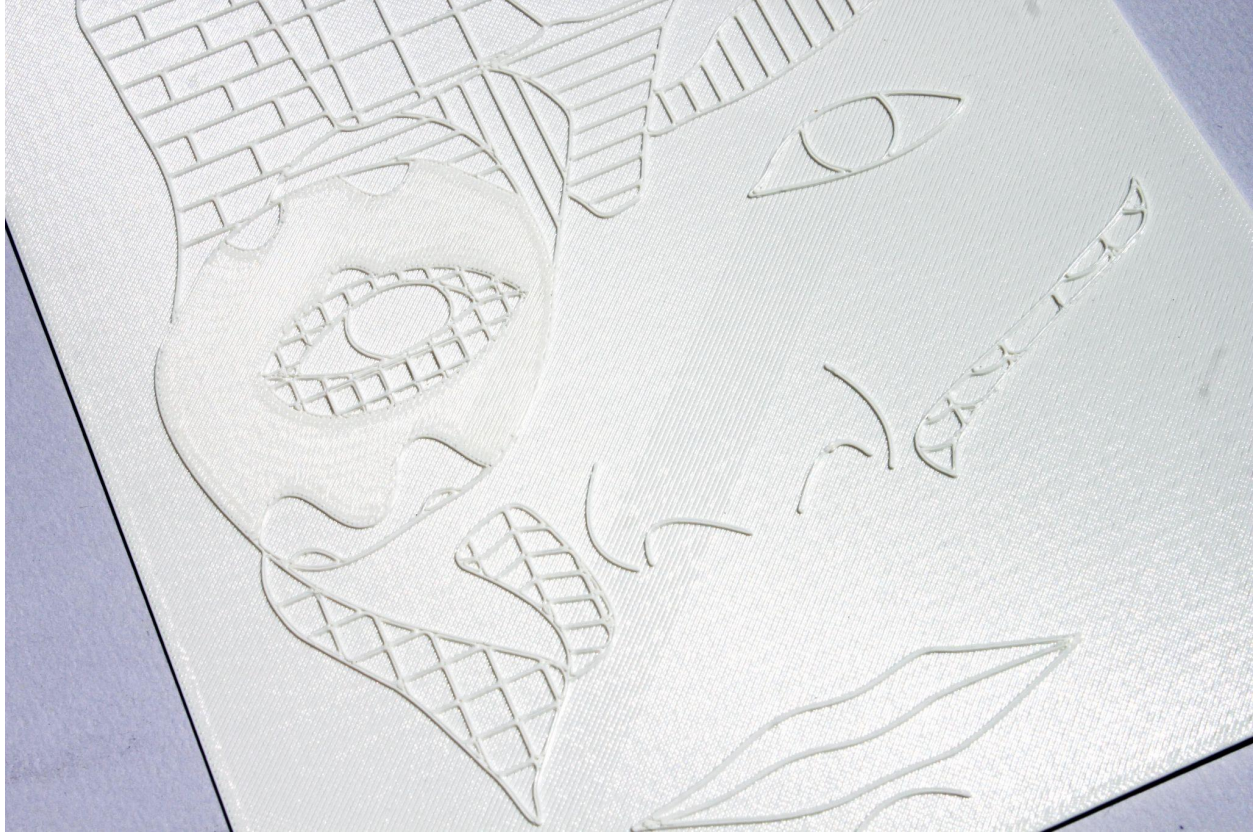


Fig. 17: Depicts another of my 3D printed 'Vandevanter and Patterson' inspired works, though this one relies on texture swatches in conjunction with raised lines, in contrast to the previous work which only utilises raised directional line work.

The limitations of the new media require a degree of flexibility. Replicating these images as faithfully as possible might be thought of in the same vein as a 'hard translation' wherein attempting to remain faithful to the structure or format of a work, we lose some of the essential meaning contained in the original. In drawing the strands of the subject's hair or adding the outline of the collar, we add a large amount of extraneous detail that clutters and ultimately detracts from a tactile reading of the image. In turn, when these details are omitted it then becomes possible to merge the upper and lower muscle group images, in order that we need not reintroduce any of this 'visual' clutter as the groupings do much to imply the structure of the face.

It may at first appear obtuse to merge the primary images only to then present two distinct works, and yet these alterations are beneficial when accounting for the way in which they will be understood through touch. To wit, it becomes important to reiterate, that in regards to tactile translation we are attempting to "communicate an idea or information" and not simply reproducing a "visual picture in a tactile form". In this particular example, we are met with a situation in which it is beneficial to simplify aspects of the image and complicate other aspects of the work, all with the primary goal of making the pieces easier to understand through touch. This results in a collection of pieces that attempt to extract some vital piece of information from the original, creating an eclectic range of works that may be thought to have deviated significantly from the original, but that critically, attempts to preserve intended meaning rather than replicating a visual picture.

To build upon this, when considering the distinctly multifaceted approach outlined throughout early sections, with practical examples like the 'Wooden Spoon-ness of Wooden Spoons' or our own exercise of the Eiffel Tower-ness of Eiffel Towers, we see that many functional offerings benefit from a collections-based approach. When attempting to create tactile illustration for Vandeventer and Patterson's writing, we are offering not just the two images, but those images in conjunction with the text it illustrates and the descriptions of the tactile work which offer a guided approach to comprehension. As with our earlier examples, offering multiple different aspects creates a multifaceted picture of the whole, which in turn offers both additional context and opportunities for understanding that would be insufficient if these same aspects were 'viewed' in isolation.

Indeed, when thought of in conjunction with one another these two tactile works are pertinent examples of this concept in action, as each highlights the benefits of the other whilst compensating for their deficiencies, each offers some essential piece of information its partner does not which in turn creates a more holistic understanding when they are presented in tandem. The image that uses tactile swatches allows for clear labelling and segmentation, facilitating the discussion of specific groupings but losing the directional and structural information present in the original. In turn, the line-based image demonstrates the structure that is omitted from the swatch piece, whilst acknowledging that its own form is ill suited to discussion of specific parts, as the nature of line texture next to line texture does not provide enough tactilely distinct segments to clearly discuss a certain area or grouping.

In a connected vein the Vandeventer tactile image that works with texture swatches as opposed to expressive lines, has two notable distinctions from its partner, both of which are related to its print size. Firstly, whilst both are designed in such a way that it can be printed at a reduced scale, as they are both still tactilely legible with a plate thickness and line height of 0.25mm. When printed at this extreme the plate is essentially a single print layer thick, pushing the limits of what a standard machine can hope to produce without some degree of print failure, an issue that is less problematic with the less detailed line work of the expressive print as opposed to the more complex patterns offer in the swatch piece. Indeed, the sample print produced at this scale shows multiple gaps in the plate and areas where the lines printed on top of the base layer are in some way distorted, whilst ultimately not affecting the legibility of the work.



*Fig. 18: Is a close up of my 'Vandeventer and Patterson' line print, backlit in such a way that the thinnest parts of the printed plate appear lighter, showing the areas where the print was close to failing. This demonstrates areas of concern, which suggest the thickness of the plate should be slightly increased on future prints.*

Similarly, texture swatches of this kind are not designed to be read below a certain scale, not because the textures themselves cannot be understood as distinct in relation to one another at this size, but because the subject as a whole is difficult to discern when it does not allow for straightforward reading via the index finger. In creating tactile works we must always defer to the mechanism with which they are being understood, much as Braille must retain a specific 'point' size to be read via touch as the cell is designed in such a way that it fits under the tip of the finger, so too must tactile works be designed in relation to the same haptic functioning of the end user. If a work is to be understood via touch, it should be designed in relation to the hand, in this way a work that is less concerned with form can function on a smaller scale as it may not need to be 'read' in the same way that a traditional diagram needs to be.

Through these diagrammatic prints and examples like them, we can understand the tension between the accessibility concerns that surround comprehension of a tactile work, and the similarly access centric notions that surround ease of printing. Compromise is an essential aspect of modern disability discourse, and indeed legislation surrounding disability, which might often be thought of as the loudest voice in a mainstream understanding of accessibility, is often prefaced with an acknowledgement of this reality. Senator Harkin is known to have used the phrase "fragile compromise" (Colker, R. 2000) when describing

the American Disability Act Title Three and legal definitions like “qualifying compromise contract” are enshrined within the UK Equality Act (2010). In turn, the creation of emotional codes and 3D printed accessible works more broadly, are not immune to the need for compromise, for such prints cannot be effectively applied without a frank acknowledgment of the constraints of both the audience and the medium, balancing the need to create tactilely legible works, against the practical requirements of those who wish to print them.

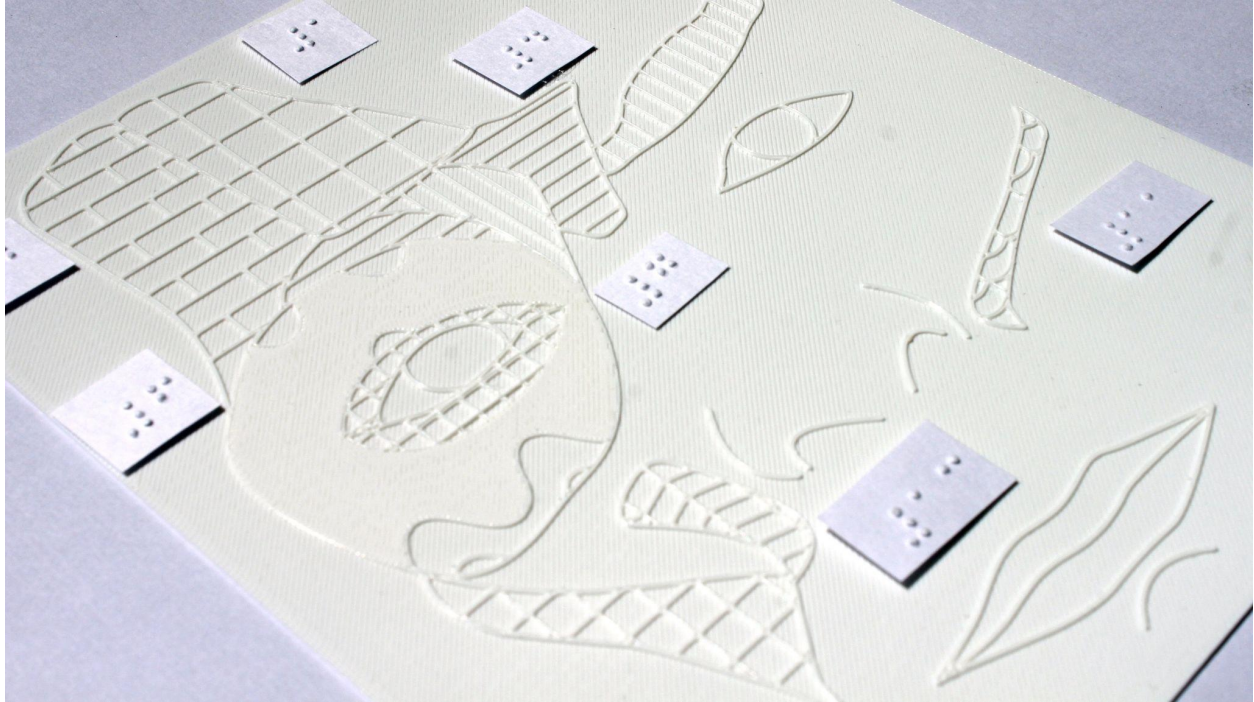
In creating work that is ‘accessible to print’ we sometimes sacrifice legibility, and in turn a more legible print may come at the cost of no longer being practical for a hobbyist printer, most notably when the scale or cost of a work becomes prohibitive. Whilst the expressive line print loses little of what makes it successful at a smaller scale, this is predominantly because the work itself is not hyper fixated on figurative depiction and more broadly offers a sense of one or two aspects of muscle structure, that being the directionality of muscle groups and the fibrous nature of the muscles themselves. Its partner attempts to identify specific areas of interest to be understood alongside the original text, for which a larger print is necessary in order that it can be experienced in a more fluid, less restricted manner, and that in turn, shape as well as texture can be discerned.

Equally, whilst labelling is included in the original works it is omitted here for numerous reasons, the most prominent of which as I have previously established, is that Braille can be problematic when printed on home or lower quality printers. The addition of paper Braille labels is a straightforward adaptation and one that grants the audience a greater degree of flexibility, allowing them to utilise large format text or rely on the description-based key if the end user is not a Brailist or they simply wish to rely on the limited vision they have. Adding 3D printed labels limits who can effectively work with this image, both by limiting the intended audience to only those who read the specific Braille you are using<sup>23</sup> and by making the print itself more mechanically difficult to successfully print.

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<sup>23</sup> This can refer not only to different languages but different ‘grades’ with contracted Braille (Grade 1) and uncontracted Braille (Grade 2) being radically different. Additionally, there is some variation even amongst Brailists of the same language, with Standard English Braille and Unified English Braille having notable differences and ‘Jumbo Braille’ being reserved for early learners and those unable to feel smaller point type.





*Fig. 19: The image above shows the 'Vandeventer and Patterson' swatch print, with the addition of paper Braille markers corresponding to each muscle group.*

Whilst tactile image-based emotional codes operate as predominantly functional works, the information they present and the aspects of a collective 'visual lexicon' they offer access to, are representative of distinctly cultural concerns. Where the functional begins to overlap with the other categories I outline within this thesis, is the type and variety of information such utilitarian works can be used to convey. Whilst the functional is most often concerned with the form of information and clear, figurative depiction, these defining aspects that are not wholly unique to the category. Many poetic or aesthetic works still require figurative depiction, and a tactile model of a landscape may still require its audience to discern the form of a tree or river in order to fully appreciate the scene, even if the guidelines that define the functional, are perhaps not considered to be quite as rigid or dogmatic in these more expressive pieces.

To this end, the functional provides a foundation for later works and a strong basis from which to explore and contrast the approaches of our other facets of tactile image making. In understanding what is meant by 'best practice' as the functional defines it, we are better able to identify areas where we might deviate or compromise from that functional ideal, whilst avoiding creating work that is either entirely illegible or in the most extreme cases unpleasant to engage with. The functional addresses the structure of tactile language, it offers us evidence-based tools from which we can create works that we are confident can be understood through touch. In turn, where and if we compromise on that legibility, we do so with the intent to add value, and not because we do not understand the conventions of the territory.

## Chapter 2: The Cultural Tactile Image:

*"The disability arts movement encompasses several reinforcing dimensions. Firstly it argues for disabled people to have access to the mainstream of artistic consumption and production. Second it includes impaired-focused art that explores the experience of living with impairment. Third, and most crucially, disability arts offers a critical response to the experience of social exclusion and marginalization."* (Barnes & Mercer, 2001)

Whilst the functional is often concerned with hyper-specific information and straightforward intended applications of that information, there is a value in a broader form of access which is not encompassed by this narrow view of tactile image creation. Where some interpretations of the functional asks us to *"Decide if a tactile graphic needs to be made at all."* and to *"Omit the graphic if it doesn't convey essential content."* (Amick & Corcoran, 1997) a cultural perspective does not attempt to make the same value judgments on the information it translates, instead asking whether it is possible to make visual information accessible through tactile-kinaesthetic means, regardless of our own preconceived, ocular-centric notions of 'essential' and inessential.

Barnes & Mercer in their writing on disability culture, offer a definition of disability arts which includes a need *"for disabled people to have access to the mainstream of artistic consumption and production."* (2001, c.21, p.529). In a functional context this could be taken to refer to the mechanisms by which a blind person might read a tactile image and similarly how such mechanisms might enable a response. However, if we consider the cultural dimension of such a statement, we are presented with a far more complex state of affairs and indeed a far more nuanced idea of the term "access". Similarly, the term 'culture' within the confines of the thesis can be thought to encompass a wide variety of established definitions, in part because the nature of a relational, fragment based understanding of access, accommodates many interpretations of what we might consider culturally significant information. In this regard, aspects of 'the cultural' are determined by the wants of those requesting access, where the desire to participate and engage within the world, informs the broader conversation on that which should be made accessible.

In terms of defining access to the mainstream, it should be understood that definitions of access are inherently varied and flexible. Therefore, when we say that something is accessible, we are not always referring to a strict set of criteria which defines good and bad practice, more often we are referring to a specific way in which a specific provision of access has provided a certain kind of access. For instance, tactile paving is a decidedly accessible feature of our city streets in that it acts as a mobility aid for blind people, and yet, it is important to recognise that uneven surfaces present 'potential conflicts' with the needs of those with sensory or mobility issues<sup>24</sup> and that excessive use of tactile paving systems could be thought to make streets less rather than more accessible.

To expand upon this, the UK Equality Act (2010) mandates that "reasonable adjustments" be made to accommodate disabled people, and that the nature of such access within the confines of this legislation, is heavily dependent on a few key factors. The act states that where a provision or physical feature would *"substantial disadvantage"* a disabled person, or where but *"for the provision of an auxiliary aid"*<sup>25</sup> a disabled person would have a substantial disadvantage in relation to persons who are not disabled, then there is a duty *"to take such steps as it is reasonable to have to take to avoid the disadvantage."* The act

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<sup>24</sup> (Department of the Environment, Transport and the Regions, 1998)

<sup>25</sup> UK Equality Act, (2010) S.20 (5)

also states that the cost of such adjustments should not fall to the disabled person, with the logical justification that the adjustments would be considered reasonable and thus cost would be considered when determining if a mandated course of action is appropriate.

All of this is to say that when attempting to encompass in law such a complex and multifaceted topic as reasonable adjustment, the Equality Act (2010) presents a view of access that is inherently a negotiation between parties. A large corporation may be thought to have a higher threshold when considering the cost of an adjustment when compared to a small independently run firm, whilst the needs of the individual may be identical the definition of providing reasonable access is to at least some degree flexible.

Indeed, returning to an earlier potentially more sensitive example between parties with less of an obvious power disparity than the “employer-employee” relationship, we can see that tactile paving at crossings are often laid down in “L” shapes, to guide a blind pedestrian to the crossing without the need to blanket the entire pavement. Here we see a negotiation for access between groups who both have an equal and valid need for adjustment, but whose prerequisites for access may be thought to be in conflict, showing that in many instances a perfect solution is not always available.

Yet, in outlining the right to access it would be a disservice to say that the Equality Act (2010) does not in many ways, establish minimum requirements for a very functional access to both space and information. For instance, *“The duty to make reasonable adjustments in goods and services is anticipatory.”* (Citizens Advice, 2022) In that, reasonable access to a commercial or public space for disabled people, should be considered as a matter of course and not upon request.

In this way, non-ambulant people should not need to ask for a ramp at the entrance of a supermarket, and systems should be in place to provide large print and alternative formats at banks. In these and many other cases, reasonable provisions at the outset prevent a need for adjustment later, and UK law recognises the need for adjustment to be anticipatory and not exclusively reactionary.

Whilst the need to request access to the niche or unexpected is broadly non problematic, there are instances of information that are encompassed by the mainstream, that are both ubiquitous enough and widely understood to be significant enough, that the idea that many disabled people should want to engage with those works, should not be unexpected. From this we might infer a more controversial stance that goes beyond the protections laid down in legislation, but which nonetheless utilises many of its rationales. Namely, that there is a great deal of visual information that by virtue of its cultural significance and prevalence within an ocular-centric lexicon, should be made accessible in anticipation of a want for access regardless of whether it could be deemed essential, especially when such a desire for access might thought to be highly probable, due to the status of the work within national or sometimes global discourse.

In the United Kingdom a museum or art gallery is considered eligible for charity status, only if they demonstrate that they *“are set up for the benefit of the public”*, similarly, the same government report highlights the value of such institutions by noting that *“Museums and art galleries form a vital contribution to the nations culture and heritage<sup>26</sup>”*. In this regard there is an implicit obligation, as well as a more concrete legal obligation, to make public institutions accessible to a disabled audience.

Yet, if we conjure in our mind notions of such establishments, few of us would consider them places that routinely encourage touch, a fact which it might be argued, provides a material barrier to those blind

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<sup>26</sup> (The Review of the Registered Charities, Museums and art Galleries, 2002)

people who rely on forms of touch-based comprehension. Indeed, Fiona Candlin (2004) addresses what they refer to as “*The embargo on touching in museums*” through their essay ‘*Don’t Touch, Hands Off!*’, highlighting an institutionalised reluctance to allow touch-based experiences of objects of artistic or cultural significance. In this, Candlin proffers the words of Kevin Hetherington (2000), stating that “*he positions blind people and their demand for haptic learning as other to ocular-centric museum practices*” wherein conservation is routinely offered as a rationale against touch, and that such calls for haptic engagement in these settings might be thought to “*undermine the very idea of the museum.*”

To this end Candlin presents a form of institutional access that they perhaps tellingly describe as ‘palliative’, wherein handling material is used to signal a museum’s accessibility credentials as opposed to being a truly developed haptic experience. Not so much celebrations of touch as a source of “*knowledge and pleasure*” but rather, a way in which to placate the want for touch in such settings, done so in order to prevent haptic interaction with other work not designated as appropriately touchable. This argument is framed within the context of a “*growing trend within museum practice that acknowledges the value of sensory experience*” which in the almost twenty years since the essay’s publication, has continued towards more inclusive and nuanced ideas of access.

Here it is perhaps worth noting, that there are long standing examples of blindness accessible art in museum contexts, many of which predate Candlin’s writing. Indeed, some institutions include disability access as amongst their core concerns, where provisions for those without sight are considered in much the same way that they address the need for any other disability provision. London’s National Gallery hosts “*Art through words*<sup>27</sup>” events in conjunction with its more routine provisions that include guided tours and audio description, “*The V&A has been offering tactile sessions for visually impaired visitors since 1985*<sup>28</sup>” and the Art Institute of Chicago, houses the permanent Elizabeth Morse Touch Gallery collection<sup>29</sup> and has had some version of their ‘touch and see’ initiative in place since the 1920’s. Candlin herself offers no fewer than three exhibitions where touch-based access to original artefacts was provided, highlighting that they are not isolated instances but a “*growing trend*”. Yet, through her essay, Candlin draws attention to a prevailing sentiment that museums are not meant for touch, a sense that even a contemporary audience can concede is still embedded into ocular-centric notions of what it is to visit such places.

Yet, the breadth and success of such accessible opportunities for arts engagement, demonstrate that it is already apparent to many within the visual arts that there is a broad and wide reaching desire from blind and partially sighted audiences, to encounter exhibited works and to engage with this mainstream of artistic consumption, and that there is a value above the ‘essential’ that comes from such engagement. In turn, there is a reasonable case to be made to extend the question of reasonable adjustment from concerns of the purely pragmatic, to some examples of the aesthetic, and that further when considered alongside other reasonable adjustments, the need to request access to works of great cultural significance, is perhaps unreasonable.

In this it may now be in some ways more apparent why this thesis has been separated into three distinct chapters, as much as access in regards to the functional is straightforward, in that it concerns the mechanisms by which information is accessed, the other two categories tackle questions that might be thought of as more nebulous or defuse. Cultural access is not only a question of the form of information, but a question of *when* visual information should be made accessible, and it broadly includes the question

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<sup>27</sup> (The National Gallery, 2022)

<sup>28</sup> (Richardson, 2022)

<sup>29</sup> (“Touch and See”, 2022)

of participation in what we might know through Wittgenstein, as a form of life<sup>30</sup>. Going further and addressing the language of the Equality Act itself, it may even be fair to say that it is a question of when and what information should be accessible in order that a disabled person is not at a "substantial disadvantage" from not disabled persons.

Returning to the keychain of the Eiffel Tower which operates as a recurring motif and exemplar within this thesis, few would argue that the monument itself is not culturally significant. Nor could they reasonably argue that it is not a part of the mainstream collective consciousness, a seminal aspect of a cultural visual lexicon that few with sight would not be able readily identify, thus it to some degree a visual icon whose image represents more than just the physical structure. In this way, facilitating an understanding that goes beyond the form and highlights the context and significance of the work, grants access to a degree of what the French sociologist Pierre Bourdieu (1973) would refer to as cultural capital<sup>31</sup> or access to the "legitimate culture" of a society. In our case we specifically refer to access to cultural goods like art and literature, as well as a knowledge of that society's language and mannerism. In this way, access to cultural capital can be thought to go beyond the functional access offered by more diagrammatic tactile images like graphs and maps, with the express aims of enabling broader participation and inclusion.

Gaps in visual understanding may be par for the course for blind people operating in an ocular-centric world, but limiting 'visual' education to that which is necessary to function as opposed to that information which is significant but perhaps not immediately useful, creates not just simply gaps in understanding but a considerable deviation between the available language of blind people comparative to the general population. For instance, removing the visual context from concepts like 'the stars', or their constellations, risks reducing them to primitive shapes or a collection of clinical scientific descriptors, as the poetry which is self-evident to those who can look towards the heavens is not priori to those without similar evidence. Detached from the qualia present with regards to exclusively visual experiences, many 'beautiful things' are improperly described, especially when that beauty is thought of as an inessential aspect of translation.

In the first chapter, I alluded to the common practice of offering multiple aspects of an object to create a more complete mental picture. This multi-modal approach when applied to a tree could be thought of as presenting a blind person with a tree, a leaf, a branch, a scaled down model of a tree and any number of other aspects to fill in a mental model of what defines "tree". An extension of this is to include in our definition of aspects, information that relates to the history, function and broader context of a subject, and not that which merely represents form. In essence, applying a functional argument that has so far predominantly referenced objects, to more complex but intertwined ideas of concepts.

It may be helpful at this point, to connect this approach to something more congruent with the traditional creative arts and non-tactile image making, turning to an example that offers a distinctly visual analogy of our non-visual discourse. For this a pertinent instance can be seen through the work of Charles and Ray (Eames, 1959), namely "Think/Glimpses of the USA<sup>32</sup>", where multi-screen films were used to show a broad range of topics that displayed many fragmented aspects of a singular, often distinctly American territory.

Resonant with the onto-epistemic ideas of 'Types' and 'Tokens' that, as we shall note shortly, are prevalent within the philosophy of Eddy Zemach, Glimpses showcases the vastness of what can be thought of as 'River' or 'Road' by presenting a range of concrete tokens to display the variety of types that

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<sup>30</sup> (Hunter, 1968)

<sup>31</sup> (Bourdieu, P., 1973)

<sup>32</sup>(Eames Office, 2021)

can be encompassed by it. That is to say, “Types are generally said to be abstract and unique; tokens are concrete particulars” (Wetzel, 2006). Therefore, by presenting multiple “concrete” instances, we are better able to understand the broader category, that being the “unique” type, many individual rivers help define the concept river.

To offer a less abstract notion of types and token, we might return to the experiences of Helen Keller (1900, p44) this time with reference to her experiences of early education. Keller explains that “*When playing with my new doll, Miss Sullivan put my big rag doll into my lap also, spelled “d-o-l-l” and tried to make me understand that “d-o-l-l” referred to both*” or to draw from a previously mentioned contemporary example of such thinking in application, we might consider the exercise “The Woodness of the Wooden Spoon” and extrapolate that to the consider Glimpses of the USA as the “Americanness of America”.

Through this, the Eames’ attempt to create a kind of associative fusion of the abstract, where context, form and function are linked in such a way that they display a more holistic understanding of the subject, whilst still very much dealing with fragments of a far greater whole. Yet, in their choice to use multiple screens, changing images and to some degree changing subjects, albeit under the broader category of the American, the installation creates an immersive experience which highlights the breadth of the territory at the expense of the clarity offered by a slower more contemplative consideration of each facet. In effect bombarding the viewer with the enormity of the multiplicitous, offering fragmented self-directed exploration, arriving at a syncretic exploration of tokens rather than encouraging an examination of every individual instance.

What Glimpses of the USA does in a predominantly visual way, we attempt to replicate through an alternative and distinctly slower sensory approach. By presenting the tactile image as an integral part of a guided or companion led methodology, we offer the audience the context needed to gain a truer sense of the subject, offering something more than depiction, that being, real, substantive representation.

In regards to a keychain of the Eiffel Tower, what a cultural approach seeks to offer over and above the functional is additional context that promotes access to a traditionally visual lexicon. Not merely to understand the shape of the tower’s arches or the feeling of cold metal, but to be able to apply that information in a confident and useful way, to use this knowledge and a body of similarly acquired knowledge of shared visual language, to better participate in the conversations contained within an ocular centric discourse. This in turn creates something akin to “the Eiffel Tower-ness of Eiffel Towers” to allow for not just understanding but tangible application of the subject ‘Eiffel Tower’. This in effect refers to a more holistic arguably phenomenological understanding of concepts, in which we offer access to the mainstream of artistic consumption and other kinds of experiential knowledge, by producing accessible alternative formats of information, amongst which we can count tactile works.

Yet, the distinction between the functional and cultural is complex, as the two schools are deeply interconnected in so far as the cultural as I have described it, oftentimes largely relies on a foundationally functional approach. In this way, it may be appropriate to proffer an individual work that demonstrates the value of the context provided by the cultural beyond the functional model. To this end I turn to Appendix B an Interview with Huddersfield Transcription Service, and an anecdote which was briefly alluded to in the first chapter, that is grounded in the relatively unique experiences of blind people.

*“I had a student who thought that chickens had four legs. He had only seen tactile drawings from the side, and all the images of dogs and cows only showed two legs to reduce the clutter of an image, but we had told him that these images that only showed two legs referred to animals with four legs, so when we*

*showed the chicken, which was another animal that had two legs, it was only natural to assume it was four legged because all animals have four legs right? It's just one of those examples that stuck with me because it showed that sometimes we really take things for granted that need to be taught instead."*

In chapter one I utilised this example to highlight the dangers of a reductionist doctrine of simplification when it is applied without due consideration, yet here, the same example demonstrates the need for a multifaceted, collections-based approach when presenting distinctly visual information to blind people. This is done in order to prevent such misunderstandings and lessen the 'deviation' between the image contained within a blind person's imaginative vision, and the common visual understanding of that type.

The error in the above example is made by a child, on a subject of seemingly little real consequence, yet it nevertheless serves to illustrate how information we consider second nature when sight is available, may be lost in translation when a degree of abstraction is applied. Furthermore, as the concepts we approach increase in complexity, there are more places where our own visual education may impede rather than aid in the propagation of a similarly visual connected lexicon. For in regards to the experiences of blind people, the sighted may often find it *"difficult to escape the ocularcentric mode of thinking"* (Willis, 2000, p.2)

In turn it might be suggested that the ubiquity of certain everyday objects renders the need for their tactile representation unnecessary. That is to say, if an object could already be thought to function as a model in its own right, in that as a vehicle for information it straightforwardly conveys its form, function and relationships, then it could be reasonably claimed that it is a tactile image simply by being presented as such. Returning to our interview with Huddersfield Transcription Service, we might proffer a pertinent example through the testimonial of staff, namely, in reference to aspects of their own training in regards to tactile works:

*"I remember a workshop where we were talked through tactile illustration, how we often think of "simple as better" when it comes to this kind of work. We were blindfolded and asked what an image was, it was clearly a rectangle but when I said that I was told "yes, but this image does refer to a real-world object". Eventually I gave up and was told it was an envelope. The fold was very faint so it was hard to pick up by touch, so while it was clearly there when you could see it and when you knew it was there to feel it, it wasn't very clear without sight."*

The envelope in the example above is ubiquitous, its form and function are understood far more straightforwardly by being able to put something inside it, by licking the gum to seal it or by simply engaging in the act of opening it. In this way it would seem unnecessary, in purely pragmatic terms, to create a tactile image of an envelope, since an envelope itself provides a significantly more effective tactile explanation of its own form. Where a functional approach might argue that a tactile image of an envelope is inessential in so far as there are viable alternatives, a cultural approach might similarly opt not to create a tactile work, not simply because there are other options, but because those options offer greater context. Wherein, the various forms of interaction make the found object a more enriching tactile work than a theoretical crafted equivalent.

For a tactile image of a common object introduces unnecessary layers of abstraction, often at significant cost of both time and resources. To broach another material example, a pencil is a more effective tactile explanation of itself, not only because of its ubiquity, but because of its three-dimensionality and the ability of the student to relate the object back to the ergonomics of their own hand. In this way an object provides

the contextualisation that is critical in offering access to the cultural, showing that an object is sometimes not only the simpler choice, but the better one.

It is reasonable to assert that the keychain is a representation of the original, and a vehicle for information as presented in chapter one. The keychain is recognisable as 'Eiffel Tower' even if we broadly understand that it is not 'The Eiffel Tower' itself. Yet more than this, the ubiquity and ease of access such tourist trinkets offer as tactile representations, facilitate a cultural access to aspects of a broad visual lexicon. That is, regular depiction of artworks and monuments in media, represent an aspect of a cultural shared language, one which, without accessible works those without sight may not have access to.

Yet whilst it is straightforward to assert that a keychain of the Eiffel Tower conveys information and that it is useful in providing access to depictions of the original work, it is perhaps more controversial to assert that such tokens offer us more than simply functional information, and that the status of the keychain as a vehicle for cultural access and by extension, that it conveys aesthetic information, may be seen to many as an overreach and ultimately a quaint understanding of what it means to experience and to be confronted by an original work.

Yet it is not inherently controversial to believe that aesthetic qualities can be conveyed through replicated works. From a realist perspective it may be asserted that *"... if any predicates correctly describe objective reality, aesthetic predicates are amongst them."* (Zemach, 1997, p.56)

Cultural access concerns aesthetic predicates, yet it is not entirely beholden to them. We can accept that to provide cultural access, we need to provide a suitable, functional vehicle for information. We may also accept that amongst that translated information, there must inherently be a kind of sensory information, what Zemach here refers to as Aesthetic Predicates. To convey through a visual work that an object a non-tactile image depicts would feel soft, there must be an analogous way of translating that information for a sighted audience to recognise it as such. When we state that something looks soft, few would think we are referring to an obscure or alien concept, despite the term being an inherently tactile descriptive we might reasonably think of a depicted object's blurred edges or some other visual indicator of softness.

In this way, we might also convey visual information through non-visual analogues, to proffer an example from my initial chapter, a 'shininess of shiny things' can be explained through other properties shared by said shiny things, i.e. the combined coolness and smoothness of buffed metal, being an indicator that an object is most likely shiny.

Aesthetic judgements require the ability to discriminate on a sensory level, and if we are to translate information across media, we must be able to offer sensory information that is at least loosely analogous. We need not equate the original to the keychain to concede that it in some way functionally represents it, nor do we need to equate the original to the keychain, in order to accept that it conveys certain aesthetic qualities of the original. Through a keychain of the Eiffel Tower we can offer not only a functional, pragmatic outline of the original tower, but a sense of the original that provides enough information to add it to a blind person's own cultural lexicon. A model which in a very real way, offers access to the mainstream of artistic consumption that goes beyond mere figurative depiction.

Similarly, the cultural might sometimes be thought of as the connection between the functional and aesthetic, still a vehicle for material information but one that is not always straightforwardly diagrammatic. Indeed, our repeated motif of the Eiffel Tower keyring conveys information that lacks the specificity of application that can be seen in typical examples of what I outline as functional works. A map or chart



stands in stark contrast to cultural examples, as functional works have definitive aims both in terms of the information they attempt to convey and the way in which they expect that information to be utilised.

In this way a cultural tactile image can straddle the line between categories, both by offering access to functional but still culturally significant information or conversely, by depicting iconic poetic works that may also be defined as culturally significant. Indeed, the Eiffel Tower Keyring's functional depiction of a culturally significant artistic and architectural work, puts it in the relatively unique position of being a good example of the intersection of all of three territories that orient this thesis. Accordingly, the tensions that are presented by this example's multifaceted nature, likewise serve to highlight many of the defining aspects and qualities of each respective category.

Yet, with this middle ground in mind, it is perhaps difficult to articulate a typical exemplar of what is a straightforwardly 'cultural' tactile image, at least not with the same ease that we can point to a functional or artistic work. In this regard, I was initially drawn to the previously established archival piece 'computer screen display' as when considering the date of the work and the writing that accompanied it, it would have once been a very typical example of the kind of image I am attempting to define. A work which intended to grant access to visual information, but which did not have a straightforward practical application for the information it presents.

With the added context of the age of the work and the style of the accompanying writing found within 'computer screen display', it becomes apparent that the aim of the collection was to offer access to mainstream visual information that had little practical application outside of that initial offering. The piece was commissioned by a blind person and created by the transcription service in response to that request, this was done primarily so that this blind individual might discuss the visuals of computer screen displays, in other words, so that they might add the concepts contained within the tactile pieces to their own 'visual' lexicon.

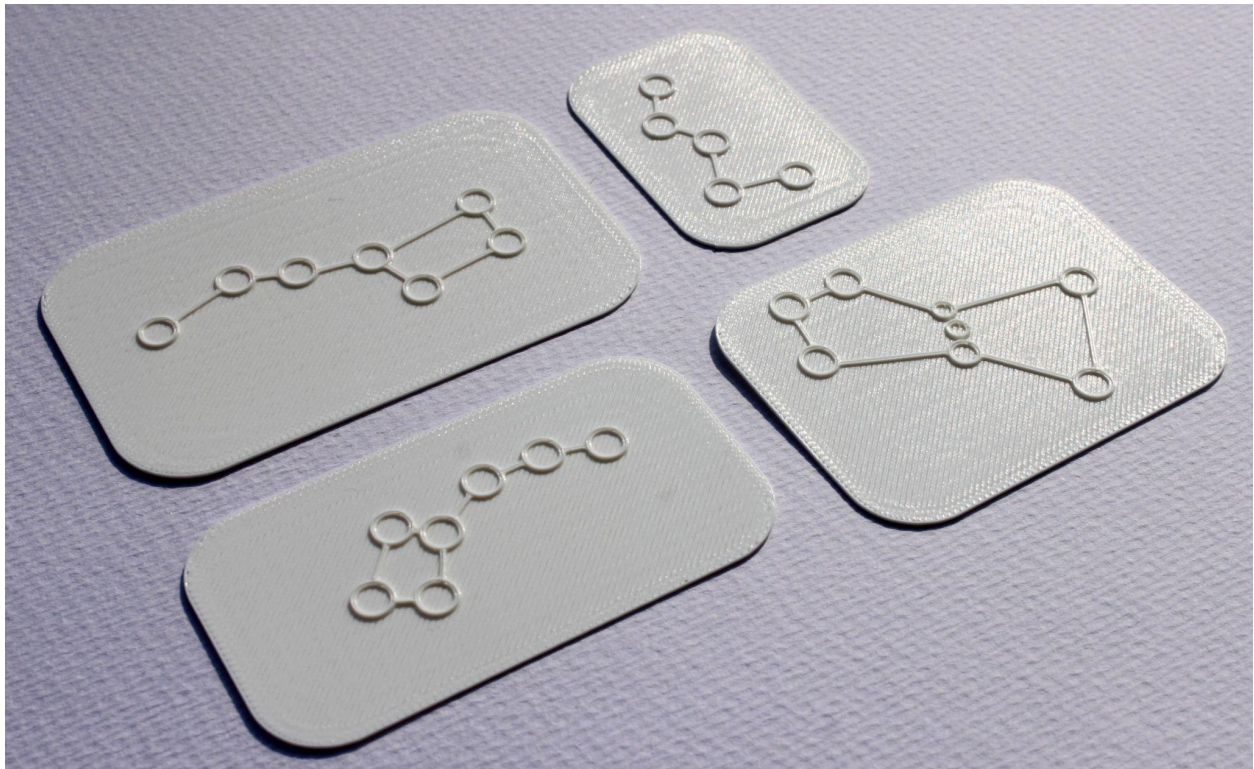
This piece's purpose is perhaps most straightforwardly evidenced by the non-navigational way navigational devices like drop down menus are presented, with the accompanying key displaying all screen-based information without direction on how a user might apply that information, "*10. Font name: ms sans serif 11. Font size: 8*" do not explain how one might change a font size, only that these buttons and features appear on the screen. In this way, 'computer screen display' clearly satisfies the criteria for a cultural tactile image as I have defined it, for it is a work that attempts to translate information without a value judgement or expectation of how that information should be applied. Instead, the piece simply attempts to offer access in response to a requested desire for access, in part because it is not unreasonable that such mainstream information be made accessible when there is a clear want for access.

Yet, with the progress of technology a knowledge of computer screen layout is now very much a functional concern, one that e-readers and similar software have mainstreamed to the point that claiming a contemporary blind audience would not be computer literate by default, is perhaps misguided. In turn, this historic example might come with problematic readings that make it less useful as an archetypal solution, as it could be argued that the form of the concern is now an outdated question.

As such, it may be beneficial to proffer my own example in tandem to this proven external work, one that is perhaps more pertinent to a modern era whilst still possessing many of the qualities that made 'computer screen display' an exemplar of the cultural tactile image within the context of its own time. In

this regard I turn to the concept of constellations as they might be presented as an archetypal cultural concern, which in turn, might be met with a similarly archetypal solution.

In this way, the work presented here has been produced in part because of the subject's enduring nature, that unlike 'computer screen display' the want for access is not tied to a particular interface which may date or weaken it as examples were that technology to become obsolete. In addition, the poetic or mythic dimension of the constellations as a topic, present an emotional dimension to such tactile solutions, one that stands in contrast to the rather dry presentation of 'computer screen display'. This emotive facet could be thought to strengthen an appeal for access to the 'inessential', for a potential justification for access to information without straightforward application, is the value we place upon the human centric experiences they facilitate.





*Fig. 20: The first image documents four 3D printed constellations, Cassiopeia, Orion, and both Ursa Minor and Major. Circles indicate the stars themselves with each star in a constellation being connected by the lines that make up their imagined form. The second image shows the same four prints presented on an MDF board, etched lines and rounded squares highlight where prints should be placed in order that their placement in the night sky can be understood in relation to one another. Cassiopeia is placed top centre of the board, Ursa Minor below and to the left of Cassiopeia, Ursa Major is below and slightly to the left of Ursa Minor, and Orion is located bottom right of the board, it being the constellation furthest removed from the others.*

Constellations lend themselves well to my already established form of tactile translation, circles and lines are simple to replicate and such models apply many of the same principles of raised line drawing that we utilise in other works, albeit in a less complex or pattern centric way. Even these rudimentary depictions can be used to explain formation, proximity and relation to other constellations, offering translations of broadly accessible information that does not necessarily have obvious application. Indeed, whilst wayfinding is one of the primary reasons to know of constellations and to be able to recognise them in relation to one another, it is not a skill that most of us apply on a regular basis. Many of us may know of Orion by virtue of having looked up at the sky, noting such celestial landmarks as Cassiopeia or the North star not as tools for survival, but as a connection to our collective histories and the shared stories that surround them.

Blind people may know the existence and names of these formations, they might also be familiar with the heroes and legends that birthed them, but a tangible visual understanding of a constellation is not something easily conveyed through description alone. To say Orion bears a striking resemblance to a human figure, or that either of the two Ursa formations are clear depictions of bears, is perhaps overstating their similarities to their name sakes. A degree of imaginative vision is required to understand these forms within the contexts of their mythos, and within that context it is not unreasonable to expect these depictions to be available to those without sight. Indeed, this can be thought of as both offering

access to imagery contained within a shared visual lexicon, and as a way of providing a tactile approximation of an already abstracted form.

As we have noted previously, Betelgeuse may be primarily known for its place within Orion's belt, but other interpretations like The Japanese Investigator, the Belarusian Throne or The Old Man of the Tupi, are all equally valid interpretations of the night sky. Each is a connected part of their own rich cultural heritage with their own associated stories and connection to the zeitgeist in which they were conceived, what Nadieh Bremer in her project 'figures in the sky' (2018) refers to as 'sky cultures'. They are a continuation of the oral traditions of our forebears, and as such represent an almost tangible connection to our own recorded histories, a foundational link to a past that is often intimately entwined with a particular societal or national sensibility.

In this way such tactile images are uniquely cultural artefacts, defined more so by their connections to the specific cultures that birthed them than either their imagined forms or aesthetic predicates. They are a vehicle for information that do not straightforwardly present expectations in regards to how that information should be utilised, offering access to context without further agenda. In turn, we might think of a primary defining feature of a cultural tactile image that goes above the functional, as its ability to offer access to seminal or distinctly human experience.

Previously I have posited that removing the visual context from the stars risks reducing them to primitive shapes or a collection of clinical scientific descriptors, as the poetry which is self-evident to those who can look towards the heavens is not as priori to those without similar evidence. In some ways, a connection to a 'sky culture' reintroduces some elements of the poetic into our discussion of the stars, a sense of shared histories and the *"innately human"* compulsion *"to see and use figures in the night sky"* joining us in a kind of collective identity.

*"It is innately human to see and use the figures in the night sky. To dream, to tell stories, to navigate, and more. Some groups of relatively bright stars are so distinct that cultures from around the world, separated by vast oceans, have connected them into a constellation in almost the same way. It's our human imagination and cultural history that ascribes wildly different figures and meaning to the shapes though. From kings, to legendary & important animals to mythical gods and beings."* (Bremer, 2018)

There are innumerable other examples of this connection to 'core' experience that is firmly rooted in an ocular centric context. One might turn to innate or evolutionarily ingrained phenomenon like Pareidolia<sup>33</sup>, that is our propensity to see faces in all manner of inanimate objects, or else any of the wide variety of optical illusions as representative of the most fundamental of human moments. Experiences that whilst not always readily viewed as important, might be thought to access some high universal quirk of our biology, a symbol which with the prerequisite of vision almost any human should be able to understand.

Conversely, we might also turn to less innate experiences that are nonetheless culturally significant and firmly rooted within the confines of the visual, such examples might include viewing the ultrasound of your unborn child or reading the Torah<sup>34</sup> to congregation. Oftentimes these events come with complex and

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<sup>33</sup> (Baylis, J., & Ting, D. K., 2015)

<sup>34</sup> Braille versions of *'chumashim'* or printed book versions of the Jewish Torah that have been divided into the five 'books' of the Torah, are commonplace for blind worshippers. However, when performing a reading 'to congregation' it is considered improper to use anything but a complete text. Additionally, touching a 'Sefer Torah' or hand-written Torah is directly forbidden in scripture, for *"Rebbe Parnach said in the name of Rebbe Yochanon that whoever holds a Sefer Torah naked [i.e. bare handed] is buried naked without that Mitzvah."* additionally *"it is not permitted to recite the Written Torah from memory."* In turn, the strictest reading of such

deeply emotive connotations, viewed as seminal moments within a culture or milestones within narrative of a single human life. Experiences which whilst not strictly universal, are often thought to add a significant positive connection to the human, for which those without sight do not readily have straightforward access.

## **2.1: Accessible 3D Printing & Tactile Image Making Tools in Application:**

Returning to our collection of tactile swatches introduced in our previous chapter and its corresponding appendices, it is pertinent to note that this body of work represents more than the series of objects of reference. Rather, as a collection, these pieces constitute something of a raised line, tactile image making tool set, one which whilst framed through an example of practical output is not limited to such a specific application. Indeed, as both a broad set of practical guidelines for tactile image making and a more targeted framework for the creation of a specific style of 3D printed raised line work, the aim of the collection is to enable the effective creation of further tactile images and a knowledge of why certain techniques or haptic elements are successful. In turn, the pedigree and provable history of effective tactile translation derived from RNIB techniques around swell paper, allows for both the development of a 3D printing specific expression and a more holistic understanding of the broader territory, where skills are transferable between media.

Whilst it might certainly be argued that this technique is inherently skewed towards the diagrammatic, in that it offers functional depiction that favours a simplified, reductionist approach, it is this relative simplicity that creates a low barrier to entry, where the means of production and replication of this style of work, enable a specific kind of broad cultural access. Indeed, there are notable benefits to 3D printing in a modern digital landscape, where the intersection of emerging user ability and profound public interest, allow for a degree of access to the mainstream of production and consumption of tactile image making, one that is in part fuelled by an engaged amateur or hobbyist audience. In turn, publication of printable files through browser-based design sharing platforms, promote the regular dissemination of accessible images in a way that is unprecedented in both its scope and scale, where potential reach is paired with a new found ease of access to equipment and files, as the cost of machines and compatible modelling software has declined sharply over the last decade.

Indeed, this ecosystem creates opportunities tied to the now widespread ability to print, where niche application presents less of a barrier to the availability of individual pieces, as access to STL files is straightforward and bespoke machining or manufacturing is replaced by a more commercially viable, rapid prototyping style process. In turn, the potential novelty of tactile images in terms of their ease of modelling and printing, is highly resonant with an already emerging market for the open source production of disability centric solutions, where even a cursory search on any major file sharing platforms reveals the prevalence of accessible prints of all kinds. In this way, exploring the website 'Thingiverse' under the search term 'Braille' reveals a multitude of disability tools and creative output geared towards a blind and partially sighted user base, from common place disability aids like sets of polyhedral dice with Braille

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laws would bar a blind member of the Jewish faith from ever reading 'to congregation' as neither a 'hand-written' Braille Torah, reading from memory or the use of chumashim would be acceptable. Reading the Torah aloud is something which remains a key aspect of becoming a Bar Mitzvah, and without concessions this would prevent a member of the Jewish faith undertaking this essential writ. Additionally, rabbi who lose their sight may find themselves prevented from practising by these standards. A more complete version of this conversation can be found in Aliza Sperling's "*Can a blind man read the Torah for the congregation?*". (Sperling, A., 2021).

numbering<sup>35</sup> and slates for hand embossing Braille<sup>36</sup>, to more innovative work like tactile prints designed to be used in conjunction with swell paper<sup>37</sup> and catalogues of tactile architectural ornamentation designed to be understood through touch with Braille annotation<sup>38</sup>.

It is perhaps pertinent to note that this wealth of easily viewable, downloadable and printable projects, is generated by both amateur and professional creators, wherein some featured projects have been published by established institutions like the RIDBC<sup>39</sup> and practising industry professionals as is the case with the tactile collider project and Burtonwood and Samuelson's (2015) work 'Twenty something Sullivan'. In contrast, others have been published by users whose body of work shows they use the platform in a more casual, hobbyist manner, but who routinely create sophisticated disability solutions, often after not finding models that work for their own purposes. In this regard we might note Kelsey Ross and her Braille polyhedral dice set, a work that was only created and disseminated after finding that similar prints available on the platform were too large and cumbersome for their partner. Ross states in her about section, that the "*vast majority of my designs are inspired by my wife who is nerdy, silly, and blind*" a story that is echoed across many of those who have close connections with loved ones and specific subcultures. There is a clear desire to share solutions, knowledge and work, one that is facilitated by these platforms and the communities that evolve around them. In turn, it is worth noting that these links were all retrieved on the same day, with little difficulty and limited searching, a fact which showcases the breadth and availability of the work that is already freely available to download.

In this, it might now be apparent that tactile prints operate most effectively when they are easy to find, readily accessible and straightforward to print, that accessible prints ought to be accessible to print. In turn, this methodology frames many of the mechanical design aspects of my own practice, where the construction of my own 3D models is guided by a series of principles which enables the broadest range of people to approach such prints, a beginner centric design philosophy which also accounts for a potentially disabled print maker. In this way, I embarked on something of a technical study that operated in tandem to our creative practical output, where a functional raised line toolset is applied to create a broad variety of tactile images whilst exploring a range of access driven technical questions.

The resulting study is documented in Appendix B, wherein notable aspects of the printing process emerge to shape later practice through pointed questions of access. In this regard, our design methodology primarily focuses on 2.5D images, as they require little to no smoothing or printing support<sup>40</sup> and which subsequently do not exclude those without the dexterity or technical ability to perform these actions. Additionally, notions of workable scale largely dictated by the size of commercial home printers and ergonomic considerations of both tactile comprehension and the size of the hand, work in tandem to provide an understanding of 3D printed tactile image making, wherein a collection-based offerings allows other works to compensate for an individual translations limitations, enabling multiple avenues towards accessible printing tailored to both the mechanical process and the end user. Finally, the thickness of our base plate factors into both print-bed adhesion and cost, where a thinner base reduces the time investment of individual prints whilst making them cheaper and more reliable to produce, something which

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<sup>35</sup> (Dots RPG, 2018; Idellwig, 2013; Ross, .K 2017)

<sup>36</sup> (Craeen, 2016; RIDBC, 2017; APHFTB, 2018)

<sup>37</sup> (Tactile Collider, 2018)

<sup>38</sup> (Burtonwood., T & Samuelson., T, 2015)

<sup>39</sup> The Royal Institute for Deaf and Blind Children, Sydney.

<sup>40</sup> Printing supports consist of extra material that is designed to 'support' areas of a print which either overhang or bridge sections. This additional material is usually printed in such a way that they are considered 'break away' and can be removed from the model as a part of post-production clean-up.

is weighed against the long term survivability of a print, which is somewhat mitigated if the work is mounted to a readily available backing material.

These factors, operate in conjunction to other mechanical and functional notions that have been addressed in our functional chapter, creating work which is both tactilely legible and straightforward to print, where the consumption and production of our work is considered in such a way, that the means of dissemination and tools for the further creation of work, are offered to a hobbyist but nonetheless engaged and in some cases, sophisticated audience. In this way, it is not always readily noticed that the French word amateur literally means 'lover of' and indeed, many prominent disability projects emerge from small groups of passionate individuals with little to no formal training in the subject area. These people may have personal experiences with disability culture, or else be created to fill a specific personal need, one which they publish under the assumption that others may benefit from their personal solution. To proffer an earlier referenced example, a Braille set of polyhedral dice might allow a blind person to play games in a physical space, where a material experience of dice rolling allows for a different kind of active participation, one that a non-tactile auxiliary aid like online dice roller doesn't.

Yet, as I extol the virtues of amateur engagement, it is perhaps necessary to acknowledge the pitfalls that emerge when those unfamiliar with the conventions of accessibility solutions, participate without a full understanding of certain facets of the territory. Indeed, those without the prerequisite experience might not appreciate some of the unique challenges and concessions mandated by works that cater towards disabled people, potentially even perpetuating damaging or problematic misconceptions. A pertinent and common example in regards to 3D printed solutions for blind people, is the notion of 'flat edged Braille' where the Braille dot is not a rounded hemisphere but rather an extruded cylinder. Whilst it would be inappropriate to cite examples of poor practice especially when referring to those making a good faith effort to engage with a challenging and often nuanced territory, flat edged Braille represents a ubiquitous and fundamental misunderstanding of the haptic experience of Braille reading.

As previously noted, flat edges in tactile works tend to catch the finger and are most problematic when applied to harder materials. Yet, extruding a flat shape is one of the first things a person will learn when they begin to design and model, as such, it is perhaps understandable that those who do not fully understand the mechanics of Braille, might think of these dots as a raised circle, a misconception which when combined with a student's desire to create something useful that is still within their newly emerging skillset, results in work that is unfortunately, not fit for purpose. Despite this, the positives of amateur engagement far outweigh the negatives, for whilst those initially exploring the territory may make errors, the people, communities and resulting printed works that already permeate these digital spaces, represent a tangible resource for further learning and continued engagement within disability arts, a way to educate those approaching a area of design for the first time, in order that subsequent work is both more sensitive and better informed.

Whilst we consider a great many technical questions within this section, it is pertinent to note that our cultural understanding is one which, in part, emerges for the functional. Indeed, through a discussion of the mechanical concerns of printing, we explore makerly and production-oriented aspects of access, where the cultural dimension of access to mainstream involves an ability to respond and present one's own voice. In this, the tactile image can be thought to move away from passive notions of looking at a work, towards a different style of active participation, where the ability to create and participate within a culture, offers the creator the tool to create a dialogue, one where we are able to contribute as well as consume. Indeed, the remediation of image into a tactile-kinaesthetic form already blurs the distinction between active and passive engagement, as the more measured interaction required for basic

comprehension of a touch based image, already presents a form of 'observation' that differs from simply looking at a work, one that it mandates considered action and contemplation from the viewer. Similarly, by providing access to a form of language, accessible work allows for broader participation within a culture, where aspects of shared experience that are often thought uniquely ocular-centric, are contextualised in such a way that they are not only understood, but able to be applied.

To this end, we position an understanding of the tactile image that goes further than the functional, whilst still being firmly rooted in the foundation of that same argument. Indeed, from a functional perspective, *"The purpose of a tactile illustration is to communicate an idea or information—not to reproduce a visual picture"* (Wright, 2008) a position that becomes difficult in consideration of art or aesthetic translation, in that often, the information we are attempting to translate is the visual picture. Yet these ideas are not inherently in conflict, as if we consider the ability for such techniques to present a more significant sense of a work, tactile images have the potential to be something altogether more transformative. In providing access to a cultural visual lexicon, tactile images attempt to grant access to elements of the visual which often include the pictured, information which facilitates a more comprehensive style of engagement where one does not only know of a visual thing, but rather, can apply that knowledge to conversation.

Positioned as fully realised models, tactile images offer the potential to index something essential about an object, to go beyond merely depicting the visual and grant a sense of the subject. Indeed, whilst we attempt to translate the visual picture, we also attempt to preserve the essence of that which we translate, to provide something analogous to visual experience that compensates for the deficiency of language to describe the full nature of a thing. To this end, we might draw upon two notable theorists on translation and the nature of language, comparing and contrasting Walter Benjamin's theory of translation, with both early and later Wittgenstein's views on language. In this, Benjamin will offer us a bridge between the cultural to the aesthetic through his notions of fragments and pure language, whilst Wittgenstein will facilitate a similar form of travel through the functional to the cultural, relying on his idea of logico-propositional picturing and his later notions of both form of life and family resemblance.

## **2.2: Walter Benjamin, Translation & Pure Language:**

When tackling questions of remediation and equivalency, we might well refer to the writings of Walter Benjamin, specifically his thoughts on 'pure language' and translation. Indeed, the way in which I have utilised the term translation in earlier chapters, that being the modal-shift that comes from converting an individual work into a new media, might reasonably be ascribed to Benjamin's consideration of the practice of textually describing artworks, within the context of art theory and his connected discussion of forms.

Through the Task of the Translator, Benjamin initially posits an almost reductive idea of the role of art writing and other forms of art translation, namely *"Is a translation meant for readers who do not understand the original? This would seem to explain adequately the divergence of their standing in the realm of art. Moreover, it seems to be the only conceivable reason for saying "the same thing" repeatedly."* (Benjamin, 1968, p.151).

Whilst Benjamin goes on to playfully deconstruct this initial rhetoric, it is pertinent to address that in many regards, disability solutions are often constructed in response to this exact concern. Those without useful vision often do not have the mechanisms available to understand the original, as such when viewed



through a lens of disability theory it becomes apparent that there is strong justification for saying “*the same thing repeatedly*” that concerns notions of access for those for whom the conventional way of engaging with a work is in some sense unavailable.

Antoine Berman et.al, (2018) in their seminal work addressing Benjamin’s ‘Task of the Translator’ refer to this section in terms which may offer additional insight and context to Benjamin’s words, namely that “*as the opening gambit in his critique of communication. Benjamin asks a question that is both essential and odd. It is a question that goes unanswered. To be more precise, he uses the interrogative form to lay out the assumption that underlies all conventional theories of translation: translation is made for readers who do not understand the original text.*” In this way, we might understand that the term translation has dual meaning throughout the early sections of Benjamin’s writing, that “*conventional theories of translation*” as Berman describes them could be thought to concern informative texts, where the intent is the translation of meaning in the most literal and in some ways limited sense, what this thesis might describe as functional works.

Further, Benjamin’s later definition of translation and the one which he predominantly refers to, concerns the translation of poetic works. In turn, such translations do not attempt to convey ‘meaning’ but rather seek to convert the essence of a work into another language. In this way, the poetic is made accessible to those unable to ‘read’ the original in its mother tongue, and whilst Benjamin might rebuke any notion that a translation conveys meaning, his ideas on translation when understood through a lens of disability design practice, are deeply resonant with ideas of access. In converting a work into another language, we offer a route towards understanding, much as Berman asks “*Do we ‘understand’ a foreign language in the same way we ‘understand’ a poem?*” So too can we address the idea that there is a distinction between being able to comprehend a work and understanding it, in the sense of being in tune or resonating with it, whilst extending and transforming its life.

In chapter 1 through our discussion of functional forms of translations, we established that a photograph might be considered as much an accessibility aid for those without the means to travel to the original, as a tactile image is to those unable to mechanically view the same work. Whilst aspects of such translations may be aesthetically inferior, such mediated forms offer access that would be otherwise unattainable. This notion is in tune with other readings of Benjamin, indeed, Varley in their address of Benjamin’s notions of the original, states that “*technical reproduction can put the copy of the original into situations which would be out of reach for the original itself. Above all, it enables the original to meet the beholder halfway, be it in the form of a photograph or a phonograph record.*” (2004) Similarly, whilst poetic translations seek to index something essential about the original through remediation, a recurring motif when discussing access to the mainstream of consumption is the desire for equivalent access and not necessarily equivalent experience. For much as “*The cathedral leaves its locale to be received in the studio of a lover of art;*” and “*the choral production, performed in an auditorium or in the open air, resounds in the drawing room*” so too might we find similar value in the cultural tactile image, for it might bring the Mona Lisa from the Louvre or the Eiffel Tower from the Champ De Mars. In turn, it is beyond the purview of the poetic translation to help its audience “*‘understand’ a poem*”, instead in a pursuit of access we are simply the mediator between the language of the visual and the language of haptic.

To consider this thought in line with a more established functional context, we might turn to the disability focused writings of Michael Oliver (1995) wherein he states that “*an aeroplane is a mobility aid to non flyers just as a wheelchair is mobility aid for non walkers*”. Whilst it might be tempting to consider accessibility as the sole concern of disability studies, as indeed there are broad sections of my writing that concern a uniquely disability centric discourse, a critical facet of the territory is that by facilitating access

we grant entry into a broader conversation that an audience was previously excluded from. With regards to translation and remediation, we offer opportunities for connection that are not unique to those with a disability, but rather any who lack the means to engage but for the presence of a translated form.

In turn we might frame a similar sentiment through another previously mentioned accessibility argument, where the legislative lens of the UK Equality Act (2010) presents a simple but effective litmus test for access, where persons might be "substantially disadvantaged" but for the "provision of an auxiliary aid". Whilst this is a distinctly disability focused argument, the concept of access but for the addition of an external aid is one that can be readily applied to translation, photographs are to those who are unable to access the original, as aeroplanes are to non-flyers or tactile images are to those without sight.

Considering the era in which Benjamin operated, it may not be surprising to note that a disability framework is not readily found within his writings. Despite this, the contemporary notions of parity of access through replication in multiple forms, is highly resonant with his own definition of translation. Yet, upon first reading the task of the translator, one might be forgiven for thinking his writings present the opposite viewpoint:

*"When seeking knowledge of a work of art or an art form, it never proves useful to take the receiver into account. Not only is every effort to relate art to a specific public or its representatives misleading, but the very concept of an "ideal" receiver is spurious in any discussion concerning the theory of art" going onto say that "No poem is meant for the reader, no picture for the beholder, no symphony for the audience."* (1968, p. 69)

Yet, what at first appears incongruous with disability art, could in fact be read as a way of championing it. For indeed, Benjamin does not argue that texts should not be translated into different languages, nor that translation of artistic works should not be attempted, only that the idea of an ideal observer is a fallacy. Indeed, in his mind art objects are rarely created for an audience, but rather it is the case that *"A work of art does not presuppose a receiver."* and as such *"It does not 'turn' towards us. And that is precisely what makes us turn towards it"* (Berman et.al, 2016) In this way poetic works are introspective, they turn inwards in a way that is distinct from informative or functional pieces. As such Benjamin's position is that such works *"essential feature is not communication"* and the meaning an audience takes from a work is not the concern of the translator, rather *"It is the task of the translation to lead the original towards its ideal version"* and that this 'pure language' as Benjamin describes it *"exists silently beyond all translated versions"*. In other words, translation is not for the reader, but rather, its role is to elevate the original.

In this there is an accessibility argument to be had, for in the dismissal of an ideal observer we also remove much of what bars participation from a disabled and lay audience. Indeed, other theorists present a distinctly antonymic view, where an ideal audience is not only theorised but present, to this end we might proffer the work of the philosopher Eddy Zemach and his consideration of 'Real Beauty' (1999) to address both the rationale for a better audience and the ways in which it often stands at odds with disability theory. To Zemach there is in fact an ideal or at least more suitable audience for the reception of beauty, a group that possesses a correct set of observational conditions for engagement with the media, a specialist, often innately gifted recipient to whom we should turn to as authority on definitions of what is beautiful.

In this regard there is a somewhat elitist, connoisseurial dimension to his thinking, which is reflected in his preference for a harmonious and integrative aesthetic lexicon, as well as in both his assertion of the Mona

Lisa as a paradigmatic example of the aesthetic<sup>41</sup> and in his privileging of specific forms of aesthetic taste as possessing a kind of superiority. Other aspects of Zemach's writing are more resonant with some of the concerns of this thesis, such as his notions of time sensitive properties and standard observation conditions, which are based in a kind of aesthetic relational materiality that will be explored later in the chapter. However, at this point we will focus upon the more contentious aspects of his position, that which concerns a mode of elitism which does not always sit comfortably next to prominent notions found within disability studies.

To Zemach beauty is not subjective, but rather a 'real' property of the object, in much the same way that something might be soft or hard, such aesthetic predicates contained therein require a certain perspective to appreciate them, a perspective that Zemach argues not all are capable of attaining and where finding beauty in lesser forms can be explained by a viewer possessing a non-standard set of observational conditions.

To proffer a more concrete example, we might turn to his discussion of wine tasting where he writes that "*the taste of wine require[s] natural skill*" and goes on to refer to "*native talents*" such as "*(perfect pitch)*". The idea that access to beauty requires a natural disposition, could be thought to be at odds with many theories within disability arts, where a mechanical inability to observe or comprehend a work, what Zemach might refer to as having a set of '*non-standard*' observational conditions, might in his mind makes a real appreciation of the aesthetic dimensions of that piece at best highly improbable and at worst impossible.

Yet, what Zemach offers as definitive examples of native talents, are not indisputably innate as he perhaps presents them. Indeed, the pallet of the sommeliers or the ear of those that can discern pitch, both have taught dimensions and are in some cases, questionable authorities within their respective territories.

The findings of the statistician Robert Hodgen (2008) serve to contest such claims. In his four-year study on wine judging, Hodgen states that "*judge inconsistency, lack of concordance – or both*" are responsible for results that show often random distributions, and that "*any wine earning any medal could in another competition earn any other medal, or none at all*". The Napa valley tasting of Paris or "the judgement of Paris" is a now infamous example of wine connoisseurs being unable to ascertain region from taste alone, disproving "*the myth that only in France could you make great wine*" (Godoy, 2016) and more recently the Frédéric (Brochet, 2001) wine experiment showed that oenology undergraduates were unable to discern a white from red wine after it had been dyed, and that the expectation of tasting a cheap vs an expensive bottle of wine had enormous influence on the taster, demonstrating to some degree, the impact of social and cultural factors in our appreciation of the beauty of things.

Similarly, whilst absolute or 'perfect' pitch is widely thought to be an innate ability<sup>42</sup>, similar talents like relative pitch or pitch memorisation are not. As such the ability to recognise single notes and then extrapolate others from that initial identification, is a skill that can be learnt and implemented to great effect. Similarly, 'perfect' pitch rather than being exclusively a boon to musicians, can in fact be problematic when attempting to learn 'transposing instruments' where the written and sounding pitch are notably different. In turn it is thought only around 1 in 10,000 people have perfect pitch, and whilst many

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<sup>41</sup> (Zemach, 1999, p.7)

<sup>42</sup> Though some dispute over the level to which it absolute pitch might be taught does exist, and (Van Hedger, Heald, Koch and Nusbaum, 2015) state that "*auditory working memory can explain the success of non-AP possessors learning absolute pitch categories supports the notion that intermediate levels of absolute pitch*".

of those go on to be musicians only around 1 in 25 operating at that level are thought to possess the skill (Harrison, 2019)

All this is to say, that whilst I do not dispute the existence of biological sensory conditions such as perfect pitch, I do take issue with the claim that such predilections are necessary to excel in a given field. Rather, an uncommon perspective can be of benefit when approaching a well-established area and whilst some native talents may give an advantage, it could be argued that few territories truly exclude participation for want of an innate ability or what some might refer to as a 'super sense'.

To go one stage further, we might detach definitions of native talents from such extreme examples of extraordinary sense abilities, and instead posit that very often the absence of a primary sense or presence of a disability is not as definitively exclusionary as one might think. It may seem glib to state that those without legs may find a career as a sprinter more difficult, were it not for the plethora of examples of successful Paralympians who prove that difficulty is not always insurmountable given the right adjustments. Disability often presents unique barriers to entry but the ability to see is not the prerequisite to draw, only the ability to make marks, the ability to see is not the prerequisite to take photographs, only the ability to operate a camera. By concentrating on the skill or sensory discernibility of the viewer Zemach could be said to exclude a mainstream audience from meaningful engagement with the arts, taking a position that ultimately limits the cultural impact such works can have on the collective consciousness by declaring only a select few capable of understanding their 'Real Beauty'. In contrast, the disability arts position of the importance of access to the mainstream of both artistic consumption and production, takes the view that whilst the means in which a disabled person might engage with a territory might differ, this variance is to be celebrated and not to be thought of as Zemach might say, as the audience possessing a 'substandard' set of observational conditions.

To proffer some pertinent examples, both Monet and Matisse created some of their most influential work with ailing health and deteriorating sight, with their unique perspectives and indeed their limitations playing a key role in the direction of their creative output. Matisse might not have taken up tailoring scissors if he was still able to paint, and some consider Monet's later work evidence of his ability to see ultraviolet light as a result of his cataracts<sup>43</sup>. All of which is to say that I take the position that great minds rarely think alike, and that in truth a unique set of observational conditions as opposed to an ideal set of standard observational conditions, often offers an approach to a territory that can be of great benefit even to those working at the height of their field.

With notions of native talents now firmly in mind, it is perhaps more straightforward to consider Benjamin's outlined position as inclusive rather than exclusionary. Indeed, it should now be apparent that the idea that no audience should be considered and that an ideal observer is '*spurious*', is not as it first appears against equivalent access, but rather against the concept of equivalent experience. For if "*No poem is meant for the reader, no picture for the beholder, no symphony for the audience.*" then by rights, a translation would most likely be no more tailored than the original, with the obvious caveat that a work should be at the very least presented in a way that makes it equivalently comprehensible. In translating poetic work from its original visual language into a haptic equivalent, we do not seek to help an audience "*understand the poem*", only facilitate access akin to that possessed by native readers.

For instance, German writing need not be tailored to an English cultural lexicon but in translation it should at least be equivalently comprehensible, that being it should be presented predominantly in English. Indeed, a notable example is already present in translations of Benjamin's own writings, where certain

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<sup>43</sup> (Fessenden, 2012)

terms for which there is not a straightforward English parallel like *‘Überleben’* or *‘Fortleben’* are presented alongside their most suitable equivalent, ‘survival’ and ‘continuing life’ respectively. A tactile rendition of a traditionally visual work may be representative of the original, but as long as it is mechanically comprehensible it need not be mediated in such a way that the subject or material is any less abstracted or challenging.

In translating the ‘visual picture’ into a tactile one we offer insight into the presented form, yet in regards to poetic works beyond translating said work into another ‘language’ we need not necessarily simplify the content to make it more digestible or palatable to a specific group. In this we are presented with a fundamental tonal shift from the functional to both the cultural and poetic translation, in that it *“seeks in translation something other than the reproduction of meaning”*. For it is the sense of a thing we are attempting to convey and not merely the preservation of its various components, in written works a translation may be understood whilst at the same time losing the poetry of the original, and indeed whilst a tactile translation should rightly approach the original content with some sensitivity, it may differ in a great many regards whilst still being appreciably of the same type as the original.

Further, Benjamin outlines that the task of the translator *“consists in this: to find the intention toward the language into which the work is to be translated, on the basis of which an echo of the original can be awakened in it”* (1968, p.76). If we accept that the audience experience is to some degree a secondary concern when translating poetic works, and that in turn the primary consideration should be a sensitive translation that attempts to index something essential about the work, then it is non-problematic if the translation omits aspects of the original. In this way a cultural tactile image could be thought to offer a better sense of a subject without having to translate every aspect, especially in cases where the information we are attempting to translate is perhaps more nebulous or defuse.

At this junction, it is perhaps important to more clearly outline *“Benjamin’s famous concept of ‘pure language’”* for it is pertinent to translation in that it *“invokes an amalgam of all the languages of the world, and it is precisely this aggregate language that is the medium in which the translator should work”* (Nabugodi, 2014). To Benjamin, a translation should *“render the relationship between the words of the original and a third thing that it indexes”* and it is through this indexing, or an understanding of the connections between translations, that a pure essence of the original work emerges. In this way, Benjamin considers it *“the task of the translation to lead the original towards its ideal version”* and states that pure language *“exists silently beyond all translated versions”*, a utopian ideal that justifies translation not as aesthetically equivalent to the original, but necessary in a process of transformation, to elevate a work beyond the language in which it was conceived.

In characteristically faith-based terms, Benjamin discusses Pure Language in connection to the supposed universal language of antiquity, before the fall of the Tower of Babel, and through this mythology *“It presupposes a language into which all texts of all living and dead languages are to be translated undiminished. Or rather, it is this very language. But not as a written language, rather as a festively enacted one.”* That is to say, that an aggregate of all language might give us a distilled essence, an idealised, undiminished version of the poetic. In this regard, his distinction that this universal language would not be written but rather enacted, is resonant with discussion of remediation, and that the transformation present between forms is essential. Pure language is *“attainable only through the totality of their [individual translations] complementary intentions”*, and in this way, it is important to note that *“Kinship is not resemblance”* (Berman, 2018) that intention as Benjamin describes it does not straightforwardly refer to an intent from the author, but rather the parts of every translation that are harmonious. In regards to a translation of a written work into a film and a TV show, complementary

intentions may be the aspects that connect all three instances, the narrative points and characters that transcend adaptation and create an essential work that is an amalgam of all three. In this regard we are left with a silent version derived from an understanding of all instances and the connections that bind them, where the sum total of these works creates a better or some might say, purer version that operates in the background.

In a connected vein, an essential tenet of Benjamin's ideas on translation, is that *"True translation is translucent, translation does not cover the original text, does not block its light, but allows pure language to fall on the original all the more fully."* For a translation acknowledges its parent whilst at the same time presenting itself as something distinct, and further, Berman (2016) in their reading of this concept, states that *"a translation can only look like a translation if it introduces distortions into the translating language. If a translation wants to make itself felt in the texture of the text, it can only do this if one senses the foreign language behind and inside it"*. In this regard Berman acknowledges a discrepancy amongst translations of the 'Task of the Translator' namely, that there are versions of the work that use the term transparent in place of translucent, a distinction which might be thought to offer a notably different interpretation of the same text. With this point of contention acknowledged it is worth noting that my own writings utilise Berman's preference of translucent, for the broader implications of transformation are resonant with many concepts found within the territory of disability studies. Namely, the idea that *"one senses the foreign language behind and inside it"* is particularly poignant when considering a shift between the visual and the haptic, for through this we might proffer the idea that either register might offer a sense of the other.

With Helen Keller's concept of the 'seeing hand' once more in mind, we can discern the notion that in the absence of both sight and hearing, that touch has the potential to replace those senses in terms of both function and experience. In a broader sense many aspects of our shared language already acknowledge this interplay between senses, for soft can denote the blurred edges of an image and loud might refer to a bright colour. In this way, a translation that is predominantly concerned with changing modes of sensory perception, might offer unique insights into our other senses.

In those cases where an audience is unable to access visual language, it may be possible to create translations that offer a loosely analogous experience within the confines of the other senses. In turn, by presenting the essence of something we consider uniquely sight-based, in a form removed from that ocular-centric context, we might better understand facets of the original that might be confused by visual modes of thinking. In this way, it may be beneficial to return to some of our earlier practical examples, for when they are considered in conjunction with Benjamin's ideas of translation, we might address some of these visual biases, offering tangible examples of sensory interplay that are intimately connected to ideas of translation.

In Cottin and Faría's "The black book of colours" the concept of colour is expressed through small captions and tactile illustration. The story, told from the point of view of "Thomas" a blind child who, like Frank Jackson's eponymous 'Mary' of the famous thought experiment 'Mary's Room'<sup>44</sup> has never observed colour, though unlike Mary, Thomas never develops the ability to see colour in a traditional sense. In turn, Thomas conveys the concept of colours through its relationships to his non-visual senses and the objects he knows to be associated with those colours, for "Red is sour like unripe strawberries and as sweet as watermelon." and "It hurts when he finds it on his scraped knee". In this way, we find real

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<sup>44</sup> (Jackson, F., 1982).

examples of equivalence through connections, where in the absence of the experiential knowledge or the qualia of viewing colour, we might still understand a subject by its connections to other instances.

In addition, the black book of colours goes on to address the concept of water, namely that *“Thomas thinks that without the sun, water doesn’t amount to much. It has no colour, no tastes, no smell”* for whilst we think of water as blue, it is only blue in the same way that mirrors are green, for it is only when it is seen in extreme examples like large bodies of water or in the case of mirrors when they are reflected in another mirror that this faint colour is revealed. In this way, small quantities of water are most often colourless and in this regard the truth is more nuanced than simply stating it is or is not blue. With this, we might accept that there are at least some preconceived notions that arise from sight, for whilst being similarly faintly coloured, mirrors are broadly discussed in colourless terms and water is often considered blue by default, for the answer to even simple visual statements like the colour of things, is rarely completely binary.

Benjamin’s discussion of translation is predominantly concerned with poetic works, and yet in regards to disability focused translation, it might be appropriate to apply his thoughts to the broader discourse. To this end, a particular section of Berman’s writing stands out as particularly resonant with many of the points established within the previous functional chapter of this thesis, for *“As soon as we postulate that translation is something other than the transfer of meaning, discourse on translation ceases to be a method because the question of its purpose arises (why translation?) and its object (what should I translate? Or: should I translate?)”* In this regard, there are clear parallels between the functional tenets of tactile image making and Berman’s interpretation of poetic translation, as both have a far greater consideration of whether a translation is necessary<sup>45</sup> or appropriate than is common amongst *“conventional theories of translation”*.

In this way, the shift between modes of sensory thought present within almost all tactile images and other accessible translations, might be considered poetic concerns, in that there is a far greater responsibility upon the translator to convert the essence of a work, when the intended audience lacks a sense-based, contextual understanding that would be present in a non-disabled audience. In this way, Benjamin writes that the translator must translate *“the incomprehensible, the secret, the “poetic”? That which the translator can render only insofar as he — also writes poetry?”* For as much as this thesis makes distinctions between the functional, cultural and poetic tactile image, in regards to the complexity of any disability translation, it would not be unreasonable to assert that a translator must be engaged in disability art in order to understand the complexities of the territory, that they must *“also write poetry”*.

Indeed, Benjamin presents an idea of translated forms that tackles questions of aesthetic inferiority primarily by considering them auxiliary, connected to the original but also in some ways independent. A translated work need not be aesthetically equivalent to that which it translates, and by Benjamin’s definition judging a translation by that standard misses the purpose of translation more broadly, which whilst inherently entwined with the original need not be considered art objects in their own right, thus they need not be assessed by that same standard. Benjamin states that *“although it [a translated work] cannot claim that its products will endure, and in this respect differs from art, does not renounce its striving toward a final, ultimate, and decisive stage of all linguistic development. In translation the original grows into a linguistic sphere that is both higher and purer.”*

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<sup>45</sup> (Amick & Corcoran, 1997; Presley & Hastings, 2005; Tactile Graphics, n.d).

In this, the concept that a translation of a poem is not the act of creating poetry, but that the translator must nonetheless be engaged in the broader sphere of poetry, or more over that a translated artwork *“cannot claim that its products will endure”* but that a translator must consider the poetic dimensions of the work, that being that a translator is not creating art but must understand art to properly translate their work, is highly resonant with the cultural tactile image as this thesis describes it. Indeed, when understood through the hybrid lens of disability translation, considering the cultural image as an auxiliary aid, a way of creating access without necessitating any claims of aesthetic equivalency between the translation and the original, are where the cultural tactile image is at its most district.

In this we might return to the writings of Barnes and Mercer (2001), as whilst they present a definition of disability art that includes our often referenced *“access to the mainstream of artistic consumption and production”*, this definition is incomplete and in context it becomes clear that access alone is insufficient. Indeed, the second and third aspects that Barnes and Mercer set forth when defining the nature of disability art, namely *“impaired-focused art that explores the experience of living with impairment.”* that presents *“a critical response to the experience of social exclusion and marginalization.”* would rightly exclude my own tactile works from the umbrella term of disability art. As translations and as frameworks for the creation of future tactile works, most if not all the practical work I generate as a none disabled person, should not be considered disability art by this standard. Yet, by offering access to the mainstream and in some ways facilitating a practical disabled response to that mainstream, I nonetheless operate in the broader sphere of disability art. Not a poet, but still concerned with the poetic.

As such, when tactile images are utilised in such a way that they offer access to the mainstream of artistic consumption, they need not be judged by the standard of traditional art objects. As a translated and mediated form a tactile image might render a poetic work without straightforwardly being a poetic work in its own right, and it is perhaps through this perspective and the way in which it allows us to navigate or to some degree circumvent questions of aesthetic equivalency, that we can think of the cultural image not in binary terms of copy or artwork, but as a way to elevate the original, a tool to aid in understanding.

In turn, by primarily defining tactile translations and equivalent auxiliary aids as ways of accessing aesthetic works rather than equating them, the cultural tactile image can be said to function as a way of offering access to the mainstream without necessitating the same level of scrutiny that might feasibly accompany an original piece. In this, there is a reasonable argument for the creation of disability accessible versions of ‘beautiful things’ that does not require an acceptance of the perhaps more controversial stance that the auxiliary aids themselves might in fact be beautiful.

By presenting the cultural image as ways of indexing the essential work and referencing Benjamin’s thoughts on ‘translatability’, we might now return to the idea of a collections-based approach to understanding, examining the way in which collections with strong relational properties, might mirror notions of fragmentation. Whilst continued reference to exercises like ‘The Woodness of the Wooden Spoon’ might seem quaint in regards to the wider territory of art translation, it is pertinent to highlight where mainstream instances of applied disability theory and the broader discourse of art translation, strongly intersect. In this way, collections might be thought to offer many fragments of a theoretical whole, assembling tokens in order that we might lay the foundation for an understanding of the broader type to which they belong. For it is only by offering many concrete instances or translations, that we might understand the implied pure language that emerges from the aggregate of information presented.

In this way, Benjamin states that *“Just as fragments of a vessel, in order to be fitted together, must correspond to each other in the tiniest details but need not resemble each other, so translation, instead of*



*making itself resemble the meaning of the original, must lovingly, and in detail, fashion in its own language a counterpart to the original's mode of intention" (1968, p.78).* In response to Benjamin's metaphor of the vessel, Berman states that *"Joining up languages at the point where they both fracture and fit back together can only come about through literality. For Benjamin, far from producing a sort of informal mixture of two languages, this is how the two languages complete each other."* For translation is concerned with individual concrete works and silent, almost ethereal connections between those works. To wit, Benjamin's own metaphor offers an image that doesn't merge individual instances, rather, translations are understood in relation to each other and connected in a very literal sense. In turn, when enough harmonious fragments are assembled together, they can imply a completed whole that does not require all fragments to be present for the completed form to be understood.

This archaeological idea of assembling a vessel in order that we might glean a true understanding of its form, is pertinent to disability focused translation primarily because it does not require all instances to be present in order for the 'pure language', that is the form of the vessel, to become apparent. In the absence of visual instances, a non-sighted audience is prevented from possessing every fragment, but such gaps do not preclude an understanding of the work, rather they are accounted for in the idea that pure language is implied from an aggregate of all available instances. More fragments give a better understanding of the form, and in this way, a tactile translation operates as both an auxiliary aid to those unable to access the original, and as an additional fragment for those who can perceive the parent work.

In my previous discussion of objects of reference, I briefly alluded to the pattern of a tyre tread, for the ability to touch the tread when entering a vehicle creates a close tactile relationship between the event of travelling in a car and the pattern of the tread itself. In the case of someone who struggles with transitional events and for whom sight is not a prevailing factor, the ability to feel a one to one relationship between the abstracted tread pattern depicted on an object of reference and the tyre itself, presents a smooth transition focused on tactile relationships to specific fragments. In contrast, a more complete image of form like a toy car, looks a lot like the original but does not have the same tactile kinship, it is a fragment of the vessel but not one that can be immediately recognised without other fragments, ones that are traditionally connected to a visual understanding of the form. They are part of the same whole, but in this analogy, they are not pieces that sit side by side. In this way, the relationship between the object and the sign that represents it, often strongly correspond to each other without always straightforwardly resembling each other, and accessible solutions may act as additional fragments in order to present a more complete picture of the whole.

In turn, the context offered by the event and interaction with the car itself, elevates the tread pattern from simply a fragment, to a collection in its own right. It is not one facet that is demonstrated through the use of the tread pattern as an object of reference, but rather, multiple fragments. The experience of travelling in the car is understood in relation to the object of reference, the tyre tread and the ritualistic act of touching these parts in order to orient the user. These aspects then intersect to create a more holistic understanding of the subject, and by drawing on other information that surround an object like the function and experiences that are connected to it, such work can be thought to simultaneously echo the collections-based approach of exercises like 'The Woodness of the Wooden Spoon', and Benjamin's ideas of translations as presented fragments.

### 2.3: Ludwig Wittgenstein & A Collections-Based Approach to Models:

Whilst Benjamin's notions of 'Pure Language' and translation are firmly rooted within a poetic or aesthetic discourse, the cultural image as described within this thesis is broader in scope and subject. Indeed, as the bridge between the functional and the aesthetic, the cultural tactile image concerns itself with many of the intricacies of both territories. In this way, not every cultural tactile image attempts to distil the essence of what it translates, because not every cultural image is poetic. Rather, in some instances such works are almost hyper fixated on the "*reproduction of meaning*" and the mechanisms with which the intended audience might understand the work presented to them, in stark contrast to Benjamin's own views on the nature of translation. In this regard an explanation of the cultural image that relies solely on Benjamin, omits important facets of the territory, especially when referencing those works that operate in a register closer to the functional end of the spectrum.

In this way, it may be pertinent to proffer an additional viewpoint, one that in some ways harmonious with Benjamin's theories but which is not solely concerned with translations of aesthetic works. In this, it is through the writings of Ludwig Wittgenstein that we might proffer a rationale for more audience centric tailoring of work, whilst avoiding conflicting notions that no poem is meant for the reader by working within a more design centric notion of translation. For indeed, whilst it might be the case that no poem is meant for the reader, every advertisement has an intended demographic, thus not all images with aesthetically considered elements, need be thought of as wholly poetic works.

Bertrand Russell (1922) in their introduction to a later printing of Wittgenstein's Tractatus, attempts to summarising his famous 'picture theory of language', stating that we create a picture which is "*a model of the reality*" and that "*the objects in the reality correspond to the elements of the picture: the picture itself is a fact*". In this way picturing as it applies to Wittgenstein, relies on the presentation of state of affairs or 'possible worlds'. In turn, propositions describe a possible version of events in order that they might offer a sense. This sense says nothing of the truth-value of the proposition, rather, it presents a scenario from which we might draw logical inferences by inferring the state of affairs if the sum total of presented propositions were true. In this way, Wittgenstein can be thought to have engaged in a kind of imaginative thinking, derived from a logico-propositional position.

The nature of propositions as Wittgenstein describes them, is that they are able to represent something in the world. What is particularly relevant to the form of our own argument is that "*In the proposition the thought is expressed perceptibly through the senses.*" That is to say that by their nature as real-world expressions of thought, propositions have a sensory component, speech is auditory, photographs and non-tactile writing are a visual concern, and as such be evident from the nature of this thesis so far, objects and tactile images can serve similar propositional functions through touch.

Additionally, Wittgenstein notes that a "*States of affairs can be described but not named. (Names resemble points; propositions resemble arrows, they have sense.)*" (1921, p.3.144 - 3.2) Sense in this regard refers to its most literal usage, that being in opposition to 'nonsense', that a material understanding can be obtained even if features remain ineffable. This 'sense' whilst distinct from Benjamin's essence, is not wholly unconnected, indeed reference to points and arrows reveal an understanding of the nature of language that is deeply rooted in the relational, where the whole is known only through an interconnecting web of fragments and connections. To this end, the form of our own argument frames Wittgenstein as a functional-cultural counter to Benjamin, wherein precision and clarity of meaning, help facilitate participation in what Wittgenstein refers to as a "form of life" or what we might consider cultural access.

It might also be argued that what Wittgenstein presents through logical propositioning or what Ahlberg (2020) refers to as “propositional imagination”, might be considered notably different from “Sensory or Objectual imagination”. Propositional picturing with its emphasis on logical form, might be referred to an image-free imagination, in which the presentation of proposed atomic fact constructs a conceptual notion of an object or state of affairs wherein “*We make to ourselves pictures of facts*” (Wittgenstein, 1921, p.2.1). In contrast to this, a sense-based imagination, would instead refer to a version of ‘imaging’ more akin to imaginative vision, or to what might be known in a common parlance as ‘a picture in the mind’s eye’, though “*Imagery in this sense could be any kind of phenomenology associated with our five senses*” (Ahlberg, 2020)

In this regard Wittgenstein’s sight-free picturing might be thought to be uniquely resonant with many aspects of blind experience, as the notion of propositional imagination does not require the ability to form actual pictorial representation in the mind, only mentioning sensory perception in relation to the expression of the proposition. In turn, Ahlberg’s definition of the sensory image as one not necessarily driven by vision, creates an intersection between Wittgensteinian notions of propositional picturing that might include sensory information.

To Wittgenstein to ‘picture’ is not to straightforwardly conjure an image in the mind, and to Ahlberg ‘image’ does not denote a purely visual phenomenon, positions which share a strong familial resemblance to notions of tactile image we have presented within this thesis. As such, the primary difference between the two concepts is not, as one might assume that a picture in the mind’s eye is a visual concept, but rather, it would seem to be that a sense-based imagination treats the ‘image’ as its content, whilst in contrast Wittgenstein notes the thought as a logical picture of facts, as distinct from propositions which are sense perceivable expressions of states of affairs.

Yet in this, Wittgenstein’s notion of models might be thought to bridge the gap between sensory imagination and logical picturing, bringing both concepts into a position in which we might consider them resonant with Ahlberg’s version of imaging. By attempting to utilise models to provide a representation of a state of affairs, Wittgenstein presents additional sensory information as a way of providing clarity. In effect, this shows the model to be propositional, as “*In the proposition the thought is expressed perceptibly through the senses.*” In this way we might claim a physical model to be a mode of that expression, in much the same way as we might claim writing or speech to be ‘proposition’.

In turn, if we understand the proposition only through a sensory-based reading of them, then it is not unreasonable to suggest that the thought may, to some degree, include sense-based information in the picturing or imaging of a thing. Though in this, we must necessarily include the caveat that sensory imagination in this form evokes the memory of sensory input rather than being an actual sensory experience, that is to say we recall or imagine as opposed to having an entirely new sensation. Whilst Wittgenstein separates the picture from the proposition, it is still clear that sense perception plays a role in the formation of thought, where in the role of sensory input and by extension language, is not just the ability to produce ideas but also to consume them. In this way, we might construct a reading of Wittgenstein that allows for sensory imagination, not as distinct from propositional imagination, but as a necessary extension. Where in the recollection of the proposition, facilitates the creation of a logical picture of facts that might include sense data.

Returning to more concrete notions of physical objects, it is commonly espoused that Wittgenstein took inspiration for his notion of propositional models from the courts of Paris, wherein toy cars were used to

facilitate a propositional argument into the state of events as they pertained to a traffic collision.<sup>46</sup> In this way, physical models were used to remove ambiguity by supplying additional sensory information to offer a more holistic picture of events.

It should not escape our notice nor indeed was it accidental, that Wittgenstein's purported example features a toy car not dissimilar to the 'Keychain of the Eiffel Tower' which orients the mode of translation conducted in this thesis. In this way, Wittgenstein can be thought to not only concede the limitations of language, but to tacitly acknowledge the role of sense-based imagination in the context of picturing. That is to say, that by presenting sensory input as a clarifying influence, Wittgenstein concedes that such presented objects provide something additional that other modes of language might not. In this way we might note a harmony with Benjamin's notion of translation and the form of Wittgenstein's model argument, that if thought of as translations or remediated instances, the presentation of multiple forms enable a relational understanding greater than the sum of its parts, where Wittgenstein's focus on clarity is not incompatible with Benjamin's want to distil an essence.

Wittgenstein addresses this want for clarity in language by considering a theoretical ideal language, one that is logically perfect and which leaves the least room for miscommunication. Russell (1922) in his summation of this idea, states that "*The first requisite of an ideal language would be that there should be one name for every simple, and never the same name for two different simples*" and that "*In a logically perfect language nothing that is not simple will have a simple symbol*". In this regard no single word should refer to the same object, lessening the ambiguity present in natural language in favour of a kind of logic-based precision.

This idea stands in stark contrast to Benjamin's notion of 'pure language' in that Wittgenstein's ideal concerns itself almost wholly with reproduction of meaning and the preservation of understanding. In turn there is an acceptance that when judged by this standard, that no "*language is logically perfect*" nor are we "*ourselves capable, here and now, of constructing a logically perfect language.*" (Russell, 1922) Indeed, Wittgenstein presents a logical perfect language not to champion a prescriptive version of how language should be, rather, it is a useful tool to explain the ways in which natural language falls short.

Whilst the aims of both pure and ideal language are radically different, it is perhaps worth addressing that in regards to textual practices their outcomes are remarkably similar. In aggregate many languages overlaid upon one another have the ability to distil an essence, whilst at the same time changing the presentation of simple symbols by contextualising points of potential confusion such as homonyms, so their meaning becomes more apparent. For whilst the English word 'bat' may reference either a flying mammal or a piece of sporting equipment, the same two words in German "Fledermaus" and "Schläger" respectively, are not so easily confused.

Lois Shawver (1998) in his commentary on 'Philosophical Investigations' offers us his own example that "*If I say "love" when I am scoring tennis, this does not mean the same thing as when I speak endearingly*". In this way a lack of access to a shared cultural visual lexicon, may be thought of as an absence of context that gives the alternative meaning. If one were not familiar with the game of tennis, the use of the term love for zero may not be readily apparent, in turn if we do not possess the context afforded by a knowledge of visual language, then it is possible we may misunderstand the regular form of language that rely on sight dependant knowledge.

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<sup>46</sup> (Sterrett, 2017)

Introducing for a moment disability focused systems of language like Braille and sign language, it is clear that both occupy an unusual space in translation, for they are not in the traditional sense a language in their own right, but rather they are connected and, in many ways, beholden to a parent language. Yet, what makes such systems unique is that Braille is primarily concerned with written language and sign is similarly concerned with acted language. In turn, both have practical differences that can be thought to remove margin for error, that might be thought of as distinct from comparison of two 'traditional' languages, in a major part because of their respective specialities.

For instance, in regards to sign language "*Name signs*" or a given name distinct from one's own "*English name that would appear on the birth certificate*" (Kautzky, 2019) is a unique sign that references a specific individual. These names are most often given by a Deaf person and the practice has "*a rich cultural heritage within the Deaf community*". To give an example, one name sign might be "*The upper part of the letter "D" tapping my chin, Diana.*" but this specific symbol would not be recognised as 'Diana' outside of a local community ecosystem. In this regard two people within the same locale who share the same English name, will rarely share the same name sign, thus there are situations where sign names offer a reduced margin for error, as each 'Diana' is referred to by a different sign-name. Similarly, in regards to contracted or grade 2 Braille "*Preference is given to the contraction that more nearly approximates correct pronunciation*" for instance "*(wh)(er)(ever) not (where)v(er)*" and "*di(spirit)(ed) not (dis)pirit(ed)*"<sup>47</sup>. In this regard, there are some instances in which a contracted Braille word offers the means by which to understand its pronunciation.

All this is to say that in reference to the value of disability access in relation to pure and ideal language, there are forms of communication that only emerge when working within a specific media or otherwise operating within restrictions. Unique 'sign names' are not applicable to written systems and are a solution to a particular problem at a person to person level, they are a time saving device to avoid having to spell out a name much as Braille contractions are a space saving device to make bulky texts shorter. Yet, when they are understood as fragments connected to language more broadly, they offer insights and clarification of meaning that do not have obvious parallels in traditional language. In regards to tactile images a similar observation might be made, that the haptic or tactile-kinaesthetic mode of understanding required to engage with such work, does not have a simple counterpart in a mainstream ocular-centric cultural discourse. In this way such accessible solutions offer a fragment of understanding that are unique amongst other potential languages, in part because of the speciality of their purpose and substantial mechanical restrictions they operate under.

In a connected vein, "*Misunderstandings concerning the use of words, caused, among other things, by certain analogies between the forms of expression in different regions of language*" (Wittgenstein, 1953, p.59). A reference not only to notions of homonyms, but rather an introduction to language games, where in the cultural context provided by an immersion within a form of life, offer insights into the intent of statements based on which 'language game' someone is engaged in. (The School of Life, 2015) in attempting to define language games, presents a pertinent example to this. An adult telling a frightened child "*Don't worry everything is going to be fine*" might not be playing the "*rational predictions from available facts game*" but rather the "*words as an instrument of comfort and security game*". In this way the context afforded by engagement within a cultural form of life, offers insights into the nuances of that culture's language games.

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<sup>47</sup> (Braille through remote learning, 2000, p.2)

In the cases of the experiences of blind people, it might be pertinent to return to the functional example of facial expression, wherein a great degree of uniquely visual context is lost if one is unable to read or imitate those movements. In regards to language games, an inability to read social cues can make identifying the game that is being played more challenging, at the same time, difficulty masking or imitating expression presents barriers to those seeking to understand your own intentions. A lack of regular access to an ocular-centric form of life, increases the room for misunderstanding for want of a knowledge of both visual cues and a cultural visual lexicon.

A continued exploration of Philosophical Investigations, offers us the almost rhetorical notion of 'Private language' a concept Wittgenstein proffers only to immediately reject its premise. Much as the form of his earlier arguments present a version of language that is highly relational, so now might the notion that language can exist in isolation of an external world, be rejected as to a degree nonsensical. Wittgenstein states that "*words are connected with the primitive, the natural, expressions of the sensation and used in their place.*" using the example of the word pain to note that whilst we cannot know another's pain, we might understand the general usage of the term pain as a label for a set of core human experiences. The 'private language argument' as it has come to be known, addresses solipsistic ideas that "*sensations are private*" in tandem to the wider notion that language is relational, that it is only through engagement with a world in which language is used that it might be understood.

In Wittgenstein's post-tractatus writings, a private language is thought nonsensical, in part because language is defined by a consensus to abide by certain rules and usage, a descriptive view of language wherein rules are defined by the form in which they take in common parlance. In this regard Wittgenstein goes on to ask "*am I defining "order" and "rule" by means of "regularity"?*" referring to the idea that applied, regular usage shapes the nature of language. To this end, it is only through an immersion within a specific cultural situation or what Wittgenstein refers to as a "form of life" that language truly can be understood.

In regards to our own argument concerning access to a cultural visual lexicon, we are presenting the idea that accessible works attempt to facilitate access to language. In turn, from a Wittgensteinian standpoint, the value of enabling access to aspects of culture that are uniquely visual, is that it enables participation into a form of life. In this regard the functional discourse of much of Wittgenstein's writing, gives way to a cultural position that foregrounds participation, wherein the value of access is not in individual instances, but rather access to a form of life.

Returning to our recurring motif of "The Keychain of the Eiffel Tower" it might now be apparent that when understood through the lens of Wittgenstein's picture theory of language, this tactile image is perhaps more accurately described as a tactile model. For indeed, the keychain goes further than being a mere depiction of form, as what the model does that other modes of language like written description might fail to do, is eliminate many areas where misunderstanding might occur.

In this regard it may be pertinent to perform an exercise which demonstrates the ways in which language is perhaps deficient, especially in regards to presenting particularly visual concepts. As such, by creating depictions of the tower based on existing and mainstream textual descriptions, it may become more apparent where a model might be a more appropriate medium to convey a concept. As indeed, in the absence of accessible images and similar tactile models, such descriptions might represent the only available insights into such structures for a non-sighted audience.

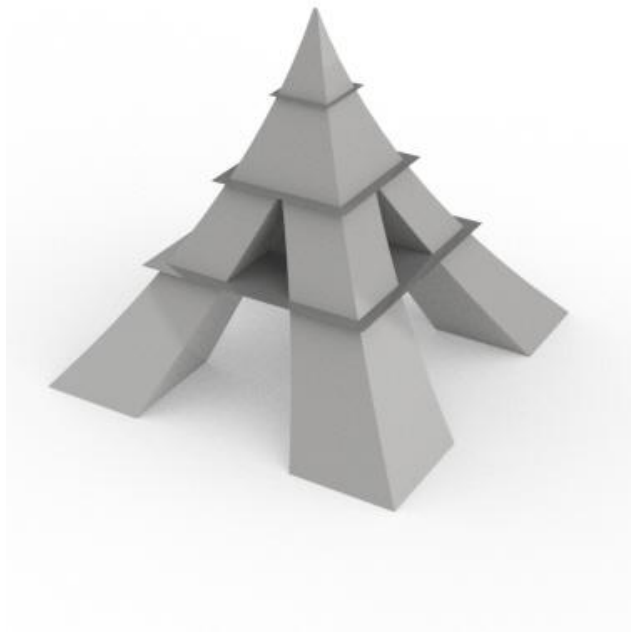
To this end, the 'Wonders of the World'<sup>48</sup> provides a written account of the 'general form' of the Eiffel Tower, noting that it is *"pyramidal in shape with slightly curved sides. It measures 324m high and is divided into 4 parts separated by a floor. Until the second floor the tower is made of 4 distinct pillars, but from there they join in a single pylon which rises vertically to the top."* Whilst far from an unreasonable description of the work, terms like pillar and pyramidal offer room for significant deviation based on straightforward and reasonable interpretations of the words. Similarly, phrases like 'four parts' omit crucial information about the distances between the floors, with the signature arches of the structure being completely absent from this short description.

In this way if such an explanation of the tower's form were to be presented to one who has never seen the Eiffel Tower and who has no additional frame of reference or context for how the tower is meant to look, might well 'picture' a version of the tower that is in reality, a radical departure from how the tower actually looks. Indeed, it might reasonably produce a mental image which resembles the proportions of a traditional pyramid, with the addition of equally spaced dividing floors and no arches between the supporting pillars.

It is worth noting that Wonders of the World was chosen in part because they are one of the few readily available sources which begin with a well-constructed representational account of the tower. Indeed, there is a propensity amongst general descriptions to rely on lists of measurements whilst omitting all mention of the tower's form, in favour of its historic context and supplementary photographic representation. For instance, at time of writing the initial google snippet provided by searching 'Eiffel Tower description' offers us an account that states *"The Eiffel Tower is a wrought iron tower that stands 1,063 ft (324 m) tall. It was designed for the Exposition Universelle, a world fair held in Paris in 1889. It is currently the most famous symbol of Paris."* (CIVITATIS Paris, n.d). This tourism centric page then goes on to discuss ticket pricing rather than elaborating further, offering a description which is not detailed enough to elicit even a proximate picture amongst a blind audience.

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<sup>48</sup> (Wonders of the World: Description of the Eiffel Tower, n.d)



*Fig. 21: Above is a 3D rendered image of the Eiffel Tower based on the description provided by Wonders of the World. The resulting model is short, squat and evenly divided into sections, reminiscent of the Eiffel Tower but uncanny to those who are familiar with the structure.*

The accompanying model depicts my own interpretation of the tower, based solely on the Wonders of the World textual description. Whilst it does somewhat resemble the Eiffel Tower and captures many of its defining features, indeed it would not be unreasonable to think someone might be able to identify the work as such without prompting, there are some ways in which the rendition verges into the uncanny, resembling the thing but differing in enough distinct ways that it seems both an abstraction and a near caricature of that which it attempts to accurately depict. Similarly, whilst further written description could be added to create a more complete picture of a work, indeed the website itself does provide further details on later pages, the difference between understanding something at a glance and having to explain something with significant description is notable.

One of the primary roles of a model is to make understanding easier, they are oftentimes supplementary tools which aid in understanding in part by supplying additional information in relation to a broader context. In the Wittgensteinian example of toy cars used in a Parisian court case, the model is not understood in isolation, rather, it is one mode of language used to explain a proposed state of affairs that works in conjunction with other approaches, like written and spoken accounts.

This might well be defined as an assemblage of translated works, brought together to facilitate an understanding in relation, something which corresponds both to Benjamin and our own notions of a collections-based approach. In this way, functional concerns are addressed by providing multiple avenues towards comprehension in an attempt to offer clarity and lessen the chance of misunderstanding. Whilst more nuanced understanding is provided in an attempt to bring forth essential features or a broader sense, that might only be understood through fragments in relation.



In this way it might now become clear why a cultural understanding predicated solely on Benjamin's notions of translation is not wholly sufficient for the discussion of tactile image. Namely, that whilst through Benjamin we seek "*in translation something other than the reproduction of meaning*" it is important to recognise that a vital aspect of access to a shared culture in a disability context, is reproduction of meaning, with the ultimate aim being to provide clarity and reduce margin for error. An absence of sight removes foundational understanding of many traditionally visual concepts, each susceptible to layers of misunderstanding that would be self-evident to those who have been routinely and systemically exposed to those concepts through constant viewing. In turn, without access to this shared cultural visual lexicon which is in part, predicated on functional reproduction of meaning, gaps in cultural knowledge emerge, which ultimately provide barriers towards participation within a form of life.

In this way, both Wittgenstein and Benjamin seek to explain something about the value of shared knowledge and experience, addressing the need for cultural participation from almost opposing perspectives. To this end, Wittgenstein presents it as a functional necessity for language to be somewhat relational in order to mechanically operate, a view which notes that even clear and articulate communication has its limitations. This might be thought to juxtapose Benjamin's aesthetic considerations, where connections and the interplay of different languages, plays an almost transformative role in understanding. Translation elevates the original to the point where it is "*raised into it anew*" and through both the presentation of many fragments and an examination of relationships between them, the essential might be thought to emerge.

#### **2.4: The Wicked Problem of Disability Access:**

Considering disability translation through a designerly context, requires an acknowledgment of the nature of the territory, namely that in many regards disability translation is a 'wicked problem'. First laid forth by Rittel and Webber (1973) in regards to social policy, the definition of a wicked problem was initially distilled into a set of ten points which later iterations have sought to streamline and generalise in order to remove the definition from the sole purview of social policy.

The wicked problem as Rittel and Webber define it has no simple formula to which we might refer to in order to define it as such, neither do wicked problems have definitive end points, as the nature of the problem and by extension applicable solutions, change or evolve near endlessly. In this regard 'wickedness' refers to the problem's resistance to solution, rather than having any ethical connotation.

Additionally, attempted solutions to a wicked problem should not be thought of in terms of right or wrong but rather better or worse, with the caveat that each solution is a 'one-shot operation' where there is no opportunity to learn by trial and error. In this way whilst we do not think in the binary terms of correct or incorrect, there is still a responsibility on the part of those creating solutions as "*every attempt counts significantly*" and will most likely have a lasting impact that will affect future solutions. Rittel and Webber go on to state, "*The social planner has no right to be wrong*" that is they are "*liable for the consequences of the actions they generate*", so whilst a wicked problem is not solvable in the most straightforward sense of the term, that resistance to solution does not absolve decision makers from the ramifications of 'worse' attempted resolutions.

To draw from a profound and historic example of a 'worse' solution to a disability centric wicked problem, we might well refer to the 'Milan congress of 1880' where in D/deaf educators with a bias towards 'oralism' or a curriculum that focused predominantly on spoken language skills and a rejection of sign language, resolved that speech was preferable to sign and that sign itself was responsible for "*injuring*

*articulation and lip-reading and the precision of ideas*” declaring that “*the pure oral method should be preferred*” (Kinsey, A., 1880). This in turn led to the removal of sign language from speech therapy across much of the western world, resulting in a significant decline in the use of sign language more broadly. The removal of sign language from D/deaf education, failed to recognise the role that sign plays in the development of language skills, indeed, it was not until the ‘Babbidge Report’ (Babbidge et.al, 1965) referred to oralism as a “*dismal failure*” that the effects of the Milan Congress began to be corrected. For the history of disability is marred with these kinds of misconceptions and damaging policy decisions, and in many regards the next generation of solution makers must contend with the lingering effects of these problematic legacies.

Whilst the creation of individual tactile works may not have the same potential impact as social policy change, it is important to recognise an individual translation’s place in relation to the broader conversation of disability access or more specifically disability translation, both of which might be thought to be profoundly ‘wicked’ concerns. To return to a point I briefly alluded to in the chapter regarding the functional tactile image, whilst there are established guidelines and examples of best practice that might further the creation of successful tactile works, tactile images should not be judged in terms of right or wrong but rather better or worse. For a poor or isolated tactile image, may lead a blind person to believe the subject of the translation or the very medium of tactile images are not something they can engage with, considering the already limited availability of such works, poor translation has the potential to disenfranchise an audience and hamper the efforts of more sensitive depictions.

In this regard modern disability solutions often circumvent the wickedness of their territories by operating in a profoundly person centric register, wherein bespoke and tailored solutions are concerned with very individualistic needs and ‘better or worse’ need only be judged in regards to the wants of that individual. In situations where it may not be practical to commission bespoke disability aids or where the work itself is intended to cater to more than a singular person, this thesis presents a collections-based approach as one potential solution, where a multi-modal offering presents many avenues towards comprehension. In this regard the individual chooses which fragments are most resonant with their own requirements, and in conjunction with previously established ideas of pure language or a holistic understanding, a collections-based approach also offers a way in which a person might tailor their own experience by prioritising the aspects they find most helpful.

To better outline the nature of the wicked problem we might offer other notable examples, many of which include economic and social policy, indeed the recent pandemic has already been described as such, with Angeli et al. (2021) stating that “*COVID-19 global crisis had evolved towards a full-fledged policy “wicked problem”.*” and many other complex territories are marred with problems that can be thought of as wicked. In this regard, Brian Head (2008) discusses the potential wickedness of a problem as a combination of “*complexity, uncertainty and [value] divergence*”, that the subject’s vastness, unknown or untested factors and competing aims of stakeholders make problems particularly difficult to provide solutions for.

To draw from an earlier cited example, tactile paving is one prevalent solution to the problem of ‘how blind people navigate the built environment’ part of the broader concern of making our city streets more accessible. However, literature surrounding tactile paving acknowledges that “*the needs of people with physical and sensory disabilities could create potential conflicts*<sup>49</sup>” as what functions as a disability aid for one group, might prove disabling to another. In this earlier section I establish the role of compromise within disability solutions, as blanket terms like disabled or even something seemingly more specific such

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<sup>49</sup> (Department of the Environment, Transport and the Regions, 1998)

as blind or D/deaf, include radically different stakeholders who may have competing or substantially different needs. Someone who has had no light vision from birth and someone who has gone 'legally blind' from age related cataracts, will both be considered blind but require completely different approaches. Similarly, someone who considers themselves Deaf with a capital (D), that is to say culturally a Deaf person<sup>50</sup>, is a completely different proposition to someone who was previously hearing and who has only recently suffered from profound hearing loss.

In this regard it may now be apparent why disability concerns are so often described as wicked, as almost every facet of disability has some degree of complexity, with unknown factors that only becomes apparent when solutions are implemented, and stakeholders with needs and values that are broad, varied and oftentimes conflicting. In regards to the creation of tactile works, even a specific intended audience such as those without 'useful vision' still encompassed a wide variety of people, in this way a collections-based approach attempts to mitigate some of the wickedness present within tactile image making, by offering multiple distinct avenues with which to facilitate a broader understanding. By presenting fragments we hope to only distil an essence, but remove the margin for error when audiences picture a work in their imaginative vision.

In previous sections I have outlined the cultural tactile image through the use of constellations, yet more than just an archetypal example of the cultural image in application, constellations as a concept represent a remarkably sophisticated model of the way in which such images operate. Nodes and links create a framework for understanding wherein a more complete form might be understood, namely that a picture can be inferred from a collection of dots and imagined lines. Yet the collection of stars that make up Ursa Major do not resemble a bear and only by understanding these points in relation to one another, that being the 'links' that connect the stars, can a partial image be presented. This collection of nodes and links might be thought to echo Benjamin's metaphor of the vessel, for with these points and connections or what we have previously referred to as fragments, a more complete image might be inferred, and through our imaginative vision a set of lines and dots might be thought to resemble a bear.

Tom Wujec (2015) in his TED talk discussing the nature of wicked problems, refers to an exercise wherein he asks participants to draw instructions for making toast. In this he makes continual reference to the idea of nodes and links, where *"nodes represent the tangible objects like the toaster and people, and links represent the connections between the nodes. And it's the combination of links and nodes that produces a full systems model"* in our case nodes represent each translation and links represent the connections between those works, from which we might understand the pure language, holistic image or *"full systems model"* that this collection of parts infers.

Another aspect of Wujec's argument that is highly resonant with the form of our own position, is that in regards to hand drawn instructions of 'how to make toast' *"some reveal some aspects of toast-making while hiding others"*. Some drawings focused on the mechanisms of the toasters, others drew an image of bread on an open fire or a grill. Still others were more concerned with the actions of the person doing the toasting with some going as far as to show a stick figure buying bread from the store before even addressing the mechanism by which they toast. In this way it becomes apparent that even simple processes might be thought of as complex when attempting to contextualise them as part of a broader picture, and that any one solution of 'how to make toast' by definition, cannot encompass the full scope of the territory. Similarly as we present fragments that pertain to ocular centric concepts, it is important to

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<sup>50</sup> Lowercase deaf "commonly used to imply: a medical description of deafness measured against the 'norm' of hearing people" in contrast to a capitalised Deaf, which is instead "linked to the construction of a linguistic identity and culture." (Valentine & Skelton, 2007)

acknowledge that there will always be some additional facet or perspective that might be included. Much as we reference the idea of constellations and might understand that even if more nodes and links could be added, there is always a point wherein imaginative vision must still be relied upon to picture a bear amongst dots and lines.

Rittel and Webber (1973) include in their definition of the wicked problem, that *“The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution.”* That is to say that the way in which a wicked problem is presented affects the way in which solutions are created, in regards to tactile image making the various chapters of this thesis could each be thought to represent a potential explanation, each of which radically changes the nature of potential resolutions.

Similarly, one dimension of the Wicked Problem is that it has no final solution, a tenet which is also ingrained into a disability or accessibility centric mode of thinking, as a ‘one size fits all’ approach is rarely in tune with the realities of a broad and diverse disabled audience. In regards to the tactile image making, we might offer specific tactile works as solutions to specific immediate problems, whilst understanding that there is theoretically no end to the quantity of images that might be required to offer true parity of access to the breadth of visual information contained within our own socio-cultural lexicon.

The cultural tactile image might then be approached as an explanation of a wicked problem, for the needs of the audience are not concrete nor is the intended audience simple to define beyond ‘blind people’. Additionally, the purpose of such images are varied and many tactile works are ‘one-shot solutions’ that contain very specific parameters and applications. In this way none of the tactile solutions I present should be thought of as *the* solution but rather *a* solution, an attempt to demonstrate potential ways of tackling problems in order to facilitate the creation of future images, with explanations of why certain ways of working might be considered more sensitive or appropriate in certain contexts.

## **2.5: Walter Benjamin, Aura & Cult in Reference to Notions of Seminal & Core Human Experience:**

Throughout the first two chapters, I have discussed access to the ‘mainstream of artistic consumption’ somewhat interchangeably with access to the mainstream or access to cultural capital more broadly. This is in part by design, applying more established functional and legislative arguments for access, to concerns of more nebulous facets of human experience. Yet, as I so frequently reference art objects in regards to culture, it may be pertinent to differentiate this argument from my later discussion of the aesthetic. Namely, that whilst access to the mainstream can indeed reference access to artistic experience, there are other, less traditionally aesthetic centric offerings cultural access can provide.

Indeed, as previously highlighted, the cultural tactile image encompasses works that can be thought to occupy both the highly aesthetic and decidedly functional end of the spectrum. As such those works that stand apart from both the aesthetic experience of art objects and the more functional transference of meaning, that being the cultural tactile works that we might consider archetypal of the category, must offer something beyond and in some cases removed from these other two facets to warrant its inclusion as more than merely a transition step between two extremes. To draw from our previous culture centric analogy, a node in its own right as opposed to merely a link between two nodes.

To this we might refer back to the theories of Walter Benjamin, namely by turning to his writing on the age of mechanical reproduction and examining his theory of ‘Cult’ and by extension ‘Aura’. Through this, we

might proffer a rationale for cultural concerns that presents them as significant and valuable in ways that are distinct from our other categories.

The definition of the aura is uniquely tied to Benjamin's reaction to the increased mechanisation and industrialisation of the modern era, stating *"that which withers in the age of mechanical reproduction is the aura of the work of art"* (Benjamin, 1936, p.ii). In this regard the aura is the 'here and now' or the unique existence of the work, a presence that is informed not only by form, but by time and place within a broader context, in other words that which defies reproduction. Benjamin also refers to *"a mountain range on the horizon or a branch that casts its shadow on the beholder, is to breathe the aura of those mountains, of that branch"* in this way the aura is not entirely related to art objects, but rather aesthetic experience.

In contrast, 'the cult' whilst intimately connected to ideas of the aura, refers to the context that surrounds a thing rather than the uniqueness of the thing itself. It is the fluid changing of perspectives and the narrative aspects of engaging with a work, which change over time as the 'here and now' that defined its creation is supplanted by ever evolving attitudes. Bjørn (Schiermer, 2012) in his reading of Benjamin, differentiates the aura from the cult by stating that the *"aura has to do with unicity, whereas cult value has to do with collective charging."* Indeed, the term cult is laden with deliberate reference to faith, which in turn informs the idea of an object's place as part of 'ritual' something which is contextualised by its connection to a wider understanding, significant partly because of the relationships to these practices and experiences.

Benjamin himself proposes the classical example of the *"ancient statue of Venus"* to differentiate Cult from Aura, stating that the work *"existed in a traditional context for the Greeks (who made it an object of worship) that was different from the context in which it existed for medieval clerics (who viewed it as a sinister idol). But what was equally evident to both was its uniqueness-that is, its aura."* In this way the Cult can be defined as a work's connection to the zeitgeist, an object's place in what we have previously referred to as the cultural lexicon.

Yet in Benjamin's narrative the cult is often concerned with a relatively small number of people, 'cult value' is used in reference to the value offered by restricting those who might come into contact with an object, much in the same way the semi-private nature of a religious artefact has a connection to the divine or the mystic by removing it from the everyday. *"Cult value as such even tends to keep the artwork hidden: certain statues of gods are accessible only to the priest in the cella; certain images of the Madonna remain covered nearly all year round; certain sculptures on medieval cathedrals are not visible to the viewer at ground level. With the emancipation of specific artistic practices from the womb of the cult, the opportunities for exhibiting their products increase."* (Benjamin, 1936, p.v)

This distinction between 'cult value' and 'exhibition value' is the difference between removing a work from the everyday and immersing a work into the fabric of public consciousness. Value accrues not from limiting an object's presence and restricting interaction to only ritualistic or 'special' moments, but rather such works are valuable in part because of a kind of over exposure, where the image is almost saturated in context and meaning that is tied to its ubiquity. Through this kind of democratisation of art, the 'collective charging' does not come from a select group of people, but instead builds as more people engage with a work, as it moves from an object of ritual to a point of shared language.

In turn these ritualistic aspects of art begin to fade away when work becomes endlessly reproducible, what Benjamin thinks of as the end of a *"Parasitic subservience to the ritual"*. Indeed, Benjamin's own

thoughts on the withering of the Aura might be thought to refer to the withering of the concept of the original as *"From a photographic negative, for example, one can make any number of prints; to ask for the 'authentic' print makes no sense"*. In this regard the tactile image is in a unique position, for at least as 3D printing is concerned it is endlessly reproducible and indeed, I regularly equate tactile works to photographs, in that they often offer an equivalent kind of access.

Yet the act of engaging with a tactile piece is slow and methodical, in many ways the process echoes ritualistic practice as the intimacy of touch even in regards to basic comprehension, often requires a kind of active engagement that has a 'uniqueness' to it, akin to the kinds of experience Benjamin equates to the aura. In the absence of the ability to saturate one's life with the visual, to be able to understand particularly ocular-centric works in relation to their exhibition value, there is an argument to be made for a reliance on some aspects of their cult value and perhaps in a sense, a connection to a kind of aura.

There are ways in which Benjamin accepts the cult as something deeply human, connecting evolving ideas of the surplanting of faith he referencing a 'secular worship' of beauty which might be thought of as the cult of beauty, or the way in which 'art for art's sake' or the idea of aesthetic experience as a primary aim of art, might echo the traditionalist modes of thought that evolve from faith based practice. This in turn opens up the argument for other cults, which each focus on a different rationale for their existence while still focusing on this idea of ritual or near mystical practice.

In regards to the cultural image a notable cult is that of remembrance, for indeed when discussing the rationale for translating media such as photography, capturing the image of loved ones in order that we might remember them once they have passed, ranks amongst the most essential of human experiences. Indeed, Benjamin in his discussion of photography, states that *"It is no accident that the portrait was the focal point of early photography. The cult of remembrance of loved ones, absent or dead, offers a last refuge for the cult value of the picture"*. In this the cult is connected to familiar ritualistic practices that are often entwined in faith, where in the lighting a candle or contemplative prayer, are supplanted or supplemented by the photograph of a loved one. In this way such an experience can be thought of as distinct from the straightforward aesthetic and would not be considered functional, in that such a memorial photograph does not act as a straightforward vehicle for information or meaning. Rather, if we take the idea of cult as a way in which to discern the purpose of these works, we might instead think in terms of access, not only to the mainstream of art or essential information, but to seminal and core human experiences.

At this point it may be important to note that Benjamin's own position on the cult is a damning one, indeed phrases like *"Parasitic subservience to the ritual"* and terms like *"offers a last refuge for cult value"* in reference to the cult of remembrance, already present a picture of the cult as distinctly negative, something which Benjamin believes must be overcome in part because of his strong opinions against what he defines as the fascist cult. Returning to Bjørn Schiermer (2012) and his writings on the age of mechanical reproduction, we are presented with a view on Benjamin's position that articulates this point more clearly, stating that art can be *"Either cultic or non-cultic depending on whether the new technology is used to 'compress' the mass, making the crowd more 'compact', instable and emotional; or whether it 'opens up' the mass and makes collective forms of rationality, self-reflection, and conscious solidarity possible"*. In this regard my own position diverges from this way of thinking, in part because I believe there to be an inherent value to the emotional aspects of human existence, something which warrants translation and is a vital facet in offering access to the mainstream. In turn, there are aspects of the cult

that pertain to what might be thought of as core human experience, with a value that whilst smaller in scale and scope, is not lesser because of its reliance on what Benjamin calls 'cult value'.

In this regard a pertinent modern example comes from Huggies the supplier of baby sanitary products, who in 2015 commissioned TBWA to produce the short film "Meeting Murilo" as part of a series of advertisements. This series presented three-dimensional prints of ultrasound scans, to expectant mothers who, by virtue of their disability, were unable to view a conventional ultrasound picture.

It is not unreasonable to suggest that allowing a blind pregnant woman access ultrasound of her unborn child, requires little in the way of justification, its value as a tactile translation becomes something that is arguably self-evident, highlighting a material and almost deterministic quality to some of our richest aesthetic experiences. Indeed, whilst it is not access to art, it is access to both shared cultural experience and to the aesthetic, no less essential than viewing "*a mountain range on the horizon or a branch that casts its shadow on the beholder*". Tactile works like this open the door to many patently human moments and as such, many cultural tactile images might be justified by their emotive value, considered important not because of their exhibition value or by virtue of their aesthetic qualities, but rather because they possess a material connection to the beautiful ritual and a cult of hope and anticipation.

In turn, a photograph of a Grandfather may not be considered an artefact of significance to most, but a person's connection to the man and the ritual of remembrance that is entwined within the object, contextualised by shared experience and fond memory, allow photographs to facilitate something patently human. In turn we might highlight a distinction in regards to this kind of cult object, namely that whilst "*According to Walter Benjamin, it is "more important" for cult objects to "be extant" than to "be seen."*" (Han, 2015) that is to say that "*"Cult value" depends on existence, not on exhibition*" the same cannot always be said of artefact of remembrance.

Indeed, whilst there may still be a want to enshrine such a piece in a place of significance, photographs of loved ones are just as routinely displayed openly as they are kept in private, arguably valuable only when they are interacted with even if that interaction echoes the rituals of faith. In this way it may be more accurate to say that in regards to some cult objects, the distinction is not between the exhibited and hidden, but between the personal and universal. Where in the cultish nature of the work arises not because it is hidden, but because those without deep rooted emotional connection do not share the same connection to the work.

In a connected vein, it may be considered reductive to argue that the primary concern in the promotion of literacy, is for the illiterate to be able to read directional signage. Rather, contemporary theories of education that concern literacy, focus on offering access to otherwise gated opportunities. Indeed definitions of literacy have expanded, going so far as to coin terms like digital literacy which define such literacy as "*The capabilities which fit someone for living, learning, working, participating, and thriving in a digital society*". In this we might understand that all forms of literacy seek to aid in the participation of a culture, to work towards not basic comprehension, but as a vehicle for real cultural inclusion. The ability to read is more than the ability to understand road markings or warning signs, it is access to poetry and self-directed contemplation of scripture, to humanities stories both real and imagined along with innumerable rich, tangible and material experiences.

Similarly, when we consider tactile image making, our concerns should not stop at the purely functional. Instead, tactile images and accessible solutions like them offer a broad range of opportunities and access to a variety of cultural touchstones, translating often uniquely visual human experience that do not have a

straightforward analogue. A photograph might show the face of the grandfather you never had the chance to meet, an ultrasound scan gives you a glimpse of your future child before they enter the world, and the artwork that defines a significant part of our collective histories, belongs as much to those without sight as it does to those who have seen the works a thousand times before.

Here I believe it is reasonable to suggest that my examples are erring towards the overly or at least overtly sentimental. To this, I might rebut that when discussing the experiential, one turns to examples of experience, when discussing the value of the visual and by extension the value of offering access to those for whom access is not straightforward, it is necessary to present that which may be straightforwardly understood as valuable.

Whilst the Huggies advert represents a good example of the process in action, it is worth noting that this is not as obscure an application as it once was, and indeed, the increasing ubiquity of such prints in a commercial context, shows an apparent desire for 3D printed ultrasound images. There is a market even amongst sighted parents for such tokens of what is, in effect, one of their most intimate and decidedly human experiences. An extension of its two-dimensional counterpart it represents a desire for connection, a want to share a moment with loved ones, and ultimately an unfettered excitement for a life changing event.

As such it represents not only an instance of an emotive human experience, but a demonstrated want from others to disseminate the information that permits access to that experience. An agreement by consensus of both the value of the moment and the desire to permit others to share in their own equivalent moments. Not necessarily a parity of experience, but an equivalent access to those experiences.

In this way, aspects of the cultural tactile image serve as a bridge between notions of access to the mainstream and similar forms of access to more distinctly aesthetic concerns. Indeed, what cultural artefacts facilitate with a 'cult' centric notion of emotive human experience, might well be considered a form of access to the aesthetic, a version of the term wherein the object becomes a catalyst, a way to evoke profound or beautiful moments. In regards to the intimate and deeply personal examples we have presented through the cult of remembrance or anticipation, namely photographs of loved ones or accessible ultrasounds respectively, the works themselves need not be considered beautiful, they need only be thought of as auxiliary aids with which we might enable access to something essential.

Indeed, many tactile versions of artwork could be understood in a similar way, wherein we need not hold the piece to the same enduring standard if we think of such works as supplementary or perhaps even transitory, a way of attaining a sense of something "*higher and purer*" through but not necessarily from the translation. This position whilst plausible, might, in some ways be thought to discount the notion that the object itself may be the beautiful thing, that it may be encountered as an aesthetic art object in its own right. In turn, what we present within the aesthetic of poetic tactile image, attempts to build upon relational notions of translation through a variety of collections-based approaches, whilst claiming that the tactile image need not be thought of as an auxiliary aid, that such works even when they serve as translations of traditionally visual instances, can function as valuable artistic works.



### Chapter 3: The Aesthetic or Poetic Tactile Image:

*“The composition of a poem is among the imitative arts; and that imitation, as opposed to copying, consists either in the interfusion of the SAME throughout the radically DIFFERENT, or the different throughout a base radically the same”* (Coleridge, 1817, p.182)

As we have continually referenced throughout our previous two chapters, the disability arts movement as defined by Barnes and Mercer (2001), includes as its first tenet, that disabled people ought to have *“access to the mainstream of artistic consumption and production.”* where mention of *‘production’* might be thought to foreground a kind of active engagement, participation within a cultural-social discourse wherein art is something that elicits a response, or more precisely, a creative output. In this way, access to a cultural visual lexicon functions as something of a prelude to access to the aesthetic, where a cultural access to the mainstream of art, requires that its audience be presented with the tools to respond and through this engagement, participate in a form of life.

Such a participation allows for a degree of ownership, one that is in some ways separate to the notion of the mainstream in that whilst it relies on a foundational degree of cultural knowledge, the work that emerges from an informed disabled audience, need not itself be concerned with appealing to the mainstream. The ability to create art that is both tailored towards blind people and where techniques that enable participation are similarly unconcerned with appealing to an ocular-centric orthodox, presents an avenue of exploration that at first appears contrary to many of the notions of access presented within the earlier chapters of this thesis. Yet, to write poetry in one’s own language is rarely done to disadvantage those unfamiliar with your mother tongue, rather it is written in this way because it is the lens through which the author experiences the world, the vantage from which they are best able to articulate specific thoughts and experiences.

In this way, art that appeals to a haptic register need not do so with the express intent of penalising those who rely on sight. Indeed, as we explore throughout this chapter, there are modes of both art appreciation and creation, which encourage an engagement through one’s own language without necessitating a mandate for exclusion. Similarly, much as overlaying multiple languages allows for aspects of the essential to emerge, so too might a non-disabled audience benefit from work which requires a shift in register, a way in which through tactile translation a sighted person might come to appreciate some novel or otherwise previously unconsidered aspect of a work with which they consider themselves familiar. In turn, through engagement with a wholly original work that has not been designed with an ocular-centric register in mind, it might well be that an observer is offered insights into perspectives or modes of experience, with which they have little frame of reference.

Yet, before we are able to address such production led concerns, it is perhaps pertinent to draw attention to common perceptions of disability centric works, namely, that art produced by disabled people, is often considered either through a lens medicalised model of therapeutic practice, or thought to be the product of the ‘superhuman’. In this way, Aaron McPeake (2018) in his reflections on visual arts practice, notes that through interviews with artists that have visual impairments, that *“the majority wish to identify as being artists who happen to be blind rather than artists for whom blindness is part of how they are labeled”* predominantly because the associated label risks work being *“condescendingly viewed as either the result of occupational therapy or in terms of amazing feats of achievement rather than as serious artistic production.”* both of which present distinct and problematic challenges to those engaged within the arts.

Indeed, this harsh binary can be thought to do a disservice not only to the artist and the work, but ultimately to the nature of disability arts practice, as the reasons people engage with the arts can be thought as varied as the people themselves. Whilst notions of art as therapeutic are not incompatible with an understanding of art created by disabled people, a propensity to consider those working in a professional artistic capacity through that particular vantage, is to show an ignorance of those elements which are technically sophisticated and aesthetically sensitive. Similarly, notions of the ‘superhuman’ or ‘supercrip’ in regards to blind people operating in the ‘visual arts’, wherein the feat of production is lauded above a consideration of the object itself, present a potential barrier to sensitive engagement, where a work is not met on its own terms but only approached with caveat.

In this regard, it may be important to note that McPeake’s own position is borne from an engagement with professional audience, that he is an artist “*who happens to be blind*” with his own sophisticated sculptural and installation based practice. To this end, his perspective might be thought to reflect the opinions of those actively working within a particular sphere of art, as such aspects of my own position might be thought subtly distinct from those presented by McPeake, in part because I am primarily concerned with an amateur audience. In this regard, McPeake draws attention to the critical reception of the work of Eşref Armağan to illustrate the damaging nature of supercrip rhetoric, wherein through headlines like “*the painter with no eyes*” Armağan’s work appears to be understood primarily through an exotic perception, championed for his perceived extraordinary ability to depict a visual world, rather than judging the work by its own aesthetic merits.

Contrary to consensus of those McPeake interviews, Armağan wholly embraces the title of blind artist<sup>51</sup>, born with no eyes he taught himself to paint utilising a Braille stylus and a system of applying oil paint with his fingers, allowing layers to dry before returning in order to not mix colours. This creates paintings with a specific style of impasto, often utilising a bright, almost primary colour pallet derived from this out of the tube process. With no formal system of training, Armağan can be thought of as something of an outside artist, with a style of work that almost wholly emerges from the particular style of practice he is engaged in. At this juncture, it is perhaps pertinent to address McPeake’s criticisms of the nature of Armağan’s profile, contrasting it with the nature of his own practice, where he believes his work “*meaningfully engages beholders rather than relying, like Armagan’s, on the impact of considerations of the feat of its production.*” Yet, whilst much of the mainstream coverage of his paintings might be thought to hyper fixate on the nature of Armağan disability and by extension, his ability to paint figuratively whilst unable to see, there is a case to be made that the public interest in his methods of production might have more complex motivation that McPeake presents.

Indeed, a consideration of Armağan’s process might be thought to be intimately entwined with the context of his work, perhaps even a fragment from which might better understand the work in relation. It is perhaps pertinent to note, that want to understand makerly aspects of process is not something without precedent in the art world, with the novel form of creation derived from Pollock and Matisse<sup>52</sup> being amongst many famously documented “*artist at work*” recordings. Equally, as an outsider with a unique form of self-developed practice, part of the allure of Armağan’s work comes from an understanding of that process, a form of making that is to some extent, indivisible from his disability.

Removed from a high art context, the value of Armağan’s work can be thought to come from more than an observer ascribes to it, indeed much as Benjamin argues that no poem is written for the audience, so too might much of Armağan’s practice be thought to cater to no individual but the self. In this regard, had

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<sup>51</sup> (Genn, S., 2022).

<sup>52</sup> (Naumuth, 1951; Matisse at work, 1946)

he not enjoyed the raise in profile that came from participation in studies of blind art creators, of which included the research of John Kennedy whom has been referenced at length in the functional section of this thesis, then Armağan's work might have remained largely unexamined, but nonetheless still created for its own sake. In this, we might note that there is value in creation that operates beyond a therapeutic register, as whilst Armağan states that his own practice began as a way to engage with the visual aspects of a cultural lexicon, through his continued development, it emerges as a facet of his own form of life, an aesthetic experience born through the creation of the object and not necessarily from the work that results.

Yet, tactile images when thought of as disability centric artefacts, have other preconceived notions placed upon them by a lay audience, separate from considerations of therapy or the superhuman. Namely, as objects which often function as something of an auxiliary aid, works that emerge from this tradition must contend with a form of stigmatisation derived from the *'medical appliance'*. As such, it is apparent that disability solutions have historically strayed away from aesthetic concerns, focusing instead on what might be considered a functional or utilitarian approach. This has, in part, been driven by a medical model of disability that prioritises basic functionality, wherein attempts are made to camouflaging or obfuscating the medical appliance.

In this regard, we might turn to evolution of modern wearable devices or personal disability aids, to demonstrate the inherent tension between a functional and more aesthetically considered approach, what Graham Pullin (2008) through the work 'Design meets Disability' frames as an argument between fashion and discretion. In this regard, Pullin states that *"The priority for design for disability has traditionally been to enable, whilst attracting as little attention as possible"* as medical appliances were meant to accomplish their intended function with minimal visible impact.

This utilitarian mode of design thinking considers aesthetics only so far as wearables should fade into the background, wherein *"The approach is less about projecting a positive image than about trying not to project an image at all."* As such, certain personal devices like hearing aids, which were notably easy to camouflage, have been consistently developed with discretion in mind, creating steadily less noticeable devices or what Pullin refers to as *"concealment, through constant technological miniaturisation"*. Yet this approach has come at a cost, as the stigma that surrounds hearing devices remains both significant and pervasive<sup>53</sup> with the device's reduced profile being credited as one of the primary explanations for its negative perception.

In contrast, spectacles were a constant and noticeable presence, a fact which positioned them a part of a person's visual identity. As such a fashion led approach eventually supplanted notions of invisibility, to the point where few would think of modern glasses as a disability aid at all. Yet this was not always the case, as indeed, in the 1950's the British National Health Service actively discouraged spectacles *"which seem designed to set a fashion"*<sup>54</sup> with negative opinions of glasses as a sign of ailing health or age, were fairly recently commonplace. In the decades since, glasses have become a prominent example of the role fashion plays within adoption of disability aids, where a fashion-led approach is credited with removing much of the stigma that once surrounded them. In this way, Pullin notes that *"glasses do not owe their acceptability to being invisible"* rather, it is their constant presence and a consideration of aesthetic notions of fashion and taste, that such devices emerge into the mainstream.

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<sup>53</sup> (Sanford MJ, Anderson T, Sanford C, 2014; Action on Hearing loss, 2011; Wallhagen, 2010)

<sup>54</sup> (National Archives, 1950)

Whilst the benefits of fashion and broader aesthetic consideration has become more pervasive in the contemporary discourse of personal disability aids, notions of the medical appliance still persist in other areas of design. In regards to tactile image making, a prevalence for images to be made only when deemed essential decreases both the number of available pieces and the topics they approach. In this way, it becomes apparent that if the only places tactile images are found are those which cater exclusively to the education of blind learners, many who might benefit from a haptic engagement with such work might be dissuaded from doing so if they do not consider themselves the intended audience. Additionally, the caution surrounding fashionable or beautiful works means that the objects that are engaged with, are often utilitarian or academic, reinforcing the notion that the role of tactile imagery is to function solely as an auxiliary aid, not aesthetic work. In this way, an approach that only limits image creation and which only considers the functional, can be thought to damage the profile of the territory as a whole by reinforcing notions of potentially beautiful objects as medical appliances.

Returning to the idea that everyday objects might be repositioned as tactile images, such models can be thought to serve a significant role in the proliferation and appreciation of aesthetic works, in that when we consider found objects through a lens of haptic perception, we not only dramatically increase the number of available images, but recontextualise seemingly innocuous objects as things of beauty. In this regard, understanding these objects as works of aesthetic significance, as items with which we might engage in a significant haptic discourse, we enable a lay audience to understand the mechanics of a style of tactile-kinaesthetic perception, which in turn, has the potential to uncover other opportunities for a touch based understanding of beauty from those who have not previously engaged with art objects in this way.

In this regard we might return to our recurring motif of the keychain of the Eiffel Tower, this time understood through a haptic-aesthetic register, one through which we might position this tactile model as something more than simple a tool for a kind of function or cultural access. In this way, we might instead think of the keychain in terms of experience, how through an understanding of the form and context of a work, we might allow for a more transformative consideration, one where the aesthetic qualities of the image emerge through both an appropriate touch-based engagement and an acknowledgement of its relational qualities, the connection it holds to both the primary work and as an aspect of a form of life.

To this end, it is perhaps pertinent to address specific aspects of tactile-kinaesthetic perception, namely, to outline the nature of haptic engagement in regards to aesthetic appreciation. In this regard, there is a definition of tactile or haptic space, that surfaces through the notions of the smooth presented by Deleuze and Guattari (2013), wherein *"the Smooth is both the object of a close vision par excellence and the element of a haptic space"* a consideration of the close and the nomadic, what Marks notes as something *"that must be moved through by constant reference to the immediate environment"* (Marks. L, 2002, p.xii) In this way, the form of understanding of haptic aesthetics and perception that emerges through notions of the smooth, is one that is not primarily concerned with the sensation of touch, rather, it refers to the experience of feeling, as it is only through this addition of motion that a true sense of the haptic emerges, where the appreciation of that which is being touched makes itself known.

On a mechanical level, the difference between laying your hand on a surface and exploring its texture is essential, something deeply rooted within human experience which whilst perhaps rarely considered, becomes almost self-evident when addressed. Indeed, on a basic level we might note that sensations like rough and smooth are more readily apparent when we explore with our hand, but more than that, subtle distinctions emerge through movement that allow for an understanding of form, pattern and shape,

foundational notions through which tactile works allow for both the conveyance of meaning and perhaps even an experiential, aesthetic offering.

It is this facet of haptic experience that represents the core of our argument, that mundane objects can be beautiful in part because of the way in which we are forced to engage with them. Indeed, as we have previously and consistently established, comprehension through touch provides a slower form of engagement, where even rudimentary understanding through tactile-kinaesthetic means, often requires a conscious investment of time. In this regard there is no haptic equivalent of 'glancing' at a tactile work, as a momentary touch does not reveal enough information to form that kind of mental picture, as such to observe through touch, is to do so without pace. In regards to everyday objects, they can be thought of as valuable tactile images in part because they are everyday, work with which it is not unreasonable to expect repeated and significant interaction.

In this way, a keychain is an object of significance in part because it is readily available, not only in the sense that such an object is ubiquitous, but in regards to the fact that they are often kept on a person, that by virtue of the nature of keys as essential, they are involved in a ritualistic and repetitive form of touch. In much the same way, a worry stone or fidget toy presents a material, haptic experience when presented as objects of focus, when their experiential offerings are understood in relation to a kind of disinterestedness, to play with and consider, but also to lose oneself within the moment of feeling. In addition, a keychain, as much as any other wearable, is an expression of personal identity, an object which through continued use takes on new meaning to the wearer, a significance through which a long and perhaps profitable dialogue might begin to emerge.

To this end, the aesthetic tactile image embodies many of the attributes of what Reed (2017) might define as 'slow art', stating that *"one way to gauge slow art is its power to persuade us momentarily that our experience is all-consuming."* In this way, the concentration and myopic focus that might be thought of as integral to tactile comprehension, fundamentally intersects with the nature of the kind of aesthetic experience Reed describes, for such approaches are not merely about spending more time with a piece, but rather positioning yourself in the frame of mind in which you are receptive to the work in question.

Reed goes on to clarify his position through the words of Richard Serra, referencing that *"The question is not how much time you spend actually looking at a work, but how much it occupies your thought. A limited viewing can lead to a long lifespan. Indeed one reason we go back to the work is that it's not commensurate with what we recalled. We can even be mocked by it. If it's good, it keeps on"* In this way slow art is not wholly a question of time, but rather time in relation to approach, and whilst we may certainly draw a distinction between interaction with a work and *"how much it occupies your thought"* an important facet of the concept is that the longer a conversation is, the more likely we are to take something of value away from it.

In turn it is broadly acknowledged that the lay person only tends to engage with artwork in a gallery setting for a relatively short amount of time, with Reed reporting that *"Americans, on average, spend between six and ten seconds with individual artworks in museums or galleries"* and whilst other sources like that of Smith and Smith (2001) report engagement times that are substantially longer than that, stating that *"The mean time spent viewing a work of art was found to be 27.2 seconds, with a median time of 17.0 seconds."* it is still apparent that there is a fundamental disconnect between the approaches of slow art and the way in which the everyman explores art.

Indeed, the Tate Gallery (2019) in their guide to slow looking “*recommend 10 minutes*” as the initial point with which to engage with art in a slow way, quite the departure from the sub thirty second mark that is generally purported. In turn the very language used, that being ‘slow looking’ is perhaps somewhat telling, as whilst its origin can be attributed to the ocular-centric discourse of the visual arts, there is an implied suggestion that sight in contrast to touch needs to be trained in order to be ‘slow’. In this regard, it may in fact be more straightforward to ‘observe’ slowly without vision, as we need not unlearn the sight-based propensity to ‘view’ quickly.

In this, a sighted audience might also understand the keychain of the Eiffel Tower as a beautiful artefact or even an art object, by first divorcing ourselves from our own ocular-centric mindset, to consider the work in the way in which is most likely to elicit an aesthetic form of engagement. Indeed, when we interact with a tactile image on its own terms, what Zemach would consider viewing it under “*standard observational conditions*” we are able to separate preconceived notions an object as inconsequential or as a cheap tourist trinket, instead focusing on the material, aesthetic qualities that are readily present within the model.

### **3.1: The Mona Lisa-ness of Mona Lisas, The Aesthetic Tactile Image in Application:**

Over the course of the previous two chapters I have supplemented my arguments with practical examples of tactile images, using them to demonstrate the various facets of the ‘functional’ and ‘cultural’ in application. In turn, the aesthetic tactile image may benefit from the same examination of companion works, highlighting pieces which either primarily focus on the translation of art, or which concern themselves with notions of beauty and the aesthetic. It’s important to recognise however, that whilst a distinction helps for the purposes of exposition, these categories need not be treated as mutually exclusive, that is to say, a functional image might still be beautiful and a cultural image can provide access to the aesthetic, albeit in a different fashion.

It should be apparent that the works presented here still utilise the same foundational tactile image making system that we have outlined in earlier chapters, 3D printing images with raised lines and texture swatches to ensure a base level of comprehension and understanding, though, as aesthetic works it can said that they attempt to move beyond simple transference of meaning. Indeed, one of the primary claims of the aesthetic tactile image is that works that are designed to be understood through touch, have the capacity to be beautiful, emotive, or even sublime objects in their own right. As such, whilst our established techniques ensure that such works can be mechanically understood through touch, once that base level of comprehension is established, the aesthetic image might utilise this haptic register to elicit aesthetic experience.

In turn, tactile translations of traditionally visual works may be presented as more than merely auxiliary aids, whereas a cultural understanding frames them as objects that are designed to facilitate access to experience, an aesthetic understanding presents tactile images as the objects of focus. In this, such works enable a kind of access to the aesthetic that is more resonant with the experience of someone confronted with the original work, something that without caveat can be thought of as an art experience. To begin with, we return to two works which we have been briefly alluded to in earlier chapters, though whilst this initial mention was predominantly in reference to their technical and mechanical properties, they might now be explored in regards to their intended function, namely, as predominantly aesthetic works.

In this way, tactile versions of 'The Mona Lisa' and 'The Oldest Image of Venice' allow us to highlight the ways in which aesthetic decisions impact the sensitivity of a translation. That is to say, how seemingly technical questions of swatch choice, framing and notions of level of detail provide a background with which we might go beyond mechanical notions of legibility, by foregrounding questions of what is appropriate or resonant with an original work, not only what is most straightforwardly comprehensible.



*Fig. 22: The image above pictures three tactile renditions of the Mona Lisa, all three of which are printed in white PLA plastic. These two and half dimensional images are constructed with the texture swatches referenced in earlier chapters, with a wave pattern denoting the texture of the hair and a variety of line and grid patterns denoting fabric.*

*Two of the images are printed with a raised line height of 0.25mm, but cropped and edited in such a way that the background and hands of the figure are not visible. The final image is a scaled version of this 0.25mm cropped image, printed at a size that gives it a 0.5mm line height.*

The intertwining contexts of this thesis are perhaps most apparent when discussing work which spans the breadth of multiple distinct registers, that is, when mechanical concerns meet questions of emotion and experience, where access combines notions of comprehension with other forms of understanding. To wit, aside from aesthetic considerations, the Mona Lisa can be thought to open up a complex discussion in regards to what is, in effect, a functional concern of emotional codes. Indeed, any tactile depiction of the portrait must attempt to convey a complex and nuanced expression set, grappling with the idea that as a painting and not a photograph the face may not accurately depict real expression, in turn the expression

itself is famously ambiguous, for whilst the Mona Lisa is thought to smile, this smile is said to disappear when observed directly<sup>55</sup>.

As such, in regards to our own tactile images, by reducing such a complex painting to simple lines and patterns, it could be argued that this style of translation is unsuitable or unfaithful to the original. Indeed, given the general consensus that Da Vinci left the original expression ambiguous, translating the work using tools that by design, utilise necessarily harsh striations of shape and form, could be said to remove that intended ambiguity. However, it's important to recognise that the rationale for selecting the Mona Lisa was firmly rooted within the contexts of each of my major territories, in that any tactile translation of this image would stand as a functional depiction of a culturally significant, aesthetic work. Furthermore, there is a clear desire amongst blind communities for an analogous image that might provide some kind of aesthetic access to the Mona Lisa. Living Paintings, The Unseen Art Project, Museo del Prado and The Touch Art Festival<sup>56</sup> amongst countless others, have presented tactile versions of Da Vinci's artwork. In a territory of art creation that systemically questions and demands a clear rationale for the production of any tactile image, the ubiquity of the Mona Lisa and its status as one of most prominently reproduced sighted-artworks, is significant.

Whilst there are many other tactile examples of this painting, the approach taken within my own research is distinctive, in that it can easily be printed by an amateur or hobbyist audience. In this fashion, we present a different kind of access and ubiquity than that which is offered by an accessible work in exhibition. Such a tactile model has the potential to bring the image to the audience rather than rely on the audience's ability to engage with a gallery setting, by allowing them to produce their own version. Additionally, an explicit aim of this work is not only to print more of itself, but also to lead others to the tools and means of production with which they might create their own tactile images, a goal which is aided by the profile of the original.

It may now be more apparent why I approach the work early in my practice but only address it relatively late within my thesis, in a functional register the painting can be thought of as figurative depiction, but one that complicates notions of facial expression. Culturally, the work is seminal, deeply ingrained within the public consciousness, but its status as an art object precludes it from being considered a wholly cultural example. Similarly, as an aesthetic object it is considered by many to be an embodiment of the beautiful, an example of why we might venerate art, yet the work's profile and connection to the zeitgeist make it difficult to remove from its broader context. It is, in effect, the intersection between all three chapters, where functional depiction, cultural significance and aesthetic appreciation meet, albeit with an uneasy incongruity.

As such, whilst the Keychain of the Eiffel Tower stands as a near archetypal example of a work from any of our three territories, a tactile instance of the Mona Lisa does not sit comfortably within the boundaries of any one individual section of this thesis. In this way, it might be thought of as an exemplar of the tensions present between each group, rather than being representative of any one style of image. To this end, the approach we have taken to create a tactile rendition of the Mona Lisa has developed in response to this complexity. In this way, we have moved from an initial prototype version that was designed to be understood in isolation, a work which can still be found within Appendix B of this thesis, towards a more

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<sup>55</sup> (Soranzo & Newberry, 2016).

<sup>56</sup> ("Breaking down the visual boundary: How do visually impaired people enjoy art", 2018) ("Mona Lisa Collage", Living Paintings; "Mona Lisa For The Blind", 2015; "At Museo del Prado, Blind Visitors Can Touch Masterpieces, 2015).



sophisticated multi-work collection, that operates on the principle that fragments and relationships offer clarity and insight.



*Fig. 23: The accompanying image pictures a tactile version of the Mona Lisa, printed with a raised line height of 0.5mm. All background detail is omitted and only a section of the figure is present, depicting the upper portion of the woman in a bust like style. A frame encases the portrait, making sure each texture is contained within its own section and minimising sharp terminator points that can come from the endpoints of 3D printed lines.*

As such, through the collection-based, multi-model approach offered by our assemblage of tactile images, or what as a whole might be considered the “Mona Lisa-ness of Mona Lisas” we attempt to compensate for the potential failings or limitations of individual fragments, by presenting additional complementary instances. As such, the work is composed of five distinct but interconnected pieces, which each serve a specific function. To the end, the works that constitute this collection are as follows:

- I. Complete Painting (0.25mm)
- II. Without Background (0.5mm)
- III. Without Background (0.25mm)
- IV. Neckline (in Situ)
- V. Neckline (Flattened)

Of particular concern within this collection, was the pairing of appropriate texture swatches to the material they denote. Waves become the texture of flowing hair, whilst fabric is pictured with grid and line swatches, the more layered the fabric the tighter or more complex the grid, ranging from horizontal lines for areas of light or flat fabric like the model's veil, to zig-zag grids for areas of ruffled or bunched material.

Similarly, areas of exposed skin are left textureless as a way of ensuring that swatches don't interfere with the details of the face and the edge of the painting is denoted by a simple raised line outline, in part to lessen the chance of hard terminator points, which as we have previously established can be problematic in regards to tactile works.



*Fig. 24: This image features a close up of the 0.25mm complete image of the Mona Lisa, drawing attention to the single line depictions of mountains and other natural forms featured in the background of the image. These simplistic line drawings can be easily traced with the finger and understood as basic depictions of mountain forms, without confusing the edge of the primary figure, which contains large self-contained areas of texture.*

The most complete image features a line depiction of the portraits background, utilising 'level of detail' concepts that are commonly found in certain forms of digital media. Objects in the distance are depicted in less detail and as such, the more complex swatched sections in the foreground become the primary focus. In this way, level of detail in regards to tactile image making, can be thought to parallel visual concepts of depth of field, that is, the photographic technique of blurring parts of an image to alter the point of focus. In this fashion, we might consider a lower level of detail to be the haptic equivalent of visual blurring, where in the function of both might be thought in some ways analogous.



*Fig. 25: The image above shows both of the tactile renditions of the Mona Lisa that feature a 0.25mm line height. The smallest cropped version is placed on top of the more complete image, in such a way that some lines connect to the image below, highlighting exactly where the image has been cropped and that the sizing between the two has remained consistent.*

Building upon this, each piece within the collection can be thought to operate through similar considerations of level of detail, where the absence or reduction of specific features allows for some other consideration to be foregrounded. The two images that do not depict any background detail, do so in part to enable those who find tactile images more difficult to read, to first understand the figure in isolation, allowing them to understand certain essential features before attempting to engage with the more complex work.

Additionally, the tight cropping of the image removes the figure hands and sections of their dress, narrowing the focus of the image and reducing the work to half the size of its background counterpart. This allows the work to be functionally printed on a smaller bed whilst enabling it to be scaled-up for those who require a larger print or increased line height to discern the figure. Indeed, every image in the collection is designed to operate at two scales, that is at two distinct lines heights, as such, the largest print is, by design, half the size of the original painting, which given a large enough print bed might be printed true to life.



*Fig. 26: Pictured are two white 3D printed, raised line tactile images. The first is rectangular and features a direct copy of the pattern along the neckline of the Mona Lisa as it appears in the painting. In turn this results in areas where the pattern is distorted or less obvious by virtue of how it hangs on the fabric of the model.*

*The second work is square and features an excerpt of the same pattern, but in contrast to the other piece the pattern has been flattened and enlarged, in order that it may be more clearly understood. The pattern itself is made up of a collection of interconnected octagons, under which a single continuous line connects elongated diamonds at regular intervals. Periodically this line creates a plus or cross from four such stretched diamonds, with a central connection which makes the cross resemble a four petaled flower.*

The final two fragments take singular details from the eponymous painting, printing them completely separately from any reference of the portrait. This is done in order to highlight the embroidered pattern present within the neckline of the figure's dress, a feature which is absent from our other depictions primarily because of size restrictions<sup>57</sup>. Indeed, at this scale, both versions are simple to trace with the finger, to the point where terminator points or areas of catching are less problematic than if they were a part of a larger piece.

Similarly, to print the pattern in a way that is legible as part of any of the other tactile images, would require that the rest of the image be similarly scaled for the embroidery to be discernible, resulting in many other features of the work to be significantly oversized and as such, more difficult to discern via touch. In fact, at this theoretical scale, we would move away from established conventions of feeling with the index finger, to a work which would require the whole hand to explore, a method that is not appropriate for this kind of raise line image, in that it does not allow for the kind of sensitive recognition of form as other modes of touch.

Additionally, the flattened version of the motif gives a more accurate understanding of the shape of the pattern, in contrast the 'in situ' work denotes how the pattern appears on the painting, each offering a

<sup>57</sup> (The unique embroideries, 2012)

subtly different perspective wherein one work compensated for aspects of the other. Smaller images with lower line heights foreground ease of printing, whilst larger works are easier to read at the cost of being more labour or time intensive to print, that is, if a print bed is even large enough to do so. Isolated elements allow specific details to come to the fore, whilst more complete images often require elements to be omitted or simplified in order to appropriately depict the whole.

It might now become apparent that in regards to tactile image making, aesthetic decisions are uniquely connected to functional and mechanical concerns of legibility. In this regard, questions of access are never wholly separated from such works, even when discussing them in a more experiential aesthetic register, in part because legibility is often a vital aspect of enabling a certain kind of sophisticated engagement. Yet, sensitive depiction goes beyond simple functional consideration, as whilst swatches must still be distinct when observed adjacent from one another, the primary concern in an aesthetic context is whether the texture sensitively renders the material. Similarly, level of detail can be thought to make it easier to discern more complex areas of a work in part by isolating those fragments, yet, if thought of as an aesthetic decision, then the process can be positioned as a way of shifting focus.

Presented as a collection, each work not only represents an alternative path towards comprehension, but if understood in relation to one another, they offer a way in which a greater understanding of the work might emerge. Similarly, the repositioning of many of these smaller details, presents an audience with novel and unconventional ways of engaging with the subject. By isolating details like the embroidery of the figure's dress, we shift focus towards aspects of the work which were likely unconsidered, details which may encourage someone already familiar with the painting to revisit it, perhaps even elicit a new appreciation for those aspects of the original.

Moving on from this collection we might proffer a less well-known work, one which is perhaps more mechanically suited to this style of raised line translation. Indeed, for as much as the justification for choosing the Mona Lisa is in part because of the nature of its profile, a less well known piece might allow us to instead focus on another facet of tactile image making, that being the way in which a tactile image might harmoniously correspond to the original, where the nature of the primary instance is resonant with the form of the translation.

To this end, "The Oldest Image of Venice" might function as something of a counter to more high-profile works. As a simple line drawing, the primary work seems to bear a strong familial resemblance to the raised line image that emerged from it, albeit with the minor alterations in the addition of swatch patterns to areas of water and roofing. Through a haptic register the image might similarly be understood as a sketch, where harsh delineation of form allows for comprehension of figure, but the decidedly hand drawn feel to the work is apparent even via touch, with uncertain lines a far cry from much of the diagrammatic or digitised work that often permeates the field. Yet, the original might be thought of as particularly resonant with this style translation, not only because of its mechanical focus on line, but in part because the context of the original work highlights that distribution may have in fact always been its intended purpose.



Fig. 27: Above are two versions of the 'oldest image of Venice' each relying on simple raised lines to denote the sketched look of the work. Both depictions feature relatively few areas where swatch patterns were applied to denote specific textures, but a tight grid pattern has been used on many of the tiled roofs to denote the cross hatching present on the original, and a large body of water features a similarly texturally appropriate wave pattern.

The image itself features a row of houses in the foreground, each of these buildings is slightly different in shape with some appearing to be built on top of each other in a ramshackle or quite organic way. Behind these buildings is a large body of water, where two basic depictions of a ship float, both of these vessels are drawn as a crescent moon shape with two triangular sails connected to a central mast. Behind this is a road and another set of buildings, notably a church is included amongst them, occupying a place in the top right-hand corner of the image, with a mounted cross on its roof distinguishing it from the buildings that surround it.

Some of the buildings feature sloped roofs, others feature crenelations like those of a castle or in the case of one tower in the top left, a domed cap with what appears to be a rectangular chimney. All of this comes together to give the impression of a city that has been built upon, urbanised and tightly packed with no consistent style amongst constructions. The image is drawn in a flattened 'sketched' style, where lines are a little irregular with an exaggerated kind of two-dimensionality, where structures and objects are reduced to simple shapes without concern for perspective.

The image dates from around 1330 and is credited to Niccolò da Poggibonsi, however, in the intervening centuries the piece faded into obscurity and was then re-discovered by Dr. Sandra Toffolo, only then being reintroduced to the public in 2020. Of particular note to our own research, is the idea that the work itself was designed for replication, that *"The presence of these pinpricks is a strong indication that this city view was copied"* and that *"Indeed, there are several images in manuscripts and early printed books that are clearly based on the image in the manuscript in Florence."* (Toffolo, 2020). There is perhaps a kind of poetry to translating work which has already been so deliberately distributed, wherein through contemporary methods it might be made accessible to a blind audience, in tandem to a kind of visual proliferation through other forms of digital replication.

Much as the foregrounding of elements might draw attention to a specific aspect of a work, the shift in focus offered by a tactile translation might also bring novel insights into the primary instance. To wit, the Oldest Image of Venice becomes a point of interest, in part because of its rediscovery and the emerging context with which its 2020 presentation was framed. In this way, a tactile equivalent is aesthetically interesting, in part because the nature of translation is intimately connected with the nature of the original, wherein the rendition might be thought faithful in both form and in a perhaps more nuanced sense, function.

### **3.2: Two out of Three Panels, Defining the Original & Time Sensitive Properties:**

With the aid of Benjamin's definition of translation, we have established that "*Fragments of a vessel*" need not resemble one another, rather the 'essential' form or true language is revealed only when many works are understood in relation. In this regard Zemach offers a connected but nonetheless distinct aspect of translation, one derived from established notions of types and tokens but which is primarily concerned with artistic work and remediation, that being a theory of "instances". To this end "*A literary critic does not rewrite the poem he interprets. So his work is not an instance of the poem*<sup>58</sup>". Similarly, a theatrical performance might be defined as an instance of a play, wherein the notion of originality becomes somewhat immaterial in a sphere of artistic practice which is not concerned with the permanency of objects. In this regard, there is no original song or sonata, but rather many instances of a work performed, the quality of each performance defining only whether it is an aesthetically 'good' instance, not whether it belongs to its respective type. In this regard, a children's performance of *Les Misérable* is no less an identifiable instance of the work, despite the clumsiness of the presentation or even occasional mistakes within dialogue.

Yet, Zemach applies this notion of instances to areas of art practice that traditionally hold a reverence towards an original, noting that such an understanding of tokens "*is also true for interpretations that present an interpretandum in a new medium*". That is to say, remediation into a new media does not preclude an instance from belonging to a certain type, as such a photograph of the Mona Lisa might still be considered an instance of the work if it can be clearly identified as such, distinct in translation from other transformative works by its resemblance to the original, even if that resemblance might now be considered familial. In this way, the creation of an instance can be understood as an attempt to "*rewrite the poem*" a form of retelling that both embodies many facets of what it translates, whilst being in some ways, distinct.

As such, much in the way fragments of a vessel need not resemble one another, so too might translated instances be thought of as what (Coleridge, 1817, p.182) defines as "*interfusion of the SAME throughout the radically DIFFERENT*" wherein each work can be understood as of the same type whilst at the same time differing significantly. In this regard we might draw upon Zemach's notion of instances, to counter one potential criticism of Benjamin's theory of translation that emerges from a disability centric discourse. Namely, that in its pursuit of a relational understanding of work derived from fragments, or what others might consider "*nodes and links*" or "*points and arrows*", we must concede that the 'original' might be considered a significant aspect of the collection, one which will routinely be inaccessible to a disabled audience and which therefore cannot be understood in relation.

Whilst Benjamin's analogy of the vessel does account for the incompleteness of the image, in that true language reveals the essential features of the whole in part because the collection of fragments is not

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<sup>58</sup> (Zemach, 1997 p.92)

presented as whole, the notion of an original as aesthetically better or definitive, might be thought to present a substantial missing piece. That is to say, that a version of the original wherein the aura or ineffable aspects of a piece are thought to be essential to understanding, present a larger barrier to true language than simply an absence of an individual token. Thus, if we instead present a version of instances that in some ways discounts the primacy of the original, we are no longer presented with a problematic or irreconcilable absence, simply an omitted token akin to any other fragment.

Yet, the interpretation of instances proffered by Zemach, notes that an instance need not and often will not, contain the same set of aesthetic predicates as the original. In this way, we are presented with another point of contention, one that is in part derived from this discussion of originality. Namely, that the value of the original might in many ways be thought to be derived from its superior set of aesthetic predicates, that to "*understand a poem*"<sup>59</sup> in the more holistic, conceptual sense of the term, comes from the preservation of these predicates. In this way, a theory of the original that considers the primary instance innately aesthetically superior to translation, in part because of its primacy, would understand the original instance to offer something more than our designation of '*any other fragment*' might suggest.

To this end, notions of aesthetic equivalency might now come to the fore, beginning with the assertion that a tactile image has the potential to elicit a beautiful experience, or that one might in fact, be considered an aesthetic object. In this way we can be thought to deviate from Benjamin's notion that a translation "*cannot claim that its products will endure*", for the aesthetic tactile image as we present it, might not only have the potential to endure, but may in some circumstances, provide a superior experience, that is to say contain a *better* set of aesthetic predicates, than the original.

Here it perhaps becomes pertinent to address notions of "*equivalent aesthetic experience*" both from our established disability centric understanding of access and more broadly, in regards to how we might consider any two peoples experience of an aesthetic work, to be equivalent. In turn, we must also note that the definition of what constitutes an original, is routinely thought to be a point of contention, that by many established understandings of the term, original is not always synonymous with aesthetically superior and as such, might not represent any more significantly problematic an omission than the absence of any other fragment.

In this regard, translation theory often makes mention of the original<sup>60</sup> from which the translated form bears a significant resemblance. In turn, when considering a work for translation, there is an inherent requirement to identify the original work we hope to translate. With respect to specific instances this aspect is often largely self-evident, though the particulars of why are perhaps difficult to articulate. The 'original' Mona Lisa hangs in the Louvre, the 'original' Eiffel Tower stands on the Champs de Mars and certainly when discussing my own tactile images and the keyring of the Eiffel Tower, these are the originals to which we refer. In practice, defining 'the original' in this sense, or perhaps more accurately 'an original' is often a relatively non-controversial process, for in a translation context original may simply reference either that which I translate or that which came before.

Yet, the Isleworth Mona Lisa was also purportedly painted by Davinci, indeed, it is thought to depict the eponymous Lisa Gherardini around 10 years before the Louvre hanging. Similarly, the Eiffel Tower has

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<sup>59</sup> (Antoine Berman et.al, 2018)

<sup>60</sup> Indeed both Benjamin and Zemach make reference to the nature of the original in their own discussions of art translation: "*Is a translation meant for readers who do not understand the original?*" (Benjamin, 1968). "*the criterion is identity with a physical thing, the original of X*" (Zemach, 1997)



had three major renovations throughout its lifetime, similarly, the 'Société d'Exploitation de la Tour Eiffel' consider the tower's illuminated night-time form to constitute a separate artwork from its earlier construction, wherein, the instillation is considered to be under copyright, thus permissions should be sought before distributing photographs of the tower after dark. In this sense, each instance may have a claim to being more original than the subsequent renovation, yet in a pragmatic sense, any may be considered *The Eiffel Tower*. In turn, a sketch or precursor to a finished work might seem to have a claim to being 'the original' if we are to take a definition of 'primary instance' to its logical extreme. In this regard a wooden print block might be thought more original than the print it creates, for it might well be considered the earlier instance, bearing a strong familial resemblance whilst being a singular point of contact for the plurality of prints it creates.



*Fig. 28: Pictures is an assorted collection of wooden and rubber printing blocks, namely, a figure of a sketched woman used in fashion drawing, an image of a star with a smaller star inside it and a dotted square border, a rubber stamp denoting a broom and dustpan, a wooden mounted rubber stamp of a pair of boxing gloves, a similarly wooden mounted number 4 in an ornate serif font and a wooden carved pattern block, in a paisley or floral style.*

In turn, it may be apparent that such a definition might be considered deficient, as to consider the earliest instance of work is to point to something incomplete or which was otherwise designed solely to aid in the creation of the work. Yet, from a disability centric perspective, there is perhaps a value in humouring this initial rhetoric, as indeed whilst a finalised work may be distinctly ocular-centric, its precursors may allow for a different kind of engagement. To wit, we might return to the perspective of Fiona Candlin (2004) wherein she proffers a want for haptic and tactile engagement which provides not only access to translated works, but rather access to the original artefact.

In *'Don't Touch, Hands Off'* Candlin bemoans the notion that *"the knowledge and pleasure they derive from handling artefacts has to be repressed within the institutional framework of the museum"*, and whilst an original print may be of little haptic interest and indeed, handling such a print might represent a significant danger to conservation, the same might not always be true for the printing block from which it came. To this end, the nature of such objects might well be thought highly resonant with established traditions of tactile image making presented within this thesis, indeed, thick raised lines, clear segmentation of form and strongly delineated figurative depiction, are regular features of both territories. Additionally, pattern centric work commonly found in fabric print blocks, evoke the kind of haptic differentiation present within our tactile swatches, whilst circumvents notions of proficiency by requiring less understanding of form in favour of a more experiential offering, one that nonetheless, still enables a tangible form of haptic engagement and understanding.

In turn, such collections might well provide a wealth of readily available, tactilely discernible work, objects that function in a sophisticated haptic register without need for alteration or translation, often with the additional benefit that precursory objects might be considered more robust or less precious than the work they created. Indeed, our own foregrounding of found objects as viable tactile images, present a notion that might work in tandem with Candlin's own desire for unmediated access to artefacts, where rubber stamps and common household craft blocks, might be thought of as the domestic equivalent to a galleries printing blocks, sculptural machetes or casting moulds, all of which might offer a form of touch based access that may not have otherwise been readily apparent. In turn, considered as fragments such objects have the potential to offer new insight into other instances, revealing makerly aspects of the production when understood in relation, a form of presentation which is highly syncretic and which foregrounds not only access to the mainstream of consumption, but in a very real sense offers an avenue toward the mainstream of production and artistic practice, where an understanding of the processes involved in creation, might in turn lead to a connected process driven style of engagement, where print blocks create print makers.

Returning to notions of the original, it may perhaps be more appropriate to only consider finished works in our definition, where it is the aesthetically superior example that warrants the term original. In this way, a painting might be deemed 'better' than a subsequent print or prior sketch and in this regard, the work is elevated to original status by virtue of the aesthetic predicates that define it as a beautiful or 'good' instance. Yet by this standard, a piece that degrades or radically changes over time, might then be thought to lose its title as original, for if we state that a prerequisite of originality relates to the work's aesthetic predicates, changes to those predicates present a deviation from that original state. In this way, the Louvre hanging of the Mona Lisa's now possessed ailing varnish, something that in turn presents significantly more muted colours than were original intended, indeed, the forensic work of Pascal Cotte (2015) offers a version of the Mona Lisa that is far closer in hue and tone to the piece that left Davinci's studio some five hundred years ago, which by this standard, may have claim to a theoretical originality.

In this way, we might reasonably concede that the notion of original in the way in which Benjamin predominantly utilises the term, references the pragmatic definition of an earlier instance from which a translator might in turn derive a translation. In contrast, Zemach definition of original is perhaps more obtuse, in part because notions of instances do not inherently hold reverence to a primary instance, instead asserting value by virtue of the set of aesthetic predicates the work possesses. In some regard it may now be tempting to dismiss any notion of reverence to a primary instance, to consider notions of an original, incompatible or at the very least unnecessary beyond notions of that which we translate.

Yet, both theorists proffer at least one position which might be thought to defend an original work as aesthetically superior, to wit Benjamin notes with his presentation of the aura, that even a perfect copy is unable to replicate an artworks "*presence in time and space, its unique existence at the place where it happens to be*". Similarly, Zemach includes in his definition of aesthetic predicates 'time sensitive properties' wherein, "*to observe an object as having TP one must look at it from a particular point in time.*" a kind of aesthetic predicate which it would seem defies replication or translation. Despite this, whilst it is true that Benjamin concedes that there are properties which defy translation, Zemach's stance which upon first examination appears resonant with such ideas, is nevertheless subtly but distinctly different.

Indeed, to Zemach 'TP' are not in fact, representative of a unique existence, but rather more closely resembles Benjamin's connected theory of the cult, with the distinction that rather than being beholden to the contemporary context of its current situation, a work might instead be considered from a particular temporal vantage point. In this regard Zemach proffers his own example in regards to the arts, stating that "*Warhol is an important artist because he saw that he could generate significant TP by positioning his work between two traditions, industry and art*" that "*He saw that at this moment in history and the history of art, against a backdrop of our economic-cultural environment, a handmade Brillo box would have valuable TP.*<sup>61</sup>" a reference which is in part notable, in that it bears more than a passing resemblance to Benjamin's consideration of art in the mechanical age.

Accordingly, for Zemach, for any time sensitive properties to be known as a 'visible' property of the artefact, it must be presented in context "*against a certain historical background*". Whilst Benjamin treats presence in time and spaces as ineffable, the context Zemach describes is something which can be conveyed in translation, an aspect which as we have defined, is integral to a collections-based approach to tactile image making.

As such, whilst the "*presence in time and space*" of an object may present aesthetic predicates that are unreplicable, the context required to appreciate those properties might be conveyed and understood through an appreciation of that context. Thus, the original in regards to accessible translation, might be considered non-problematic, on the proviso that the context surrounding a work is presented alongside the individual instance, a notion which represents something of a core tenant of our collection-based approach.

At this juncture, it may be pertinent to return to a work that I briefly alluded to in our introduction, one for whom notions of TP are uniquely resonant, both in a physical, situational sense and in a perhaps more nuanced consideration of the role context plays in access to art. The work is composed of two 7.5ft x 4.5ft ceramic tile murals, both of which are situated in the foyer of Huddersfield Library and Art Gallery and which depict scenes from the surrounding area, more specifically figure by the side of the canal. Whilst the initial justification for approaching the works was their technical suitability for raised line translation, in that harsh striation of tiles imitates common conventions within tactile image making, the narrative of the work and its fragmented history, proved to be more substantial and intermittently in turn with notions of access.

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<sup>61</sup> (Zemach, 1997 p.85)



*Fig. 29: Pictured above are two ceramic murals which hang in Huddersfield Library and Art Gallery, each of which flank the stairway into the gallery on the upper floors. Each work is composed of many smaller tiles, which means that every object is segmented in such a way that individual colours and textures are self-contained within heavily striated lines.*

*The mural on the left pictures a male figure in a green coat, sitting down on a wooden pier looking away from the viewer towards a body of water. Behind these blue and green wavy tiles, is a collection of yellow stone buildings that is atypical of architecture around Huddersfield. The structure on the furthest right of the scene has scaffolding in front of it, criss crossing over many rectangular windows. The central building features arch-shaped windows and a pointed roof, with smaller square details framing these primary features. The final structure on the furthest left is depicted as a blank space, giving the impression that we are looking at a side view of the building, which contains no windows or notable features. Above everything a slatted roof with skylights and a series of thin rectangles which seem to show a glass fronted structure.*

*The mural on the right features a young boy feeding swans, he wears a bobble hat and a yellow coat, facing towards the audience and holding a roll of bread in one hand, scattering crumbs with the other. Two swans wait in the water, facing towards the boy and seemingly waiting for food. Behind the body of water is a single large building, with a central peaked roof section and more scaffolding on the left hand side. The building is covered in rectangular windows and a larger central glass doorway at the top of a small flight of stairs Above this is a single large connected roof, with large tiles denoting a flat area. Above this is a row of blue tiles denoting the sky, which correspond to the tiles on the other mural.*

At this integer, it may be apparent that I have not yet referenced the work by name, indeed, on first encounter, the work itself came with no supporting information from which one might be found, no artist placard, object label or other written context available from its locale. Additionally, by virtue of its hanging, in that both panels are located above down facing stairwells, any observer who wished to stand directly in front of either piece, would only be able to do so by standing directly in the flow of foot traffic, precariously situated above a set of stairs. As such, we might deem the work inaccessible not only in a physical sense, but also in the absence of TP that would allow us to understand and appreciate the murals broader context, missing some essential element as plainly as if it were missing a panel.

In this regard, one aspect of making an accessible image based on and in relation to these murals, has been to rediscover the origins of the work and in so doing, allowing both a disabled and non-disabled audience access to a the works contextual histories, in order that we might *“look at it from a particular point in time.”* In this way, my first port of call was Huddersfield Art Gallery itself, who upon being approached informed me that the panels *“were a library commission<sup>62</sup>”* and as such had no information or documentation regarding them, in the way one would expect from something housed in a permanent collection.

This was followed by enquiries from the library, and whilst the library staff, local studies and archive services did not have the information to hand, they did offer an insight into where such information might be found. I was presented with an informal collection of previous enquiries on specific artworks within the council, a series of physical folders with copies of newspaper articles and handwritten notes.

Through these folders and other informal discussions, I was able to ascertain that the works were not in their current location in 1939, as shown by a photograph that documented previous library renovations, inturn, through conversations with staff and volunteers, it was anecdotally determined that the works were installed sometime around the late 1980's or early 1990's. Furthermore, a news article mentioning *“the ceramic mural”* from The Huddersfield Examiner 12/06/1990<sup>63</sup> pictures a now lost centre panel, which it credits to *“German artist Marion Brandis”* and which appears to depict Huddersfield in much the same style and tiled construction of the other panels. Additionally, the margins of one of the available printed versions of this newspaper article, features handwritten notes that appear to read *“plus other 2 murals hanging in stairwell”* which seem to suggest that the diptych we are trying to place, is in fact, two thirds of a triptych.

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<sup>62</sup> *“I’m ashamed to say that I know nothing about them, I believe that they were a library commission rather than a gallery commission”* An extract from correspondence between myself and Huddersfield Art Gallery.

<sup>63</sup> (Huddersfield Daily Examiner: 1990, 12th June)

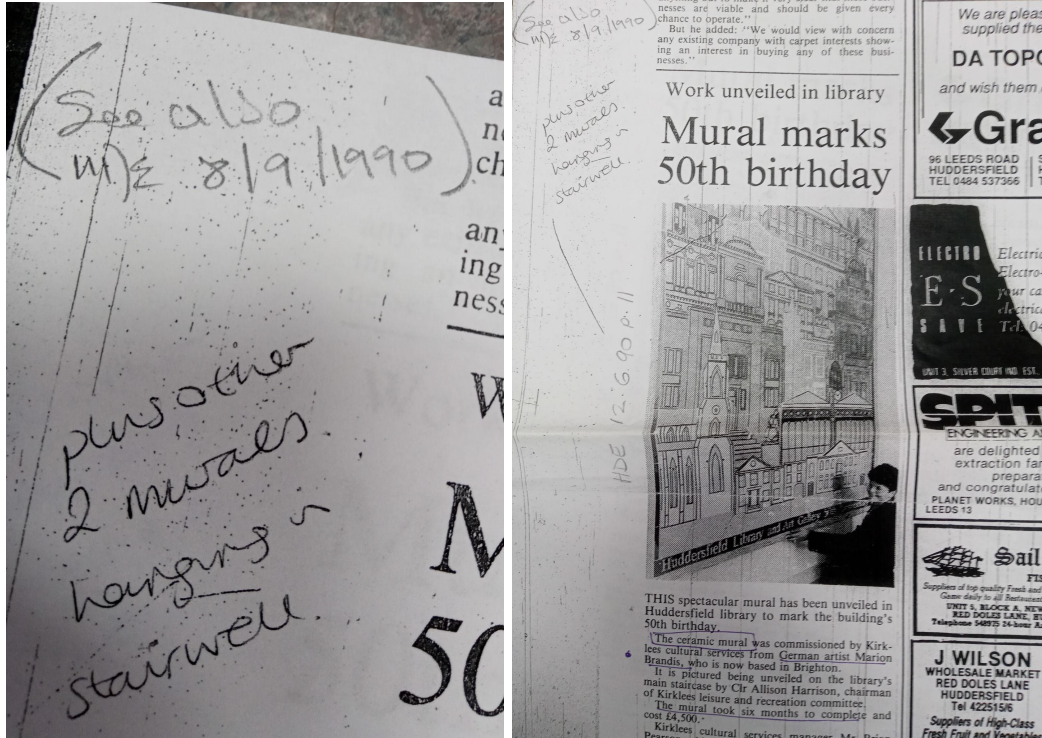


Fig. 30: The images above feature the physical newspaper article from 'The Huddersfield Examiner 12/06/1990' the article is titled 'Work unveiled in library, Mural marks 50th birthday'. Along with the image of the missing centre panel, this physical version of the article features handwritten text in the margins, that appears to say something to the effect of 'see also H/E 8/9/1990' and plus other 2 murals hanging in stairwell.' although parts of the handwriting are difficult to make out clearly. It is worth noting that whilst the suggested issue 8/9/1990 was also pulled from archives, no articles referencing the unveiling or the mural were found.

If we consider this newly discovered centre panel, then the location of the murals is perhaps more straightforwardly understood. Indeed, whilst the side panels are currently difficult to observe head on in the convention of a traditional painting, when thought of as part of a foreground that flanks a much larger focal point, then their placement might be designed to create a deliberate, forced perspective. Indeed, in this arrangement both side panels would be physically closer to the viewer, featuring close-up scenes of Huddersfield with the city off in the distance, a context wherein subject and placement work in tandem to create a specific effect, one that is designed to be viewed from much further away than its current presentation would suggest, out of the flow of traffic as you enter through the main doors. In this way, the two now very separate panels were always meant to be understood in relation to the third, where essential information like the intended location of the viewer, is no longer apparent in the absence of this vital fragment.

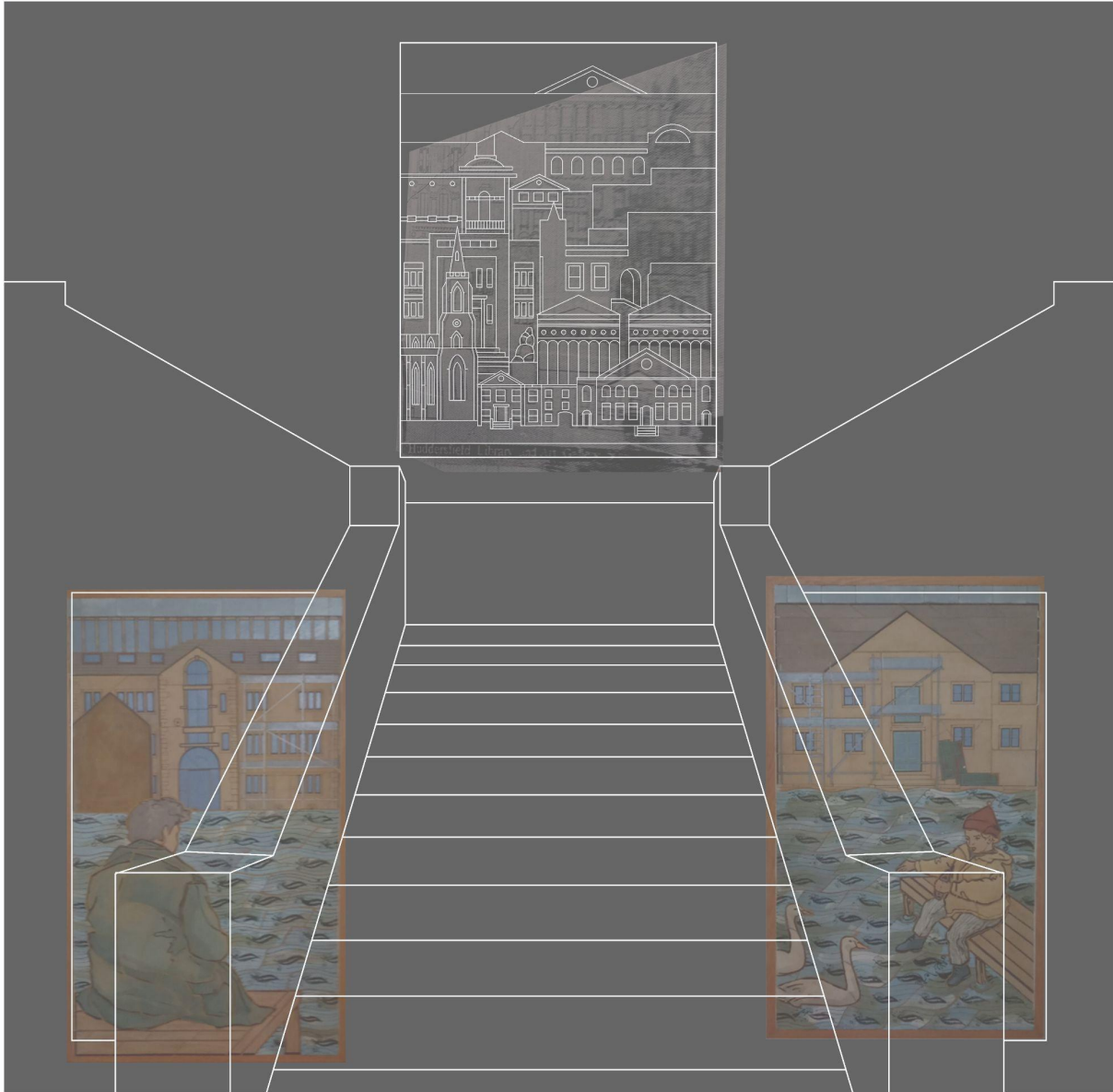


Fig. 31: The image above features a vector rendition of the staircase in the foyer of Huddersfield Library and Art Gallery, with photographs of both side panels and the newspaper image of the centre panel showing how the triptych might have looked in situ. A vectored line drawing is superimposed over the newspaper image to offer a better sense of the original work, and stairs leading down are located under each of the side panels. In this position the main panel is at the top of a large set of stairs, further away from the viewer, with the side panels being substantially closer and featuring similarly 'close up' scenes of Huddersfield.

At this juncture I was able to contact the still practising Marion Brandis and ascertain that she was in fact the original creator of the work, both confirming that the lost section was a part of the collection and in conjunction with the newspaper article, that the work was unveiled in 1990. Through correspondence, Brandis stated that: "Yes, I did make 3 panels in 1990, one central one of the town of Huddersfield which I believe has been removed, and two smaller side panels which show the canal and the Victorian warehouses which made up the industrial landscape and were then becoming sites of recreation and nature again." allowing us to not only verify the mural's provenance and date of installation, but present a brief insight into the artist's intent and rationale.

With permission from the Gallery, I was able to create and install a placard that presents the bulk of this information without the need for such time-consuming research. Equally, as the methods I utilised in my search were often informal and esoteric, I took steps to prevent this loss of information in the future, in that I supplied copies of the placard to the local services folder of past enquiries, so they may be kept alongside the news article that led me to the information in the first place. Additionally, I forwarded the information to the gallery's current curator and plan to offer similar information to the transcription service if and when the resulting tactile model is available for public use.



*Fig. 32: The placard above reads: Marion Brandis, Two out of Three Panels, 1990. "One central panel of the town which has been removed and two smaller side panels which show the canal and the Victorian Warehouses which made up the industrial landscape and were then becoming sites of recreation and nature again".*

Despite this success, it is important to note that this information should not have been difficult to find. The work was hung in its original location and was commissioned by a local governmental body, placed in a high traffic area before the entrance to both the library, gallery and other services concerned with the preservation of local history. In many regards the triptych has a rich contextual history, a connection to a time and place which would be difficult to replicate were it to be moved, yet, in the absence of both the third panel and a readily available province, the piece was robbed of its connection to time and place, becoming inaccessible for want of that additional context. Yet, it is precisely because of this absence that the work is valuable to our discussion of the aesthetic, as through a want to create tactile equivalents, new or forgotten perspectives might emerge.



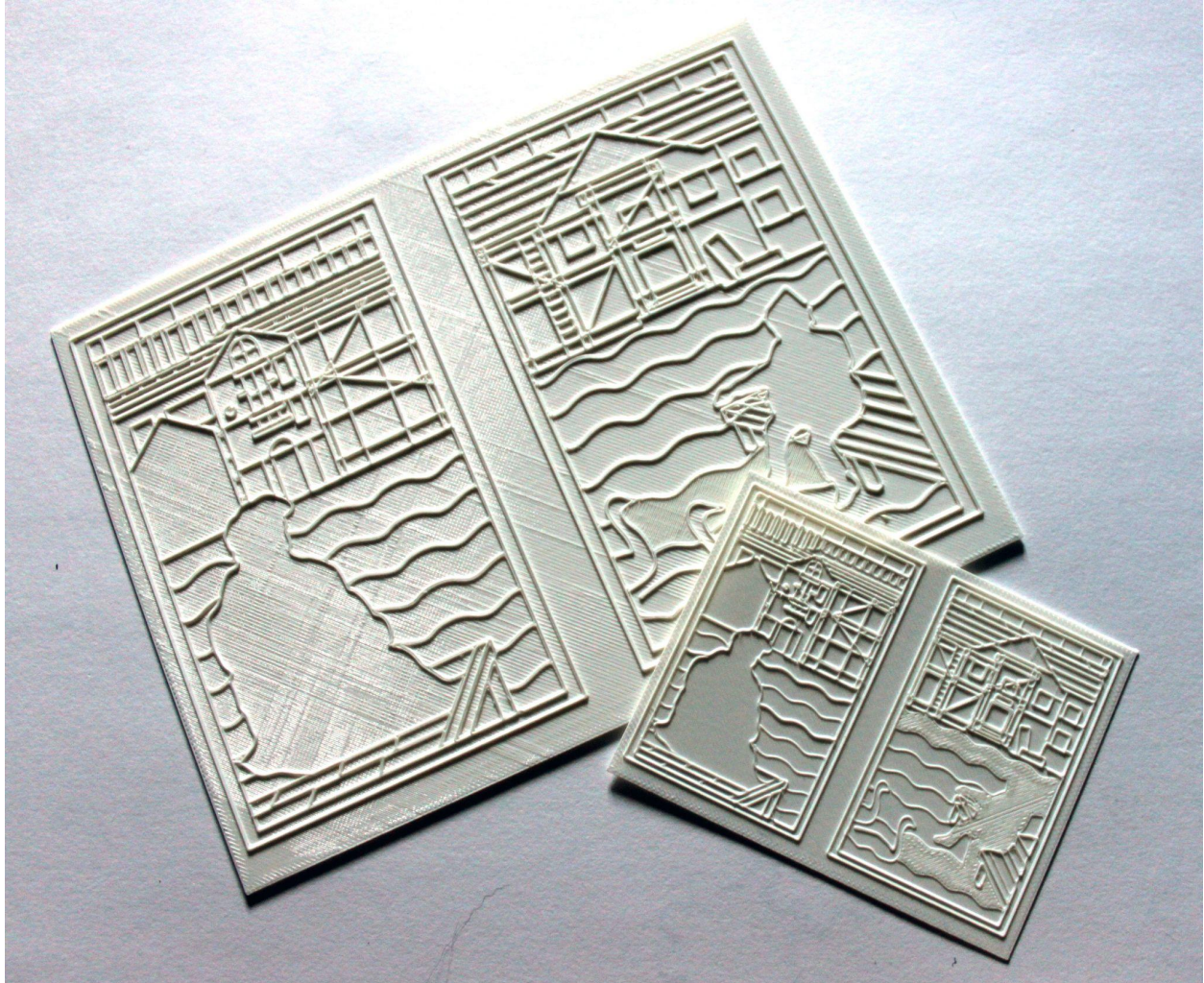
To this end, the tactile collection that emerged from this exploration, includes amongst its fragments equivalent translations of both the work in situ and the now missing panel. Operating in a similar register to the Mona Lisa collection, the collection features a variety of smaller and larger prints, each designed to compensate for another's potential shortcomings and work in two distinct scales. As such the works that constitute this collection, referred to here as "Two out of Three Panels", are as follows:

- I. Two Panels (0.25mm)
- II. Two Panels (0.5mm)
- III. Third Panel (0.25mm)
- IV. Third Panel (0.5mm)
- V. Artist Placard

The first piece combines the two panels that are still in situ, originally printed in this way in order to preserve the relationship between the works before the lost section emerged. In this regard, whilst the panels are still placed in such a way that they represent the current situation of the murals, a larger installation where in the two might be separated and the third section placed in between them, might perhaps be more representative of the original. Yet, the piece represents the current state of the triptych and in that vein, serves a specific purpose to a blind audience, namely, depicting what is plainly visible to others who visit the locale.

The image features a few key alterations, in that the figures lose a lot of their painterly details and tiled waves have been replaced with an appropriate texture swatch. Similarly, sections of the roofs and dock parallel other grid and line swatches, demonstrating the way in which the tiled work already lent itself well to this form of raised line depiction. As can be noted in the smaller print, details below a certain size begin to fail if pushed below a specific scale, indeed the details of the figures were largely omitted because the nature of translating such a large work into something the size of a postcard, requires a degree of simplification in order for it to be clearly discerned through touch.

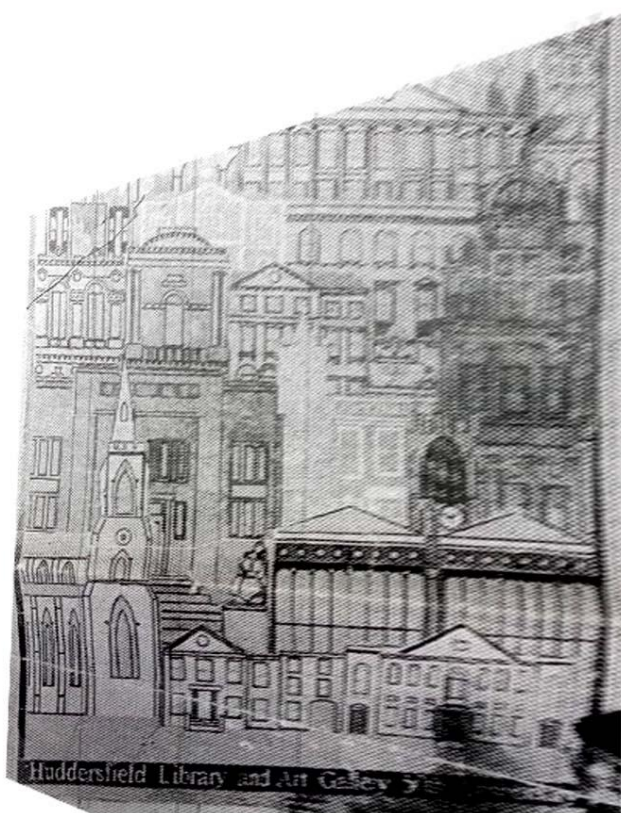
Similarly, whilst it may not be immediately apparent that the placard should be considered amongst the fragments of the collection, it is important to acknowledge the role such instances play when contextualising and framing other works. Indeed, all the tactile images presented within this thesis are designed to be either companion or description led, as such, the additional context offered by written accounts and access to a works histories, should be noted as an integral aspect of a collections-based approach.



*Fig. 33: This image pictures two tactile works, both of which denote two ceramic murals that hang in the foyer of Huddersfield Library and Art Gallery. One is printed quite small with a 0.25mm line height, whilst the other is scaled in order for the raised lines to be 0.5mm height. Both images contain an image of a figure sitting on a pier, the one on the left shows an adult man sitting down and facing away from the viewer, looking out onto the canal and the buildings beyond. The background shows a collection of structures, one of which has scaffolding in front of it. The upper most section of the image is made up of regular patterns, with lines denoting tiled roofs and vertical rectangles representing the skyline and distant constructions.*

*The second mural picture on the left of the print, features a young boy feeding swans, facing towards the viewer his legs dangle off the pier as he throws bread to two swimming birds. Behind him is the canal and a single large building, covered in scaffolding with a ladder at one side and boxes of materials on the other. Above that are lines denoting the tiled roof and a series of tiles denoting the skyline which line up to the other mural. These images were originally made from cut tiles, with painterly detail on the figures omitted to make the outline clearly to feel, and the wave pattern replaces a similarly painted water scene.*

The accompanying image is taken from *The Huddersfield Daily Examiner* (1990) and depicts the section of the mural that has since been lost, the image has been cut from its original background, distorted and flattened in order to give us a front on view of the work. In its printed form the photograph was only around two inches tall, with the added complication that parts of the upper section of the work have been cropped out of frame, and the image itself was taken at an angle. This results in areas of the mural being obscured or otherwise difficult to make out and, in this regard, it is perhaps not an ideal 'original' image to work from, yet as the centre panel is longer in situ, this may represent the only remaining public record of the works existence.

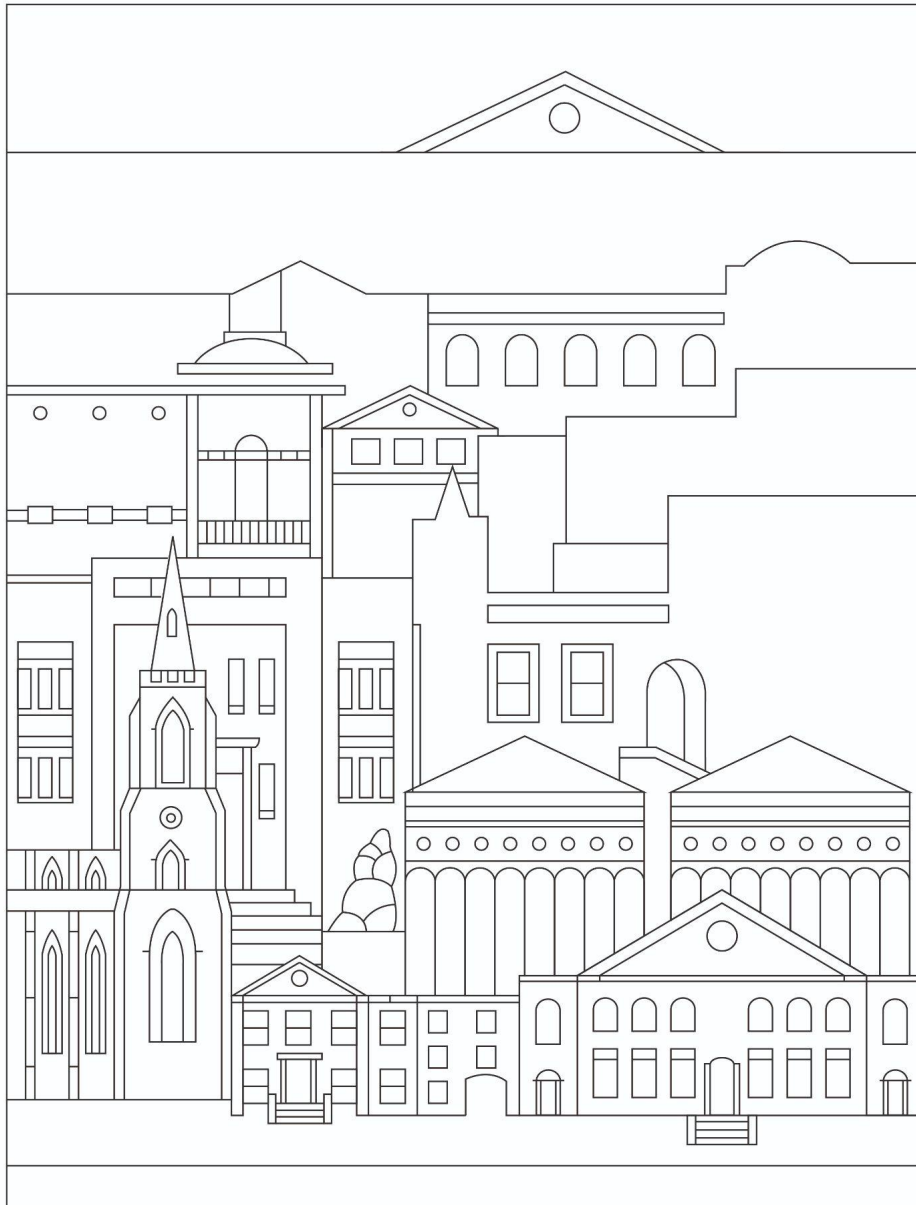


*Fig. 34: The image above features a clipping from 'The Huddersfield Examiner 12/06/1990' newspaper article surrounding the mural's unveiling. The photograph has been edited in such a way that it only includes the featured panel, warping and skewing the picture in order to get a front on view of the work. A large section at the top left of the piece is missing by virtue of the original image being taken from an extreme angle and cropping that section from the photograph. Some sections are blurry or faded by virtue of the small scale and low-quality of the newspaper print, and a woman's head can be seen at the bottom right, with parts of her shadow blocking some of the original text on the tiled work.*

*The image features an eclectic range of buildings, framed with a black border that reads 'Huddersfield Library and Art Gallery 50th Anniversary'. There is little perspective, and the characteristic flattened style of the other two murals is more extreme in this instance without large sections of water to denote fore and background. The bottom row features a church-like building with arched windows on the furthest left-hand side, followed by smaller buildings with square windows, pointed roofs and circles embedded into the top of the triangle like a clock on a tower. Behind those are buildings with many arches, rows of circular patterning and triangular roofs, after which some forms become instinct and difficult to make out, whilst clearly architectural in nature pillars, arches and windows of many shapes and varieties give a feeling of looking over a wide area of huddersfield, with many buildings off in the distance.*

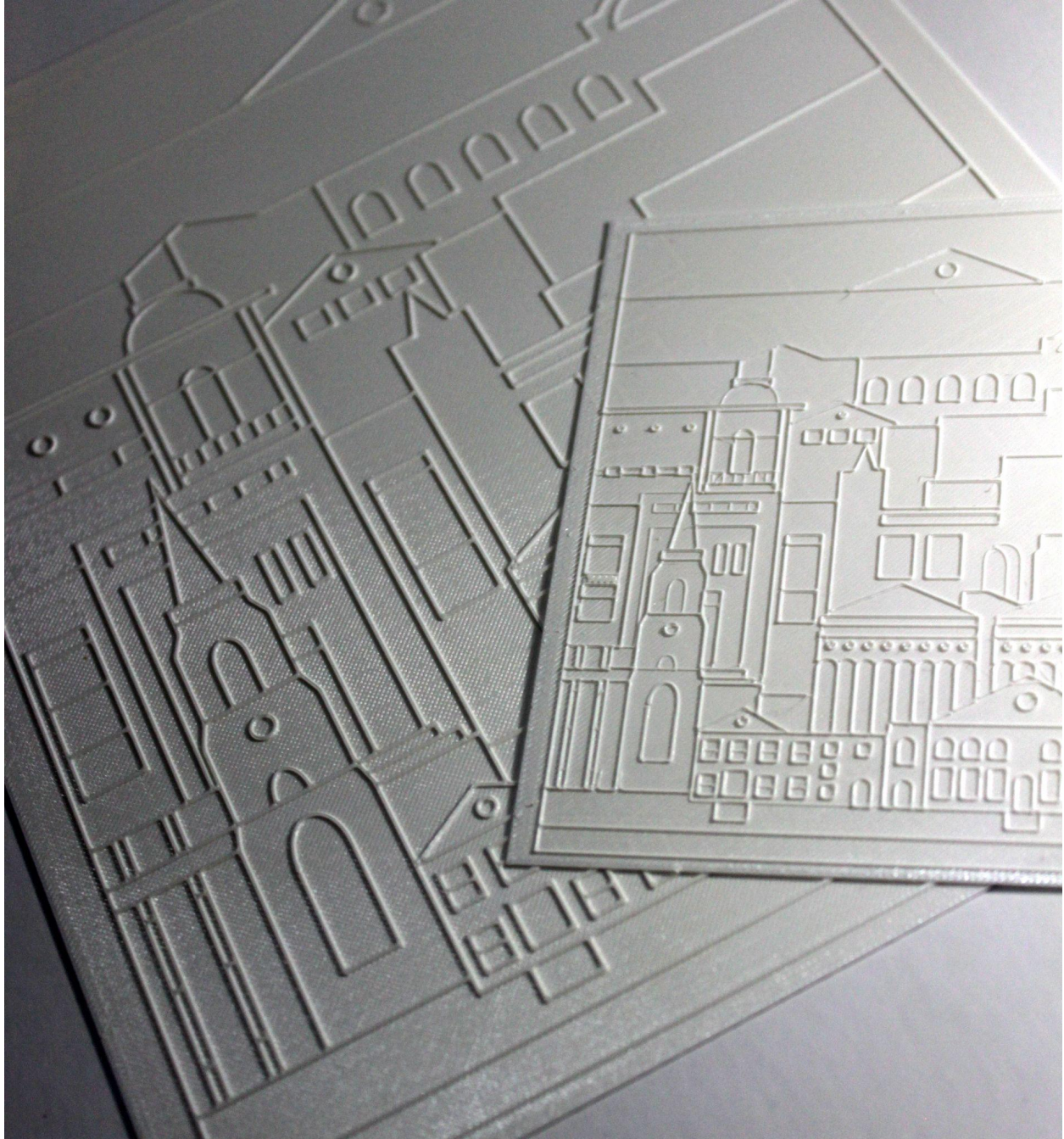
This absence offers another argument for the creation of accessible works, one that is firmly rooted within the discourse of translation and notions of the original that we have addressed previously. Namely, that access to the mainstream and our collective histories, might also extend to access to those things which have been lost. In this way, one of the primary functional justifications for the creation of tactile images, is to enable transference of traditional visual information when sight is unavailable, in other words in cases where the original work for whatever reason cannot be understood by an audience in its current form. In this way, we might use the same reasoning to justify the creation of translated work for non-disabled people, as in cases where the original is inaccessible, any image that facilitates access might be considered an accessible one.

Similarly, the subsequent images denoting the finished prints, take advantage of previously stated notions surrounding level of detail, in that as the sections where the form of the work is less apparent because of the quality of the newspaper image, is broadly limited to the upper half of the panel. In this way, the reduction of detail now works to create a kind of depth, where the areas of the background become less concrete. In this way, both this image can be thought to deviate from the original, yet, the areas that are left blank are not done so in the attempt to alter the spirit of the mural, rather, in the deliberate omission of details that are not readily apparent in documentation, we take a restorative approach. To this end, as we extrapolate and infer details that have been lost or obscured, we take the stance that as the translator we are re-writing the poem and not creating our own, attempting to complete details without projecting our own sense of self onto the work. In this way, the work and the collection as a whole, can be considered as much a statement on what has been lost as it is about what remains.

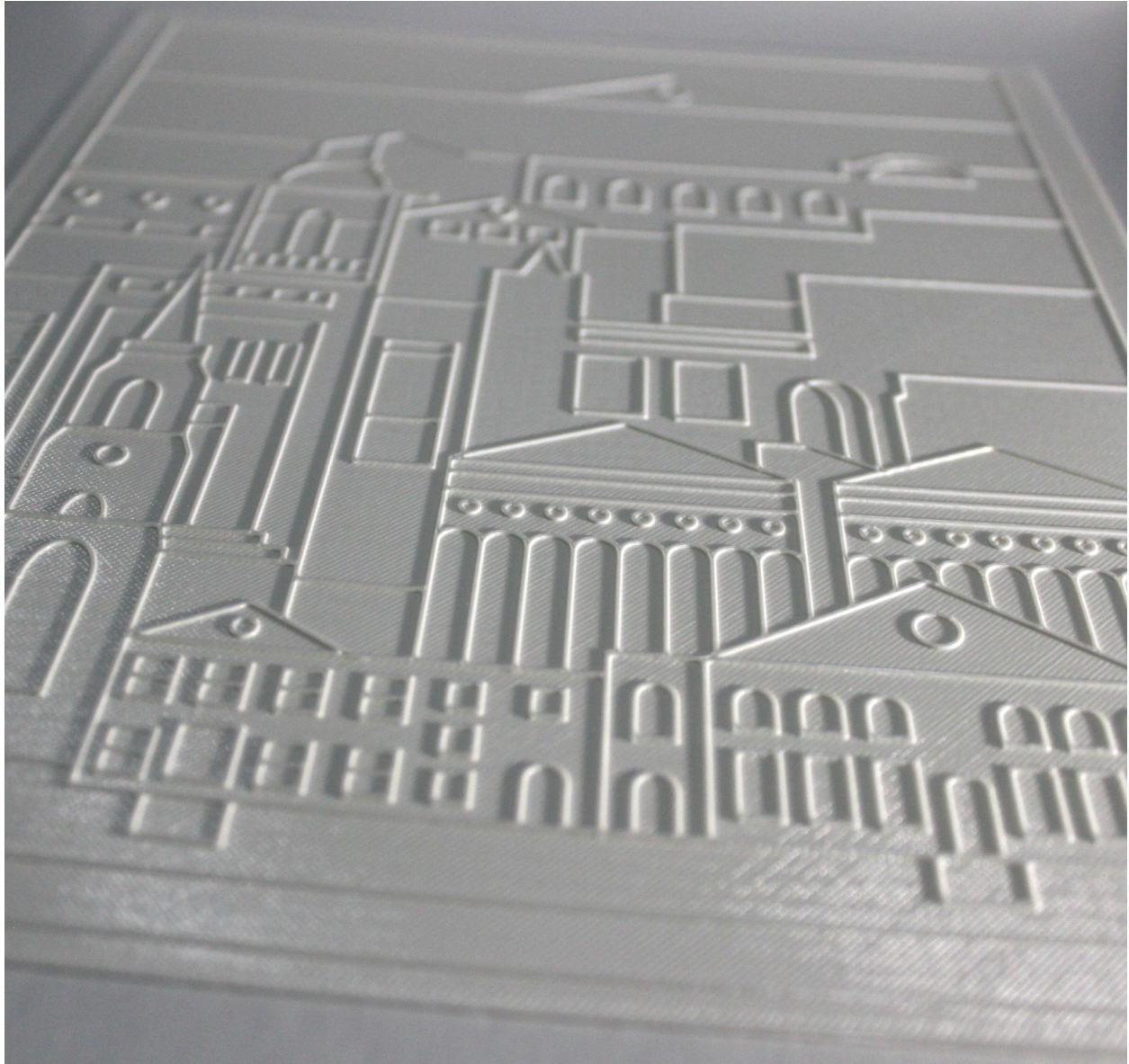


*Fig. 35: Above is a simple vector drawing an image of the missing third panel. As the piece is based on the newspaper clipping photograph, details at both the top and right-hand side of the image are limited, often simply continuations of lines until the natural edge of the work. This loss of detail somewhat imitates the practice of 'level of detail' we have briefly alluded to in conversations of earlier work, where in perspective is demonstrated by those elements that are closest to the viewer being the objects that demonstrate the most complexity of form.*

*Buildings of note include a multi-levelled church and spire at the bottom left of the image, rows of arches with peaked roofs on the right-hand side of the work and a semi-organic form that appears to be a statue in the very centre on some kind of plinth. This statue, along with certain other minor details, were removed from the final 3D printed piece due to issues with tactile discernibility at even our larger proposed scale.*



*Fig. 36: Above is an image of both a 0.5mm line height version of the centre panel, and its smaller 0.25mm equivalent. Details like double lines or windows which would otherwise clutter specific elements were removed because of concerns with legibility. In turn a few sets of lines were removed from the left-hand side between the first and second larger print, over concerns that the smallest print had two small areas of print failure surrounding lines that were too close together.*



*Fig. 37: The pictured image shows the larger 0.5mm 3D printed missing panel, taken at an extreme angle in order to highlight the shadows produced by the raised lines. Repeated arches produce textures similar to those of the line swatches of C4, with areas of detail paired with sections of relative simplicity, in order to help a blind person navigate the work with through tactile kinaesthetic means, discern figurative depiction of structures amid a scene that is designed to feel built up and otherwise chaotic.*

Oliver's (1995) assertion, that "*an aeroplane is a mobility aid to non flyers just as a wheelchair is mobility aid for non walkers*" echoes almost as a refrain throughout the earlier chapters of this thesis. Similarly, an English version of Benjamin's *Illuminations* might be thought of as an aid to those who cannot read it in its original German and a photograph might be considered an accessible image to those unable to visit the original. Through this lens of disability studies, it is quite possible to frame the recreation of lost art as aids to those unable to view the original, a way of reclaiming that which has all but disappeared from our collective consciousness.

In this regard we might rightly think of this argument as an extension to what we have referred to as the cultural tactile image, as it is predominantly concerned with a facilitation of access to a shared history, in much the same way we have previously considered constellations. Yet, it is included within the framework of the aesthetic in part because beyond the argument for access which unites all accessible images, translations of lost work represent a uniquely complex territory in regards to aesthetic experience. Namely, that in some instances the depictions we have to work from, will be of notably lower quality than the translation itself. In this way there are situations where the translation might be thought of as aesthetically superior than that which it translates, seeking to '*endure*' in a way that Benjamin's definition of artistic translation precludes.

In reference to the central mural, it is clear that the remaining 'fragments' are not wholly representative of the original. There are sections that have been omitted, details that are indiscernible and the image itself features none of the original colouration. As such, it becomes notable that in previous chapters we have often deferred to a need for access as the prevailing rationale for compromise or deviation from the aesthetic qualities of the original. The photograph need not be the aesthetic equivalent of the painting as it serves another purpose which elevates the work, and a 3D printed ultrasound scan need not be considered beautiful, rather such works grant access to deeply human experiences which are themselves beautiful. In this regard the aesthetic image differs from our previous arguments, as an aesthetic tactile image must be judged by their aesthetic predicates.

With this in mind 'lost works' present an extreme but useful initial framing device, as without a substantial original to work from we are perhaps less beholden to arguments that dismiss remediated works as pale imitations or weak pastiche. Instead we can understand such translations as restorative, where the way in which they 'elevate' the original is by attempting to reconstruct those elements which have been lost, a repair that does not seek to supplant that which it apes, but rather to exist alongside it. In this regard such works still function as translations, but blur the line between what might be considered transformative, integrating themselves within the space left by a works absence, or in the extreme case of lost or destroyed art, potentially occupying that space entirely. To this end such works function in a decidedly aesthetic register, for indeed much as Benjamin (1968) states "*the incomprehensible, the secret, the "poetic"?. That which the translator can render only insofar as he — also writes poetry?*" so too must a conservator know the artform they work with to best preserve or revitalise it. In turn it might be argued that those who work with accessible translation of lost work, attempt to evoke an aesthetic experience without claiming the work to be that which it translates.

At this juncture, it is perhaps pertinent to proffer more established examples of lost art, in turn citing attempts made to replicate or restore such work utilising incomplete fragments, highlighting the interplay present between the aesthetic discourse of the original and that which now attempts to occupy its place. In this regard we might, in a slightly radical fashion, turn to the 1937 'Entartete Kunst Ausstellung'<sup>64</sup> a Nazi

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<sup>64</sup> (Entartete Kunst Ausstellung, 1937)



showing of confiscated pieces taken from museums and art galleries around Germany, displaying what the party deemed 'degenerate art'. Featuring 650 confiscated works which had been effectively disappeared, or rendered both culturally and aesthetically invisible, the exhibition was part of a wider effort to demonise the avant-garde and sell off works to contribute towards the war effort. Yet in regards to our own writings, the exhibition itself and its Berlin counterpart are not our primary concern, rather in a discussion of the replication of lost art, it is difficult to avoid the topic of Nazi sponsored theft and destruction.

In this regard I wish to proffer the 'Entartete Kunst Inventory', a comprehensive record of 'degenerate' art kept by the Nazi party and now held at the Victoria and Albert in London<sup>65</sup>. The ledger notes a variety of basic information regarding the art in question<sup>66</sup> most notably in reference to our own discourse, the name of the artist, the title of the work, the medium of the piece and its ultimate fate, where in an 'X' denotes "*Vernichtung (destroyed, as could not be sold or exchanged)*" In this way, some of the basic descriptions kept within the inventory, may represent the only record of certain destroyed works, the last fragments of shared histories lost. In this way there is a poetic irony that in the campaign to systemic destroy art they deemed degenerate, "*The vast volume of documentation left behind by the Nazis*" (Rothfeld, 2002) has in some small sense preserved them. This meticulous record keeping has facilitated continued efforts to recover and document lost work, or in some cases, understand its profound absence.

In 2014 the Neue Galerie in New York hosted an exhibition that was similarly named "Degenerate Art", wherein the gallery was temporarily home to much of the surviving work originally exhibited in the 1937 Nazi exhibition. Interestingly, from the perspective of this thesis, lost or destroyed work from the exhibition was represented with empty frames, with only an artist placard in the bottom corner of each absent work offering insight into what should be there. These placards featured all available information regarding the missing piece, information which would have been lost to time were it not for the records of sale and destruction the Nazi's themselves kept, which in turn now serve to earmark the presence of that which has been robbed from our collective histories.

In this way there is a very real possibility that much of the destroyed or stolen work may only have this written documentation to reference its existence. To this end translated work which attempts to restore aspects of the original, might be thought to in some ways lessen the effectiveness of the Nazi's legacy of erasure. Whilst working with such partial fragments as written descriptions will necessarily create significant deviation from the original work, these records still represent a link to that which has been lost, a way in which we might attempt to reassemble or preserve the work from those aspects which remain, even if that translation takes the form of something as simple as an empty frame.

Whilst the missing centre panel cannot reasonably be equated to such targeted art destruction, as a practical example of the aesthetic tactile image in action, it offers us an insight into the potential aesthetic value of translated works. Above simply restoring a piece in order that it might be accessed, such translations allow for a version of the aesthetic experience of a work to be preserved, often not in the original form but in such a way that captures some essential element of what was intended. In regards to Marion Brandis' ceramic triptych, whilst the medium may have changed, the replication of the third panel attempts to contextualise the other two sections, in some regard drawing attention to the missing elements which now frame the other works as incomplete or fragmented. Whilst it cannot replace that

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<sup>65</sup> ('Entartete Kunst': The Nazis' inventory of 'degenerate art', 2019)

<sup>66</sup> (How to read the Entartete Kunst inventory, 2019)

which is lost, such fragments can help us gain an appreciation for what should be there, to picture the whole vessel from the fragments that remain.

### **3.3: Eddy Zemach, Aesthetic Realism & Standard Observational Conditions:**

In previous chapters I have briefly alluded to the writings of Eddy Zemach, predominantly in relation to Benjamin's own notion that no poem is meant for the reader and no art for an audience. In this context, Zemach acts as something of a foil to an inclusive disability centric argument, offering a connoisseurial understanding of aesthetic appreciation that could be thought to exclude those without the prerequisite abilities or education, from a substantive engagement with the arts. Yet Zemach's work is broader in scope and subject, concerned with aesthetic-realist notions of perception and the nature of reality, a stance which at times, might be understood to be congruent with our own ideas of access.

To this end, considerations of realism in the context of aesthetics, enables us to open out the question of accessibility beyond the functional and cultural concerns we have presented so far. This framework questions Benjamin's notions that a translated work "*cannot claim that its products will endure*" by foregrounding the unique perspectives and situations accessible works can provide. In turn, by deviating from almost apologetic ideas of translation as unending auxiliary or supplement, we might instead consider that tactile images, even those that are remediated examples of a traditionally ocular-centric pieces, have the potential to be both beautiful instances and perhaps even judged as art objects on their own merit.

Through his work in 'Real Beauty' Zemach offers a realist image of the world, one which is highly functional and parsimonious in its pursuit of integrated and harmonious answers, a designerly depiction which is nevertheless imbued with the aesthetic. In contrast, the position Benjamin foregrounds through "task of the translator" and other essays compiled within "Illuminations" presents a version of reality which opts to celebrate the diffuse, opaque and multiplicitous qualities of the world, wherein the status of objects might be thought to be, in many ways dependant on the mind. As such, Benjamin can be thought to take a historical-materialist position, one which demonstrates a deep acknowledgement of both the experiential and the phenomenological, where the idealist aspects of his writings seems to stand in direct opposition to the kind of fundamental realist position offered in Real Beauty.

In turn, realism can be thought of as a perspective wherein a "portion of reality" is thought to exist independently of what we might think or feel about it, even if this part of the world might in some sense transcend our ability to capture or be cognisant of it. Where Zemach's own stance differs from other realist positions, in his assertion that aesthetic predicates are properties of the object and thereby, describe reality, that "*if any predicates correctly describe objective reality, aesthetic predicates are amongst them.*" In this way, the portion of reality which might be thought to exist in some sense, independently of our own minds, includes descriptors that are intrinsically linked to sense perception, such as hard and soft, sweet or sour, even an object's colour. In this fashion and through a foregrounding of physicalist descriptions, Zemach blurs the traditional Lockean distinction between primary and secondary qualities. Indeed, for Locke primary qualities such as figure, quantity, and motion, were genuine properties of things and measurable aspects of reality, distinct from secondary qualities, such as colour, odour, taste, and sound, existed only in human consciousness and were not genuinely a part of the objects to which they are normally attributed.

By way of clarification of Zemach's position, we might turn to his own example of "*the blind physicist*" where he presents the argument that colour, a predicate often uniquely tied to notions of ocular

perception, might be deemed a real property of an object. That is to say, the physicist “*can distinguish precisely, with no mistake, which objects are red and which are not red, since as a physicist he can measure the wavelengths of the light reflected by those objects.*” To Zemach, the object is red because there are scientific mechanisms by which we can discern its red-ness, that regardless of the abilities of the audience, the object itself is not changed by their inability to see the object as red.

Through this analogy, we might begin to understand what Zemach refers to as Standard Observation Conditions (SOC), namely that “*If observational conditions are nonstandard, X may look red and be blue, observed circular and be ellipsoid*” (Zemach, 1997 p.50) In this way we might note that “*Red things do not look red under blue light*” without conceding that the thing is now blue and not red. Instead, we might simply state that the conditions under which it is currently viewed are nonstandard, a stance which then allows us to ascribe discrepancies between what individuals perceive, to the conditions under which they were observed and not necessarily a change within the nature of the object.

To this end ‘SOC’ refers not only to environmental conditions under which something is observed, but rather, includes the person themselves, wherein factors like your knowledge, mindset and past experiences, influence the set of observation conditions you possess and may in turn, make you more or less able to correctly identify aesthetic predicates. Operating within notions of haptic aesthetics, part of the SOC for understanding a work as tactility significant, involves not only the use of one's hands but touch through movement, an engagement with a haptic experience where form and shape are understood through considered and thoughtful feeling.

Yet, Zemach’s position can be thought to take on additional complexity when we progress from ‘simple’ predicates like colour, which have clear scientific mechanisms to verify them, to more complex or nuanced aesthetic descriptors. In this, Zemach applies SOC is used to explain the rationale by which Zemach accounts for a difference in opinion wherein “*Realists in aesthetics are therefore under no obligation to hold that if X is gaudy then it would appear gaudy to everyone, under all observable conditions*”. (Zemach, 1997) As such, the SOC for understanding the beauty of a tactile image, that necessarily operates in a predominantly haptic register, might be distinct or even contrary a visual consideration of the same work. What appears beautiful through touch, is “*under no obligation*” to be similarly beautiful to the eyes. As such, those without an optimal set of observation conditions may be unable to appreciate beauty, in this way “*observers who do not attain the SOC for making those observations may be wrong*”. A work may not appear significant through an ocular-centric set of SOC, where beauty is thought of through as a predominantly visual property, but that does not mean it can not, or more accurately is not beautiful.

In contrast, from an accessibility or disability-centric standpoint, notions of a right or more precisely a wrong way in which to perceive the world, are perhaps more contentious. In this way, it is perhaps apparent that someone who is colour-blind, sees some aspect of colour differently from large portions of the population, that their sight by differing in a significant way from consensus, might even be straightforwardly deemed ‘nonstandard’. However, the idea that by virtue of this nonstandard SOC they may be unable to appreciate the beauty of objects that rely on sight, or more concerningly, that in observing an object to be beautiful they “*may be wrong*” is perhaps incompatible with a disability-arts notion of access to the aesthetic.

At this juncture it may be pertinent to note, that whilst Zemach’s own presentation of standard observational conditions is accompanied by a kind of deference to authority, it does not hold that our own reading of it must be. Rather, in reference to the tactile image, it offers a cohesive and well-constructed

explanation of why a seemingly innocuous object like a 'Keyring of the Eiffel Tower' might be thought of as a sophisticated and even beautiful work. If we engage with such things through a haptic-kinaesthetic register, one which includes a longer, more methodical interaction with the work, then we might now understand that an appreciation of the object comes in part, from a particular set of observational conditions.

It is also pertinent to address that "SOC are not (as is often said) the conditions that generally prevail or are more common than others" indeed, standard in this sense does not refer to ubiquitous or average, but rather the best conditions for eliciting a specific outcome or style of observation. In this, Zemach proffers that the "SOC for bacteria do not usually prevail; they require expensive instruments, as well as long professional training<sup>67</sup>". Zemach then goes on to utilise more art specific examples, where "to appreciate a painting one has to position oneself at a distance of about one to ten (not a hundred) yards from it and look at its face (not at its back)<sup>68</sup>" alternating registers in a characteristically Zemach-ian fashion, by first presenting decidedly functional or scientific examples, from which an aesthetic argument begins to emerge. Perception of colour lays the foundation for the perception of beauty, SOC for bacteria go on to inform SOC for the tasting of wine or appreciation of art.

In this way, SOC for the appreciation of tactile works need not be its most common presentation, as indeed, this would undoubtedly be a visual understanding. Neither is a keychain of the Eiffel Tower less valuable as a tactile model, simply because its most common presentation shows it in the form of a cheap visual trinket and not, as we would contend, a sophisticated haptic object.

Zemach even somewhat rhetorically states that it is rational to "choose as an object's SOC those conditions under which the object displays maximum beauty<sup>69</sup>" as "we enjoy beauty, and want to increase our pleasure, not decrease it". Deconstructing this initial rhetoric in order to claim that firstly, some things are better or more beautiful than others, that a literary critic might rightly state that "I do not doubt that this novel moves you, but you are wrong to think that it is really good". Which then goes on to offer the secondary notion, that an appreciation of 'lesser' work clouds a judgement of higher art. That a "teenager who cares only for rock music" in claiming that classical music is boring, is in effect wrong.

To this end, it may be pertinent to explicitly state that one's own observational conditions are often, to some degree, transitory. That whilst some aspects may persist in regards to a knowledge of the subject, repeated interaction with the work and even the presentation of the object, if one is tired, sick, rushed, intoxicated or affected negatively in any tangible way, your own set of observational conditions may present you from engagement or even want to engage with an aesthetic work. In this regard, a genuine haptic engagement with a keychain of the Eiffel Tower, would not prevent a sighted person from appreciating the visual work at a later interval. Rather, once more returning to Benjamin's true language, an experience of this instance of the 'type' Eiffel Tower, might persist as a fragment of your own understanding, where an appreciation of the original is strengthened and not weakened by the radical, temporary change in perspective.

With notions of SOC now firmly in mind, we might now address connected questions of 'aesthetic equivalency' that have briefly alluded to in the prior section. Indeed, 'standard' observational conditions might at first appear to be an inherently exclusionary notion, perhaps even an impossibility in reference to those to whom the language of the work is unavailable. Yet, in regards to equivalent experience, SOC

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<sup>67</sup> (Zemach, 1997 p.51)

<sup>68</sup> (Zemach, 1997 p.77)

<sup>69</sup> (Zemach, 1997 p.87)

presents a foundation with which we might dismiss the notion entirely, wherein the idea that any artwork can claim it provides a consistent and reproducible experience across the majority of its audience, is to some degree, folly.

In this regard, we might return to our recurring example of the Mona Lisa, specifically in this instance, the Louvre Hanging. It might now be readily apparent, that the profile of the painting positions it in iconic terms and that in turn, the work is routinely held as an exemplar of aesthetic beauty as is the case with Zemach<sup>70</sup>. However, with this in mind, it seems strange, or almost counterintuitive that this famous work, routinely rates amongst the world's most disappointing tourist attractions<sup>71</sup>.

Yet, if we are to consider the piece in situ, it is perhaps unsurprising that the painting fails to captivate its audience, in part because the standard observational conditions we would usually ascribe to a painting of its nature, are rarely if ever met. In this regard, Zemach briefly references the optimal distance to observe a painting, stating it to be around a "*distance of about one to ten feet*" and yet, those visiting the museum are purportedly presented with a situation that begins at around fifteen feet,<sup>72</sup> a fact which might be considered even more problematic, when one understands the size of the work. At 77cm tall and 53cm wide, the rendered miniscule by the manner of its presentation, hidden behind layers of glass, a shelf, a curved wooden rail and most frequently, a sea of people.

In relation to our own discussion of slow art, it is evident that such a style of exhibition presents both a literal and metaphorical barrier to engagement. Indeed, those who visit the exhibition, often with the express purpose of viewing the eponymous work, spend on average 15 seconds<sup>73</sup> in its presence, in part because of the nature of its hanging. In this regard there is an almost systemic inability for meaningful engagement with the work, which in regards to notions of SOC, present an understanding of the Mona Lisa wherein many, more appropriately presented instances of work, may provide significantly more opportunity for aesthetic engagement. In regards to Zemach's own definition of relational properties includes a difference in "*physical environment*" wherein the presentation of a work results in nonstandard conditions for observational conditions.

In turn, whilst a departure from Zemach's own realist interpretation of aesthetic predicates, one might reasonably argue that the profoundly negative nature of the painting's physical environment, impacts the instance that hangs in the Louvre to such a degree, that it constitutes an aesthetically poor experience. Whilst Zemach's own position would note that the context may provide nonstandard conditions for observation without altering the nature of the painting, the fundamental outcome is the same. That is, that in a very material sense, the Louvre hanging may be thought aesthetically worse than many of its translations, resulting in an inferior experience of the Mona Lisa.

An alternative explanation to the lack of appreciation of the work, might be that such an audience simply lacks the prerequisite arts education to appreciate the painting, indeed SOC can include a knowledge of and familiarity with a work. Yet, when considered through a disability centric lens of access, where notions of multiple pathways towards both comprehension and appreciation are foregrounded, this position might be thought at the very least misguided.

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<sup>70</sup> (Zemach, 1997 p.7)

<sup>71</sup> (Young, 2019)

<sup>72</sup> (Nayeri, 2019)

<sup>73</sup> (Elkins, 2017)

To this end, a failure to engage with a lay audience should not be considered a fault on the part of the audience. A failure to display a work in such a way that it is accessible, to make reasonable adjustments in order that we might present the best conditions for a piece to be connected with a person, who it should be noted, at this stage has already found the nature of the work compelling enough to visit the Louvre, cannot reasonably be considered the fault of the observer. In short, a failure to offer access to the mainstream of artistic consumption, is not the fault of those actively attempting to be a part of it.

In reference to our own notion of a collections-based approach, we might juxtapose what we consider a distinctly poor or otherwise nonstandard exhibiting, with an equivalent that provides offers conditions which might be thought more sensitive, in part through a considered presentation of a plurality of forms, and the provision of a variety of rich and comprehensive contexts. To wit, we might somewhat appropriately return to Cotte's exploration of the Mona Lisa, wherein Cotte presents multiple distinct depictions or instances of the work, combined with a historical and material understanding, that is deeply rooted within an intertwining artistic and scientific context.

Here we might note that through Cotte's unique style of innovative practice, one that is in part enabled by his own "*Lumiere technology camera*" he reveals within the work insights into the work's construction, and secrets previously hidden beneath the layers. Most prominently, Cotte is credited with the discovery of a hidden drawing or *spolvero* style sketch below the paint layers, as well as the creation of a "digital restoration" of the work, wherein the panels 2.3cm shrinkage and problematic vanish has been accounted for, a form of transformative or restorative practice, that circumvents concerns surrounding preservation, by operating independent of the artefact. In this, such a translated instance might be thought to operate in relation to a broader, fragmented context, one facet that reveals in its connections, a more substantive picture of the whole.

As such, even minor revelations like a hairpin hidden under layers of paint, have the potential to reveal something essential about the nature of the work. Indeed, since hairpins of this style are not representative of known fashion within the city of Florence at the time of creation, it has been suggested that the board might have originally depicted a version of the Madonna, which in turn, has been repurposed into the work we now know.

At this interval, it is my hope that the collection-based approach present within Cotte's own practice, may be thought reminiscent of my own creative output. As indeed, what Cotte offers through a distinctly visual register, I also hope to provide with a syncretic, highly relational haptic approach. Whilst significant weight has been given to notions of multiple pathways towards comprehension, it is also an explicit aim of the collection to reveal some essential aspect of the work, perhaps even offer insights that might hope to engage both a sighted and non-sighted audience. Through a slowed styled tactile-kinaesthetic engagement, tactile images might seek to reposition the primary instance in novel and insightful ways, where fragments that depict minor details such as the embroidery along the neckline of the figure, might draw attention to an aspect of the work that might have otherwise remained unconsidered.

In turn, a unified notion of aesthetic equivalency, might well be rebuffed through the notions of standard observational conditions, or else through other resonant arguments that note consistent deviation between individual perspectives and experience. Indeed, even instances that are considered archetypally aesthetic, such as the Louvre hanging of the Mona Lisa, can be thought to routinely offer radically different experiences that are dependent on the nature of both the audience and its exhibition. Yet, whilst it might now be fair to assert that artwork is not always similarly received by its audience, it might still be

claimed that perhaps, there is a more pronounced distinction between an aggregate sighted and non-sighted experience.

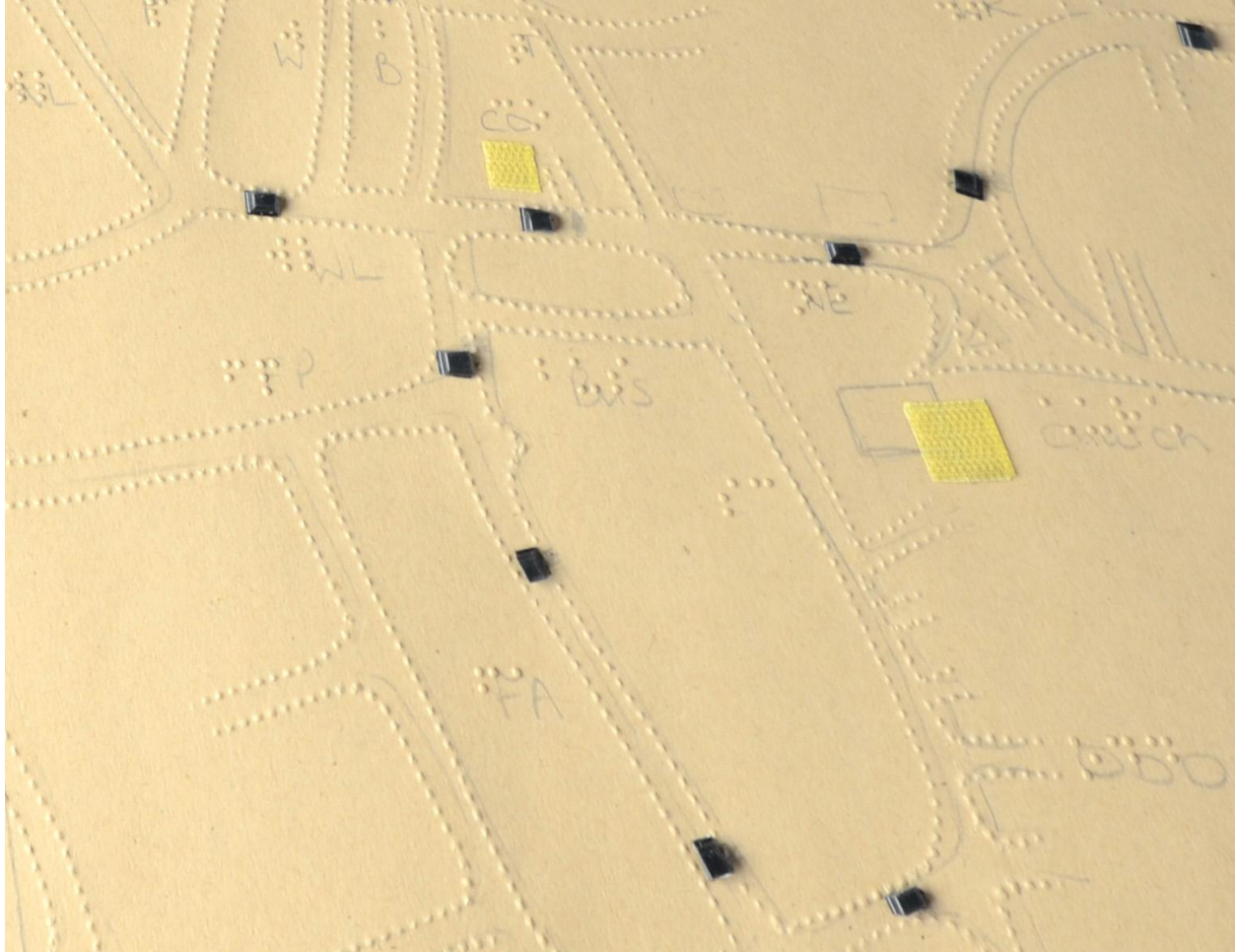
In this regard, there is a version of this rebuttal that engages with solipsistic notion of other minds, wherein, if the self is all that can be known to exist, then we cannot hope to know the nature of another's experience and thus might discount idea of equivalency by virtue of our lack of ability to accurately compare. Yet, this argument is both incongruous with the realist position present in Zemach's own writing and indeed one I find wholly unsatisfying. For whilst in this sense a true equivalent might be unverifiable, a pragmatic and approximate definition of equivalent is readily apparent.

To refer back to Zemach's recurring example of seeing red, whilst I might not know the exact shade of red your eyes perceive, we might still agree that an object is red and that in conjunction with broader consensus, might reasonably note that the experience of red is somewhat recognisable to many. Similarly, more complex emotional responses like pain, might be recognised in another and understood as a uniquely human experience, it may not be verifiably the same pain, but it might still be understood as an experience that bears a strong resemblance as analogous.

Yet, when we note the range and variety of experience elicited by aesthetic objects, we do not do so with the caveat that those without sight represent a significant departure from some rough equivalent understanding. Rather, in highlighting that the response to art objects is broad, we claim that it is reasonable to suggest that the experiences of two sighted individuals, might reasonably be thought more radical than those of a sighted and blind persons experience, on the condition that they were provided with more appropriate observational conditions. Namely, if given the context and crucially, the access required to sustain a productive dialogue with a work, any audience has the potential to engage with the aesthetic.

Despite its application to aesthetics, Zemach's notion of SOC has something of a functional quality, wherein we might perhaps better understand his position by turning briefly back to an example of the functional, one which nevertheless blurs the roles of the visual and the haptic. This will also enable us to position SOC in something more akin to a disability framework. Returning to The Huddersfield Transcription Service archive and examining the collection 'Scholes Village 20mph' we might now note how context and environment both factor in terms of individual appreciation and engagement.

The range of pieces to which we refer include both a tactile map and a set of Braille instructions. The work is designed to be understood from the passenger seat of a car and crucially without the aid of sight, this is accomplished by relying on speed bumps and other kinetic indicators, landmarks which denote distance and which can be felt by a blind passenger. To this end, one sections informs the reader that they should "*follow the road along to the 2nd speed plateaux just off the junction*" and in doing so, directions can be offered to the driver whilst the 'navigator' is materially able to understand both where they are and if the environment does not match the information provided, namely whether they have taken a wrong turning.



*Fig. 38: The connected image is a close up of the Scholes Village 20mph collage map, a full version of which is presented early on in this thesis. Velcro and cut up 'bump-ons' denote landmarks like speed bumps, and raised dotted lines denote the outline of roads. Braille labels are also included, with the words church and bus notable amongst a collection of one or two letter street names. The paper itself is a kind of yellowed cartridge paper, and pencil lines are still visible where the rough sketch was applied, showing the nature of the work as a precursor to a vacuum form piece.*

Whilst 'Scholes Village 20mph' is by no means a strictly artistic work, what we might understand through this more functional and pragmatic register, is that through its highly relational connection to place, the SOC for engaging with such a work are equally contextual. Beyond the notion that a blind person might receive the work differently by virtue of a more developed haptic register or knowledge of Braille, it might well be argued that such a collection, if presented outside the context of the area it is designed to navigate, will be understood differently regardless of the abilities of the audience. By extension, a sighted person using the map to navigate the route from the passenger seat of a car, will have a radically different experience than if they were walking the same roads or reading the directions without using them for their intended purpose.

As such, the experiences of any two individuals utilising the work to direct a driver, will be closer in nature than the experience of someone who isn't using the work to navigate. That is to say, those who actively engage with a piece in a manner that is resonant with the nature of the work, are much more likely to have proximate experiences. A considered, slow-art visual understanding of a painting and a similar haptic engagement with a translated tactile image, are both more likely to elicit an aesthetic experience in



the observer, than a fifteen second glance across a crowded hall. In this way, whilst it is unreasonable to hold aesthetic tactile images to the nebulous and unobtainable standard of equivalent experience, there is still a value in thoughtful translation and the pursuit of equivalent access.

### **3.4: Disability Arts, Process & Politics in Regards to Aesthetic Encounter:**

In this regard, a form of access to the aesthetic might be thought to emerge from a disability arts tradition, one that in our case owes much of its current form to the definition of the movement offered by Barnes and Mercer. In reference to the first tenant of their three part definition, that is our ever recurring notion that “*disabled people*” ought “*to have access to the mainstream of artistic consumption and production*” the value of artistic consumption has been evidenced through both a need for access to cultural capital, as well as through notions equivalent access to patiently human experience, amongst which can be considered the aesthetic. However, the value of production has perhaps been less acutely defined, for whilst we have presented the idea that poetry should create poets and as such it should be apparent that the disability arts should inspire those with disabilities to engage in arts practice, the actual value of creation may not be immediately self-evident.

Earlier in this chapter we introduced the work of Eşref Armağan, claiming that an insight into the nature of his practice should be counted amongst the aesthetic properties of his work, an aspect of his practice which might need to be acknowledged in order to sensitively engage with his paintings. Through a consideration of SOC and other contextual properties, the value of presenting process as an inherent aspect of an aesthetic dialogue, may now be more readily apparent. Namely, that a knowledge of technique might be thought of as an aspect of the standard observation conditions needed to meet his work on its own terms.

Yet, above a consideration of process on the part of the observer, a focus on production as a core facet of the disability arts movement, can be thought to offer something of note independent from any interaction with an audience. This is to say, that a form of aesthetic experience might be thought to emerge in part through the act of creation itself, a situation wherein the artefact is in many ways secondary to the process. Eşref Armağan practice of stylus drawing and methodical layering of paint, was purportedly borne out of a want to experience aspects of the visual, a form of creation through which he attempts to engage with some core aspect of human experience. Yet, this need not necessarily be an 'art therapy' reading of his practice even though there are indeed aspects of it that might be thought therapeutic, rather, as a form of self-directed study, the development of his own mode of creation might be similarly thought to benefit the self.

In this, the broader rationale for any art practice can be understood as varied and multifaceted, something patently human that should not be reductively understood through a singular lens. It is true that art therapy is one facet of disability arts, as indeed is the work of industry professionals, yet neither fully encapsulates every aspect of the territory, wherein there is a rich field of amateur and hobbyist practice between these two extremes. A cultural understanding of art production, centres on the ability to respond and participate within a form of life, to actively engage in dialogue and present a voice within the mainstream. In contrast, an aesthetic framing of production need not necessarily consider much beyond the experience of creation, wherein the act of engaging with process, can in some instances, be the primary justification for craft.

Within this, there are examples of disabled arts practice which combine aspects of both cultural and aesthetic notions of process, wherein the continuation of arts practice might be thought of as an issue of

identity for someone who has acquired blindness later in life. As such, the rediscovery of a once visual practice, can be an important part of reclaiming one's sense of self, where acts that were an essential element of daily life are recontextualised in a different sensory context, one through which a new aesthetic appreciation of aspects of craft might emerge. To return to our interview from the Huddersfield Transcription service *"some of those who go blind late life essentially re-learn their craft skills, it was something that was important to them before they lost their sight and so it's often something they want to keep up. I have one lady who sends me cards that she makes, cards which she learnt to make differently when she lost her sight, so for some people craft can be really important."*

In this way, the work of the contemporary blind artist Terry Hopwood-Jackson might be thought to offer a profitable avenue of enquiry into this form of disability arts practice, where process is entwined with both notions of reclaiming a sense of self and an emerging aesthetic appreciation of rediscovered craft. Through his accounts in the documentary 'The Terry Fragments' we are introduced to his own esoteric process of art creation, one wherein he finds analogous elements of practice for once visual aspects of creation, *"from fine pencil drawing to using plasticine as tactile outlines for his paintings"* (Brylla, 2018). As such, Terry utilises a mixed media combination of plasticine and paint, a technique he affectionately refers to as 'PAP', operating in a what might be considered within the confines of this thesis, to be a familiar 2.5D register of tactile image making, one that is designed not only with notions of haptic registration, but a consistent consideration of colour.

Indeed, in reference to the work "The Spirit of the Moonbather" which was commissioned for use in the documentary, Terry discusses the original intent of the work and his move away from a full colour rendition towards the use of Prussian blue and silver, something akin to a black and white rendition but one wherein notions of light and reflection are brought to the fore. Indeed, the work is not straightforwardly a monochrome image, rather it is focused on reflective elements regarding both technique and subject, where the light of the moon bathes the image in the colours which give it form, leaving trace elements of the vibrant underpaint to suggest memories of some other version of scene. As evidenced by the documentary, Terry as a commercial artist does produce work for sale, yet the processes involves are far more about reconnecting with an essential element of self, as noted by rather blunt statements like *"It's my painting and I want it the way I want"* and more colourfully *"If anyone is expecting perfection, they can whistle for it"*, for those not intimately familiar with this common English idiom, in this context it means that perfection is something you should not expect to receive from him.

In this regard, we might also briefly consider the motivation for arts practise more broadly, drawing on Daniel Pink's (2009) work, *"Drive: The surprising truth about what motivates us"*, through which Pink rejects traditional models of reward and punishment or "if/then" systems to foster better performance, in favour of more self-actualising notions of autonomy, mastery and purpose. To this end, we might similarly proffer these elements as factors of why any of us engage with the arts, wherein the want to be self-directed, for control of what we do and how we do it, plays a role in why we chose to create. The act of making is often a deeply intimate and personal one, where a sense of ownership comes from the need to take into account aesthetic considerations, decisions which you yourself are responsible for and which impart an aspect of self onto a work.

Similarly, the satisfaction we derive from improving a skill or what Pink refers to as *"the urge to get better at stuff"* drives us to engage in activities that may *"seem irrational economically"* in that they do not necessarily offer a readily apparent benefit. As such, actions like *"playing musical instruments on the*

*weekend*” are often attempted in part because getting better at a craft is a motivator factor, where in gaining proficiency with a specific media, we might perhaps be thought to improve ourselves.

Finally, working towards something worthwhile, often something perceived as greater than ourselves, echoes ideas of vocation. With this in mind, purpose is derived not only from a belief of the value of your own artistic practice, but in part because the output might also be thought to be purposeful. Indeed, craft-based pursuits like knitting, have long standing traditions of supplying work to charitable organisations, where premature new-borns, those on low or fixed incomes and in recent years those requiring breast prosthetics<sup>74</sup>, benefit from the products of craft. To this end, it is not unreasonable to assert that the value of access to the mainstream of production, might include a range of varied and complex justifications for making, beyond simply the culture-centric notion of having one’s own voice known. Rather, there are a plethora of significant rationales to undertake artistic practice, including those which might allow for an engagement with ‘essential’ dimensions of process.

Notions of self-direction, improvement and ascribed meaning, might allow the act of making to be considered an aesthetic experience, in that it is both possible to take something of substance away from an engrossment with the work and that the recurring nature of *‘practising’* requires a form of prolonged consideration, one that might be thought akin to a traditional audience focused presentation of aesthetic experience. That is to say, a slow-art, considered encounter with a work in development, might provide a positive set of SOC from which to appreciate it in its own terms, where process and one’s own artist intent, can be thought of as contextual properties from which a sensitive engagement of a work might emerge.

In reference to our recurring theme of the amateur, the aesthetic dimension of process could be justified as art practice for *‘the love of’* where in many regards, the experience of making or the emotions someone feels participating within their art, supersedes any assessment of output. A value in writing the poem beyond the sophistication of the verse, a value in the act of singing independent of the notes you produce, a value in the tactile image beyond its ability to convey meaning. In a consideration of core or seminal human experience the arts and more specifically crafting, are amongst the earliest and perhaps most essential, a way of marking one’s own place within the world, of noting a presence in time and space. This is to say, that arts practice might be considered a kind of engagement with a kind of language, wherein disability arts might attempt to work within a disability specific dialect.

Building upon this, we might now progress to the second aspect of Barnes and Mercer’s definition of disability arts, in that *“it includes impaired-focused art that explores the experience of living with impairment.”* To the end, we consider this dimension of disability arts through two distinct but interconnected practices, the first of which concerns art that functions in a predominantly cultural register, wherein its purpose is to convey *“the experience of living with impairment”* to an audience unfamiliar with such a vantage. In this, we might consider this a form of engaging within the mainstream, a way of making one’s own voice known, a shift in register or in the case of blindness arts, a change in sensory perception wherein one sense is momentarily privileged over another.

This might be thought distinct from the all too common but misguided practice of disability simulation, in that such experiences do not seek to imitate a disability in order to claim some understanding of the challenges a disabled person faces. Indeed, such attempts to mimic impairment *“address neither the coping strategies and skills disabled people develop in living with impairment, nor the cumulative social and psychological effect of encountering social and physical barriers over a lifetime.”* (French, 2007)

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<sup>74</sup> (Knit for premature babies, 2018; Knit For Peace, 2022; Knitted Knockers UK, n.d).

wherein spending a day in a wheelchair does not accurately represent the experience of being wheelchair bound, as such exercises rarely account for the cumulative factor of consistent and repeated inconveniences to travel, whilst simultaneously underestimating the value of being proficient in wheelchair use.

Secondly, *“impaired-focused art that explores the experience of living with impairment”* might operate with similar justification to that found within our section on production, wherein the artwork produced need not tailor itself to an audience. Rather, in utilising one's own life experiences to create, we do so by working within our own distinct form of life, operating in a language that may not be familiar to an audience who does not live with impairment, but which also does not actively seek to translate that experience, or alternatively, which does not aim to make a work more digestible for an audience that is unfamiliar with the style of practice. In the words of (Berman et.al, 2018) in reference to Benjamin's form of translation *“Do we ‘understand’ a foreign language in the same way we ‘understand’ a poem?”*, for in this sense, a more isolationist notion of disability arts practice, may seek to make something comprehensible, but not necessarily less difficult.

With a modern understanding of the disruptive role of contemporary art practice, it is perhaps reasonable to consider an alternative to the harmonious, beauty centric notion of blindness art I have provided in my earlier chapters, perhaps even one which rejects notions of access in favour of a more isolationist approach. Whilst notions of art designed for and which originate specifically from blind people, are still resonant with our established position of access to the mainstream of both consumption and production, a more overt want to actively exclude those who do not participate in a culturally blind form of life, is perhaps more incongruous. For indeed, the version of the arts considered within this thesis is one wherein access is a foundational concern, where notions of deliberate exclusion, if not completely incompatible, are certainly more complex to address.

In this regard, a distinction must be made between deliberate exclusion and creating within the boundaries of one's own language. A book of Braille poetry that has no non-tactile equivalent, does not seek in its use of Braille as a primary written language, to exclude those who cannot read Braille, no more than a work in French seeks to obfuscate itself from those who only read English. In turn, whilst it could certainly be argued that there is an isolationist dimension of culture specific art that does not seek to translate itself, this form of isolation is not inherently exclusionary, but rather, in that it puts the onus on the observer to operate within the register of the work, to attempt to learn a language in order to engage with it in its own terms.

As such, we might consider those aspects of a cultural-disabled form of life, wherein unique aspects of experience allow for similarly unique interactions and forms of engagement. In this way, many blind people utilise a digital screen reader to use the internet, a program which reads digital text and provides access to the metadata within a website's digital photographs, a way to identify the content of images and to render the virtual world somewhat accessible. In this way, a website filled with obscure visuals, but where the 'alt text' tags of those digital images are filled with poetry, might take on an air of something akin to the isolationism we propose, a culturally specific form of expression wherein those who do not engage in a certain form of life do not recognise the album for the poetic anthology it is. In this instance, such a work does not draw distinction between those with vision and those without, a line which as we have routinely addressed is an insufficient and inaccurate way of categorising blindness, but rather, information is obfuscated unless a person is actively involved with a practice that is almost unique to a culturally blind experience.

Similarly, we might briefly reference other notions of disabled cultural identity, namely the distinction between D/deaf, where a lower case writing of the word deaf, is “*commonly used to imply: a medical description of deafness measured against the ‘norm’ of hearing people*” in contrast to a capitalised Deaf, which is instead “*linked to the construction of a linguistic identity and culture.*” (Valentine & Skelton, 2007). As a “linguistic minority” those who sign operate within a distinct socio-cultural sphere, where the communication and identity is almost uniquely tied to disability. In this way, activities that are conducted in sign language are language and culturally specific, but in not translating for a hearing audience it is not inherently an attempt to exclude those who are not deaf, only to cater to those who are actively participating in a Deaf form of Life. Sign language performances of slam poetry<sup>75</sup> do not exclude the hearing, no more than they include the deaf, rather, they simply do not cater to those who do not speak the language, seeking to operate in the rich territory of their own linguistic expression.

In a connected vein, when considering accessible images, it is evident that such works are often produced because the form of perception required to understand an original work is unavailable. Yet, in regard to disability art, the idea of a non-disabled audience being ‘excluded’ must be considered with the caveat that no such barrier is in place. With this in mind, whilst it may be more difficult to engage with a work when it does not consider you amongst its target demographic, there is not necessarily the same moral obligation for access that is found within a disability studies context. Whilst my own practice focuses on broad notions of social inclusion, not all artistry is similarly accessible, indeed as much as work that only considers a singular register might exclude a disabled audience, there might be a potential for a kind of disability arts that is similarly hesitant of translation for want of the loss of a unique cultural identity.

Continuing from those who produce art in a specific, disability-centric linguistic sphere, we might also note that those works which operate within an alternative sensory register, even to the extent of limiting other sense information, do not inherently take an isolationist position. The London restaurant experience “*Dining in the Dark*”<sup>76</sup> does not persecute a sighted audience or take a vitriolic anti-vision stance, rather, through the use of blindfolds and absence of light, they seek to recontextualise other sense experience, to momentarily privilege taste over sight. Similarly, tactile images might often be thought to recontextualise touch, yet this shift in perspective does not inherently preclude them from working with colour and other sight-based properties, where a thoughtful consideration of the haptic need not always shun the visual.

In this way, impaired-focused art is not straightforwardly defined as simply work designed to convey the experience of impairment, though indeed those works might also be considered disability art. Rather, the breadth and depth of the territory is much broader, wherein impaired focused work might encompass any style of practice that emerges from a disability arts process, wherein the nature of the craft is itself an exploration of the experience of living with impairment. In this regard the work of both Eşref Armağan and Terry Hopwood-Jackson would qualify under this definition, as the unique style of their processes emerge as a result of their exploration and experience of living with impairment.

The final aspect of this three-part definition, includes work which actively presents questions of access or which otherwise attempts to offer “*a critical response to the experience of social exclusion and marginalization.*” (Barnes & Mercer, 2001) a premise wherein such works often seeks to communicate the nature of individual experience or otherwise note the indignity of specific forms of exclusion. In this, far from being isolationist, the confrontational nature of such work often represents an attempt to influence

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<sup>75</sup> (ASL slam, 2015)

<sup>76</sup> (Dining in the Dark London, n.d)

societal reform, or else seek to educate those not actively engaged within a form of disability culture. In this, political readings of the aesthetic experience are not primarily concerned with established notions of beauty, rather, they consider the role of art as a disruptor, as motivator of change in part through the use of emotive and evocative experience.

Indeed, Benjamin discusses the politicisation of art through his writing on art in the age of mechanical reproduction, wherein the politicisation of art is presented as the antithesis of politics which presents itself as aesthetic. In this regard he somewhat famously notes that *“Fascism is rendering aesthetic. Communism responds by politicizing art”*. Yet, even when separated from his own Marxist leanings, there is something of substance in the notion that expression without the power to affect change, is perhaps incongruent with a true understanding or even appreciation of the aesthetic. In this way, Benjamin’s consideration of the arts is one that references the potential for emotive experience to shift perspective or reframe discussion, to present a position or other form of argumentation in such a way that it might be thought persuasive.

From Benjamin’s vantage, politicised art has the ability to express thought and opinion whilst also altering something within the mind of the audience, in this regard, *“he wanted art to change our worldview, to change something it had to change the material world somehow. To give the masses expression without change was the formula of fascism”* (Then & Now, 2019) In this way, artistic expression that lacks the ability to affect change, might be considered impotent, a form of appeasement that doesn’t speak to the nature of aesthetic experience as something affective. As such, art’s potential to move or influence its audience and subsequently operate as a vehicle for societal reform, is symptomatic of its ability to connect with people. In this, a notion of art that is sanitised, where the field is prevented from presenting alternative and novel perspectives, is one that is perhaps, incompatible with notions of the aesthetic experience. An environment that impedes a work’s ability to operate as a persuasive agent, does so by preventing the kind of emotive experience or profound connection that would allow for that discourse, namely, what we might define as the aesthetic.

In this regard, Barnes and Mercer’s definition of disability arts encompasses those works which are politicised, where aspects of disabled experience and social exclusion are presented to an audience that might otherwise not consider these experiences, aesthetic in the sense that they have the potential to evoke a visceral emotive response, persuasive as well as expressive works. To this end, a pertinent example of such practice might be found within the collections of Katerina Kamprani (2020), specifically in regards to her continuous project ‘The Uncomfortable’ a group of deliberately inconvenient objects that both draws attention to the elegance of established solutions, whilst at the same time presenting the unique challenges those with impairment might face.

Indeed, some of Kampran’s objects have been utilised in conjunction with AACD<sup>77</sup> in the short film *“Objects of Empathy”<sup>78</sup>* to address some of the daily challenges disabled people face when interacting with objects not designed with their abilities in mind. Slanted chairs, thick cutlery and egg-shaped wine glasses with only a small opening to drink from, all present a range of challenging interactions, which critically respond to the nature of a world designed for able-bodied fully ambulant people. It is perhaps important to note that Kampran’s uncomfortable objects do not attempt to replicate any one disability, rather, they show a specific kind of interaction, wherein objects that have not been designed to be easy to

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<sup>77</sup> Association for Assistance to Disabled Children, or the *“Associação de Assistência à Criança Deficiente”* AACD in its native Portuguese.

<sup>78</sup> (Havas, 2019).

use, offer potential insight into the ways in which products that do not consider a disabled audience, problematise common tasks.

Similarly, some of my own previously published work utilises this politicised form of rhetorical design, critiquing aspects of products that might be considered a form of social exclusion. In this way, I presented a deconstruction of modern pharmaceutical packaging to reveal that the legal requirements for what must be presented in Braille on medication, are not only limited, but in many regards wholly insufficient. It is not unreasonable to suggest that, in theory, the information presented in Braille on commercial paracetamol ought to represent the minimum amount of textual information required to understand its contents. In this regard, general information relating to the interactions of paracetamol and more complex advice that would be found in the patient information leaflet, is legally available upon request from manufactures, yet more specific information like the dosage of individual caplets, is not something that can reasonably be devoid from the packaging.



Fig. 39: The two images above feature a plain white paracetamol box, one constructed, the other flattened and unassembled. The words “paraceta-mol 500mg caplets” written in a plain black font. The formatting of the text is taken directly from its Braille source, going over four lines with a hyphen separating the two halves of the word paracetamol.

Yet, the consistent absence of a tactile expiration date highlights the deficiencies of current systems, with EU guidelines noting that “*expiry date in Braille would be welcome, although it is acknowledged that this may not always be feasible*” (European Commission, 2009 p.17) that is to say, that Braille expiry dates are not a legally mandated requirement. The resulting absence when Braille is converted to non-tactile writing and all other text is removed, presents a stark contrast to the glut of information a sighted audience is subjected to, where reams of small print cover the back of medication with warnings and advice. In this way there is perhaps a secondary conversation in regards to medicinal packaging, as to whether the visual clutter present on such products might be thought unnecessary in a modern digital age, where it might be more advantageous to divorce additional information from the immediacy of the outer box in favour of an official digital offering that can be updated as new advice and recommendations emerge. Indeed, this is already the reality for those who rely on Braille to navigate physical products, or for whom small point text is illegible, as such, if this information is already separate for large portions of the general population, perhaps it is reasonable to suggest its current form is redundant.

It is important to note that Barnes and Mercer's three part definition of the disability arts movement, does not inherently exclude those works which do not meet the requirements of every facet. Indeed, thought of through the lens of familial resemblance, as collections of work which when considered in relation can be understood as belonging to the type disability art, then any piece which operates within any of these distinct registers can be thought to relate to the territory. In this way, the tactile image as we have presented it throughout each section, can be thought to concern disability arts despite having radically different motivations and presentations, where work which has not been explicitly positioned as aesthetic, might still be thought encompassed by disability arts.

### **3.5: Syncretism, Vagueness & Transdisciplinarity:**

In "Realism about Aesthetic Properties" Goldman (1993) addresses the notion of disagreement over aesthetic issues specifically within the context of aesthetic realism. In this he might function as something of a critic of Zemach, writing that "*For the realist, dispute must signal either error, which must be explicable at least in principle, or vagueness, in which case neither side might be mistaken in any clear cut sense.*" By this standard, Zemach can be thought to favour the notion of error in dispute, where difference in opinion signifies wrongness, that is, a nonstandard set of observational conditions.

In contrast, Benjamin's philosophy is syncretic, concerned with notions of the multiple and oftentimes even the vague, yet rather than vagueness being merely an absence of specificity, there is an attempt to institute vagueness as a material, ontological principle. The significance of Benjamin in this context concerns the ability of his broad ranging philosophy to speak to an alternative, more pluralistic form of aesthetic realism, one that is perhaps more capable of addressing the issues of haptics, aesthetic-translation and equivalent access. Indeed, whilst not all these concerns are directly addressed within his work, there is an established affinity between these topics and his syncretic writings on language. In turn, Benjamin's arguably aesthetically realist concern with translation, paired with his recognition of the importance of both the haptic and the optical in approaches to aesthetics, are directly applicable to issues of tactile image making, as indeed, are his early writings that lead towards questions of transdisciplinarity.

His positioning of both popular art and mechanical reproduction, as a means of challenging institutional and canonical hierarchies, as well as enabling aesthetic access for the masses, can be straightforwardly viewed as an accessibility argument. Indeed, it is no coincidence that when discussing the disability arts and access to the "*mainstream of artistic consumption and production*" (Barnes & Mercer, 2001) we have consistently turned to Benjamin as a primary theorist, for he is one who is frequently mentioned in the same breath as Marx, in both addressing and challenging the hierarchical consumption of culture. Yet, whilst Marx viewed pop culture as a mode of ideology, as a phenomena which further instituted working class oppression, Benjamin saw some aspects of pop culture as a means of contesting aspects of the status quo.

As we have seen in the case of Zemach's philosophy, there is a close tie between being a realist about aesthetics and being a realist about meaning. In the case of Zemach, this is shown in the realist, metaphysical supplement which he applies to Wittgenstein's notion of meaning as use, or of form of life. That is to say, that for Zemach, paradigmatic typed cases of aesthetic predicates, as used in an institutional aesthetic 'form of life', provide a kind of objectivity and sanctioned expertise. However, Zemach couples this with a foundationally realist notion, where sanctioned expertise only exists in connection with a set of real aesthetic properties, properties which might be thought to lie outside of everyday life. In the context of Zemach-ian aesthetics, 'form of life' is taken from the later, more aspect



driven Wittgenstein, but in its adherence to a more rigidly realist position, it might be thought equally resonant with Wittgenstein's earlier writing in the *Tractatus*.

Benjamin's Marxist, materialist recognition of class hegemony, offers an alternative approach to aesthetic realism, one that is highly syncretic and which critiques hierarchies of taste in a way that Zemach does not. This is perhaps first visible in his approach to language, meaning and linguistic translation, where "*an unwavering critique of rationalistic, instrumentalists, or aestheticizing conceptions of language and rhetoric in the medium of language*"<sup>79</sup> displays an oblique multiplicity, one that is nonetheless, confident in its own position. That is to say, that despite or perhaps even because of the inclusion of metaphysical, materialist, epistemological and even mystical notions "*His writings on language as a whole displayed a remarkable unity*" through a kind of constant critique of aesthetic conceptions of language, where ideas of the poetic are guided by a overarching theories of experience (*Erfahrung*) and perception.

Benjamin's mystical notion of '*pure language*' emerges in his earliest writings, where he presented a picture of language that emphasised its connection with the absolute and proposed a medium of communication amongst layers, registers, realms and states of existence, "*A concept of knowledge gained from the reflection on the linguistic essence of knowledge*" corresponding to a connected "*concept of experience*" (Wilberg 2016). In this, we might reaffirm the connection between these theorists and my own practice, as to be concerned with a mode of cross-modal translation, namely from the visual to the haptic, is to be engaged in movement across the syncretic plane, which Benjamin refers to as 'translation' or 'translatability'. Indeed, Benjamin's own notion "*that ideas are to objects as constellations are to stars*" (Buchanan, 2010) links back to our repeated motif of lines and nodes, wherein collections are understood in relation to one another, where fragments of the vessel facilitate a form of more essential understanding of the whole.

As such, in place of the linguistic precision that is urged by Zemach's notion of aesthetic realism, Benjamin offers a view that tactilely incorporates a notion of aspect seeing, where there is not only an acknowledgement of the vague as inevitable, but a veneration of the vague as real. In his writings upon languages, Benjamin turns away from the security of language and turns towards a syncretic conception of Geist (Spirit), further, by rejecting abstract notions of identity and similarity, Benjamin instead offered an image of "*polyphonic and harmonious translation among several strata*" in the great chain of language. Where there is a notable resonance between Benjamin's depiction and Jacobe Boehme's notion of "*language spirit*" as a "*divine, polyphonically tuned organ, in which every pipe, in piping its own tone, echoed the eternal Word*" (Hanssen, 2004) where difference is not the antithesis of harmony, but an essential aspect of it.

Importantly, Benjamin's mode of syncretic essentialism also embodies a generative principle, for as we have stated at length in earlier chapters, his notion of translation rejects restrictive adherence of form or notions of purity in imitation, instead translation is a preserving of the essential and not an attempt to reverently convert a work 'word by word'. In this, Benjamin asserts that the role of the translator is to capture and, in the process, partially transform an essential substance, what one might refer to as the "poetic", an idea which is more prominent in his later work, addressing the image and its reproductive context, whilst still reflecting many of his earlier linguistic concerns. This notion of creative perturbation in translation, plays a significant role in the cross-modal translation that underpins the idea of aesthetic access for blind people, where our collections-based approach seeks not one unified instance, but a constellation, a body unified in relation. In this, a tactile image may be one star amongst many, where the

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<sup>79</sup> (Hanssen, 2004)

reproducibility of the modern image is not a form of devaluation, but an emergence, where through a linguistic sphere the original is elevated ever higher.

Thus, his notion of translation evokes concepts of authenticity and truth, as well as a freedom from the original that embraced the radical diversity of registers of meaning. To Benjamin, translation both reactivates and transforms an original, retaining an echo that partially distinguishes the translation from the source whilst simultaneously distancing it from any notion of the wholly, or purely original. For Benjamin it is through the syncretic combination and differentiation of all translations, that the pure linguistic meaning of an original is revealed.

As such, Benjamin's position sheds light upon a particular strategy of translation, one concerned with cross-modal perception and access to the aesthetic, where translated instances "*correspond to each other in the tiniest details but need not resemble each other*" and must instead "*fashion in its own language a counterpart to the original's mode of intention*", different, whilst still retaining the echo of the original. In this way, a haptically oriented rendering of Da Vinci's painting remains an analogue of the former whilst also accruing a life of its own, that is to say, it is an extension, an instance and an individual all without contradiction.

Benjamin's own focus on what were at the time, emerging forms of technological translation, notes how the ability to reproduce artworks, whilst always having been present, is accelerated and becomes increasingly thorough in the context of technical mechanical reproduction. How through the gramophone "*the choral production, performed in an auditorium or in the open air, resounds in the drawing room*" (Varley, 2004) and how through film or photograph we are offered endlessly copyable visual works. Yet it is perhaps difficult to mention the impact of examples like the gramophone and their effect on reproduction, without such examples now appearing quaint, where the prevalence of digital mediation has fundamentally altered the nature of translation.

Indeed, in the face of our own practice and the rise of affordable 3D printing, Benjamin's conversation on mechanical reproduction takes on a much different tone, not least in regards to the scale and reach of physical objects. As such, Benjamin's claims that imitation no longer produces a distinguishable artefact, that the 'unique originality' of artwork has ceased to exist, is something that is still highly resonant with contemporary discourse, where operating in a digital space now facilitates even the creation of physical objects and haptic experience.

As we previously noted, in the face of reproduction the aura of a work disappears, supplanted by the quasi-religious notion of ritual, wherein the art object is still seen as a singular but in a way where it is considered an aesthetic cult object, one that orients a form of life. In turn, with the advent of mechanical reproduction, the function of the work changes and a notion of 'exhibition value' emerges, where the cult is similarly surpassed by a form of democratisation of art, where value arises from potential reach and broader engagement of a work. In the context of the 3D printed tactile image as we have presented it, the shift from an optic to a haptic register can be thought of as an extension of this exhibition value, where by, in engaging with an audience that was previously excluded, we increase the profile and subsequently the value of the work. In a connected vein, the exhibited tactile image also attempts to achieve an emergent aesthetic dimension, where working with a principle of cross-modal perception is not not limited to blind people, but rather in utilising a multi-modal approach we attempt to recontextualise aspects of the original, wherein those already familiar with a work will find novel insight through a relational understanding.

Yet, notions of exhibition might be thought to encompass something more when removed from a museum or gallery centric notion of art in place, where the mass production of art objects and digital instances of a work offer something more fragmented and relational. As digital pieces can now be thought of as an ever present constant of a modern age, it is perhaps the case that the onus is no longer on the individual to find and engage with an exhibited image, rather, aesthetic works are 'exhibited' through broad dissemination, considered in personal and private spaces as much as in public, in some ways a return to notions of ritual like private engagement, but one that work in tandem with a fractured and multi-instance model of exhibition. In regards to our practice, it is fair to state that there is a distinction between an ocular and haptic centric dissemination, where the emergence of this form of private exhibition, is not as commonplace for works that rely on touch. Yet, this is exactly what we propose with readily available 3D printed works, a cult-like consideration of the artefact whilst noting it as one part of a broader, exhibited constellation of work.

In this regard, haptic shift presents a ritualistic kind of slowing, one that in its intimacy is resonant with Benjamin's notion of the cult, but where a contemporary understanding of modern modes of mechanical reproduction, mean that translation and exhibition and no longer incongruent ideas of considered engagement with 'an artefact'. Indeed, this form of replication, rather than endangering the "auratic" nature of an object, through translation represents a modal shift into a different kind of engagement. Through a slower, intimate understanding, we are presented with a token which by virtue of replication, shows the value of exhibition, but which shares the qualities of the cult in the need to engage ritualistically with a presented art object. A keyring of the Eiffel Tower is in many ways less aesthetically sophisticated, if not outright trivial in comparison to the structure itself, yet, if we position it as a tactile interpretation of form and material, with a need for both an experiential and comprehensive kind of haptics, it gains the perhaps elevated status of an object with aura, namely, a poetic or aesthetic tactile image.

Benjamin writes of what were, at the time, emerging, more contemporary modes of experience, in this he suggests that in the context of novel experiences such as the cinema, the aesthetics of contemplation are replaced with the aesthetics of shock, that in some sense disseminate distraction. That is to say that Benjamin's modern consumer of art is "*affected, influenced, involved, changed, collectivised*" (Melberg, 2005). Considered from this vantage, many of our own tactile images might be thought peculiar objects, for whilst they attempt to translate something innately visual, hoping to attain some kind of equivalence or true sense of an ocular experience through the haptic, in the positioning of the work as something not exclusive to blind people, it might in some regards be thought to attempt the opposite. That is to say, that in regards to notions of distraction, a haptic shift attempts to encourage contemplation, offering an equivalent haptic through that which is a translation of the optic, foregrounding an intimate tactile-kinaesthetic experience that is nonetheless intimately entwined with the form of mechanical reproduction that birthed it.

Yet, from such a shifting of sensory modalities a true equivalent is always out of reach, a work may be translated but never 'word for word'. In this, it enables a kind of sensory novelty that functions as both distraction, a doorway into other perceptual modes, enabled by a technology that reproduces a canonical image. In doing this, it incorporates the vagaries characteristic of Benjamin's indeterministic translation, inducing a form of cross-modal shock. In this way, haptic translations of art objects offer a connective line, one that draws together Benjamin's thought concerning the modes of perception of the quasi-religious, auratic object and the distracted "*profound changes in apperception*" that are offered by the avant-garde.

In its mode of reproduction, 3D printed tactile images can be thought to facilitate duplication, in that there can be any number of prints available, indeed the project celebrates the ease in which it can be replicated

and actively promotes this dissemination. In this, we facilitate access whilst questioning elitist notions of 'expertise' that accompany the notion of the one off or the limited edition, with its design aimed squarely at engagement with the amateur. In this regard, it retains the ritualistic aspects so essential to description of the aura, whilst challenging the authoritarian structure that is found within the context of the cult, requiring slow contemplation, whilst championing mechanical reproduction.

Yet, in contrast to Zemach's established position, there are shifts in meaning that come to the fore in Benjamin's understanding of images and language, one which through the writings of Blair Ogden we might bring into relation with Wittgenstein's understanding of aspect perception. In this, we might note how Benjamin refers indirectly to the process of aspect perception in relation to seeing Orion as a constellation within a mass of stars, or else through the reading entrails and runes. Ogden, suggests that Wittgenstein and Benjamin are aligned in their understanding, that we "*respond to pictures as faces, or expressive objects*" namely, that pareidolia or incorrectly identifying faces in patterns and objects, is an innate, high universal quirk of human evolution that is intimately tied to facial recognition. To Ogden, this is evidence of Benjamin's position and suggestive of the idea that the imagination is implicated in processes of perception, that through notions of pattern and relational properties, the two theorists are more in tune than one might first suspect.

In relation to our own practice, there is a persistent resonance with blindness and the language of Wittgenstein and Benjamin, where terms like meaning-blindness, aspect-seeing, the face of a word and even the example of pareidolia as an evolutionary constant, are relevant to a connotation of the absence of certain information. There is a common influence in the form of Gestalt psychology on the work of Wittgenstein and Benjamin, one that plays a role in their understanding of both image and language.

To this end, Benjamin in *Doctrine of the Similar*, writes of "*similarities flash[ing] up fleetingly out of the stream of things only in order to sink down once more*" (1933, p.65) revealing yet another aspect of the syncretic thing in itself. Similarly, Wittgenstein writes of the surprise of seeing a dawning aspect of an image "*in a flash*" (1953, p.138) a singular example amongst a multitude within their practice, where their seemingly radically different positions overlap with surprising regularity. In this way, Stern (2019) notes how both Wittgenstein and Benjamin, in the context of the question of meaningful communication, compare the words and facial expressions, but how their examples function very differently. Benjamin stresses the way in which the "*grinning face of a word*" enlivens the "*dead*" quality of the word-skeleton, as to him the experience of the "*dead*" word is also a kind of experience. Wittgenstein, on the other hand states that it is possible to be "*meaning or aspect blind*" and thus have a meaningless mode of experience, tying the experience of meaning to behavioural dispositions, a connected theory within a form of life which offers a clearer overlap with the relational account of Zemach.

The practical dimension of this project can be thought to have operated between these extremes, in that it explores the relationship between properties inherent in the discussion of meaning and use. In this, we can be thought to open up participation for blind people in a broader sense than a perhaps more straightforward, information driven notion of access, where social oriented aesthetic considerations and ideas surrounding community, are often paired with an invitation to a sighted audience to experience haptic modes of perception.

### 3.6: Remediation, Supplement & Mimesis:

*"A medium in our culture can never operate in isolation, because it must enter into relationships of respect and rivalry with other media"* (Bolter & Grusin, 1999, p.65).

As a model of knowledge, remediation offers us a way of contextualising instances, which in turn allows us to group them in relation as types. Remediation is not positioned as replication, but as a dialogue between instances. In regards to translation we can point to Benjamin's desire to *"render the relationship between the words of the original and a third thing that it indexes"* as a way of broadly explaining the same concept, though at different scales. Whereas translation discusses the connection between that which was always meant to be derivative, remediation moves between the translated and more encompassing theories of intertextuality.

What Benjamin refers to as pure language might be referred to as *"Immediacy"* within the context of remediation, that being a *"contact point between the medium and what it represents"* (Bolter & Grusin, 1999, p.30) and when Benjamin (1968, p.73) states that *"the original undergoes a change"* in response to translation, it might well be thought to describe the process of remediation.

Similarly, both theories resonate with Derrida's work on the concept of the supplement as *"the unity of two gestures"*<sup>80</sup>. To Derrida, the supplement was commonly considered as aid or addition to the original, to something more originary, a thing added in order to complete or enhance, but lesser in its nature as reverent to an "original" (Derrida, 1967, p.281). Yet, by positioning them both as gestures, Derrida positions the supplement not as merely an extension, but as a connected separate, both instances symbolically contextualised by their relationship to one another.

Derrida goes on to say that the *"supplementarity is a necessarily indefinite process"* questioning what it means for something to be original, as even *"writing is the supplement par excellence since it proposes itself as the supplement of the supplement, sign of a sign, taking the place of a speech already significant"*. Thus, for Derrida, all is contextually connected and discussion of type and the definition of what it means to be a translation, are merely indicators of the number and proximity of said connections, with type specifically linking to the scale at which we view connections. What is of the type "Dog" changes depending on the situation, at times we might identify an image of a dog as of the type dog, but at others it would be categorised as separate. Neither is inherently untrue, rather, both are merely different scales of viewing connections and the language games at play.

Derrida also talks of mimesis in his discussion of the supplement, and as we are predominantly concerned with translation, it is worth exploring a theory that highlights the distinction between representation and resemblance.

*"Mimesis here is not the representation of one thing by another, the relation of resemblance or identification between two beings, the reproduction of a product of nature by a product of art. It is not the relation of two products but of two productions, and of two freedoms. . . . 'True' mimesis is between two producing subjects and not between two produced things"* (Derrida, 1981, p.9)

Whilst translation is seemingly representational by definition, it is equally defined by its active relation to that which it translates and we would do well to remember that the term 'translation' stands as both a verb

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<sup>80</sup> Derrida, J. (1967). Of Grammatology.

and a noun. Much as the supplement may be considered the unity between two gestures, and thought memetic if those gestures arise out of two resonant, producing processes, so too might we think of a translation as both supplement to and an instance of, an active mode of mimesis. In this way, we may view a tactile version of an image, as both a second producing subject and as something which the first instance has produced. As individual and as extension, as part of a singular work and as a different producing subject, an instance whilst at the same time being extension and individual, all without contradiction. As a consequence:

*“The composition of a poem is among the imitative arts; and that imitation, as opposed to copying, consists either in the interfusion of the SAME throughout the radically DIFFERENT, or the different throughout a base radically the same”* (Coleridge, 1817, p.182)

Through Mimesis we might position tactile image translation as *“the interfusion of the SAME throughout the radically DIFFERENT”*. Offering a position that accepts a piece as translation, while highlighting the need for the “same” in order for it to retain the “type” of that which it translates. Clarity through difference and deferral, becomes a *“reason for saying “the same thing” repeatedly”*.

## Conclusion:

At the outset of this thesis I proposed to answer the primary question “*Why is it necessary to consider the functional, cultural and aesthetic dimensions of the tactile image, in order to adequately define its parameters?*”. In this regard, a consideration of these three distinct but ultimately interconnected territories, reveals layers of complexity that only emerge from an understanding of each in relation to one another, a pure, but nevertheless syncretic language, wherein something essential is revealed about the nature of ‘collection’ as a whole. Applying this approach to a consideration of tactile image making, we note that a multiple model presentation facilitates numerous pathways towards comprehension, where in turn, relationships between images also offer a kind of essential understanding. This idea forms the core conception of a collections-based approach, where our primary question and the corresponding design framework, can be considered this thesis’s most holistic contribution to knowledge.

Additionally, this combination of elements and the broader multidisciplinary nature of our inquiry, have necessitated a range of secondary questions and other epistemological contributions, each of which reflects our core territories. As such, each set of sub-questions is answered within its pertaining chapter, summarised here to highlight their relationship to our initial concerns. In this way, it should now be apparent that tactile image making relies on a foundational understanding of touch-based comprehension, where functional concerns offer us the tools with which we might effectively communicate meaning through haptic-kinaesthetic channels. General rules surrounding simplification, tactile swatches and minimum raised line heights, offer insights into the ways in which we might translate non-tactile subjects into accessible equivalents, images that can be reliably and consistently understood through touch. As such, the functional provides the starting point for our other approaches, as the mechanisms involved demonstrate a base level of tactile legibility, which in turn creates something of an implicit haptic language with which we might navigate the creation and comprehension of less pragmatic tactile works.

To this end, the tactile image making toolset that facilitates much of our subsequent practice and enquiry, comes out of a functional question relating to tactile swatches, namely, “*can the RNIB swell paper texture swatches be converted into a form that makes them viable in harder substrates, in order that we might create viable 3D printed tactile works?*” In this way, it should be evident that many of these textures work effectively in plastics, where in conjunction with broader notions of raised line practice and tactile-kinaesthetic comprehension, we present a series of guidelines towards the creation of additional works. A focus on rapid prototyping and design oriented around home manufacturing, led to mechanical insights in relation to print quality, line height and terminator points, where adjustments were made to some swatches whilst retaining their tactile discernibility. This provides an accompanying knowledge base with which others might apply our toolset, where a practice driven rationale works in relation to our presented swatch textures, in order to facilitate a more sensitive and comprehensive understanding of process.

In turn, functional questions of the pragmatic application of raised line 3D printed images, are framed through an exploration of emotional codes, where we posit the question “*can tactile images be effectively used in the creation of emotional codes for blind people, in order that they might better understand and mimic facial expression?*” in part to address concerns surrounding comprehension and legibility. In this way, our own practice demonstrates that raised-line tactile images can effectively operate as vehicles for what might be considered distinctly visual information, where written accounts of the mechanical processes of facial expression, are paired with diagrammatic analogues to visual equivalents. Whilst our own practice focuses primarily on the ‘Duchenne Smile’ the collection represents a practical demonstration of how such emotional codes might operate more broadly, as such, a focus on 2.5D image

making, partners concerns surrounding accessible printing with notions of tactile legibility, providing a template for the creation of further work relating to expression sets.

In contrast to a functional understanding, a culture-centric positioning of disability arts can be thought to be primarily concerned with a form of access to the mainstream of consumption and production, where the ability to engage with traditionally visual aspects of a culture, go beyond a simple reproduction of meaning. This ability to participate is predicated on access to what we have defined as a cultural visual lexicon, a vantage from which we might foreground notions of shared language and constructive dialogue. As such, in the pursuit of a shared form of life, the cultural tactile image encompasses work which attempts to similarly facilitate access to core, seminal and social aspects of human experience, those moments wherein something patiently human is expressed and from which a blind person might otherwise have been excluded, were it not for the ability of the tactile image to operate as auxiliary aid.

This avenue of inquiry subsequently generates additional, related questions, namely *“How should we provide access to traditionally visual information to a non-sighted or partially sighted audience?”* To this end, we propose a style of access that rejects a functional doctrine of necessity, opting instead for a more nuanced consideration of what might be thought ‘essential’. Taking influence from established UK legal frameworks, we position access to culturally significant information through a lens of anticipation and request, where the duty to make reasonable adjustments is anticipatory and as such, an understanding of particular art work as seminal, presents a situation where a desire for access should be expected. Alternatively, visual information which may not be as readily identified as culturally significant but which is still widely available, should nonetheless be available upon request, as the want for access becomes the justification to deem translation necessary.

Similarly, when asking *“what is the cultural or sociological value of translating non-essential visual works into a tactile or accessible format?”* we rely on Benjamin's notion of translation, to recontextualise the nature of essential, in that it becomes more about conveying an essence or a sense as opposed to a value judgement regarding the information. In this way, a broad access to a culture lexicon that relates to visual experiences, is not judged by the ability of individual works to convey pertinent information, but the ability of the relational system of knowledge to engage in a particular form of life. To this end, we position the cultural tactile image as work which facilitates participation and access to decidedly human experience. Where, through a pragmatic directive to enable the consumption of mainstream information, we in turn, offer a sociologically driven access to the means of production, where the ability to respond and make one's voice known, comes in part, from participation within a wider cultural ecosystem.

Our final chapter addresses notions of the aesthetic, positioned in such a way that they go beyond a pragmatic or socio-cultural understanding, where the aesthetic, haptic qualities inherent in a work emerge through a considered and thoughtful style of encounter, one that mirrors a ‘slow-art’ style of aesthetic appreciation. In this way, a positive set of what Zemach might refer to as standard observational conditions, that position the work in the way in which it might be considered most favourably, allows for art to be confronted on its own terms, oftentimes removed from ocular-centric preconceptions of beauty.

In this regard we address the question *“can a translated tactile work be considered a beautiful object capable of evoking an aesthetic experience?”* by connecting notions of the aesthetic to Zemach's at once realist and relational ideas of observation. As such, correct conditions for engaging with a work are those where its aesthetic properties are most readily evident, which in regards to our own practice, most commonly presents as engagement through a haptic, as opposed to optic register. Related questions of *“what are the limitations of remediated accessible works in regards to conveying a true sense of the work*



*it depicts?*” are answered by addressing Benjamin’s notion of aura and cult, relying on a highly relational understanding to dismiss notions of the original and equivalent experience.

In this way, a translation need not resemble that which it translates, whilst still corresponding to the primary instance, as such, a haptic experience might still be considered to be of the same type as a visual work, without requiring the same form of interaction to elicit aesthetic encounter. In this way, the limitations of a tactile image are lessened by the presentation of broad collections of fragments and aspects, where context and conditions facilitate a more sensitive style engagement. In turn, beyond mechanical restrictions posed by individual instances, the essence of a piece is derived more from an understanding of a work’s relational properties and the terms with which it wished to be engaged with, than it is from a straightforward understanding of the limitations of process. A keychain of the Eiffel Tower might well represent a sophisticated tactile model, if it is understood through a more resonant style of haptic engagement.

Indeed, a recurring and integral aspect of our tactile image making practice, has been to reposition everyday objects as viable, often sophisticated haptic models. As such, the need to expand existing definitions of what constitutes a tactile image is evidence throughout each of our major territories, where the ubiquity of mundane objects is paired with their ability to elicit valuable touch-based encounters and where the effective transference of meaning, intersects with the nature of access to both a cultural-visual lexicon and more considered notions of the aesthetic. In this way, work which does not rigidly conform to established guidelines for tactile image making, which either focuses on more experiential modes of haptic engagement that do not attempt to convey figurative depiction, or which otherwise does not offer a straightforward transference of meaning, can still be encompassed by the term tactile image. Indeed, operating in this kind of distinct haptic-aesthetic register, is one way in which we allow for an appreciation of touch that engages in a blindness centric form of practice, where the ability to consume is but one aspect of a culturally significant form of engagement. To this end, the ability to create and more broadly respond is an integral function of access, where the ability to participate in a productive dialogue operates in tandem with the need for a language specific form of practice, where creative output reflects the unique form of life of the creator.

In order to answer these questions, I have necessarily engaged in a diverse system of enquiry. As such, I have paired interviews with blind people and staff members from Huddersfield Transcription service, with related collections of previously unpublished tactile image work, an archive which has been assembled and translated in order to preserve both the fragile artefacts it contains and the makerly, process driven information that can be gleaned from the body of work as a whole. In addition, technical studies surrounding raised line image making and 3D printing specific related issues, inform a pragmatic, design-led investigation into the creation of tactile image making tool sets. This in turn, laid the foundation for a diverse range of creative output, that itself has begun to address aspects of a socio-cultural discourse and notions of access to art.

As such, our overarching concern of access to the aesthetic, is one that is intimately connected to broader notions of access, where both the tensions and interplay between territories, reveal essential aspects of the nature of tactile image making as a whole. In this, a functional or design centric approach, can be understood as one facet of a larger collection, where a relational understanding of cultural and poetic equivalents, offers insight into more sensitive modes of creation. To this end, no single methodology should be thought of as definitive, rather, the effectiveness of an individual tactile work ought to be assessed on a case by case basis, determined in part, by its accompanying context and the way in which it is received by its intended audience. In this, there is a tacit acknowledgement of syncretic nature

of disability, one that informs a person-centric consideration of creative output, where homogeneous or uniform solutions are often incongruent with the nature of impairment and designing with disabled people in mind. In regards to our own practice, this has led to a collections-based approach, as its ability to offer multiple avenues towards both comprehension and access, allows us to in some sense tailor our solutions with a diverse range of disability specific concerns in mind.

This overlay of multiple, distinct voices, is something which is echoed in the philosophical context of this thesis, where both the tensions and resonant aspects of Wittgenstein, Benjamin and Zemach, facilitate a relational conversation on the nature of language. This in turn, influenced our own multi-disciplinary approach, wherein a recurring and deliberate shift between registers, works to justify a rich and oftentimes complex form of understanding. As such, the role of practice within this thesis can be thought to reflect the interconnected nature of study, where individual works seek to address specific questions or otherwise engage with different modes of inquiry. In this, each functions as something of a supplement to the broader argument, in that it operates in a mode that might be considered both an auxiliary device and something individual or distinct, where our creative output is not something to be thought of as wholly separate from the context of this thesis, but as something integral to the form of its presentation. Indeed, the cyclical nature of our process meant that our practical output not only addressed questions, but oftentimes presented its own, directing future avenues of exploration which in turn, went on to shape many aspects of our argumentation. In this regard, the connection between our written and creative practice is one of two relational, producing processes, wherein each is substantially influenced by the other and a full appreciation of either, is largely dependent on the context that is provided when both are understood in relation.

As something of a wicked problem, tactile image making as a territory is perhaps an unending concern. Indeed, whilst our own practice attempts to reconcile many of the distinct facets within each approach, alongside the often conflicting needs and wants of stakeholders found within the broader field, it might still be said each style of image creation presents inherent tensions between the need for straightforward comprehension and more disability art centric notions of both participation and access to art experience. Our own practice has centred on an amateur audience and a broader form of access through makerly aspects of production, yet this position does not encompass the entire field of study and nor was it intended to do so. The nature of tactile image making and disability art centric solutions more broadly, is most evident when we consider the plurality of forms and their relational, syncretic interplay, where my own creative output is but one voice amongst many, strengthened by those alternatives that operate alongside it. Ultimately, access is a question of the right to participate, where a holistic engagement with tactile images offers its audience the tools to experience the patently human. Beware if someone says your tactile graphic is pretty or beautiful, take a second to touch it again, they just might be right.

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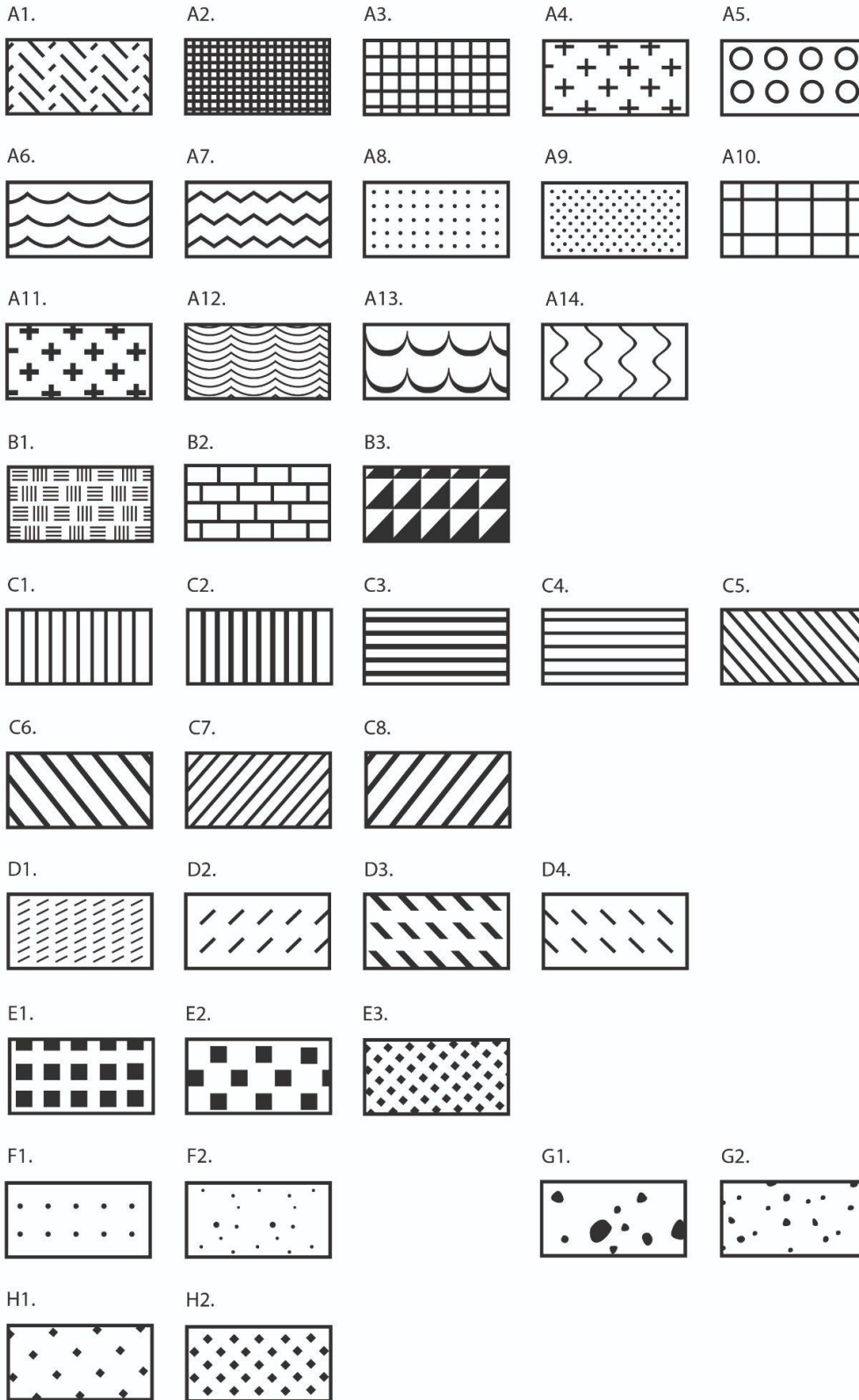
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**Appendix A: Tactile Swatches & Rapid Prototyping:**



*Fig. The image above is a replication of the RNIB texture swatches (2010) the original of which is cited above. I have chosen to replicate the image rather than include the original, partly as a way to utilise higher resolution pictures so that singular swatches can be more easily displayed next to corresponding images of my own applied practical work, and partly so that I might reorder the swatches to not require visual 'line' divisions. A description and associated name of each swatch is included here within the body of the text, in order that blind people reliant on e-readers may still gain a sense of each swatch. All swatches in group A can be used freely, together or with textures from other groups.*

*A1. Uses alternating short and long lines in a spiked zig zag pattern. A2. Is a tight grid of criss cross lines. A3. Is also a grid of lines albeit looser than the previous swatch. A4. Uses equally spaced, thin lined crosses in an offset grid formation. A5. Uses large rows of outlined circles with space in the centre of each circle. A6. Is a loose horizontal wave pattern. A7. Is a loose horizontal zig zag pattern. A8. Uses rows of small dots in a grid pattern. A9. Uses rows of small dots in a tighter offset grid formation. A10. Is a grid of lines that is significantly looser than the previous two grid swatches. A11. Uses equally spaced, thick lined crosses in an offset grid formation. A12. Is a tight horizontal wave pattern. A13. Is a loose horizontal wave pattern where the arch of the wave is thicker than the peaks. A14. Is a loose vertical wave pattern with no sharp points in contrast to all other wave patterns in this group.*

*All other groups show textures that are tactility indistinguishable from one another, as such only one texture from that group should be used.*

*B1. Uses groups of thin lines in a square grid, similar to certain textures of sheet metal. B2. Is a line texture indicative of a brick wall. B3. Is a grid of filled right angle triangles, connected in such a way that they look like rows of half filled squares.*

*C1. Is thin vertical lines. C2. Is thick vertical lines. C3. Is thick horizontal lines. C4. Is thin horizontal lines. C5. Is thin diagonal lines going left to right. C6. Is thick diagonal lines going left to right. C7. Is thin diagonal lines going right to left. C8. Is thick diagonal lines going right to left.*

*D1. Uses rows of thin, broken up diagonal lines in tight rows. D2. Uses rows of broken up, evenly spaced diagonal lines going right to left. D3. Uses rows of thick, broken up diagonal lines going left to right. D4. Uses rows of broken up, evenly spaced diagonal lines going left to right.*

*E1. Uses rows of filled in squares in a straight grid formation. E2. Uses rows of filled squares in an offset grid formation. E3. Uses tight rows of small, filled in diamonds in an offset grid formation.*

*F1. Uses small dots spaced out in a very loose grid formation. F2. Uses a variety of random sized dots in a scattered pattern.*

*G1. Uses a variety of dot-like shapes in random sizes, a scattered pattern. G2. Also uses a variety of dot-like shapes in a scattered pattern but using only small and medium sized shapes.*

*H1. Uses loose rows of small, filled in diamonds in an offset grid formation. H2. Uses tight rows of small, filled in diamonds in an offset grid formation, though notably looser than the diamond pattern in the early square group.*

In 2010 the RNIB released guidelines denoting a collection of texture swatches that were intended to aid in the creation of raised line tactile works<sup>81</sup>. These swatches are designed to be printed onto micro-capsule or “swell” paper, where temperature reactive capsules “burst” when exposed to both heat and carbon heavy inks, this creates a binary image where inked areas are raised and areas that are left blank stay two-dimensional. In turn, this results in a relatively consistent raised line height, one which is able to roughly achieve the height required legible Braille, though often not to the standard dot height of 0.46mm. The imprecision of “bursting” can also make Braille less legible<sup>82</sup> meaning that in some instances, a 3D printed image might be more effective if able to print Braille alongside the rest of the work.

In addition, heavy carbon inks most often result in black and white images, a fact which limits design options and does not cater to subsections of the blind community who may wish to make use of limited vision. Similarly, such images require specialised machinery and while the individual price of such tactile work is nominal, the initial cost of the machine is less so, with the increased availability of 3D printers being a significant factor in engaging a new audience with tactile image making. Swell paper has many benefits, designs are digital and as such easy to reproduce, the cost of each individual print is relatively low and its paper-based format allows for work that is well suited to inclusion within textbooks and traditional educational formats. However, as with most media, it has intended applications and there are places where 3D printing offers a superior or more appropriate product.

Working with an established format of image making, allows us to translate images that are already designed for tactile learners into a different media, whilst correcting for aspects of such work that does not work well in a harder substrate. Additionally, there is already a wealth of advice and support for those looking to design tactile images in this style, much of which might be applicable to 3D printed equivalents. A repeated tenet of this thesis is to engage with an amateur and hobbyist audience, as such the aim of these prints isn't to create designs that work well on commercial quality machines, but rather, designs that are built from the ground up to work on entry level printers at low quality settings. By creating textures that are designed to function at taller layer heights and at faster print speeds, we can assess whether textures that might come from less smooth prints interfere with the intended texture swatches.

Braille is rounded because hard edges are uncomfortable and when dealing with harder materials the problem is more pronounced, as what might appear to be a simple straight edge becomes a hard point that can catch a Braille user's fingers. Indeed, even minor discomfort can compound into numb fingers and less responsive reading, where the act of engaging with a poorly designed tactile font becomes more difficult over time. The same principle applies to raised line images, which should be similarly rounded so as to not make already hard materials more difficult or even painful to feel, equally, if we design around low-quality prints, we can reduce potentially negative interactions with textures that only function correctly or better quality machines. This has the added benefit that such a focus allows for quicker production and offers a lower barrier to entry, which in conjunction with the 2.5D nature of raised line drawing priorities an accessible print process where designs are functional straight from the print-bed.

English Standard Interpoint Braille, has a recommended height of 0.46mm. Yet Braille dots can range from the pharmaceutical Braille height of 0.2mm<sup>83</sup>, all the way up to French Braille at 0.8 -1.0mm. When dealing with areas of “block textures” we have more flexibility than we otherwise would have with Braille,

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<sup>81</sup> (RNIB, 2010).

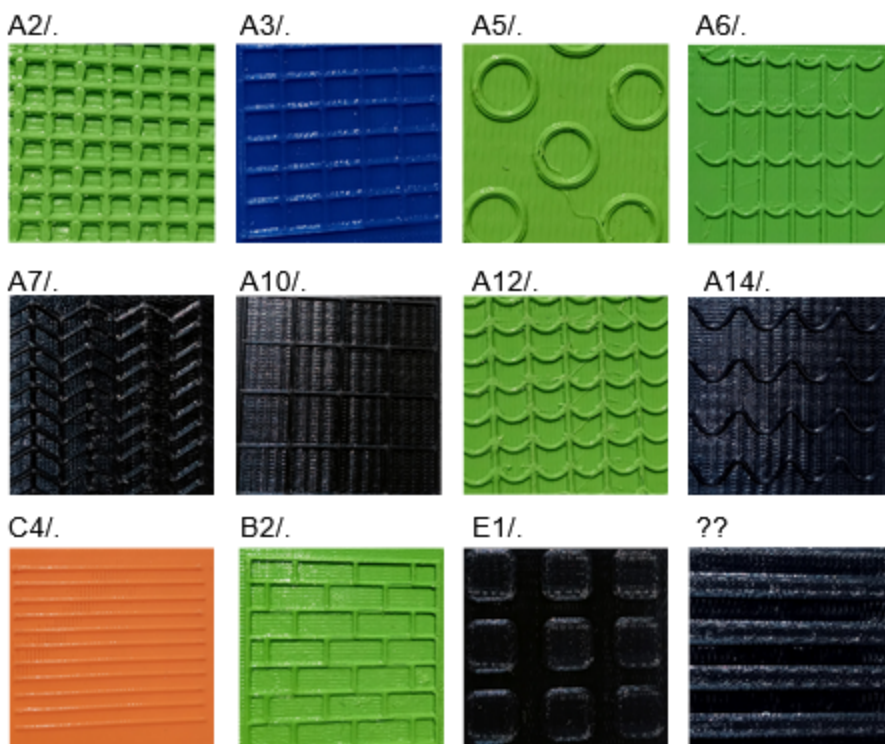
<sup>82</sup> (Cryer, H., Jones, C., Gunn, D., 2011)

<sup>83</sup> (Pharmabraille.com, 2017)



as capsule papers ubiquity shows. However, as a point of best practice I have endeavoured to keep the height above the 0.46 standard in testing, this would allow clear and effective Braille to be printed alongside the textures at the same height as long as the quality of the print could support it.

Over the course of several months, I have been able to successfully translate 12 of the 21 distinct swatches. This is not a reflection on the swatches inability to be 3D printed, only that in regards to the lower print quality I am primarily concerned with, that some swatches were more difficult or less reliable than others, i.e. I am confident that most dot patterns are suitable for printing with the prevalence of Braille within 3D printed works, they merely require a better quality print or some degree of smoothing in order to be usable.



*Fig. The collection of images above, are a series of close ups of all twelve successful swatches, produced by myself and labelled with their corresponding RNIB designation.*

*In order: A2. Is a tight grid of overlapping lines. A3. Is a similar grid pattern, though the grid is looser. A5. Shows large outlines of circles. A6. Shows a loose wave pattern, adjusted from the RNIB swatch of the same name by the addition of vertical lines I have mentioned previously. A7. Is a horizontal zig-zag pattern, adjusted from the RNIB swatch of the same name by the addition of vertical lines. A10. Is a very loose grid of overlapping lines. A12. Is a tight wave pattern adjusted from the RNIB swatch of the same name by the addition of vertical lines. A14. Is a wave pattern that thanks to the absence of 'points' did not require adjustment. C4. is made up of horizontal lines. B2. Is made up of horizontal lines connected by offset vertical lines, akin to a brick wall. E1. Shows 'filled in' squares that function as a grid of small raised platforms. The final swatch labelled ?? uses long horizontal 'lozenge' shapes that create lines of horizontal platforms.*

Here it becomes pertinent to define what I mean by a successful swatch, as whilst many textures required no alteration from their RNIB counterparts and were thus straightforwardly successful without caveat, other texture swatches required adjustment in order to be effective when applied to this harder substrate. Though it is worth noting, that as a point of best practice my aim was to keep these swatches as similar to

the swell paper originals as possible, as too much deviation has the potential to render a texture too tactilely similar to another swatch.

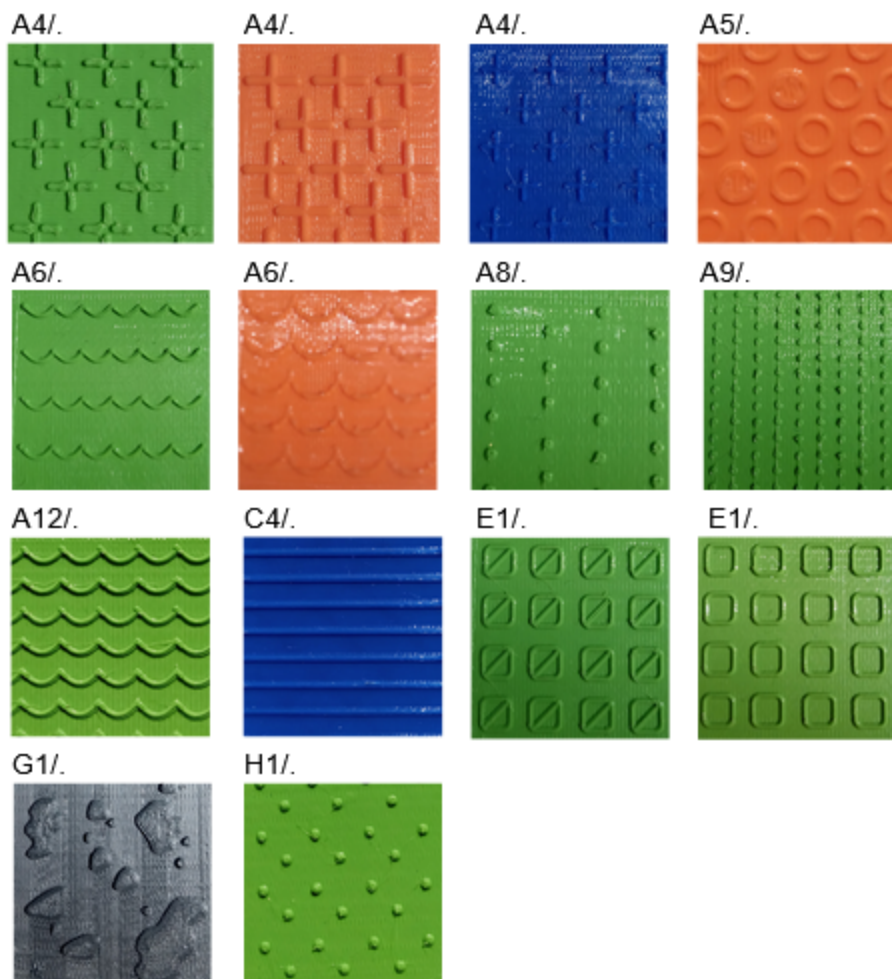
To begin with, the grid line textures A2, A3 and A10 required no adjustments to function effectively in PLA. Similarly, texture C4 and B2 showed that textures that are dependent on uninterrupted printed lines with no regular 'endpoints' have a high probability of being straightforwardly applied to harder materials without difficulty, though the ability to print a rounded 'cylindrical' line is still necessary.

The wave texture A14 worked well without adjustment, though A6, A7 and A12, all required alteration. Namely, the inclusion of vertical lines to remove the sharp end points from the top of each wave. These sharp areas caused by end points in the texture, are a recurring problem in converting many of the swatches, and whilst the inclusion of vertical lines is a simple and effective solution in these specific instances, the same approach could not be applied to other examples that had distinct challenges working in plastic, not least because the addition of such lines would render them indistinguishable from other, closely related swatches.

Yet, this collection of wave pattern swatches were counted amongst our positive outcomes, as we have generated multiple tactilely distinct swatches that bear a strong, haptic familial resemblance to their swell paper counterparts. Though it is perhaps still worth noting that such adjustments have occurred, as these alterations do represent a deviation from the intended texture and might therefore be considered less straightforwardly successful. Whilst the other textures are no doubt less controversial in that they do not differ from the established pedigree of the RNIB examples, it is somewhat inevitable that some textures will not be appropriate when applied to a different material, indeed these adjustments attempt to keep a broader variety of swatches without presenting textures that could be difficult or in some cases even painful to feel.

The ring texture A5, worked well without adjustment though only at a larger scale, as smaller circles have a higher chance of 'failing' in that the centre becomes filled in with excess print material. Whilst this might seem visually distinct, the plateau like effect it creates, becomes too tactilely similar to textures like E1 and are thus inappropriate. In turn, E1 itself required minor alterations, rounding the edges of the square removed the sharp points that have a tendency to catch the finger, with unexpected catching apparent even on test versions that did not include the infill.

The final swatch, appropriately labelled with the double interrogative '??' does not have a clear equivalent in the original set, rather it is a logical extension of C4 and E1 in that it uses long horizontal 'lozenge' shapes that create platforms whilst imitating some of the haptic sensation of line textures. Indeed, whilst I include this texture amongst my toolset, it is perhaps the largest departure from the source material and whilst I am certain it represents a unique texture that can be utilised alongside any of the other groupings, I cannot as readily claim that it would be similarly discernible in the context of swell paper.



*Fig. The connected photograph is a collection of close up shots of fourteen unsuccessful swatches, labelled with their corresponding RNIB designation. The first three swatches refer to the texture A4. which is a pattern composed of small crosses, this is followed by A5. which is characterised by large outlines of circles. Next are two unsuccessful versions of A6. a pointed wave pattern and both A8 A9 which are variations of Braille dots in vertical rows. A12. is another wave pattern spaced much tighter than A6. followed by the horizontal line pattern C4. and two versions of E1. which are outlines of squares with curved corners the first of which has a diagonal line through the centre of each square. G1. is a collection of organic shapes of varying sizes and sporadic placement, and the final swatch H1. Is made up of offset Braille sized dots in a grid pattern.*

Unsuccessful swatches are significantly more straightforward to define, textures which were either uncomfortable, indistinct or at worst painful to feel. Most suffered from two recurring issues which I have already alluded to, sharp edges caused by the inclusion of specific shapes or low-quality prints and an abundance of terminator points within the body of the texture, something which routinely results in an uncomfortable or painful catching the finger.

To begin with, the cross pattern A4 shows that more endpoints can increase the likelihood of sharp edges, something which I have found to be exacerbated by multi directional patterns. The first A4 test swatch was created early on under the mistaken assumption that many areas of overlapping might create sharp points, instead the gaps left in the centre of the cross created painful almost spike-like areas that often pinched the finger. The next version of A4 utilised larger crosses in the hope that bigger, rounded shapes would have less areas to catch and whilst this attempt was certainly better than the first, the crosses still

offered ample opportunity to catch the finger, primarily in the many gaps between the objects. My final attempt tried to space the crosses in such a way that there were fewer areas that could pinch, yet the stopping points or 'end caps' of each cross proved to be the prevailing issue with the cross pattern, not spacing. In this regard there were few avenues of development for cross textures, as whilst extending the lines from the cross pattern so that they connect, would effectively remove the end points and solve this catching issue, any attempt to do so would also create a square grid, replicating either texture A2, A3, A10 or potentially even B2, rendering it tactilely indistinct.

As we noted previously, my initial attempt at A5 required a simple increase in scale to stop areas of the print failing. Though it is also worth noting that when any circle is below a certain size, the internal space of that circle may no longer be legible. A fact that is commonly understood because of pre-braille raised lettering, where the counter of certain letters was not discernible below a certain point size. This can be most readily demonstrated through its effect on legislation, where documents like the American Disability Act standards<sup>84</sup> require both minimum font size and capitalisation for raised lettering, in order to prevent confusion between individual tactile letters.

Both the wave patterns A6 and A12 had issues that I have discussed in the previous section, where they have sharp edges at the point of each wave that create areas that catch and, in some instances, hurt the finger. Yet, I have presented two unsuccessful swatches for A6, wherein the second might be considered my least successful print, albeit the one that offered the most insight into working with 3D printed plastics. Initially I had hoped to utilise multiple or more complex elevations within a single texture, however, this has a habit of creating unintentional "stepping" on quicker prints, where the smoothness of the original design is not reflected in the output. In this case, the design had something in common with A13, in that the lower half of the wave was thicker and that rather than working with 'pipes' or rounded cylinders that were all a consistent height, the tip of the wave was both thinner and shorter than the arch.

In a high-quality print with less notable layer heights, this transition might have been relatively smooth, however, in this instance the transition between the lowest and highest points of the texture became a series of noticeably separations, akin to the difference between a ramp and a staircase with areas that significantly plateaued. This creates a 'roughness', that combined with some other aspects of the original design, like the curvature of the wave pattern, resulted in a texture that was not only sharp and catching, but one that was not wholly dissimilar to a cheese grater. The aim of these textures is to make them as effective as possible on as many machines as possible, as such future designs focused on more binary elevations in an attempt to mitigate some of the worst outcomes that can emerge from the combination of a significant variation of verticality and tall print layer heights.

My inclusion of a failed C4 print is distinct from my other swatches, in that rather than being a test of a specific texture, it was an increase in scale to test an aspect of the printing process. Instead of printing as smooth cylinders, the increase in height produced some of the tell-tale stepping and flat edges that I have called out as issues in other tests. Yet, the texture is still tactilely discernible and whilst it is less comfortable than my successful C4 print, I do not believe it represents a complete failure. Similarly, I do not think it replicates the level of discomfort found in a flat edge line print, operating in a medium space where the way a printer prints a singular line, replicates some of the cylindrical softening we are attempting in other patterns. In short, this suggests that even with high layer heights and some reasonable variation in scale, drawing lines as a printed tube or even drawing lines only a layer thick,

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<sup>84</sup> (Dept. of Justice, 2010, s703.2).

designing around your maximum nozzle size, will most likely create usable albeit not always perfect, tactilely discernible lines.

The visual similarities between E1 with its rounded squares and the circle texture A5, might make it seem like they would have very similar issues, a raised line square versus a similarly constructed circle. Yet, the addition of corners, even rounded ones, led to a small internal right angle that catches when passing over the centre hole, partly because of the scale of the square where a larger curved corner might have been non-problematic. The next attempt at E1 was designed to counter this, using a diagonal line in an attempt to stop that catching. Instead this simply resulted in smaller, sharper angles, where the same areas still offered prohibitive levels of resistance. The filled in rounded square that became the successful E1 print, was in fact closer to the original swatch than the variations I had been working with. It is worth noting that this was the first design that required flat raised areas, and as such had not been an obvious solution when all previous tests had been distinctly raised line centric, indeed I had fallen into the trap of conflating visual similarity and texture, after the success of printing A5.

The absence of geometric uniformity made G1 challenging to both replicate and test, effectively being one of a few swatches that could be best described as 'visual noise' the texture, rather than working within a strict geometric framework. The random nature of the pattern and the dual problems of sharp points found in the small shapes and areas of catching present in the larger blobs, made it quickly apparent that I was working with a texture that embodied too many of the issues I had found in my previous tests. With no simple way to reliably standardise the swatch without removing what makes it texturally unique, and neither the small nor the big shapes showing promise for adaptation without the other, it soon became apparent that such swatches represented a functional dead end in my testing.

Finally, my attempts at dot patterns, namely, A8, A9, and to some extent H1, were problematic insofar as said dots were often sharp and irregular. This is worth highlighting as these patterns effectively qualify as an attempt to print Braille, which have already been shown to work well in plastics, and yet, not in this instance. A9 was designed using specifications for English standard Braille dots, A8 was an increase in scale in an attempt to mitigate the sharp points present in A9, and H1 was intended to print as small rounded squares but lost that definition at the scale I was utilising. With regards to H1, the increase of scale necessary to counteract these issues pushes the texture too far towards those found in the E grouping, as such it is included here as I believe it shares many of the same issues as the other dot patterns.

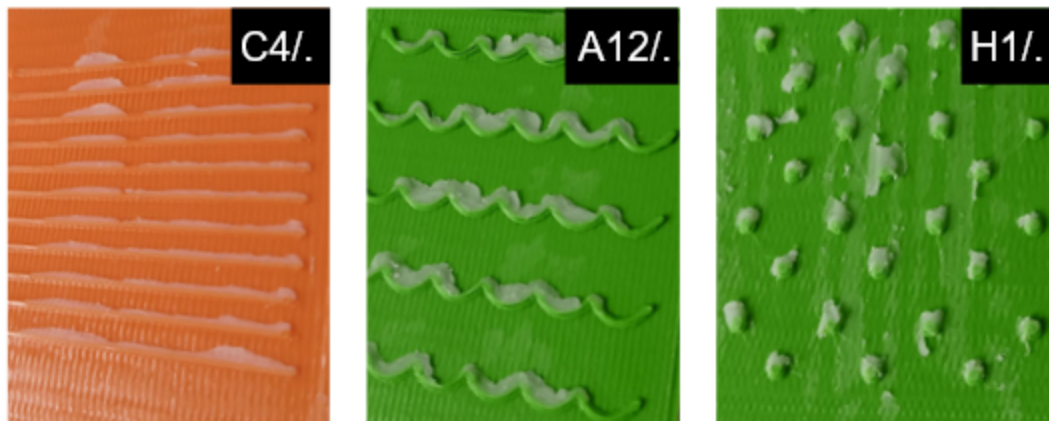
This is not to say that Braille cannot be 3D printed, far from it. Versions of 3D printed Braille are commonplace even amongst the designs of hobbyists<sup>85</sup>. What I do wish to highlight is that lower quality printed dots may not function as intended without adjustment or clean up. Indeed, as we are attempting to create the broadest range of access, I consider prints that would require sanding or smoothing unsuitable, which has led to the decision to leave spaces for the addition of traditionally embossed, paper Braille instead of three-dimensionally printed Braille. This approach also offers other advantages for objects of reference, namely, it allows tiles to be reused when a particular association is no longer needed, as is the case when a location or activity has ceased to be an integral aspect of a user's everyday life, i.e. if a user no longer goes to swimming lessons and instead use that time to learn an instrument, the label could be changed to offer a different association. In addition, spaces that allow for replaceable text, also offer the option for non-tactile lettering, as tactile engagement need not be limited to those with limited or reduced vision. As previously mentioned, one of the primary audiences of OOR are those with learning disabilities,

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<sup>85</sup> (ANZAGG, 2016), (Idellwig, 2013), (Widerporst, 2019)

many of whom have no sight related issues but who might still benefit from the inclusion of a haptic approach.

Whilst the success and failure of a swatch is not as easily to demonstrate in writing as it otherwise would be through touch, there is at least one exercise which might help visualise these inherently tactile concerns. Dragging warm wax or another soft material over the printed swatches, leaves some material behind, showing areas of resistance. The aim of this exercise isn't to show less resistance in successful swatches, but rather to show consistent resistance across the whole texture, with uneven distribution of wax indicating areas that might be sharp, or that a certain area 'pulls' the finger more than the rest of the swatch.



*Fig. The picture above shows three close up images, depicting examples of my 3D printed texture swatches with small deposits of wax on their surface. From left to right they are C4. Rows of horizontal lines, A12. Rows of tight horizontal waves and H1. Rows of offset small dots in a grid formation. Wax is uniformly distributed on C4, with specific areas of pooling on A12 and random but substantial deposits found on H1.*

My version of the texture swatch C4 shows relatively consistent resistance with no significant areas of pooling material, deposits of wax are still apparent but they do not noticeably catch in any one place. In contrast A12 sees more material accumulating near the points of each wave, with wax only appearing in the bow of each wave, only accumulating elsewhere when pushed down by additional wax. H1 sees arguably the most material in relation to the surface area of its raised sections, with large irregular deposits being apparent on almost every dot, demonstrating wax catching on the sharp points of the print.

Through touch these issues are plainly detectable, with both failed swatches being painful even in casual use, something which is harder to demonstrate without the physical pieces to touch. Yet, it is my hope that through this simple wax test, that problem areas are straightforwardly visualised, demonstrating areas of significant catching when the finger would be dragged across the surface.

The bars that were later added to A12 prevent this pooling without drastically altering the texture, a consideration which becomes an ever-present concern when swatches are so similar in construction, as indeed any alteration may conceivably make them no longer tactilely distinguishable from other swatches. As previously mentioned, early attempts at tactile swatches explored multiple elevations. Yet with taller layer heights and specifically in regards to lower quality prints, we see that these elevations introduced a kind of stepping effect, which in turn gives us more edges which may cause pulling on the finger.

## Appendix B: Technical Study of Raised Line 3D Printed Images:

Pragmatically, a focus on '2.5D' raised line images over fully realised three-dimensional objects, lessens or in some cases entirely removes the need for printing supports<sup>86</sup>. This results in less time removing this scaffolding-esque plastic, a process that is often time consuming and arduous, as well as necessitating a certain degree of fine motor skills that not every printer will possess. In this regard, my initial focus on swatches that are tactilely viable at lower print qualities, was in part guided by this aversion to 'clean up' and a want to create work that was ready directly from the print-bed.

Similarly, aside from the physical removal of supports there are other kinds of smoothing that are routinely utilised in 3D printing, processes which have the ability to make certain styles of tactile image more viable albeit with the caveat that such post production techniques add additional layers of complexity.

Mechanically, this smoothing takes the form of sanding or filing rough surfaces, alternatively, some materials offer the option of chemical smoothing often by melting the surface layers of the material as is the case with ABS and the application of acetone, reducing the presence of noticeable layers in prints. Whilst all these processes have their place within tactile image making and 3D printing more broadly, a central tenet of our design philosophy is that there should be as few barriers to entry as possible, meaning that whilst these techniques are certainly useful, our designs should not be created with a strict requirement for smoothing in mind, as this kind of mandate limits our potential audience and increases the technical requirements for engaging with our practice.

Similarly, a connected mechanical concern that features prominently in my design thinking, is the question of plate thickness, as a large proportion of the time and material it takes to print any 3D printed raised line image, comes from the base which holds the image together. Whilst it is true that thinner plates come at the cost of the long term durability of a print, this is weighed against a significant reduction in time and material cost. As such, the majority of our prints only use a base that is as thick as the raised lines are tall, in other words, I create bases that cover the bottom half of the 'pipe' that is used to draw the raised line image, as such a 0.5 mm radius tube results in a print with a total height of approximately 1 mm. This base thickness might not provide significant structural support for a print, but as the base is ultimately a simple object that does not necessarily require 3D printing to preserve any fine detail, there is an argument to be made that mounting a print to a thicker, plain surface like a sheet of MDF or thick cardstock, presents both a cheaper long term solution and prints that are more viable for single use applications.

To put this cost saving into more concrete terms, a '100mm x 100mm x 0.5mm' square base, printed at 50% infill, has an estimated print time of 40 minutes at a cost of £5.50<sup>87</sup>. In contrast, the same print with a height of 1.5mm instead of 0.5mm has an estimated print time of 70 minutes at a cost of £8.50. Whilst these are not large numbers, the percentage increase of both time and cost is significant. Indeed, the time of the print increases by an additional 30 minutes, a roughly 43% increase. Whilst the cost of the print increases by £3.00, a roughly 35% increase. This additional cost can mount up over time, with bigger prints, thicker plates and greater infills increasing the cost of individual prints even further, all to produce what is in effect, an additional 1mm blank sheet of mounting material.

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<sup>86</sup> Printing supports consist of extra material that is designed to 'support' areas of a print which either overhang or bridge sections. This additional material is usually printed in such a way that they are considered 'break away' and can be removed from the model as a part of post-production clean-up.

<sup>87</sup> Costs were calculated through the University of Huddersfield's print service and should be thought of as reflective of the difference in costs on the same machine.



*Fig. The image above pictures two versions of the same 3D printed tactile image of the oldest image of Venice. The thicker plate is placed on top of the other and is photographed from the side at an extreme angle, showcasing a substantial difference in plate bed thickness with the print on the bottom being 0.5mm in thickness and the other print being 1.5mm.*

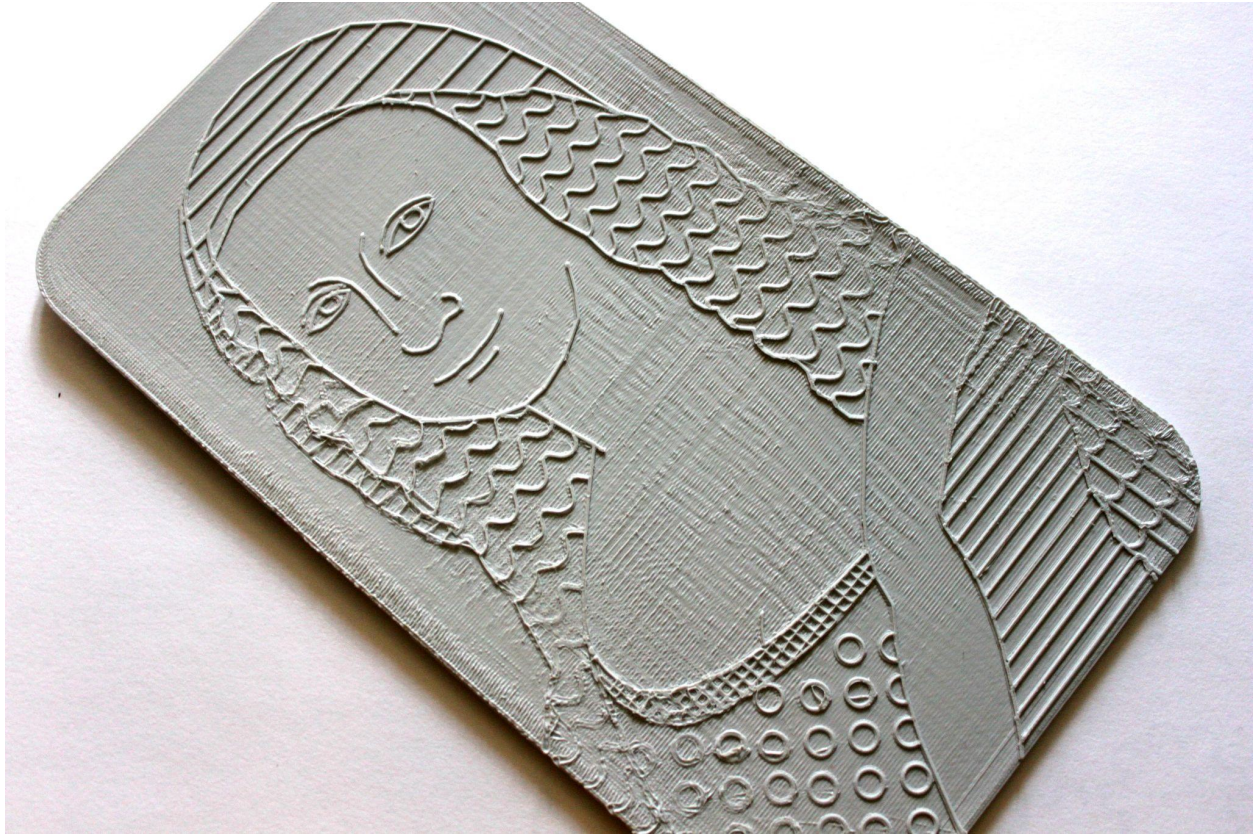
The most extreme example of this plate reduction is apparent within our emotional codes, where in the translated Vandeventer and Patterson images, the pipe radius present in the raised line image is only 0.25mm with the plate being similarly proportioned. At this height part of the plate has failed, being thinner than the surrounding material in part because the layer itself is only a few layers thick. At this junction, it might be fair to suggest that this may be the furthest such a plate can be reduced without a high probability of structural failure, where in choosing to print below a single layer height, we might well be attempting to print the design with no plate at all. Whilst such an endeavour might be an interesting exercise, the loss of structure and the high degree of precision this would require, represents a design decision that would make the print far less easy to print rather than making it more accessible, resulting in something of a lower limit when printing onto, or perhaps more accurately with, a thinner plate.





*Fig. Is a close up of the 'Vandeventer and Patterson' line print which denotes the muscle structure of the human face. The print is backlit in such a way that the thinnest parts of the printed plate appear lighter, showing the areas where the print was close to failing. This demonstrates areas of concern, which suggest the thickness of the plate should be slightly increased on future prints.*

Another consideration of plate thickness is bed adhesion, a term used to refer to how well the print adheres to the 3D printing machine's printable surface. In the case of longer and larger prints, the temperature difference between the lower sections of the model as layers cool and the higher layers that are still being extruded, can cause the corners of the work to curl because of material shrinkage. This warps the object and in some cases detaches it entirely during printing, creating a situation wherein the print registration might be imprecise, or otherwise cause the print to fail. Whilst this is often a relatively rudimentary problem to solve with bed levelling, adding adhesives like glue stick to the bed or making sure the room you are printing in remains at a constant temperature, designing prints that are both thinner and quicker to print lessens the chance of such problems arising in the first place. Additionally, the problem is often more pronounced when a large flat surface is being printed, as is the case when we lay down our initial layers for any 2.5D image. Indeed, my earliest prototype sample of the Mona Lisa, shows a significant degree of curling that affected parts of the textures at the edge of the print, in part because the initial design of the model made it more likely to warp as it had a plate thickness much larger than the height of the raised lines.

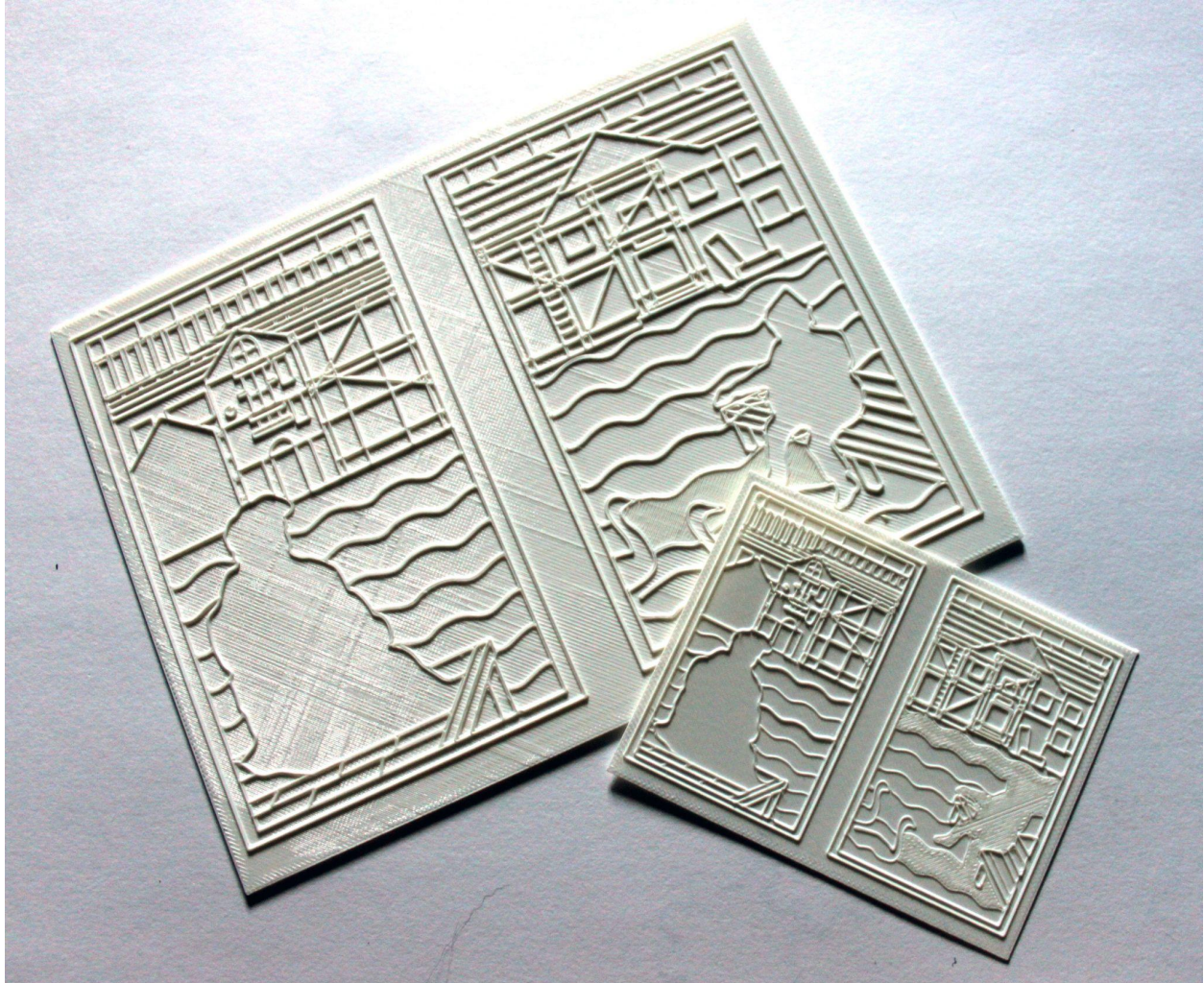


*Fig. Pictured is the earliest prototype of my tactile Mona Lisa piece. Printed in white PLA using the same raised line style my other work utilises. Her hair is primarily textured using a wave pattern and with her veil using horizontal lines. The clothing pictured in the portrait contains a mixture of grid, line and circle patterns with large 'blank' areas that denote skin. During printing, both sides of the plate bed have become detached, an issue that was corrected in subsequent prints by working with thinner print plates. This has resulted in visible print failure on both sides of the figure, where patterns fade or are otherwise distorted.*

Additionally, working with smaller prints presents many of the same benefits of printing thinner bases, albeit with more significant drawbacks, namely, that when we restrict scale it is often necessary to reduce detail. In this way, whilst we have some flexibility in terms of layer height<sup>88</sup> in regards to raised lines, reducing a print that is designed to work at a larger scale to fit on a smaller print bed, can be problematic in a way that isn't quite comparable to scaling a print up. In a connected vein, the side by side comparison of our two printed images of the Oldest Image of Venice shows a work which has increased along the Y axis, revealing that vertical scaling whilst legible, has a tendency to create raised lines that lack the smoothness present in prints that have not been warped. Whilst such a technique does produce tactilely legible work, the 'flat-edge' style of extrusion that emerges, is someone incongruent with long form haptic interaction.

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<sup>88</sup> For instance, Pharmaceutical Braille is legible at a height of 0.2mm and tactile swatches are broadly able to work at lower heights as areas of texture are usually tactilely discernible at similar elevations.

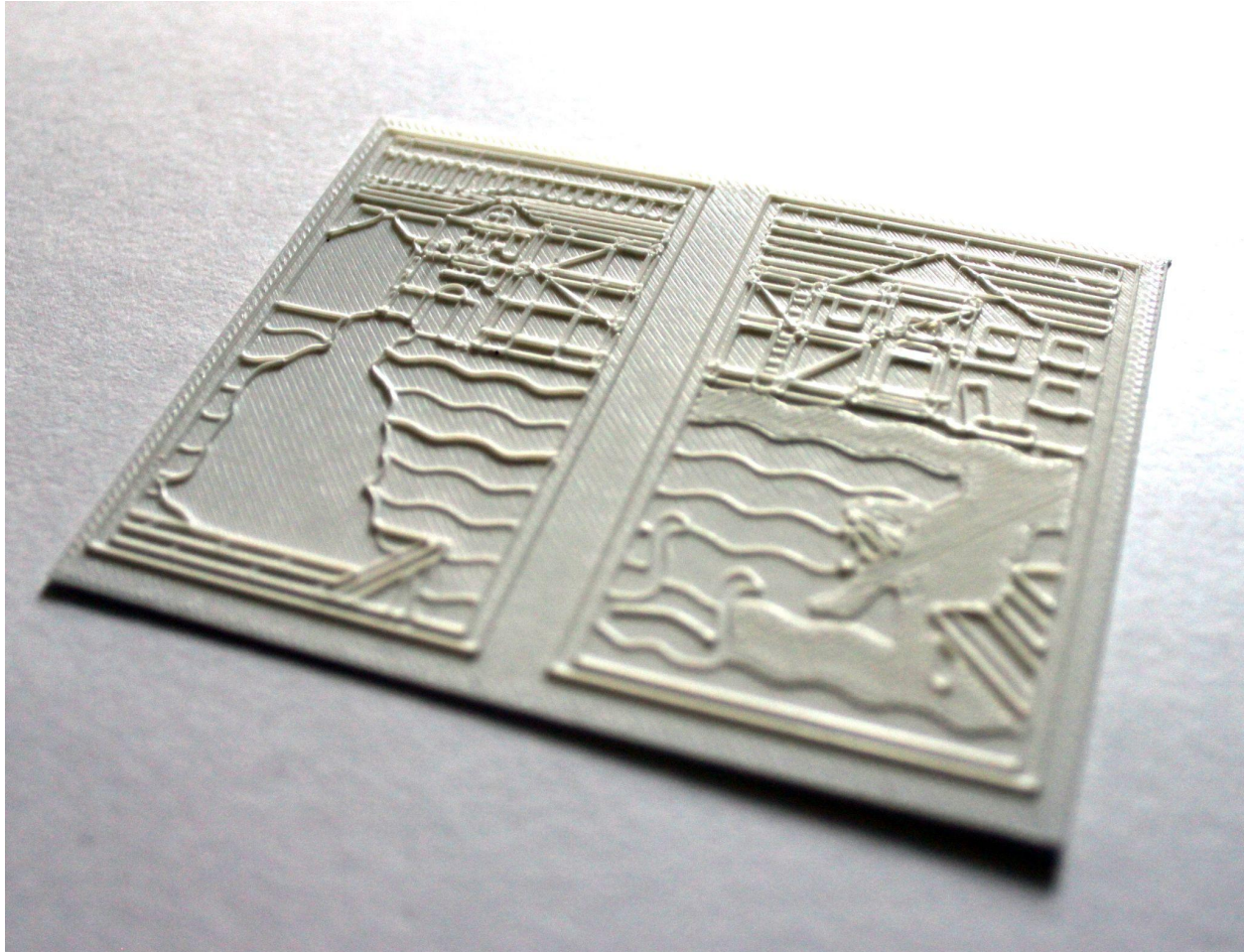


*Fig. This image pictures two tactile works, both of which denote two ceramic murals that hang in the foyer of Huddersfield Library and Art Gallery. One is printed quite small with a 0.25mm line height, whilst the other is scaled in order for the raised lines to be 0.5mm height. Both images contain an image of a figure sitting on a pier, the one on the left shows an adult man sitting down and facing away from the viewer, looking out onto the canal and the buildings beyond. The background shows a collection of structures, one of which has scaffolding in front of it. The upper most section of the image is made up of regular patterns, with lines denoting tiled roofs and vertical rectangles representing the skyline and distant constructions.*

*The second mural picture on the left of the print, features a young boy feeding swans, facing towards the viewer his legs dangle off the pier as he throws bread to two swimming birds. Behind him is the canal and a single large building, covered in scaffolding with a ladder at one side and bowes of materials on the other. Above that are lines denoting the tiled roof and a series of tiles denoting the skyline which line up to the other mural. These images were originally made from cut tiles, with painterly detail on the figures omitted to make the outline clearly to feel, and the wave pattern replaces a similarly painted water scene.*

To demonstrate the issues presented by an image which has been printed significantly below its intended print size, we might note a side by side comparison of two prints of the same subject, with one scaled down to half the intended scale. Considering both in tandem it should be apparent that there is a notable, problematic section in the bottom right hand corner of the smaller work, an issue that does not arise on the larger print, highlighting one of the potential issues with printing models smaller than intended. Indeed, the outline of the young boy feeding swans is lost amongst areas of excess material, where water and figure have merged together into an unrecognisable extruded layer, yet if this area of 'blow out' was

removed from the equation, it is interesting to note that much of the scene is still very much tactilely discernible. The 0.25mm layer height is still well within parameters to be felt and understood, though guiding a blind user through the image printed in this restrictive scale would certainly pose other challenges, as tactile works must be created with ergonomics in mind, a tactile image this small, namely just larger than a business card, does not allow for a large degree of movement, resulting in an almost claustrophobic experience where small details may be lost.



*Fig. The image above shows the 0.25mm raised line version of the two murals pictured in the previous image. Certain details are less prominent in such a small print and one section on the right hand print, namely the figure of the young boy, has a not insubstantial failure where the body of the form has been printed over. This results in a flat raised area as opposed to the outlined area present in the larger print.*

Yet, work that is designed to be printed at reduced heights and scale, might well be printed in larger formats, resulting in an approach wherein many of the works presented within this thesis are created to function at two distinct scales, allowing for more restrictive, smaller prints to still function and by extension, be accessible to those with small machines that may not be capable of tackling larger projects. Ultimately what is lost in this the most extreme small prints are areas of fine detail, which have a higher chance of failing or becoming unrecognisable when the detail you are printing approaches or is smaller than the size of the machine's print nozzle. In addition, scale is largely dictated by the size of the finger,

which, similar to Braille, can be thought to largely depend on ergonomic constraints of the size and movement of the hand.

As previously stated, conventional wisdom regarding tactile image making suggests that “*Objects and labels should be spaced at least 1/8 th of an inch apart from each other.*”<sup>89</sup> with further consideration being made for young users who may not yet possess the tactile dexterity required to discern small objects. Whilst in regards to artistic works complete separation of objects from a piece's background components, may prove unsuitable or insensitive, the overarching point that room is required for legibility, is one that bears repeating.

Yet, one of the primary restrictions of home printing is the size of home printer beds,<sup>90</sup> as “*the average printing bed size of a 3D printer intended for general use being around 150–300mm*”<sup>91</sup> a fact which presents defined limitations around our usable scale, if we wish to effectively disseminate works for home printing. As such, the smaller the model the more printers and by extension people, can attempt that print. This compromise is partially alleviated with a ‘collections-based’ approach, wherein we pair smaller works with larger prints in order to more faithfully attempt to preserve some of the scale of the original instance, allowing for sections of fragments to be understood in relation to one another, something we elaborate on in later sections of this thesis.

In this way, it is perhaps unsurprising that many tactile images require a significant abstraction in size to be understood via touch, our own reassuring motif of the Eiffel Tower being one of them. Indeed, the original collection that ‘*two out of three panels*’ is based on, is composed of two large pieces which both measure 7.5ft x 4.5ft, meaning that a lot of design decisions have already been made in the translation process. These considerations ultimately remove details that would not be straightforward to preserve at this significantly smaller scale, whilst allowing other details to come to the fore, in this, aesthetic concerns meet more essential notions of the nature of a work, where the juxtaposition between mechanical comprehension and faithful translation, must be negotiated to provide accessible but sensitive work.

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<sup>89</sup> (Wright, 2008; Braille authority North America, 2012; Tactile graphics, n.d),

<sup>90</sup> The term 'build volume' indicates the area within the printer that can be utilised to print, and whilst we are primarily concerned with the size of the build plate, namely the X and Y axis as opposed to the Z axis (Or the depth and width with less of a concern for height), it is worth highlighting the technical terms of conventional measurement for potential output.

<sup>91</sup> (The 7 Best Large Format 3D Printers in 2021, 2021).

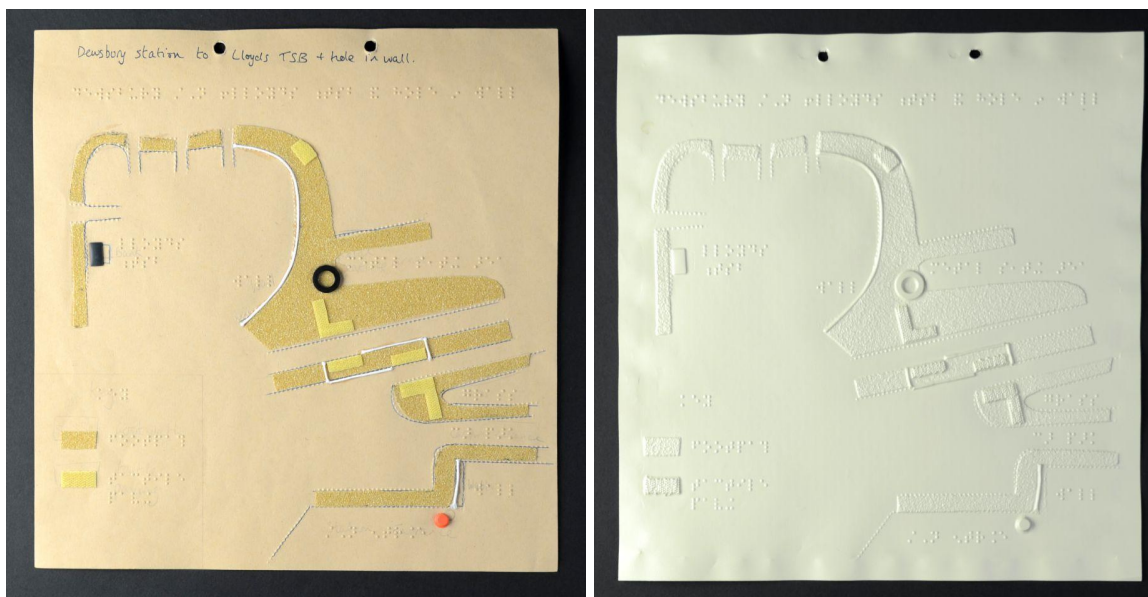
## Appendix C: Interview with Huddersfield Transcription Service:

*Q: How does your service approach tactile illustration?*

A: Well we created some pieces on swell paper and used to create thermoform images until the machine broke and we decided not to replace it. We often find that we are asked for tactile images out of a kind of knee jerk reaction, where businesses or services think it is what they need but they haven't asked what the blind person actually wants. The first thing we usually ask when asked to create a tactile map is "can the person read tactile maps?" because it is a skill and not everyone has learned to do it. Secondly we ask how the map will be used.

*Me: Like in an office where someone will work everyday they won't need a map they will just get used to the layout?*

Exactly. Tactile maps are time consuming and expensive, we don't create permanent images because there is just not the demand for it, at least not in a way we could create them. The maps we do make are for specific people on request, for example this image was created for a lady who moved house and wanted us to help her learn a new route to the train station.



*Fig. The accompanying images show both a collaged and resulting vacuum form version of a proposed route to Dewsbury Train Station. The master copy is made from cut out sandpaper, velcro squares, string and bump-ons, with Braille labels denoting landmarks and street names.*

Most of the images for the thermoform were created on request and the masters themselves are made out of everyday items and textures. The lines of these streets were created using a roller that created Braille dots, but some of the images like this image of a theatre plan, were created by cutting lentils in half.



Fig. The two images above, denote two separate levels of Huddersfield's "Lawrence Batley Theatre", each seat is represented by an orange lentil which has been cut in half and glued to the paper, with a missing lentil on the second image, denoting the seat that belongs to the intended recipient.

The lady who ran the centre before me and who helped turn it into what it is today, was really in to tactile image and spent a lot of time creating a lot of these pieces, she was really passionate about this side of our work whereas I am more concerned with the Braille aspect of what we do.

*Q: So how would you describe your opinion of tactile image in general? Also would it be ok if I took copies and archived this book of images and masters, I think it's something I'd really like to preserve and reference.*

A: Sure, and I'm sure there are lots of places with similar books. Sadly they do tend to get thrown out a lot when organisations like schools have big clear outs, if something isn't regularly used then eventually they get rid to make space for other more functional things.

As for my opinions, I think it's fair to say that they are mixed. I think tactile images need to have something else about them, accompanying descriptions or some wider context. Understanding or reading a tactile image is a skill, and there is a big difference from being able to recognise texture and being able to distinguish what something actually is. So unless you have been taught how to understand these images it isn't always helpful. They are also at the bottom of the list for most schools and services, because they take a lot of time and are seen as non essential.

I remember a workshop where we were talked-through tactile illustration, how we often think of "simple as better" when it comes to this kind of work. We were blindfolded and asked what an image was, it was clearly a rectangle but when I said that I was told "yes, but this image does refer to a real-world object". Eventually I gave up and was told it was an envelope. The fold was very faint so it was hard to pick up by touch, so while it was clearly there when you could see it and when you knew it was there to feel it, it wasn't very clear without sight.

Next we did the same exercise with a portrait. It was an old style english bobby with the bell hat and a police crest. This was far more complicated yet most people understood the image instantly, proving that simple isn't always better. But then the instructor said "but what if you had never seen a police hat, is it still obvious then?" at which point I realised it wouldn't be for many students who would never have seen it before. It was really interesting to think about.

I had a student who thought that chickens had four legs. He had only seen tactile drawings from the side, and all the images of dogs and cows only showed two legs to reduce the clutter of an image, but we had told him that these images that only showed two legs referred to animals with four legs, so when we showed the chicken, which was another animal that had two legs, it was only natural to assume it was four legged because all animals have four legs right? It's just one of those examples that stuck with me because it showed that sometimes we really take things for granted that need to be taught instead.

Q: With the work you did with younger children, did you notice a shift away from tactile learning and where would you say that shift happened?

A: Definitely, after high school you see a big shift where touch learning and illustration just isn't there any more.

*Me: Now you see I thought the shift would be in high school.*

There is certainly a shift in high school but it's after high school I see a much bigger absence. I haven't worked in high schools for a good while now so I'm not sure if this would still be the same, but the most striking thing for me at that level was the move to worksheets. Everything was done on sheets and because of that there was a pretty big turn over of physical work. Because of that and a few other reasons, images were pushed to the bottom of the pile and we might only do a few a year if we did any at all.

If we knew which textbooks a specific teacher would be using ahead of time we could get a large print version or send them to Wakefield prison to get a book written from their Braille service.

*Me: Wakefield prison has a Braille service?*

I'm not sure if it still does but it used to. I remember that most of the drawings were just written down as "image omitted" rather than trying to describe the image or create it, so I don't think they ever dealt with tactile images at all. But we only sent off for the books we didn't have any direct dealings with them, it was just our nearest transcription service.

The books were pretty good though, but we could never guarantee work we had done previously would be relevant not just from subject to subject, but from teacher to teacher; as every teacher had a different way they taught. I was in a mainstream school not a dedicated school for the blind, so a lot of the teachers didn't realise how much prep time we needed, some would try to supply blow up images on a scanner when it wasn't the size but the image itself that was problematic.

Not all the students were blind many just had severely limited sight. I had one student who could realistically only read 48 pt type, but he wanted to use the sight he had rather than Braille so he used 24pt and a magnifier wand which he was usually quite close to in order to read. It's about how the student



wants to learn and progress, a lot of students won't learn Braille and will instead use audiobooks, this is especially true if they have some partial sight or they go blind later on in their life.

*Q: What is your experience of Living paintings?*

A: When I worked in schools we used the service primarily for "spot the dot" and other books aimed at a primary and pre-school audience. We had some really positive results with these books as at that age we are trying to teach multiple skills with each activity, things like finger sensitivity and getting used to being a tactile learner, pairing well with spoken language and storytelling. Essentially it was a great way to teach Pre-Braille skills to children who were just starting to think with their hands.

However my experience of the service when I worked with older children, wasn't as successful. I started out with a series on the industrial revolution and the material was presented in quite a dry way. Most of the images had markers in the top right hand corner and a CD told you where to feel an image in order to explain parts, it was very structured and at that age it just wasn't enough to engage them. It was also something they weren't particularly used to, as they didn't use tactile illustrations in their day to day.

We did try an adult book club service last year which we were quite hopeful for, we chose Hamlet and they sent us a box with three illustrations in it. One was the image of Ophelia in the water, the famous painting, I must admit it was one that most of the group struggled with as it was very detailed and that made it hard to make out certain shapes.

The big surprise to me was that those with no vision had a more difficult time than some of the group with partial vision, one member in particular had been blind since birth and using his hand to read Braille most of his life, but he had never been taught how to read tactile images so it was something that didn't come naturally. There was also a CD that told you how to feel the images, and I don't think that helped as it made the whole experience very regimented which I don't think was meant to be the point.

On a similar note we had a "touch tour" of a gallery set up by an organisation called "make a noise in Libraries". Our group got to touch a Henry Moore statue that usually isn't able to be touched by the public and that was a really rewarding experience, but I do think that was partly down to the guide who was there to answer questions and give us information on what it was we were touching. The big issue here was that the plinth was quite high and one of the group had quite reduced mobility so couldn't join in very well. Instead she used her magnifying glass and looked at the sculpture, it was lucky that she still has quite a lot of vision.

But it goes to show that while we were making things accessible in one way it didn't take into account that some people might have multiple disabilities.

*Q: Was colour a big part of these illustrations:*

A: At the younger ages it certainly was, but later on they seem to move away from colour towards more traditional thermoform which is a kind of beige colour. The 'spot the dog' work is very bright, but that falls away as the audience gets older.

I remember I ran a workshop around large print and Braille formatting, and showed a good and bad example of layout. One had all the things we could possibly do wrong, columns, overlaid text, small point sizes, clashing colours; while the other had everything set out "right". When we ran it past some of the

intended audience, something that is essential for this kind of work, I remember one girl mentioned that she wished the “good” copy had more colour on it, and I thought, yeh why doesn’t it have more colour on it. She had some sight and wanted to use that, why can’t it look good? I remember thinking that I am one of the people surrounded by information and disability and it’s amazing just what even we can overlook. That is why it’s important to work with your audience, every now and again they will just point out something you just wouldn’t have thought of.

In our day to day transcription work we get to know what people want and we work with them to figure out what will most help them. I have one gentleman who brings the order of appearance to the opera, something he does regularly and brings maybe five or six for us to Braille at a time. Now doing this the “proper” way we’d end up with something really big A4 sheet, but that’s impractical to carry around and read on your lap. So instead I worked with him and we now have a layout we use each time that is folded and easier to use in that kind of environment. It’s little things like that which show it’s now about a right and a wrong way, it’s about general rules and figuring out a person’s individual needs. I work with around 12 “regulars” and each of them wants something different, some prefer to have everything in Braille, others just want one offs or large print, it’s just about remembering who it’s for.

It is the same with our large print work, often it’s about teaching people to print documents or posters with larger fonts, not in addition to another copy but as the only copy. It’s not always about having two versions, and often it’s better when there is just one poster that can be read by a wider audience.

*Q: How do you feel art was taught in high school vs primary school for blind children? Were there areas that allowed not just for expression but mastery?*

A: I can’t say I ever saw it being taught particularly well. Often when something was seen as “visual” the subject was written off as something not for that student, and I think that’s something we can all be guilty of from time to time. There are also additional lessons that a lot of students need to take at that time of life, and since art was often seen as a non essential lesson as opposed to the more “academic” subjects, students would be taken out for things for mobility lessons. Learning how to get around and travel on buses and in busy areas, is something that does have to be learnt and often actively taught. This time has to come from somewhere and the arts were often the most obvious choice.

On the other hand some of those who go blind late life essentially re-learn their craft skills, it was something that was important to them before they lost their sight and so it’s often something they want to keep up. I have one lady who sends me cards that she makes, cards which she learnt to make differently when she lost her sight, so for some people craft can be really important.

#### **Appendix D: Facial Mimicry Study Interview Questions:**

Q: Do you have any questions or concerns before we begin the interview?

Q: Can you please state for the record whether you have been blind since before you were 16 or whether you lost your sight later in life.

Q: Could you please make a facial expression of the emotion I say, in as natural a way as you can. Anger (Pause) Disgust (Pause) Fear (Pause) Joy (Pause) Sadness (Pause) and finally Surprise.

Q: In your own words, could you please tell me about a time where you felt anger.

Q: In your own words, could you please tell me about a time where you felt disgust.

Q: In your own words, could you please tell me about a time where you felt fear.

Q: In your own words, could you please tell me about a time where you felt joy.

Q: In your own words, could you please tell me about a time where you felt sadness.

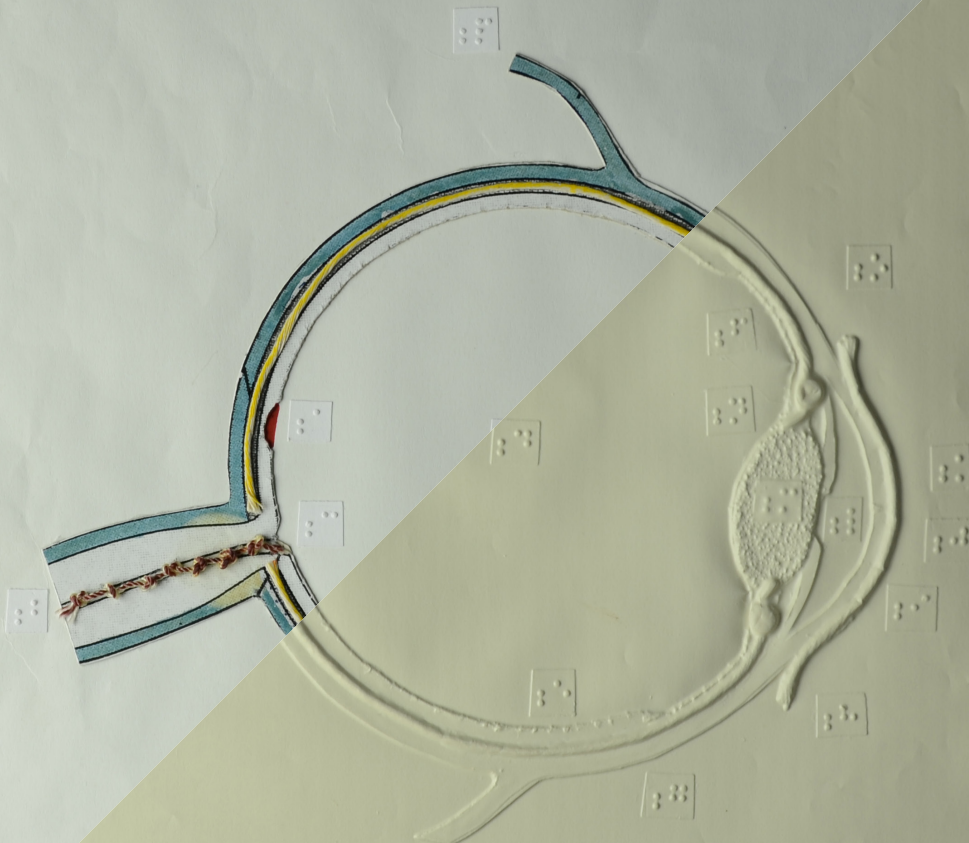
Q: Finally, in your own words, could you please tell me about a time where you felt surprised.

Q: Before we finish I would like to repeat the exercise we did at the beginning. Could you please make a facial expression of the emotion I say, in as natural a way as you can. Anger (Pause) Disgust (Pause) Fear (Pause) Joy (Pause) Sadness (Pause) and finally Surprise.

Q: Thank you for your time, do you have any other questions and could I ask you to confirm that you still consent to me using and publishing these recordings now that you know the stories you have shared.

#### **Appendix E: Huddersfield Transcription Service Archive:**

1. 2. 3. 4. 5. 6. 7. 8. 9. 10.





> A special thanks to The Huddersfield Transcription Service,  
for loaning this archive so that it might be documented and preserved.

>

*Contents:*

*Lawrence Batley Theatre.*

*Graphs.*

*Diagrams of the Human Eye and Ear.*

*Computer Screen Display.*

*MP3 Player Instructions.*

*Maps:*

- > *Swell Paper Building Plan*
- > *Sycamore Avenue.*
- > *Queensgate.*
- > *Scholes Village 20mph zone.*
- > *Dewsbury Station.*
- > *St. George's Square.*

> lawrence batley theatre  
ground level

p  
n  
m  
l  
k

[j]

h  
g  
f  
e  
d

n    c    n  
      b  
m    a    m

stage

>

*Fig. Lawrence Batley Theatre: Ground Level*

*Lentils cut in half indicate seats, string indicates edges of balconies, most Braille letters mark row names.*

*Damage has resulted in [j] no longer appearing in Braille.*

*missing lentils indicate clients seat.*

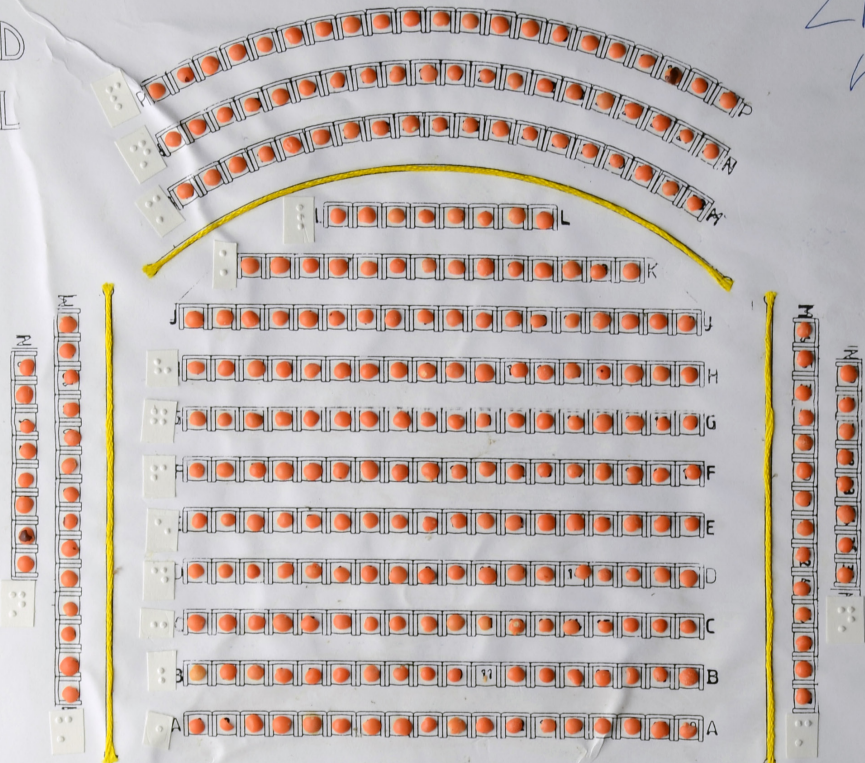
*Non tactile writing not translated: [LBT Hudds] [1] and individual seat numbering i.e. [b11]*

Braille text at the top of the page.

Ground Level

LBT  
Halls

UND  
VEL



Braille text at the bottom of the page.



> lawrence batley theatre

tier 2

u u  
t t

box c box d

u u  
t t

stage

>

*Fig. Lawrence Batley Theatre.*

*missing lentils indicate clients seat.*

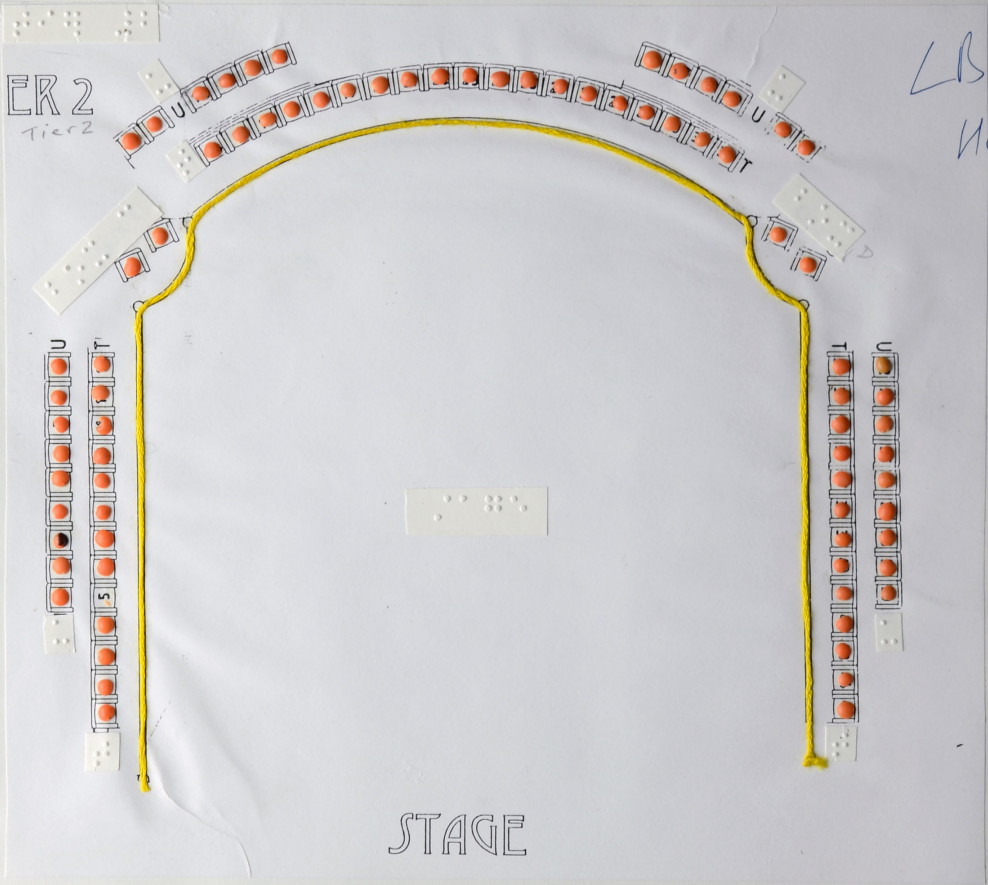
*Non tactile writing not translated: [LB H] [2] and individual seat numbering i.e. [t5]*

Braille text at the top of the page.

Braille text in the top left corner.

ER 2  
Tier 2

LB  
H



STAGE

> lawrence batley theatre

tier 1

s  
r  
q

box a

box b

r  
q

r  
q

stage

>

*Fig. Lawrence Batley Theatre.*

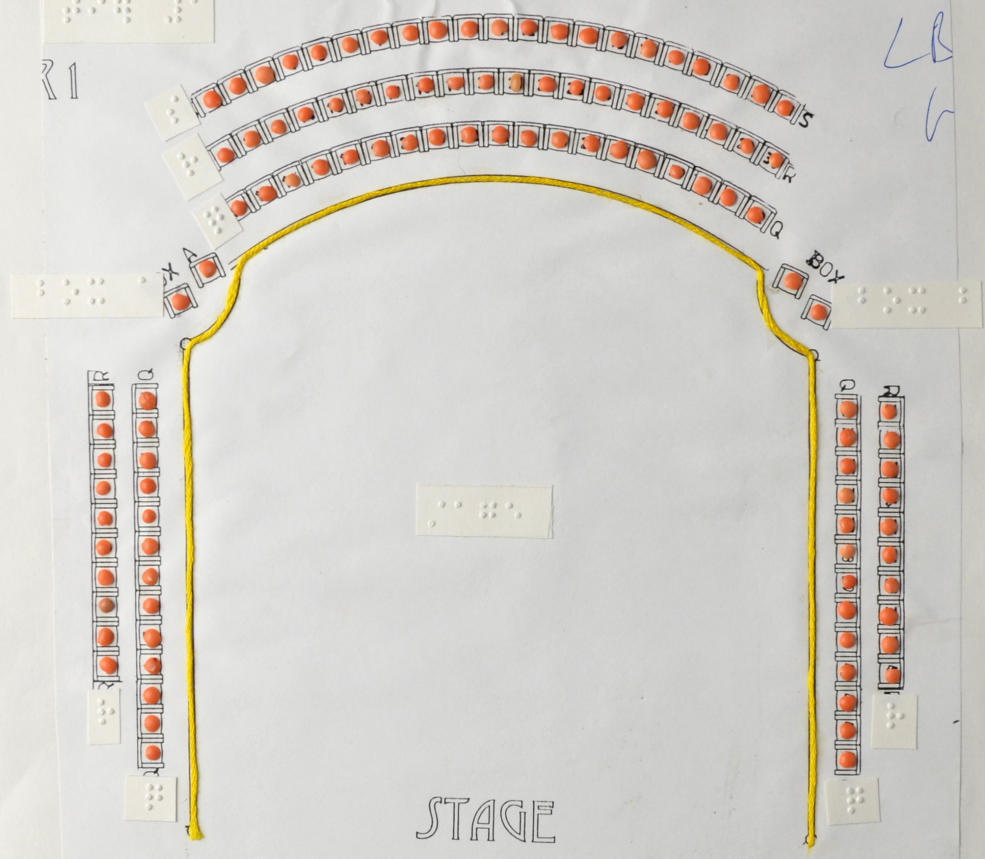
*Non tactile writing not translated: [LB H] [3] and individual seat numbering.*

Handwritten text in Braille at the top of the page.

Handwritten text in Braille on the left side of the diagram.

Handwritten number '21' on the left side of the diagram.

Handwritten initials 'LB' and a checkmark on the right side of the diagram.



STAGE

> lawrence batley theatre  
4 ground level

p  
n  
m  
l  
k  
j  
h  
g

n            n  
m            m  
f e d        d e f

thrust stage

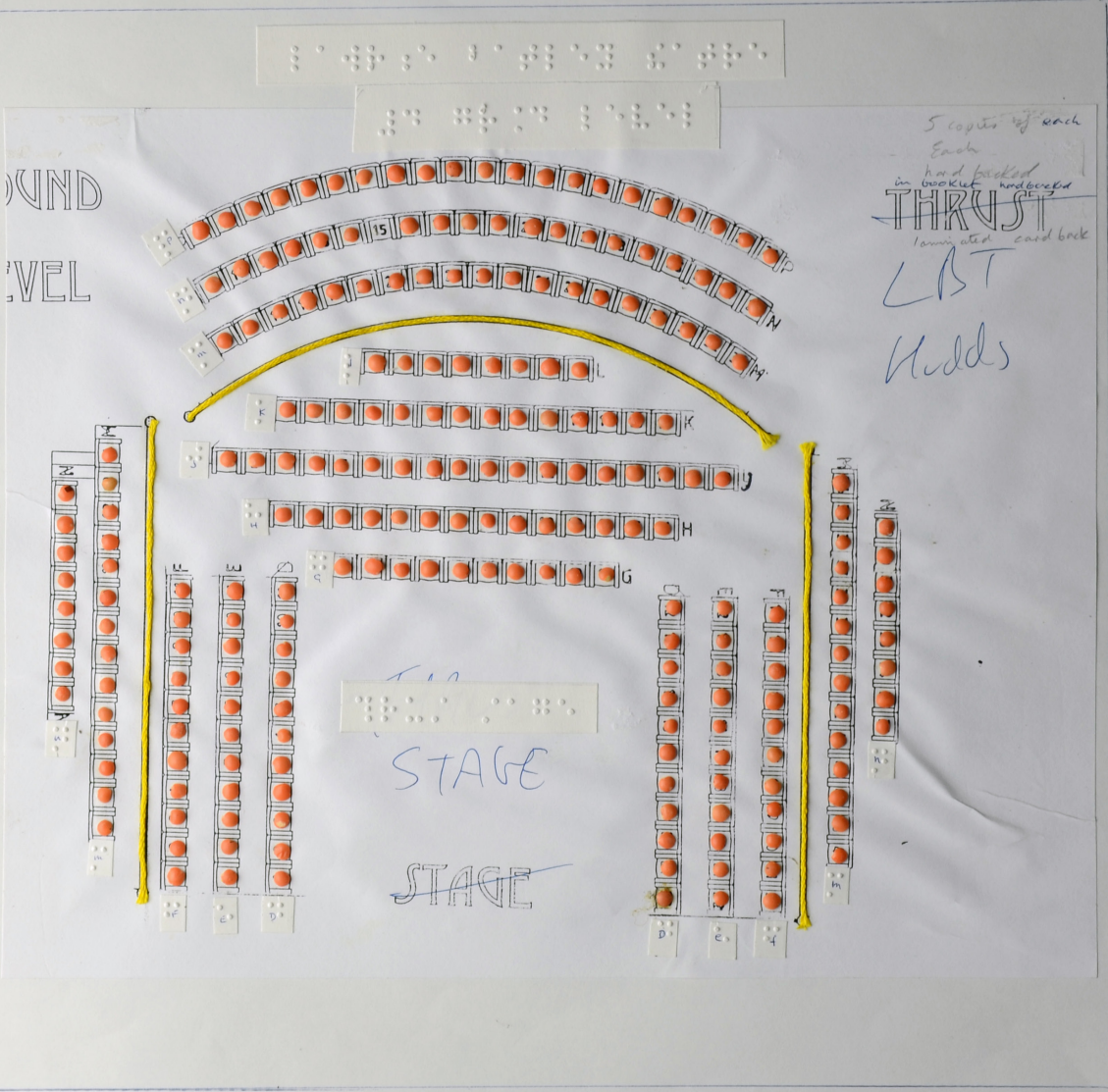
>

*Fig. Lawrence Batley Theatre.*

*Missing lentils indicate client's seat.*

*Non tactile writing not translated: [5 copies of each] [Each hard backed] [in booklet hard backed] [laminated card back] [LBT Hudds] [THRUST] [4] and individual seat numbering i.e. [n15].*

GROUND  
LEVEL



5 copies of each  
 Each  
 in hard backed  
 in booklet hardbacked  
**THRUST**  
 laminated card back  
 LBT  
 Halls

> thresholds graph  
probability in % [cp]

100

99.9 %  
g

51% f  
e

x

d

c

b

a

0

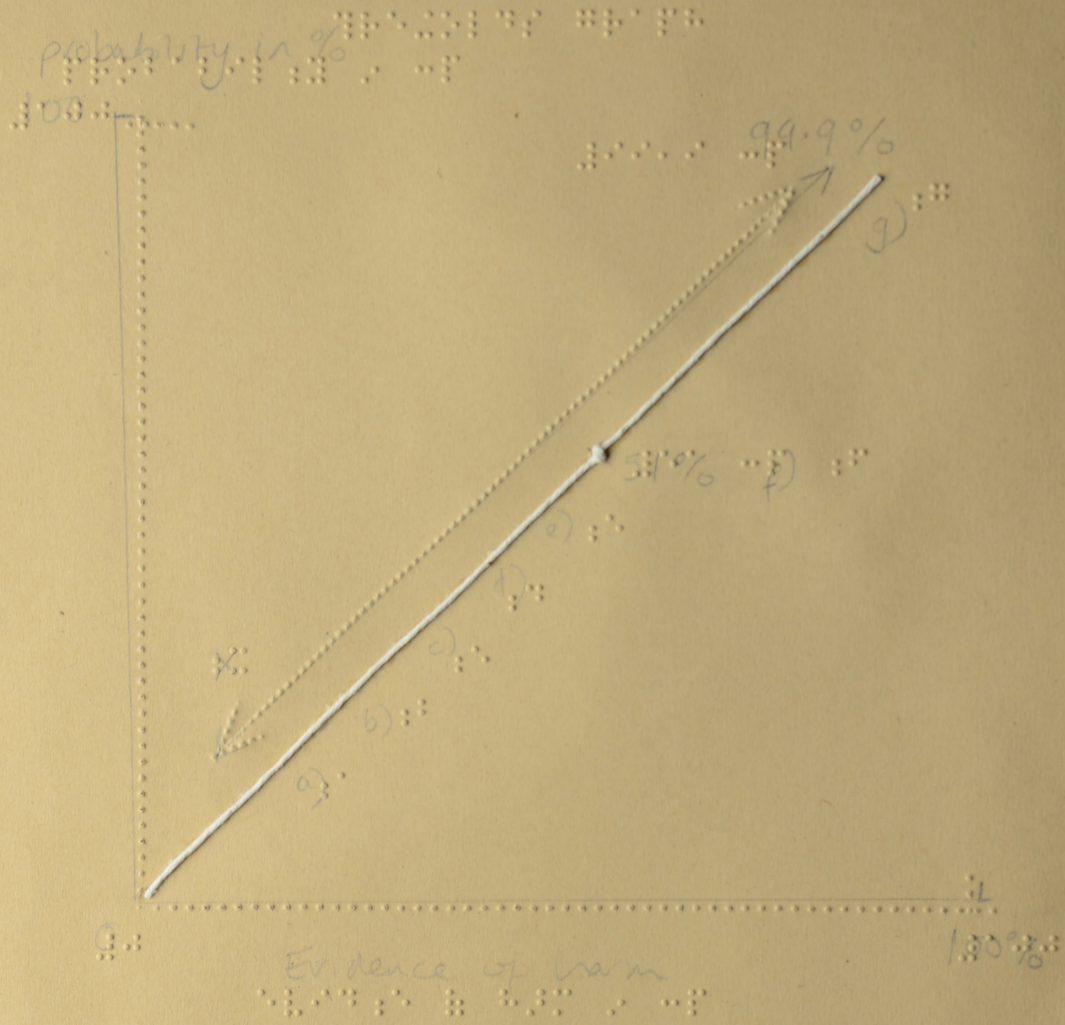
100

evidence of harm

>  
*Fig. A Threshold Line Graph.*  
*The x axis is labelled [evidence of harm] and the y axis is labelled [probability in %] .*  
*A knot in a piece of string marks the point of 51% [f] while [a-e] and [g] mark points without knots.*  
*Non tactile writing not translated: [SS.25/2/10].*

SS. 25/2/10

# Thresholds Graph





> diagan[sic] for slide 5

value

a

d

e

c

b

amount of data collected  
(key on next page)

>

*Fig. A line graph with two curves and one point of intersection.*

*The x axis is labelled [amount of data collected] and the y axis is labelled [value].*

*The intersection is marked [c], two sets of points are marked [d] and [e], and the end points are marked [a] and [b].*



> access to economics

fig. 2.1 production possibility  
curve

good x

B

$x^2$

$x^1$

C

0

$y^2$

$y^1$

A

good y

>

*Fig. A line graph, with one curve and two correlation lines indicating points on the curve.*

*The beginning of the curve is marked [A] the end is marked [B] and one middle point is marked [C].*

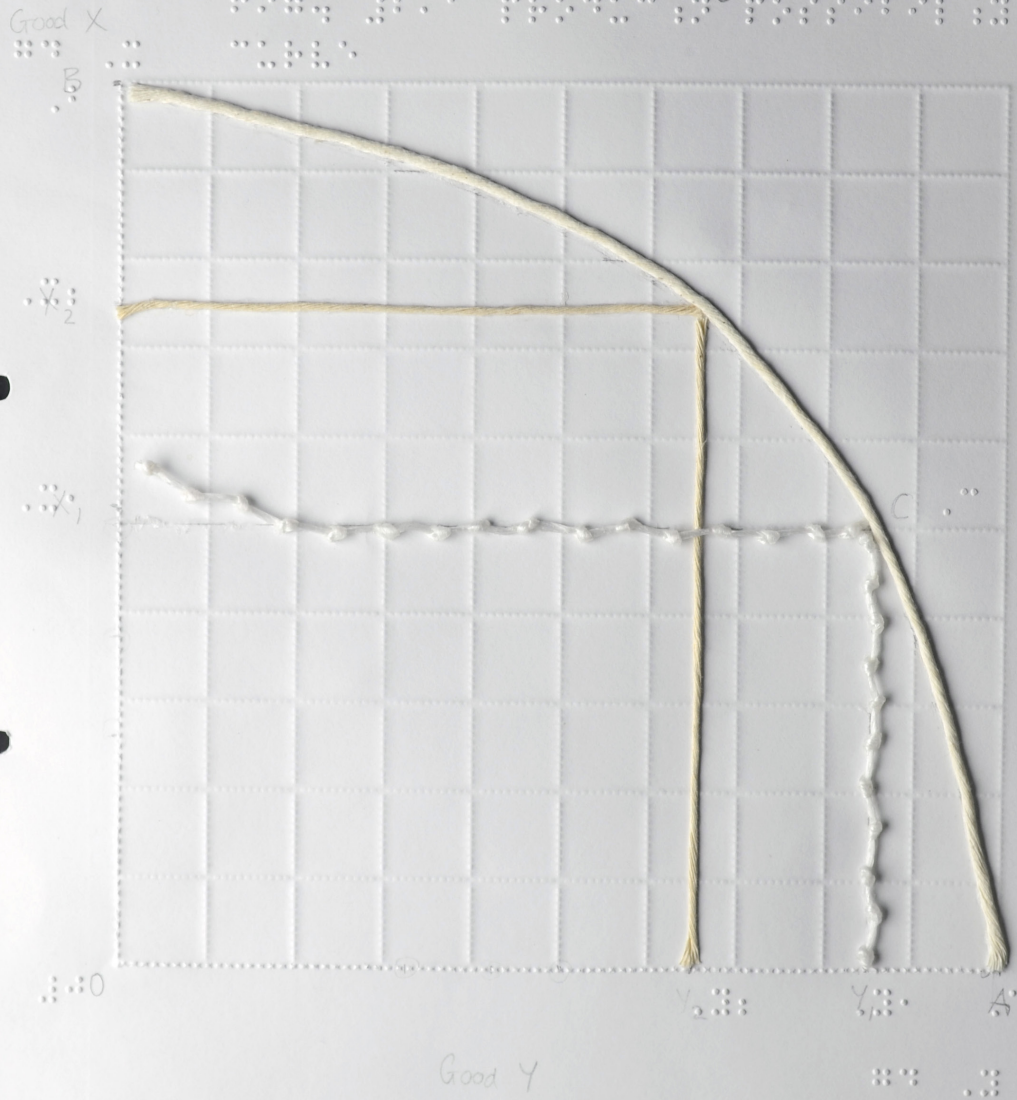
*The x axis is labelled [good y] and the y axis is labelled [good x].*

*The ends of both intersection lines are marked [ $x^1$ ] [ $x^2$ ] and [ $y^1$ ] [ $y^2$ ], the X points on the Y axis and the Y on the X.*

*Different thicknesses of string are used to show thicknesses of line, with knotted cord used to replicate a dotted line.*

Access to Economics

Fig 2.1 Production possibility curve



>

*Fig. The original rough version of the [human ear diagram].*

*Non tactile annotation [sic] bold indicates printed text:*

*a Pinna*

**B ear canal**

**outer ear c**

**middle ear D**

**inner ear E**

**brain F**

**auditory nerves G**

*H stirrup*

**I hammer**

*J eardrum Tympanic Membrane*

**K Semi circular canals**

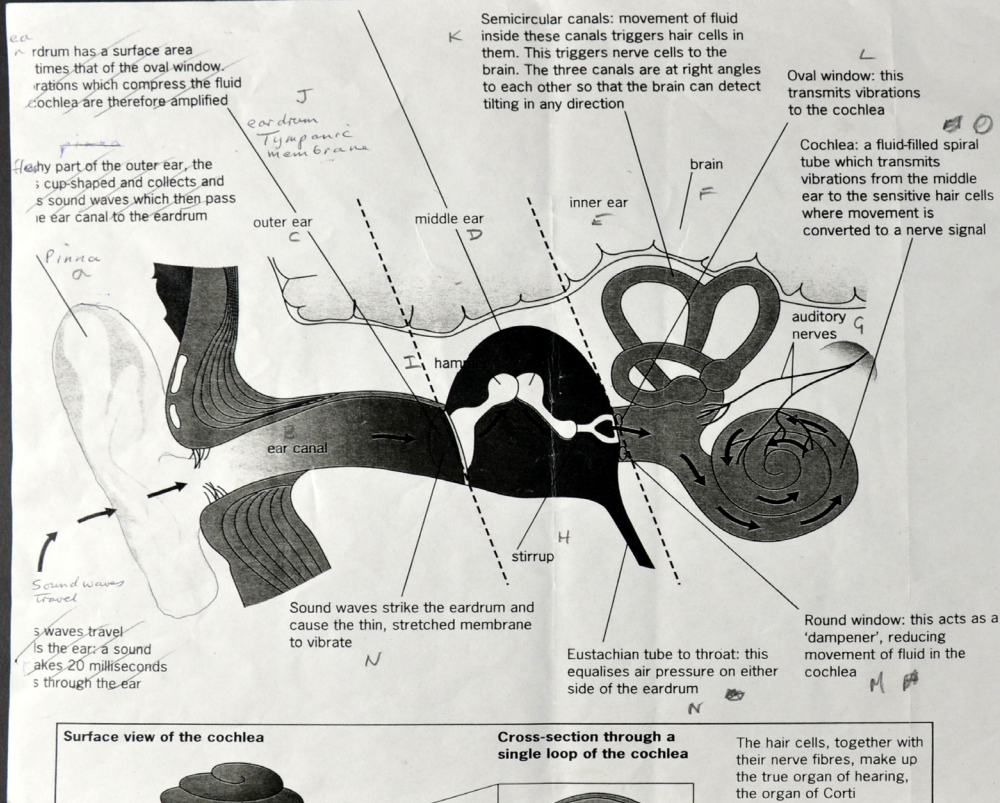
**L Oval window**

**M Round window**

**O Cochlea**

*Sound waves Travel*

*A-P 2 lots*



Surface view of the cochlea



Cross-section through a single loop of the cochlea



classified according to the type of stimulus it receives (e.g. light, sound, touch, pressure, temperature, pain, etc.).

The eyeball consists of the cornea, iris, lens, and retina.

Incoming light enters the eye through the cornea and is focused by the lens onto the retina.

- 1 A number of choroid cells re-focuses from a distance.
- a) What is the term for the part of the eye that focuses light on the retina?
- b) Copy and complete the following sentences. Each of the structures listed below has a different function.

Structure
Ciliary muscle
Suspensory ligament
Lens

[AEB 1994 Biology]

- 2 The diagram shows a single rod cell from a mammalian retina.

> human ear diagram

a            c     d     e     f  
              b     i     j     l     k     g  
              h     m     o  
              n

>  
*Fig. A diagram of the human ear.  
Various textures indicate different anatomical parts of the ear.  
Materials include: hessian, sand paper, string, cord, beads and card.  
The final vacuum form version was also a part of the archive and is documented on the next page.*

אני רוצה ללמוד איך לכתוב





> human ear diagram

a            c     d     e     f  
             b     i     j     l     k     g  
             h     m     o  
             n

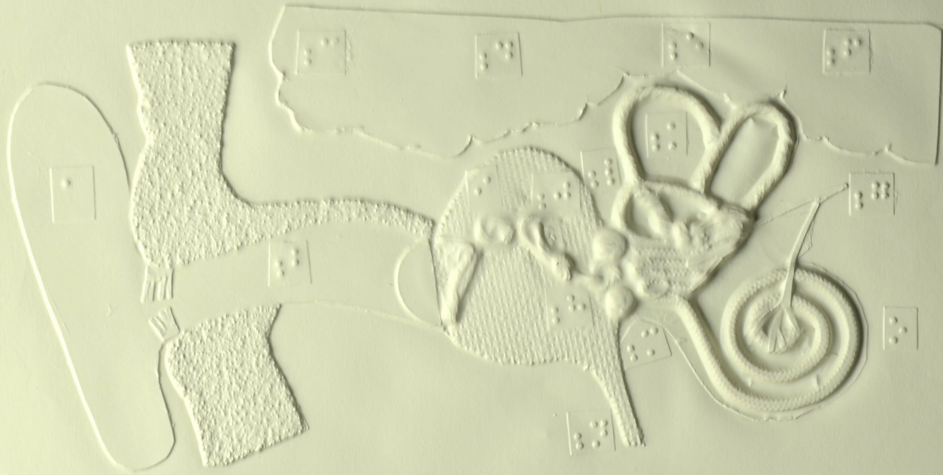
>

*Fig. A diagram of the human ear.*

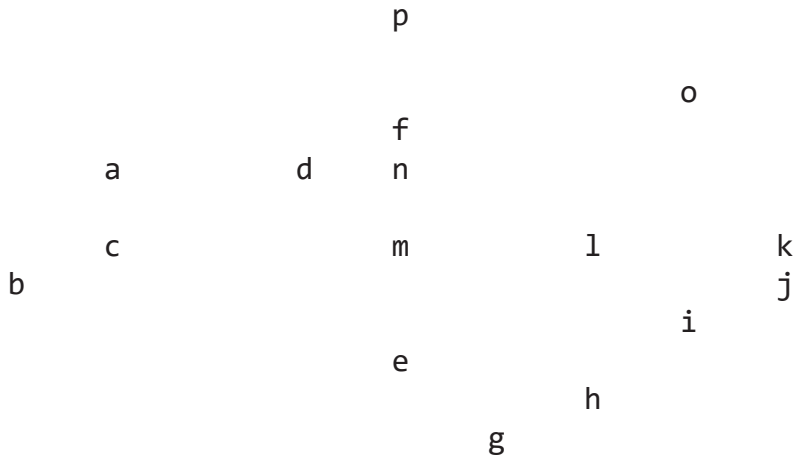
*The various parts are labelled [a - o] with the outer ear being labelled as [a].*

*[a] and [i] do not contain letter symbols while the others do.*

0.000 0.000 0.000 0.000 0.000

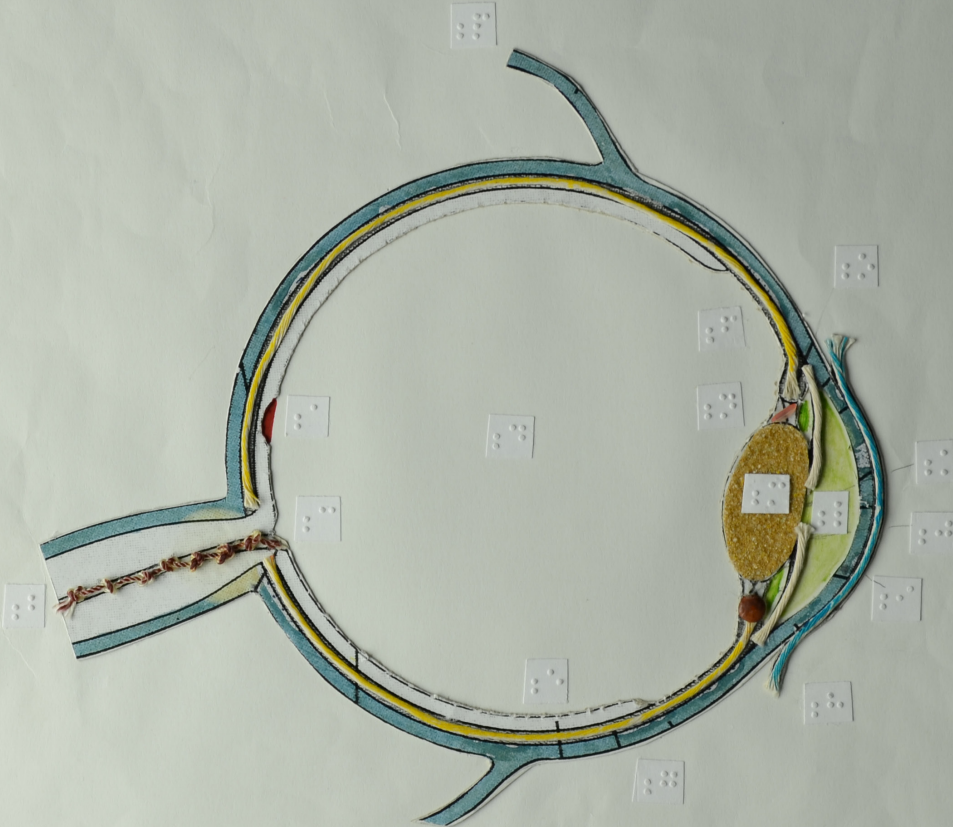


> structure of the human eye

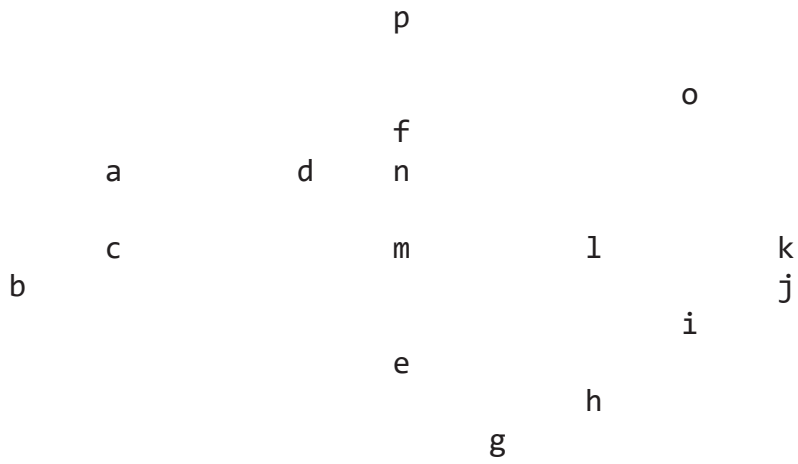


>  
*Fig. A diagram of the human eye.  
The various parts are labelled [a - p].  
Various textures indicate different anatomical parts of the eye.  
Materials include: sand paper, string, cord, beads and card.  
The final vacuum form version was also a part of the archive and is documented on the next page.*

የሰው ግራፍ ስርዓት



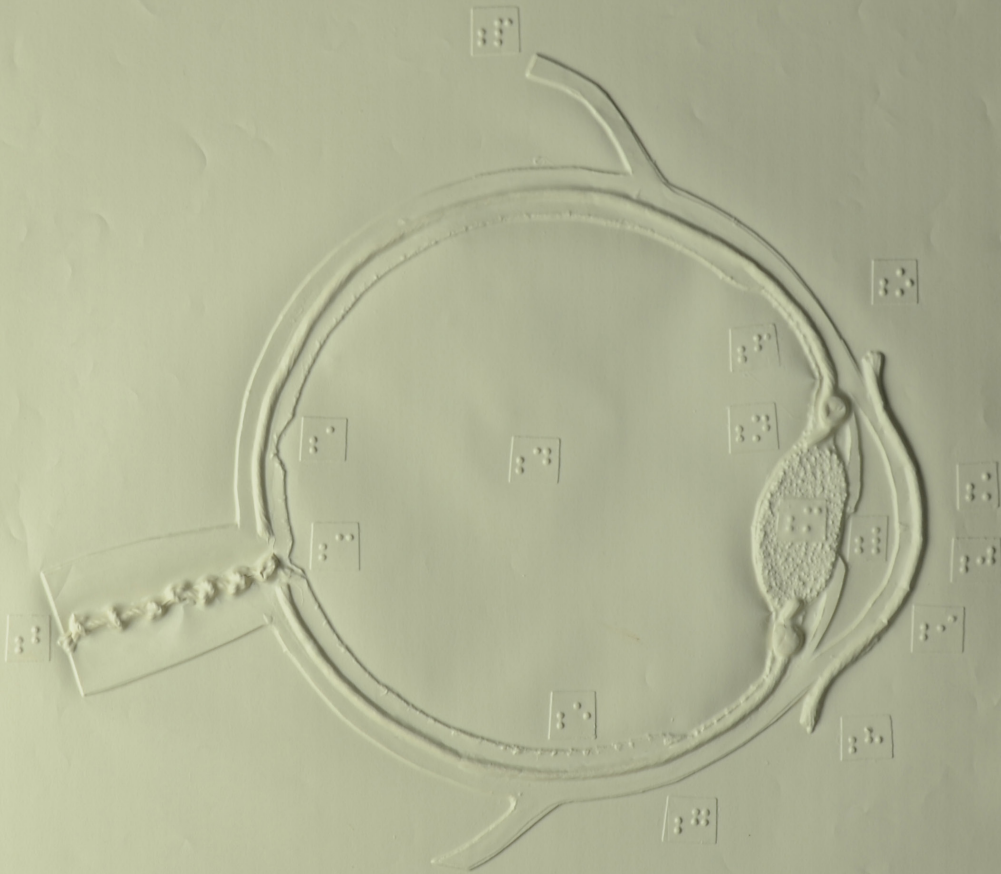
> structure of the human eye



>  
*Fig. A vacuum form diagram of the human eye.  
The various parts are labelled [a - p].*

Eye

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.



> fig 2.1

(title bar) (help and close)

insert resource

resource type:

|   |              |        |
|---|--------------|--------|
|   | accelerator  | new    |
|   | bitmap       | import |
| + | cursor       |        |
| + | dialog       | custom |
|   | html         |        |
|   | icon         | cancel |
|   | menu         |        |
|   | string table |        |
|   | toolbar      |        |
|   | version      |        |

>

*Fig. An image of a visual computer screen display.  
Part of a wider series, designed to explain a non visual interface.*

Handwritten text at the top left of the page.

Handwritten musical notation on a staff.

Handwritten musical notation on a staff.

Handwritten musical notation on a staff.



Handwritten musical notation on a staff.

Large block of handwritten musical notation enclosed in a dashed border.

Handwritten musical notation in a small box.

Handwritten musical notation in a small box.

Handwritten musical notation in a small box.

Handwritten musical notation in a small box.



> fig 2.2

1

2

3

4

5

6

7

9

8

10

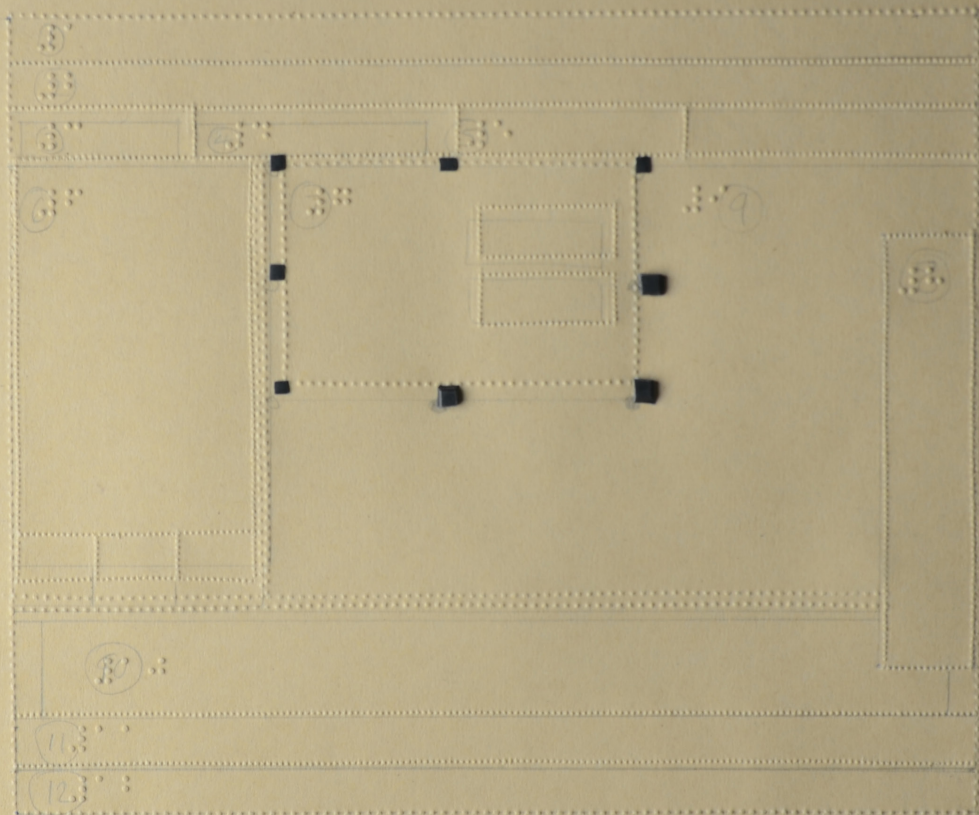
11

12

>  
*Fig. The accompanying image for [key for 2.2] located in three parts over the next three pages.  
It is unclear if the images of this series were vacuum formed or simply used as presented.*

Fig 22

Fig 22



1. title bar: ktext: first; SDI--  
microsoft visual c . . -- (first SDI--  
dialog 1 (dialog)).right.hand.side:  
minimise, restore down and click buttons.

2. main menu bar: ktext-file; edit; view;  
project; build; layout; tools; window; help;  
insert. .right.hand.side: minimise, restore down  
and click buttons.

3. drop list menu: .text: first; SDI.  
drop down arrow buttons.

4. drop list menu; ktext; win32 debug.  
drop down arrow buttons.

5. 2 lots of 3 icons.

6. folder list;  
first SDI resources  
accelerator  
dialog  
IDD--aboutbox  
IDD--dialog 1  
icon  
menu  
string table  
toolbar  
version.

1 2 3 4 5 6 7 8 9 10

11 12 13 14 15 16 17 18 19 20  
 21 22 23 24 25 26 27 28 29 30  
 31 32 33 34 35 36 37 38 39 40  
 41 42 43 44 45 46 47 48 49 50

51 52 53 54 55 56 57 58 59 60  
 61 62 63 64 65 66 67 68 69 70  
 71 72 73 74 75 76 77 78 79 80  
 81 82 83 84 85 86 87 88 89 90

91 92 93 94 95 96 97 98 99 100  
 101 102 103 104 105 106 107 108 109 110

111 112 113 114 115 116 117 118 119 120  
 121 122 123 124 125 126 127 128 129 130

131 132 133 134 135 136 137 138 139 140  
 141 142 143 144 145 146 147 148 149 150

151 152 153 154 155 156 157 158 159 160  
 161 162 163 164 165 166 167 168 169 170

171 172 173 174 175 176 177 178 179 180  
 181 182 183 184 185 186 187 188 189 190

191 192 193 194 195 196 197 198 199 200  
 201 202 203 204 205 206 207 208 209 210

211 212 213 214 215 216 217 218 219 220  
 221 222 223 224 225 226 227 228 229 230

231 232 233 234 235 236 237 238 239 240  
 241 242 243 244 245 246 247 248 249 250

251 252 253 254 255 256 257 258 259 260  
 261 262 263 264 265 266 267 268 269 270

271 272 273 274 275 276 277 278 279 280  
 281 282 283 284 285 286 287 288 289 290

291 292 293 294 295 296 297 298 299 300  
 301 302 303 304 305 306 307 308 309 310

at the bottom there is a horizontal scroll bar.

underneath are 3 tabs;

clas

res

file;v

(it looks like "res" has been selected)

7. "dialog box" with close button at top right hand corner.

(ok) button and (close) button.

this box has 8 handles; right on each corner and right in the centre of each side. the bottom right bottom centre and right hand centre are blank, the rest are white with blank outlines.

8. "control tool box" with close button at top right hand corner.

this box has 26 icon buttons.

9. main window; hosting the (dialog box) and the (control tool box).

10. tab sheets; (build) selected; also

has (debug) (find in files 1) (find in files 2) (results) (sql debugging) tabs.

there are scroll bars at the bottom right, and vertical right.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry must be supported by a valid receipt or invoice to ensure the integrity of the financial data.

2. In the second section, the author outlines the procedures for handling discrepancies between the recorded amounts and the actual cash flow. It is noted that any such variance must be investigated immediately to identify the source of the error.

3. The third part of the document details the process of reconciling the general ledger with the bank statements. This involves comparing the opening and closing balances and ensuring that all transactions are properly recorded and dated.

4. The fourth section addresses the issue of asset management and depreciation. It provides guidelines on how to calculate the value of assets over time and how to record these changes in the financial statements.

5. Finally, the document concludes with a summary of the key principles of financial reporting. It stresses the need for transparency, accuracy, and consistency in all financial records to provide a true and fair view of the organization's financial position.

>

11. this bar contains 11 greyed out icons and 2 others. (looks like they are sizing icons).

12. the bottom bar contains the word (ready) at the left hand side and at the right hand side the bar (read) is greyed out. also has two numerical measurements 0'0 and 186 (59')

-----

>

*Fig. The accompanying text for [fig 2.2], located over the previous three pages.*

*The 12 points correspond to 12 parts labelled on the primary image.*

*Most describe the contents of drop down menus.*

*Many translations are verbatim: Braille is contextual, the age of some of the computer jargon [IDD], [SDD], [ktext] along with the use of unusual punctuation, symbols, capitalisation and letters, make translation potentially imprecise.*

● Key for Fig 2.2 p3 ●

1. The first part of the key is a list of numbers from 1 to 10. These numbers are arranged in a specific order that corresponds to the positions of the dots in the figure. The order is: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

2. The second part of the key is a list of letters from A to Z. These letters are arranged in a specific order that corresponds to the positions of the dots in the figure. The order is: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.

.....



> fig 2.3

|   |    |    |    |    |   |
|---|----|----|----|----|---|
| 1 |    |    |    |    |   |
| 2 | 3  | 4  | 5  | 6  | 7 |
|   | 8  |    | 9  |    |   |
|   | 10 |    |    |    |   |
|   |    |    | 12 |    |   |
|   | 11 |    |    |    |   |
|   | 13 | 14 | 15 | 16 |   |

>  
*Fig. The accompanying image for [key for 2.3] located in two parts over the next two pages.  
It is unclear if the images of this series were vacuum formed or simply used as presented.*

"Fig 23"

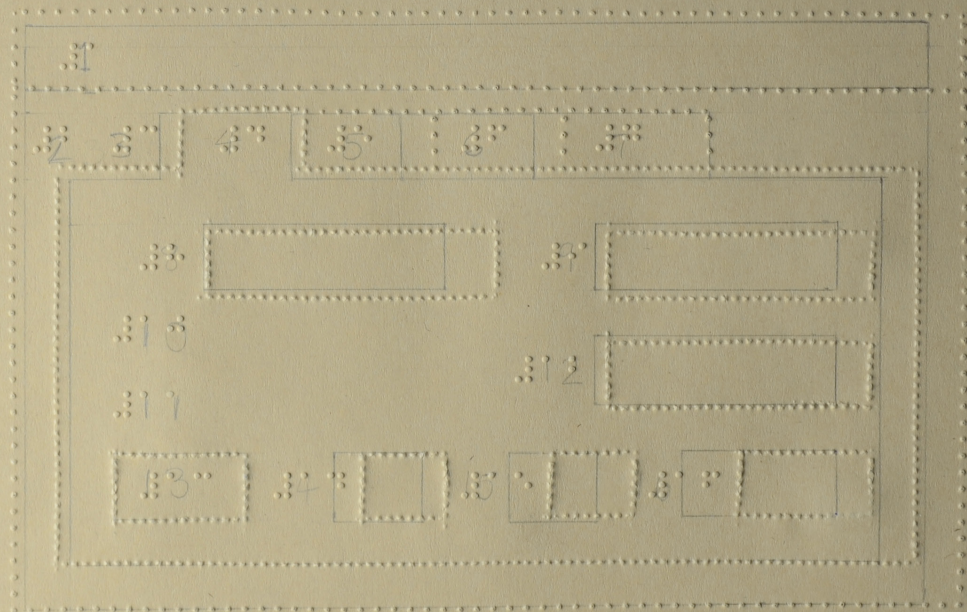


fig 2.3 consists of 2 diagrams. the first diagram has been omitted in a tactile format but is described below.

title bar of the text (sample dialog) and a close button.

the main window of the diagram has 2 buttons: ok and cancel.

for the second diagram for fig 2.3 you will need the key below.

1. title bar text: dialog properties and close button.
2. push pin.
3. help.
4. tab. text: general (this has been selected and will be detailed in 8+16)
5. tab. text: styles
6. tab. text: more styles
7. tab. text: extended styles
8. id. window, with drop down menu. text: IDDING DIALOG 1
9. caption.window. text: sample dialog
10. font name: ms sans serif
11. font size: 8
12. menu. window with drop down menu. blank.

>

*Fig. The accompanying text for [key for 2.3].*

*The number [2] appears on the back of the page, embossed in Braille.*

1. The first part of the text discusses the importance of understanding the underlying principles of the system being studied. It emphasizes the need for a thorough review of the relevant literature and the identification of the key variables and parameters involved.

2. The second part of the text describes the experimental setup and the procedures used to collect the data. It details the selection of the test cases, the measurement techniques, and the methods used to ensure the accuracy and reliability of the results.

3. The third part of the text presents the results of the experiments and compares them with the theoretical predictions. It highlights the areas of agreement and the discrepancies, and discusses the possible reasons for the observed differences.

4. The fourth part of the text discusses the implications of the findings and the potential applications of the results. It suggests ways in which the information gained from this study can be used to improve the design and performance of the system.

5. The fifth part of the text concludes the study and provides a summary of the key findings. It also identifies the limitations of the current work and suggests directions for future research.

13. font selection button.
14. x pos: window with text: 0
15. y pos: window with text: 0
16. greyed out. class name window. blank.

-----

>

*Fig. The accompanying text for [fig 2.3], located over the previous two pages.  
The 16 points correspond to 16 parts labelled on the primary image.*

Key for fig 2.3 p2

1. 111 111 111 111 111 111 111 111 111  
2. 111 111 111 111 111 111 111 111 111  
3. 111 111 111 111 111 111 111 111 111  
4. 111 111 111 111 111 111 111 111 111

.....

> fig 2.4

(title bar) (close)

sample dialog

ok

edit

cancel

check 1

one

two

three

>

*Fig. An image of a computer screen display.*

*The final image of a wider series, designed to explain a non visual interface.*

2024

အထွေထွေ အချက်အလက်

အကျဉ်းချုပ်

ပြည်ထောင်စု အဖွဲ့ဝင်များ

အဖွဲ့ဝင်

အဖွဲ့ဝင်

အဖွဲ့ဝင်

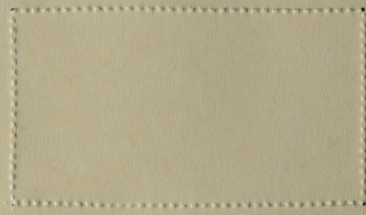
အဖွဲ့ဝင်

အဖွဲ့ဝင်

အဖွဲ့ဝင်

အဖွဲ့ဝင်

အဖွဲ့ဝင်





> Your mp3 navigation explained

key

a volume down  
b volume up  
c previous item  
d next item  
e previous section  
f next section  
g previous book  
h next book

[X] long push for on or  
off. push once to  
pause.

a b  
c d  
[e] f  
g h  
[X]

>

*Fig. An image of an MP3 player, with instructions on how to use it.*

*[a-h] represent buttons, the Braille marking button [e] is missing, and has been marked on the translation with square brackets. Similarly the primary button is shown using an orange "bump-on" which is shown as [X].*

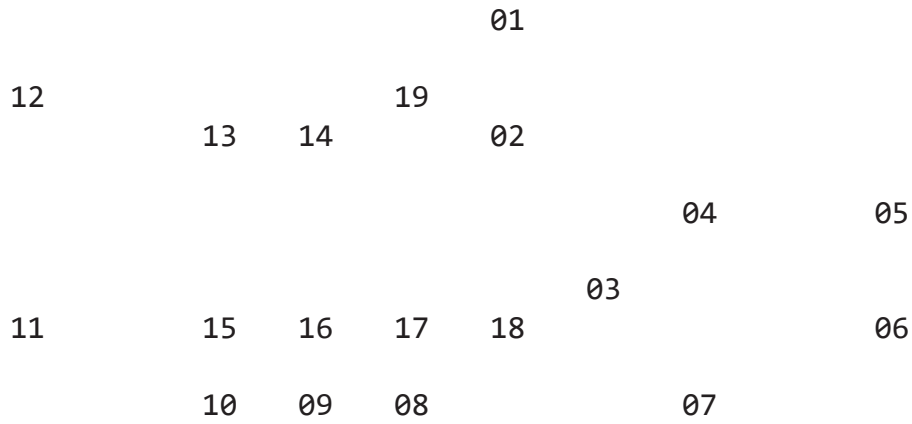
*Non tactile writing not translated: [wikki Stix needed] [mp3 navigator].*

*A "wikki stix" is a wax dipped stick, used for basic model making (similar in some respects to a pipe cleaner).*



> 1. proposed  
ground floor  
plan

main entrance

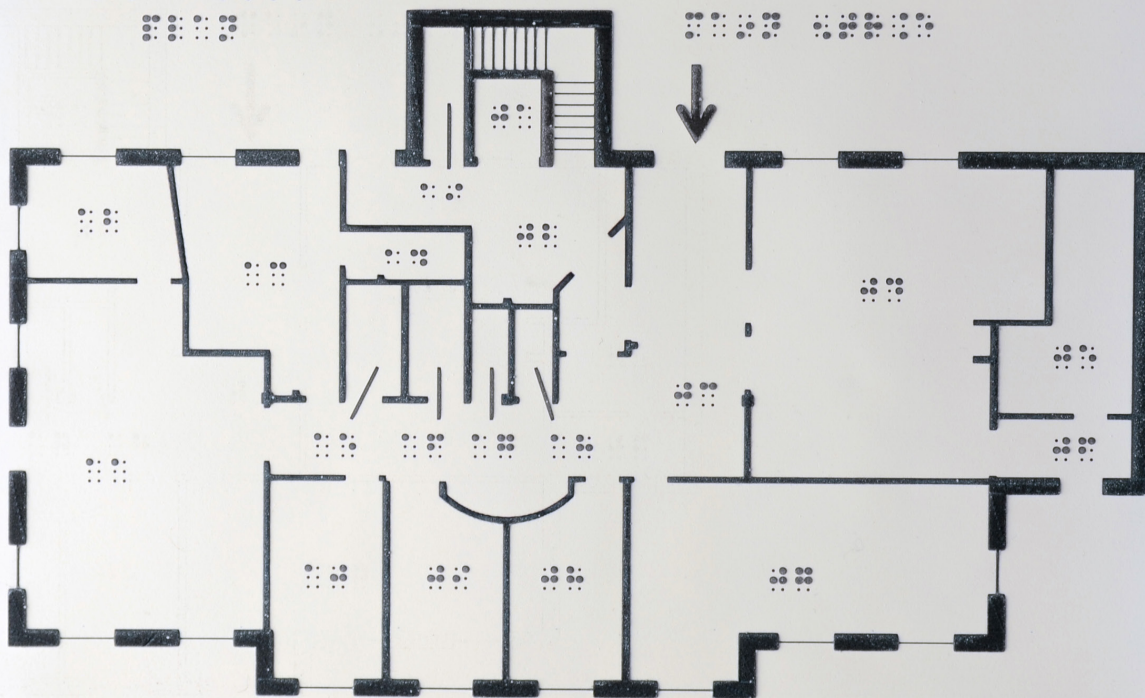


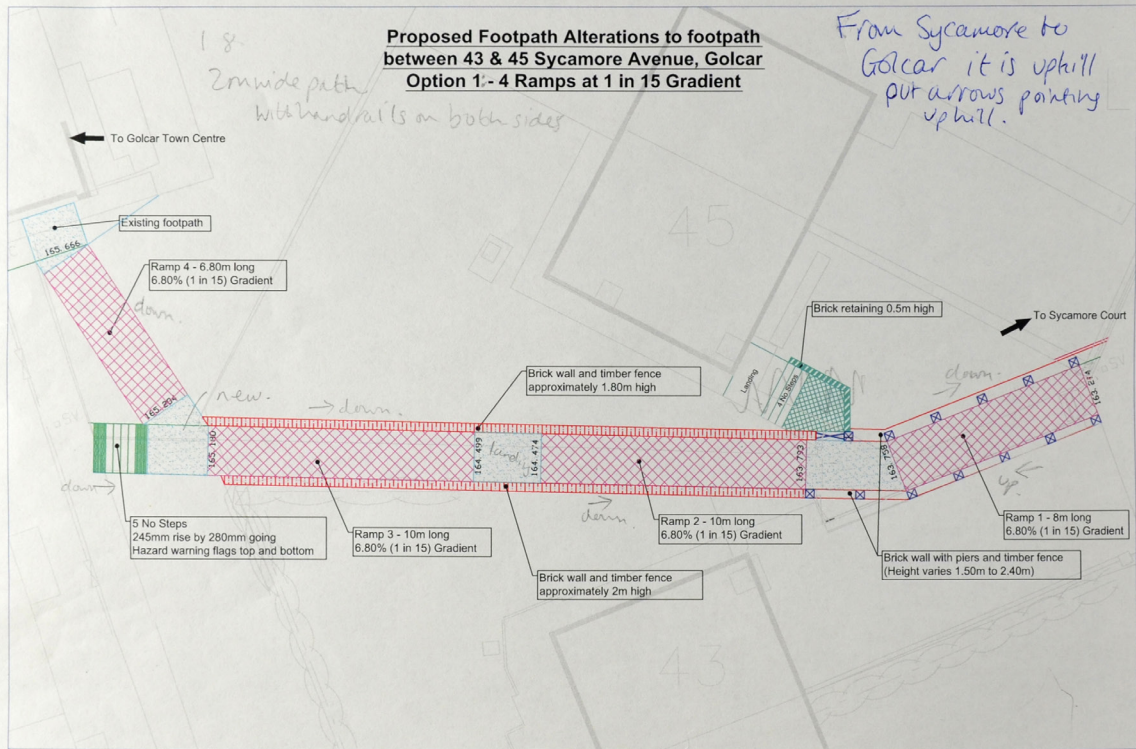
>

*Fig. A "swell paper" image of a floor plan.  
Rooms are labelled [01-19] all black areas are raised and tactile.*

Braille text located at the top left of the page, consisting of several lines of characters.

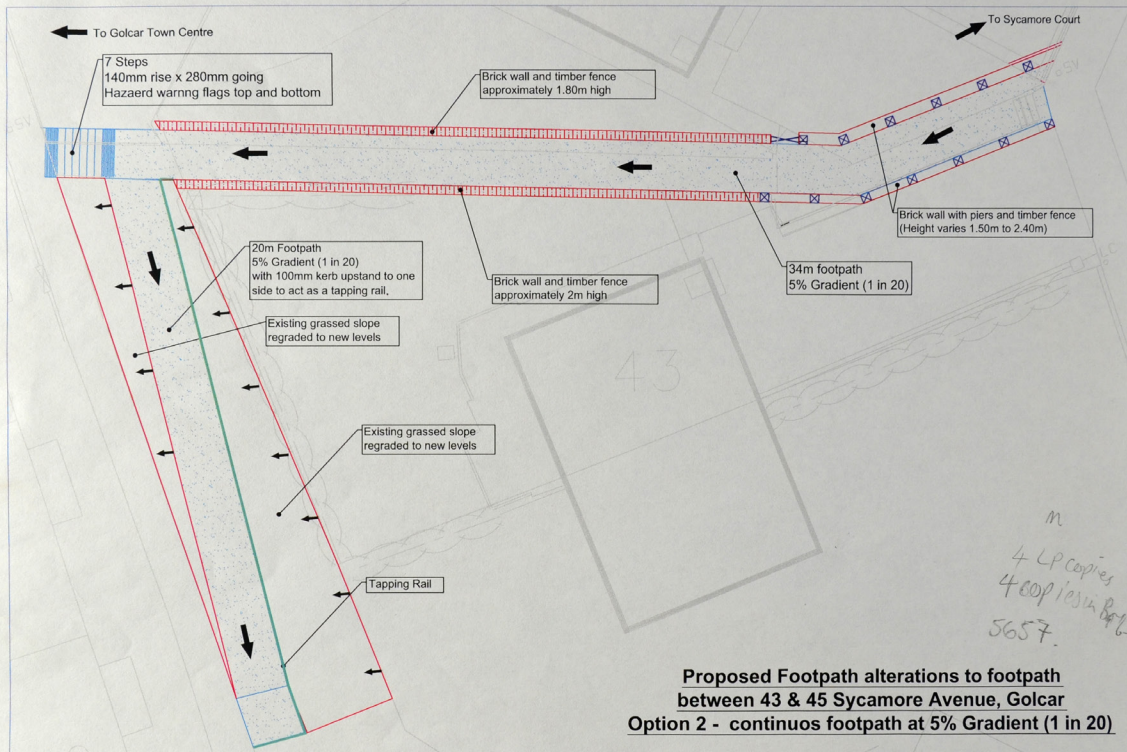
Braille text located at the top right of the page, consisting of two lines of characters.





>

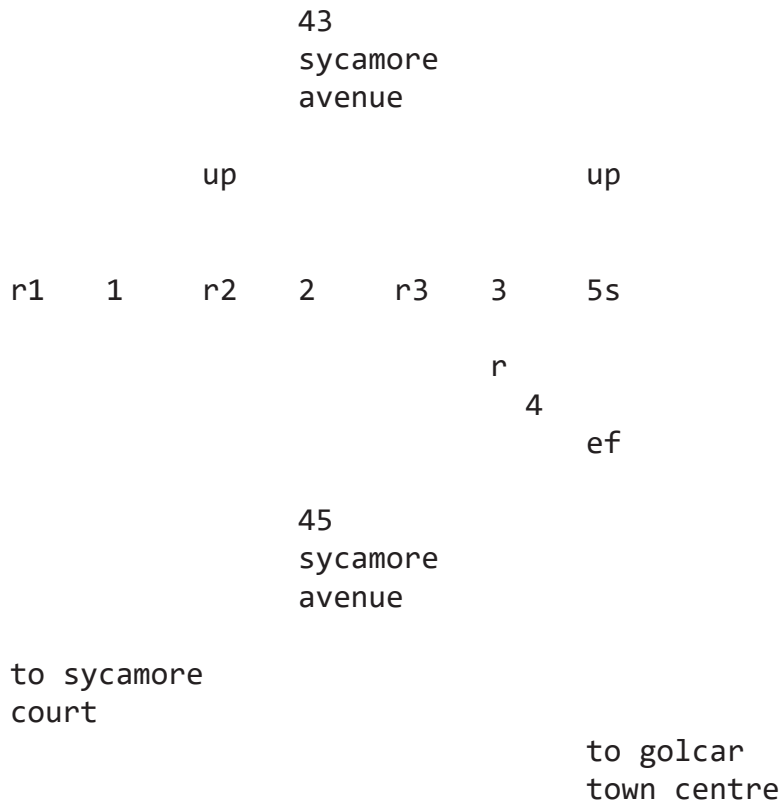
Fig. The original non tactile map of Sycamore Avenue, marked [option 1].  
Non tactile annotated writing includes [From Sycamore to Golcar it is uphill put arrows pointing uphill], [18 2m wide path with handrails on both sides].



>

Fig. The original non tactile map of Sycamore Avenue, marked [option 2].  
 Non tactile annotated writing includes [m 4 LP copies 4 copies in Braille 5657]

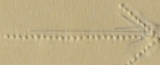
> option 1



>  
*Fig. A map of Sycamore Avenue explaining potential alterations to the footpath [option 1].*

Opinion 1

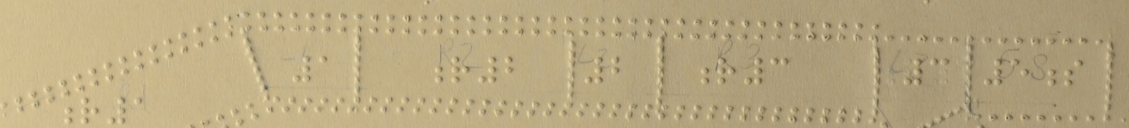
Opinion 1  
Opinion 1  
Opinion 1



Opinion 1

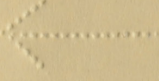
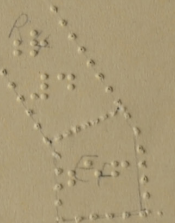


Opinion 1

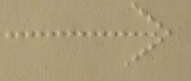


To expand  
Opinion 1

Opinion 1  
Opinion 1  
Opinion 1



Opinion 1  
Opinion 1





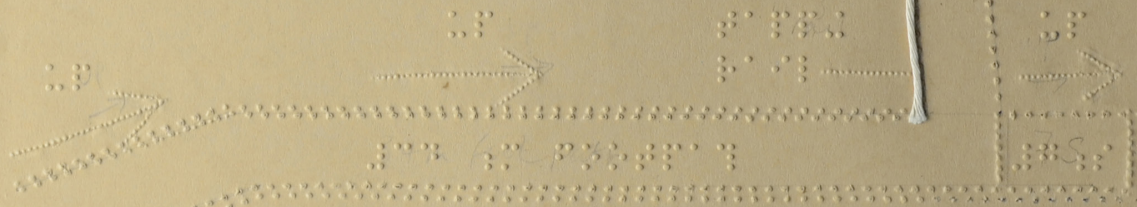
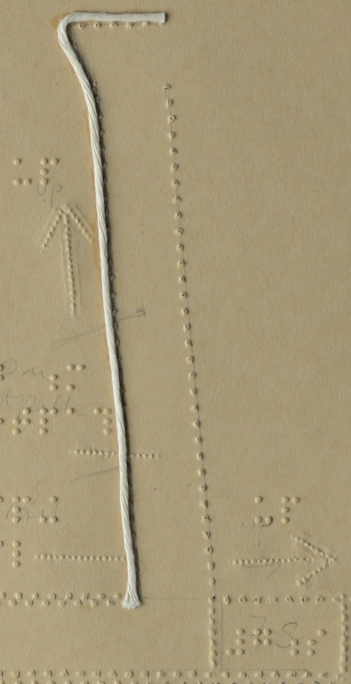
> option 2



>  
*Fig. A map of Sycamore Avenue, explaining potential alterations to the footpath [option 2].*

01/11/43

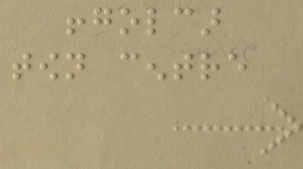
318743  
S...  
R...

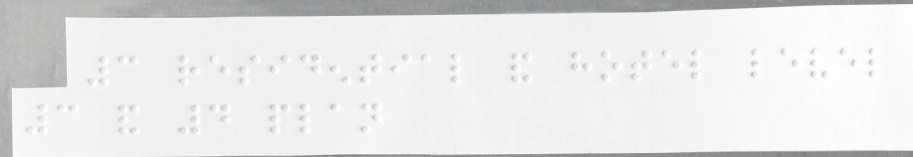
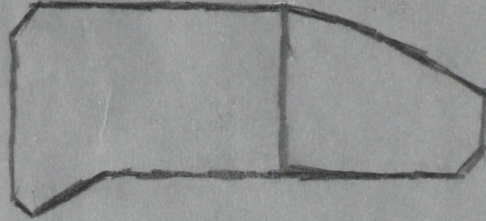
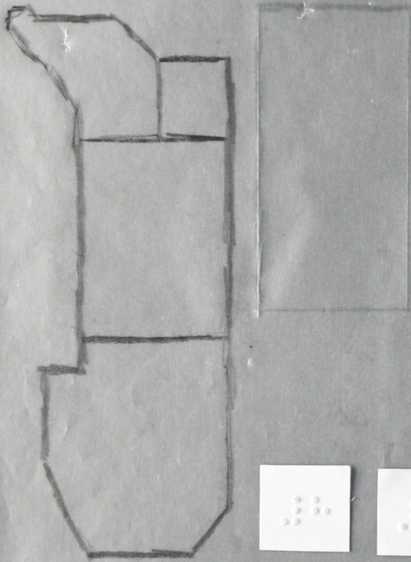
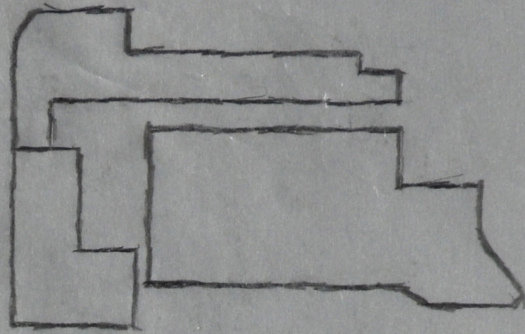
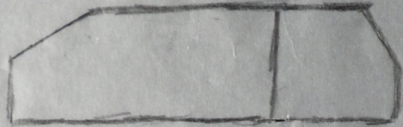


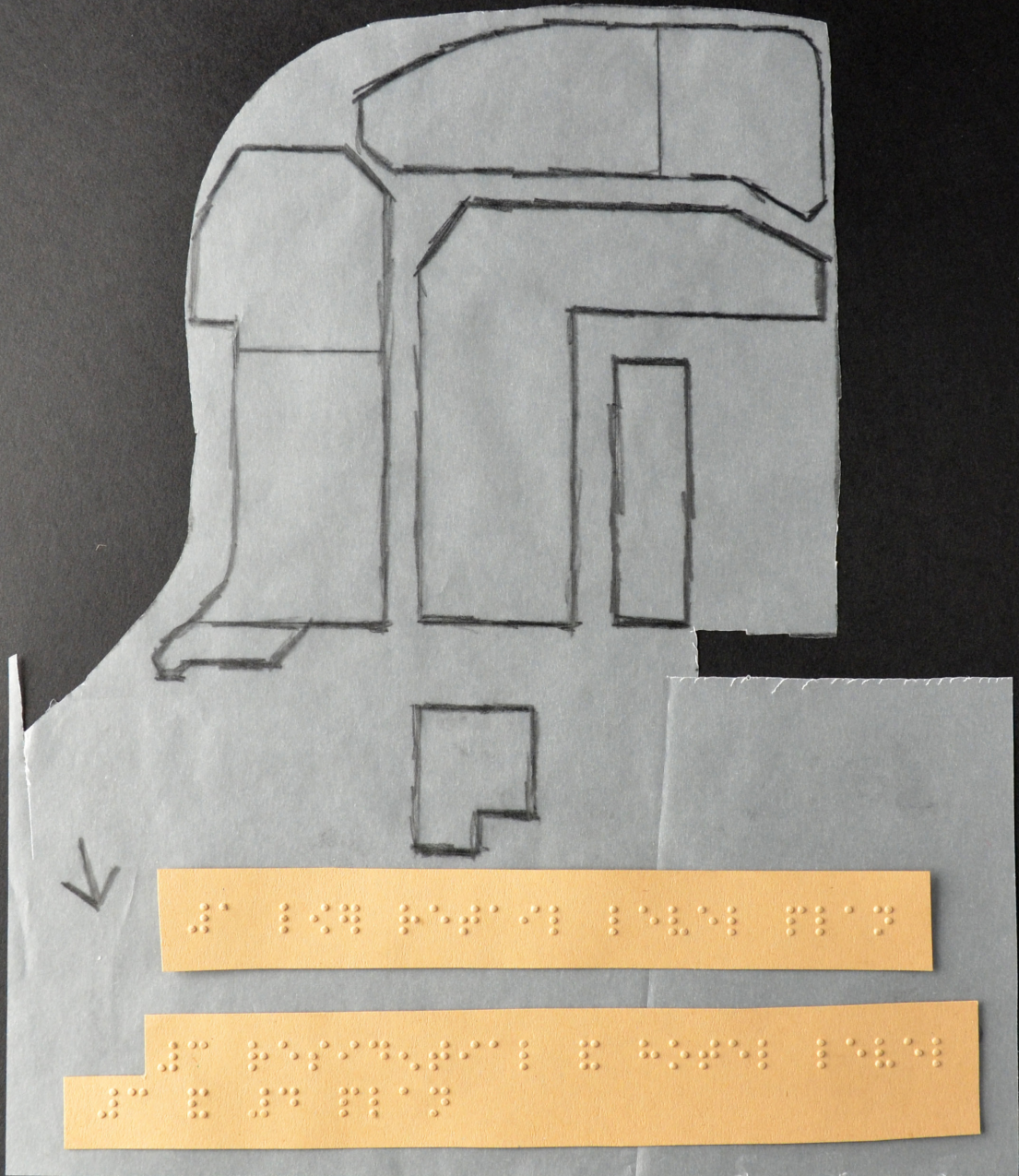
8 2 1 2 3 4 5 6



13305  
8 2 1 2 3 4 5 6  
7 8 9 10 11 12







> 8

9

1 (L)

1 lower retail level plan

2 upper retail level plan

3 residential and hotel level

3 and 4 plan

> 1 lower retail level plan

3 residential and hotel level

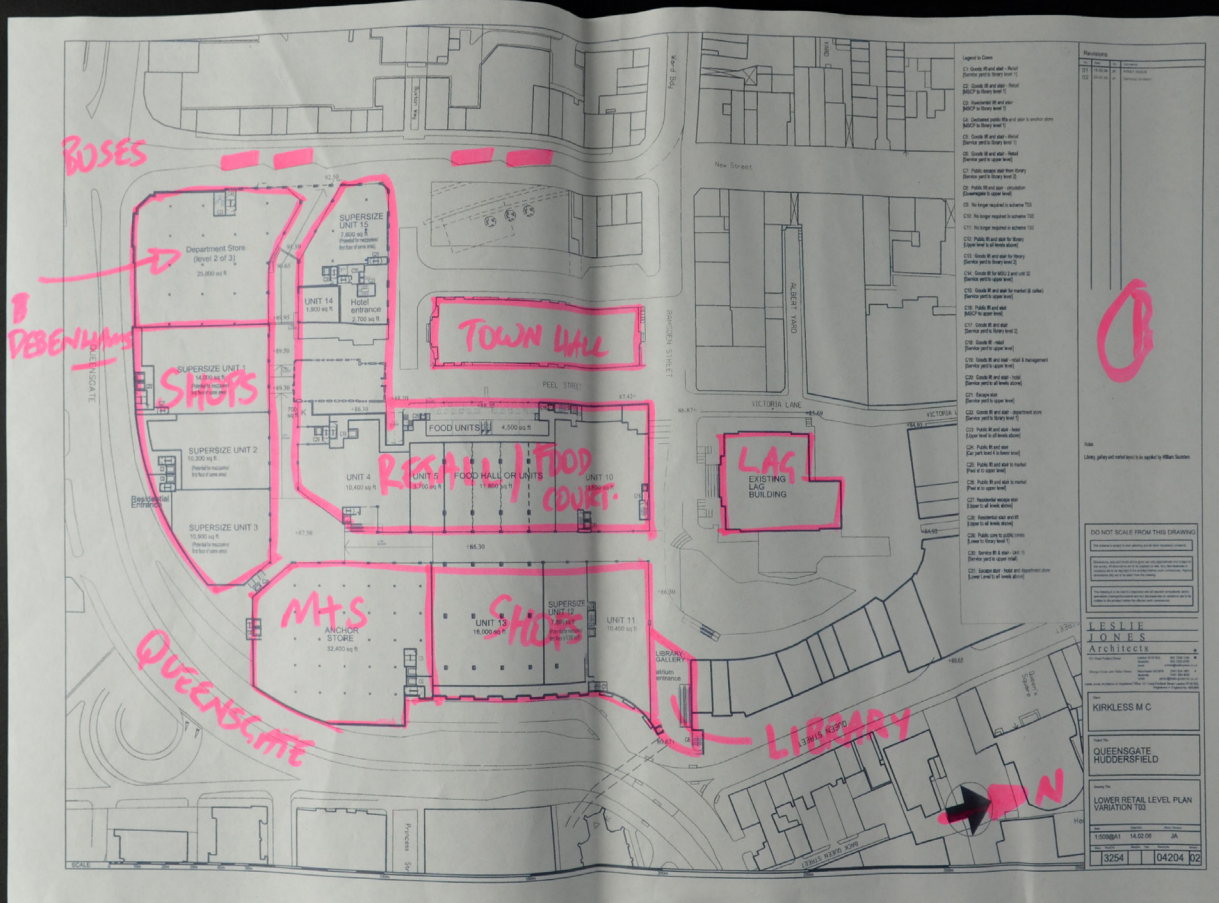
3 and 4 plan

>

*Fig. A collection of rough fragments used to plan the [Queensgate Retail Plan].*

*The accompanying vacuum form, master copies and fragments are shown on subsequent pages.*

*Sturdier brown paper has been used on many other master copies, which may explain why parts of the text have been written more than once, as the white paper may not be as "clean" on the vacuum form.*

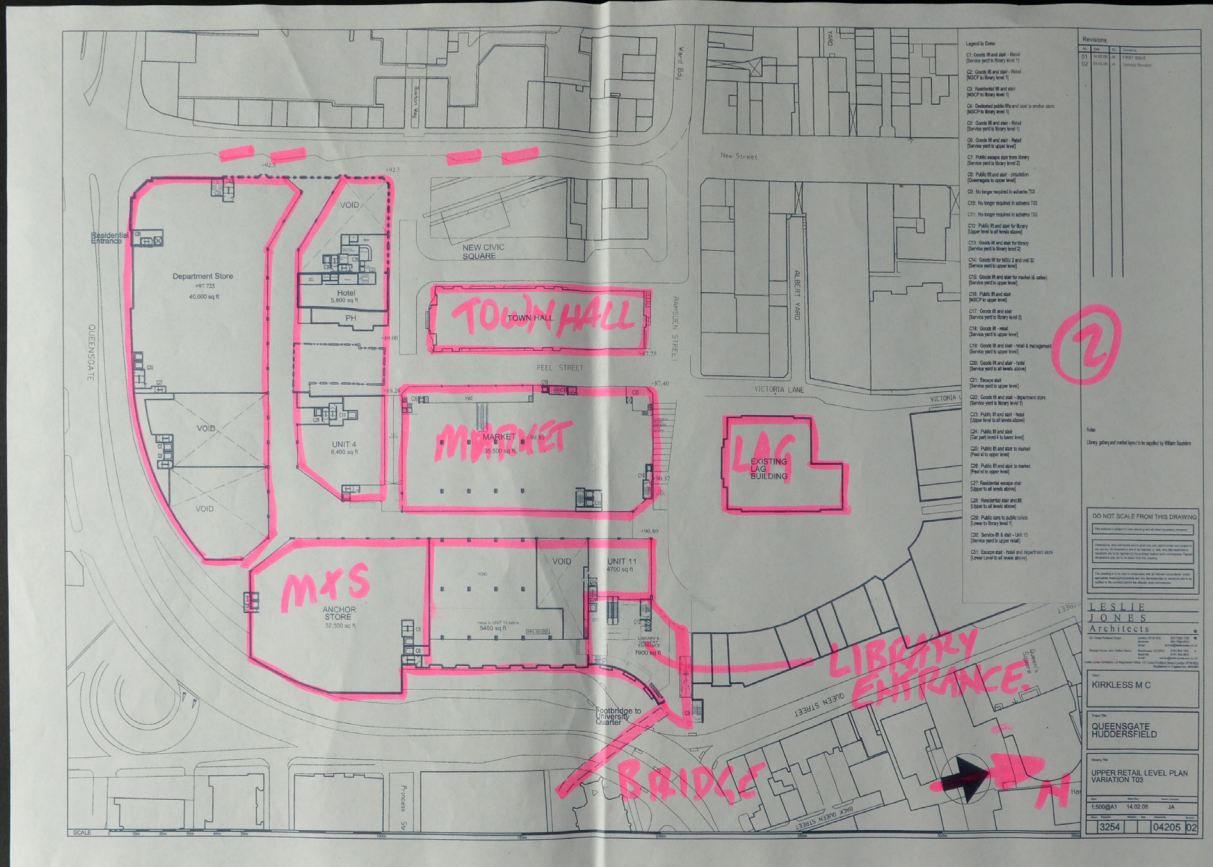


>

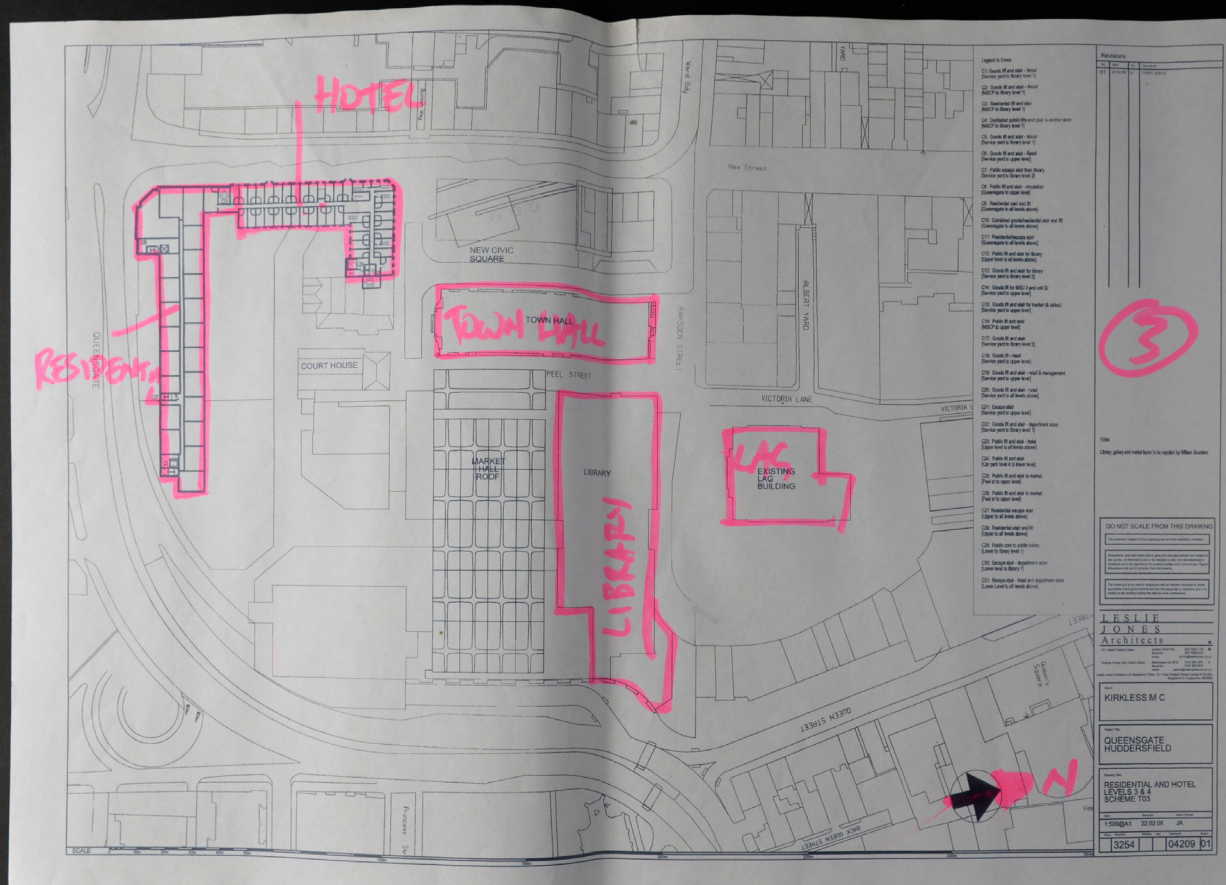
Fig. The original non tactile map of Queensgate (part 1).

Pink areas highlight points that require translation.

Non tactile writing [BUSES], [DEBENHAMS], [TOWN HALL], [SHOPS], [RETAIL/FOODCOURT], [LAG], [M+S], [SHOPS], [LIBRARY], [QUEENSGATE] and [N]



> Fig. The original non tactile map of Queensgate (part 2).  
 Non tactile writing [TOWN HALL], [MARKET], [LAG], [M+S], [LIBRARY ENTRANCE], [BRIDGE] and [N]



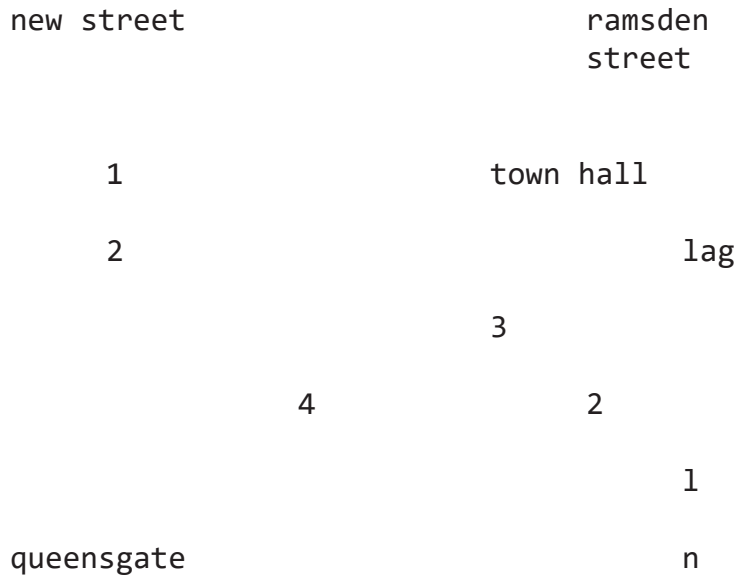
>  
 Fig. The original non tactile map of Queensgate (part 3).  
 Non tactile writing [HOTEL], [RESIDENTIAL], [TOWN HALL], [LIBRARY], [LAG] and [N].







> queensgate 1 lower retail level plan



>

*Fig. A vacuum form image of Queensgate shopping centre (lower retail level).  
The master copy of this image is on the next page.*

Queensgate 1 Lower Retail Level Plan

100' 0" 100' 0" 100' 0" 100' 0" 100' 0" 100' 0"



100' 0" 100' 0" 100' 0" 100' 0" 100' 0" 100' 0"



> queensgate 2 upper retail level plan

new street

ramsden  
street

town hall

lag

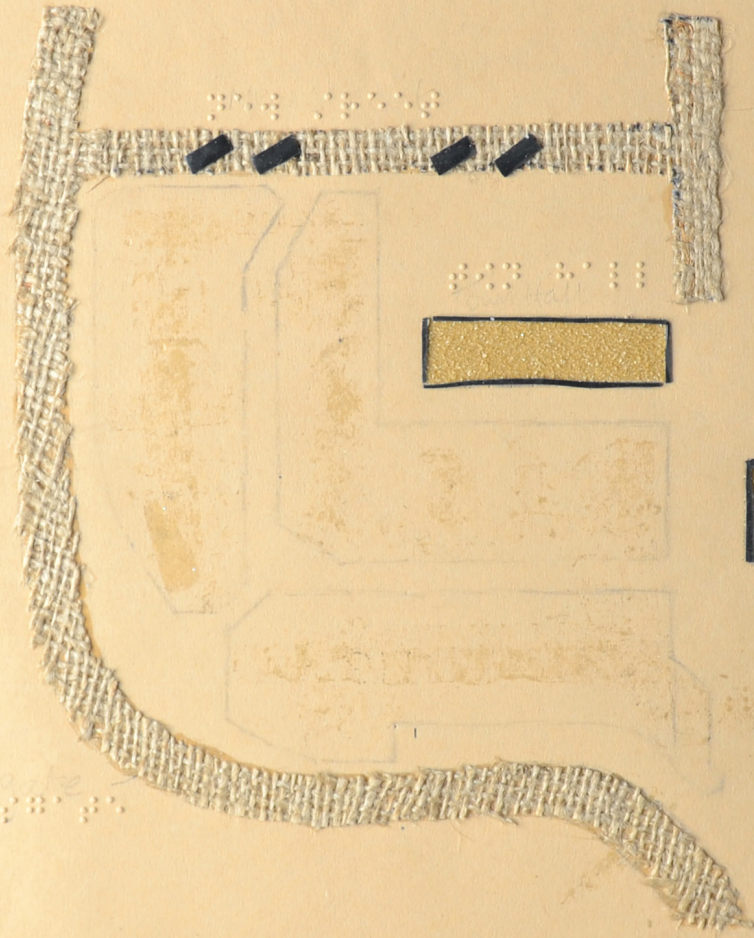
l

queensgate

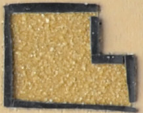
n

>  
*Fig. An image of Queensgate shopping centre (upper retail level).  
Parts of the Braille in the title have been covered up to read differently.  
The main buildings are removable, these parts are featured on a previous page.  
This modular approach allows a single master image to create multiple vacuum form pieces.*

Handwritten text in Braille at the top of the page.

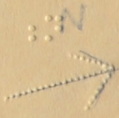


Handwritten text in Braille to the right of the fabric piece.



LAG

Overstake  
Handwritten text in Braille at the bottom left.



> key for 1 lower retail level plan

roads

buildings

1 debenhams

2 shops

3 retail and food court

4 m and s

lag existing library and art gallery  
l library

bus stop

n north

>  
*Fig. A vacuum form key for the Queensgate Retail plan located on the previous two pages.  
The master version of this key is shown on the next page.*

Key for ( Lower Retail Level Plan

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20



1 2 3 4



5 6 7 8

9

9 10 11 12

13

13 14

15

15 16 17 18 19 20

21

21 22

23

23 24 25 26 27 28 29 30

31

31 32



33 34

35

35 36





> key for 1 lower retail level plan

roads

buildings

1 debenhams

2 shops

3 retail and food court

4 m and s

lag existing library and art gallery  
l library

bus stop

n north

>

*Fig. The master copy of the key for the Queensgate Retail plan.  
A vacuum form version of the key is shown on the previous page.*

Key 1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20



21 22 23 24 25 26 27 28 29 30



31 32 33 34 35 36 37 38 39 40

41 42 43 44 45 46 47 48 49 50

51 52 53 54 55 56 57 58 59 60

61 62 63 64 65 66 67 68 69 70

71 72 73 74 75 76 77 78 79 80

81 82 83 84 85 86 87 88 89 90

91 92 93 94 95 96 97 98 99 100

101 102 103 104 105 106 107 108 109 110

111 112 113 114 115 116 117 118 119 120



> key for 2 upper retail level plan

roads

buildings

1 debenhams

4 m and s

5 void

6 market

7 retail unit

8 hotel

lag existing library and art gallery  
l library

bus stop

footbridge to university

n north

>  
*Fig. The master copy of the key for the Queensgate Retail plan.  
[key2] did not come with a vacuum form version, nor do we have the corresponding map.*

Key 2

⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠



⠠ ⠠ ⠠ ⠠ ⠠



⠠ ⠠ ⠠ ⠠ ⠠

⠠

⠠ ⠠ ⠠ ⠠ ⠠

⠠ ⠠

⠠ ⠠ ⠠ ⠠

⠠ ⠠

⠠ ⠠ ⠠

⠠ ⠠

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⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠

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⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠ ⠠

⠠ ⠠

⠠ ⠠ ⠠



> key for 3 for residential and hotel level  
3 and 4 plan

roads

buildings

8 hotel

9 residential

lag existing library and art gallery  
1 library

bus stop

n north

>  
*Fig. The master copy of the key for the Queensgate Retail plan.  
[key3] did not come with a vacuum form version, nor do we have the corresponding map.*

Key 3

⠠⠨⠠⠨ ⠠⠨⠠⠨ ⠠⠨⠠⠨ ⠠⠨⠠⠨ ⠠⠨⠠⠨ ⠠⠨⠠⠨ ⠠⠨⠠⠨ ⠠⠨⠠⠨ ⠠⠨⠠⠨  
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key to map

roads  
speed plateaux, cushions and humps

buildings

|     |                   |
|-----|-------------------|
| b   | brighton terrace  |
| bus | bus throughway    |
| co  | co-op             |
| fa  | foldings avenue   |
| fp  | foldings parade   |
| fr  | foldings road     |
| m   | meadowlands       |
| ne  | new road east     |
| odd | oddfellows street |
| p   | providence street |
| st  | stoneleigh court  |
| sc  | scholes lane      |
| t   | tabbs lane        |
| wl  | westfield lane    |
| wr  | whitechapel road  |
| w   | wickham street    |

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>  
*Fig. A key for the [Scholes Village 20mph zone] map.  
The accompanying text is located on the next page, and the map itself is on the page after that.*

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> scholes village cleckheaton  
20 mph zone

with the map in front of you and the title at the top, locate the first speed plateau at the right edge of the diagram. this is the first of 2 speed plateaux on whitechapel road. follow the road along to the 2nd speed plateau just off the junction. turn right onto new road east where about half way along there is a speed cushion. continue to the crossroads and go straight across onto westfield lane. outside the co-op there is a new zebra crossing. take the next road on the right, brighton terrace. at the end of brighton terrace turn left onto tabbs lane there are 2 flat top speed humps on this lane. the first right is brighton terrace and wickham street on the left and the second is stoneleigh court and meadowlands on the right. after the second hump take the next sharp turn on the left onto westfeild lane. there are 2 speed cushions on this lane. the first just after you turn onto the lane and the second is after the bend. after the second cushion take the next turn right onto foldings avenue. there are 3 flat top speed humps on this avenue the first between the turn for the bus throughway and foldings parade; the 2nd and 3rd after foldings parade. at the junction turn left onto foldings road where there is the final flat top speed hump. (end)

>

*Fig. Scholes Village Cleckheaton, 20mph zone (directions for a car journey).*

*This is a hard translation from Grade 2 contracted English Braille, all grammar is copied verbatim.*

*Braille contains a symbol to indicate capital letters, a full stop can be said to imply that a capital letter will follow, so in this context omitting capital symbols is correct. The translation does not contain capitals where there was no symbol.*

*[Second] and [2nd], [First] and [1st] appear as they do in the text.*

*This Braille text is designed to accompany the map on the next page.*



> scholes village 20 mph zone

m            st  
  
          t            t  
wl    p    w    b    t    wr  
  
                          co  
  
                  wl            ne  
  
                  fp            bus            church  
  
                                  sc  
  
                  fa  
  
                                  odd  
                          fr

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*Fig. Scholes Village 20mph zone (final vacuum form map).*

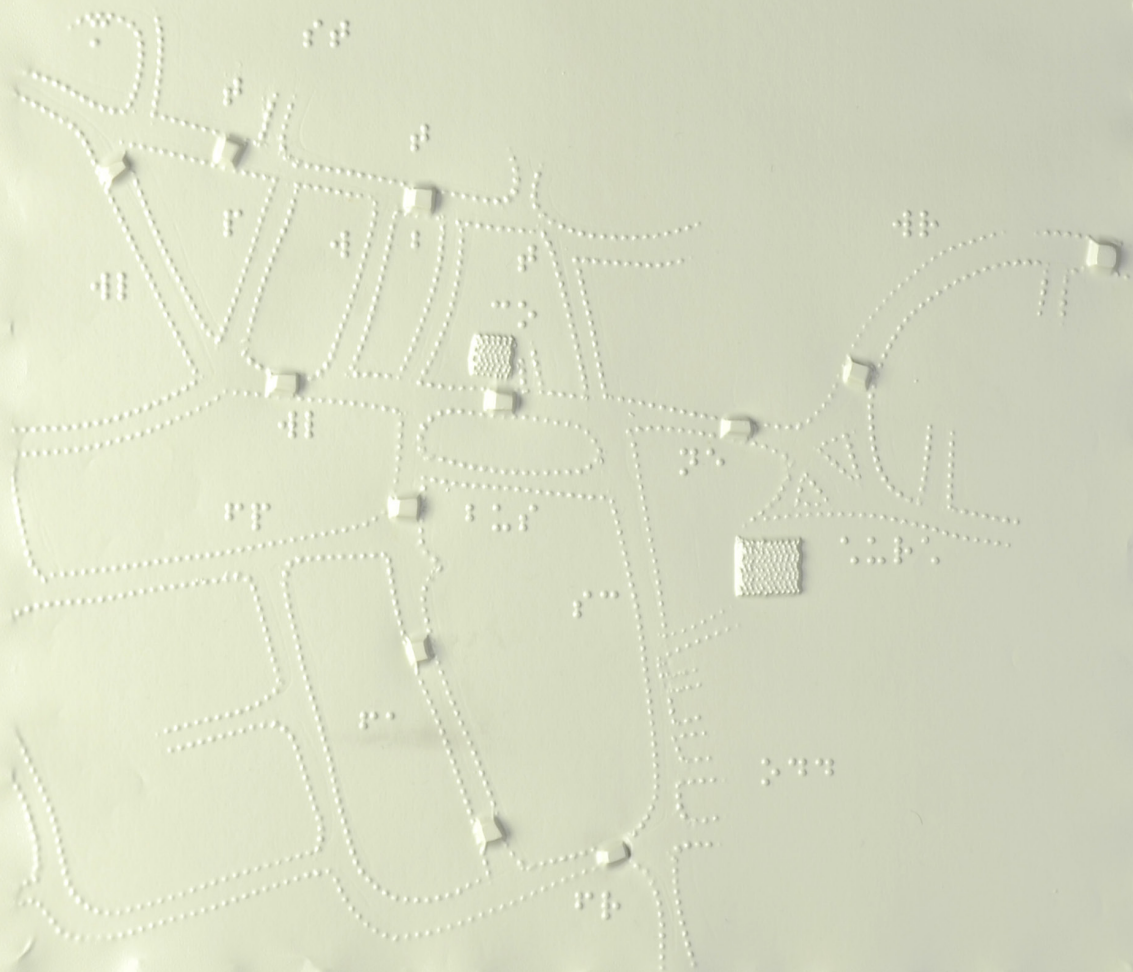
*Letters indicate street names, for instance [b] indicates Brighton terrace.*

*[co] indicates a co-op, [bus] indicates a bus thoroughway and [church] indicates a church.*

*“speed humps”, “speed plateaux” and “speed cushions” are also shown in the text and on the map as landmarks, they are important to note as they are felt when in a car, not seen, allowing them to be used to give directions to the driver.*

*The “master” version was also a part of the archive and is documented on the next page.*

STATE OF CALIFORNIA



scholes village 20 mph zone

m st  
t t  
wl p w b t wr  
co  
wl ne  
fp bus church  
sc  
fa  
fr odd

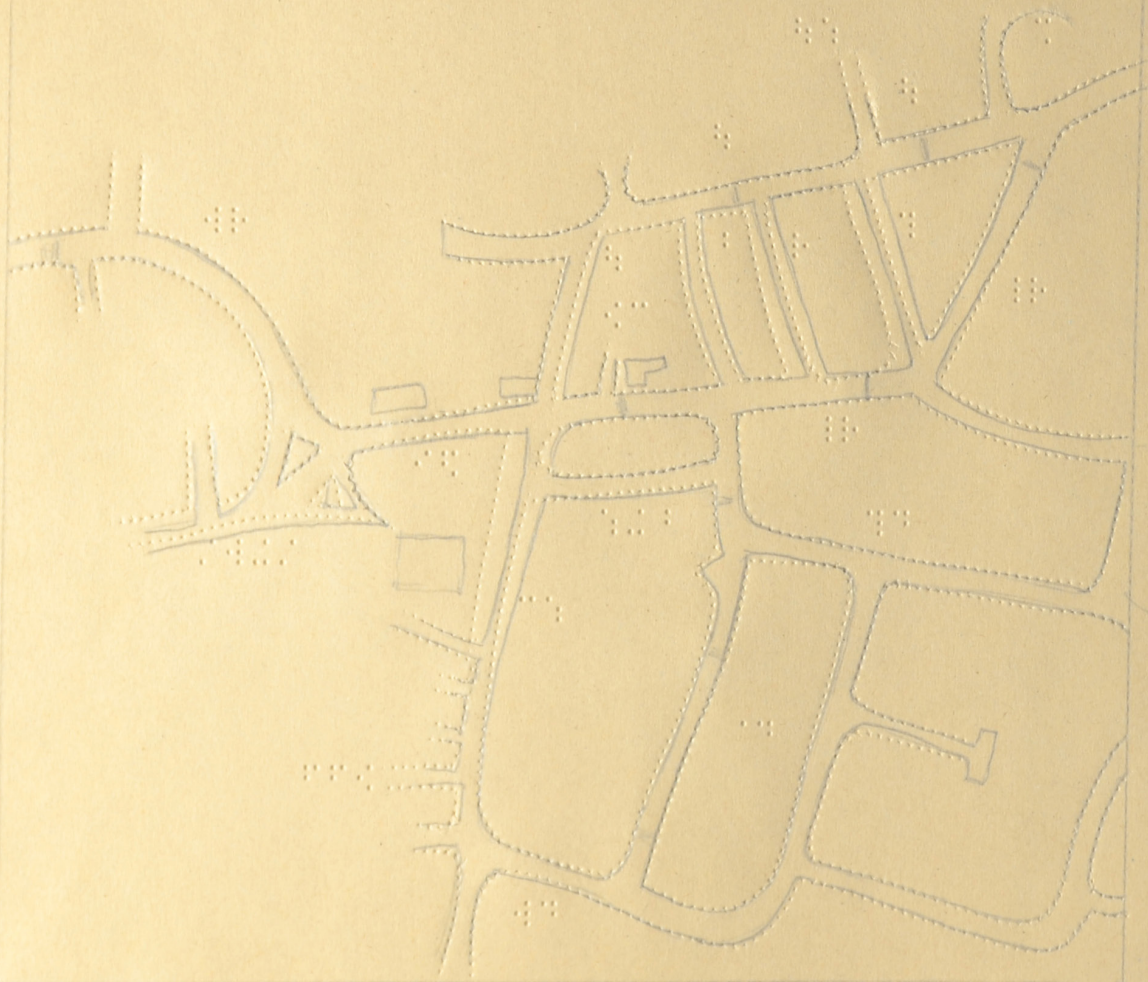
>  
*Fig. Scholes Village 20mph zone (master copy: front).  
Velcro squares indicate landmarks, "bump-on" stickers indicate speed humps/plateaux/cushions.*

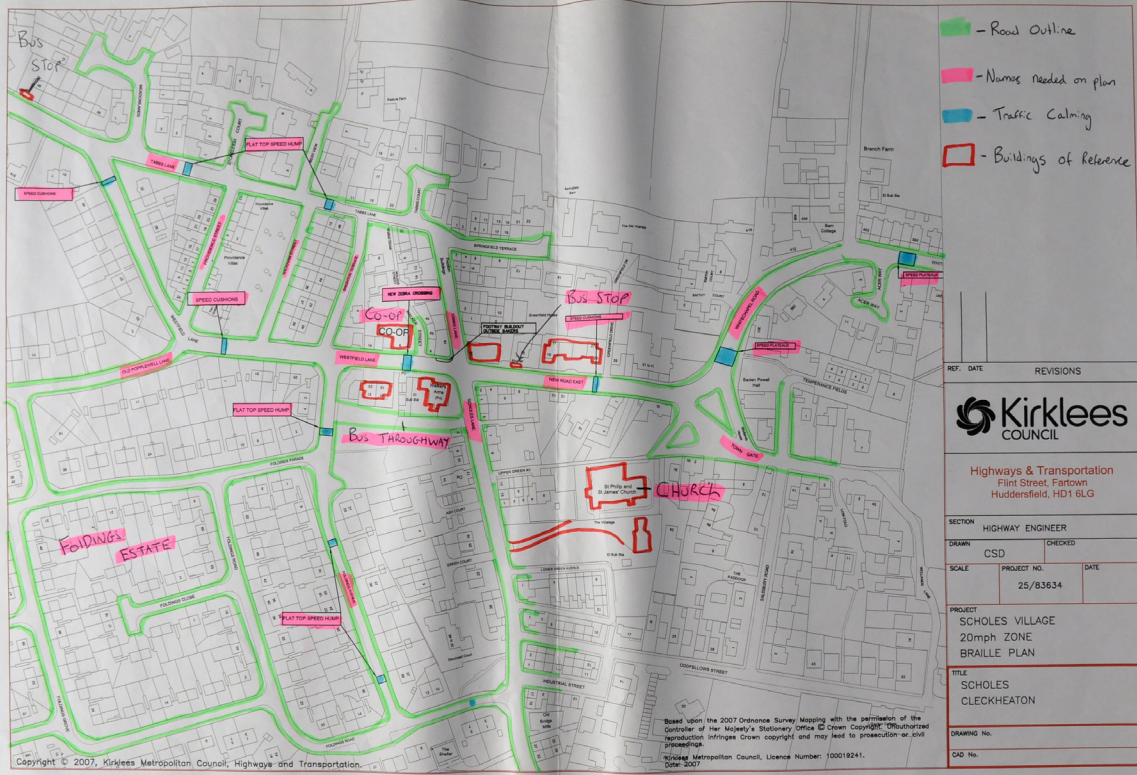
PLANS FOR THE CAMP



Access to Economics

Fig 2.4 Production possibility curve

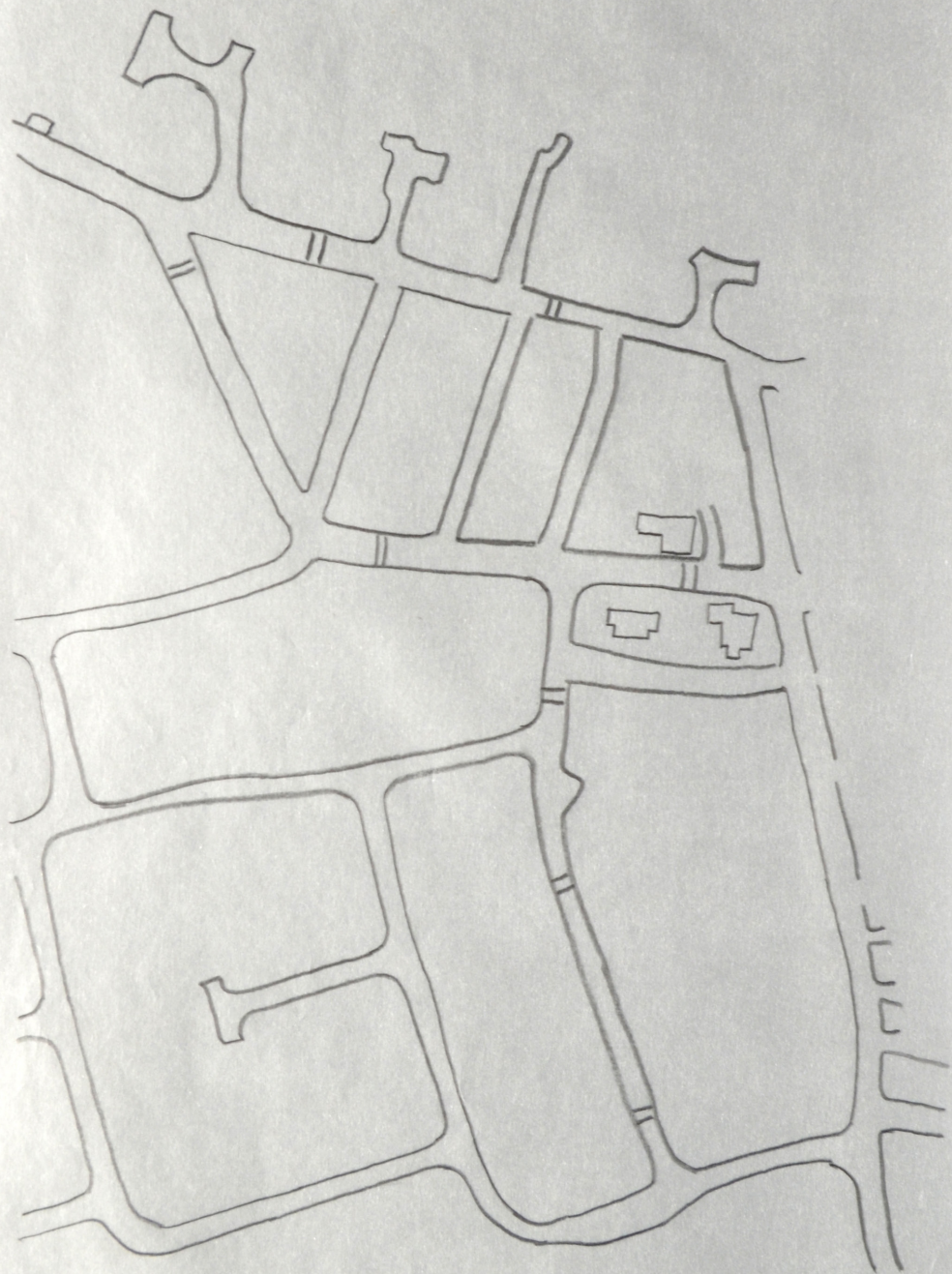


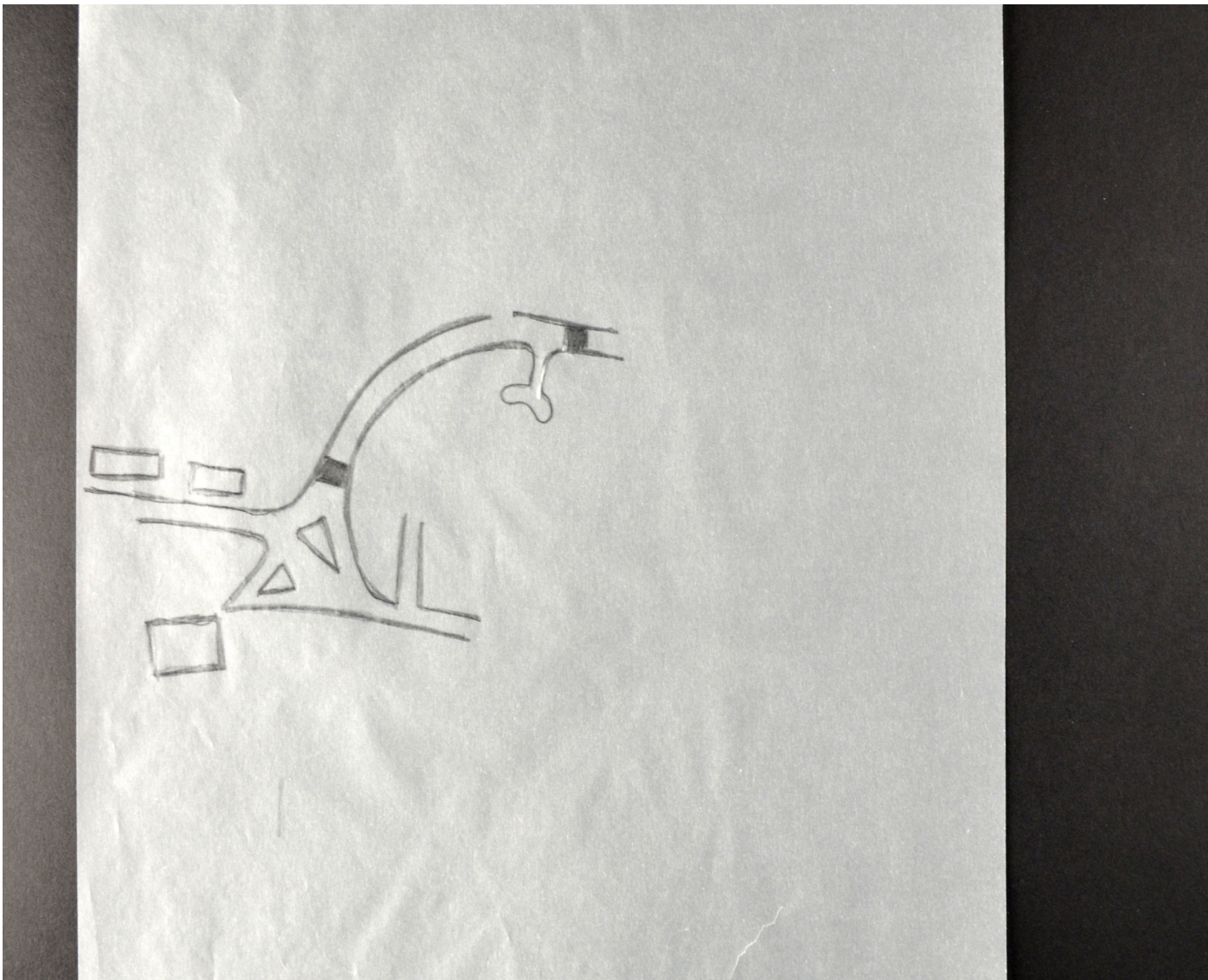


>  
 Fig. Scholes Village 20mph zone (master copy: back).  
 Non tactile writing not translated [Access to Economics] [Fig 2 production possibility curve].  
 Paper potentially re-used from another project.

>  
 Fig. The original, non tactile map of Scholes Village Cleckheaton.  
 Areas are highlighted to indicate they are to be translated.  
 Green indicates road outlines.  
 Pink indicates names needed on the plan.  
 Blue indicates traffic calming.  
 Red indicates buildings of reference.







>  
*Fig. A simplified tracing paper sketch of Scholes Village (part 1).*

>  
*Fig. A simplified tracing paper sketch of Scholes Village (part 2).*

> dewsbury station to lloyds tsb and hole in the wall

lloyds  
tsb

wall

metal seating area

grass

key

car park

footpath

tactile  
paving

wall

station entrance

>  
*Fig. A vacuum form image of Dewsbury Station and directions to Lloyds TSB (hole in the wall).  
The master copy of this image is located on the next page, as is a "clean" copy of this map.*

Dewsbury station to Lloyds TSB + hole in wall.

REVERSE SIDE OF CARD



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REVERSE SIDE OF CARD

REVERSE SIDE OF CARD



מכשירי רפואה וציוד רפואי



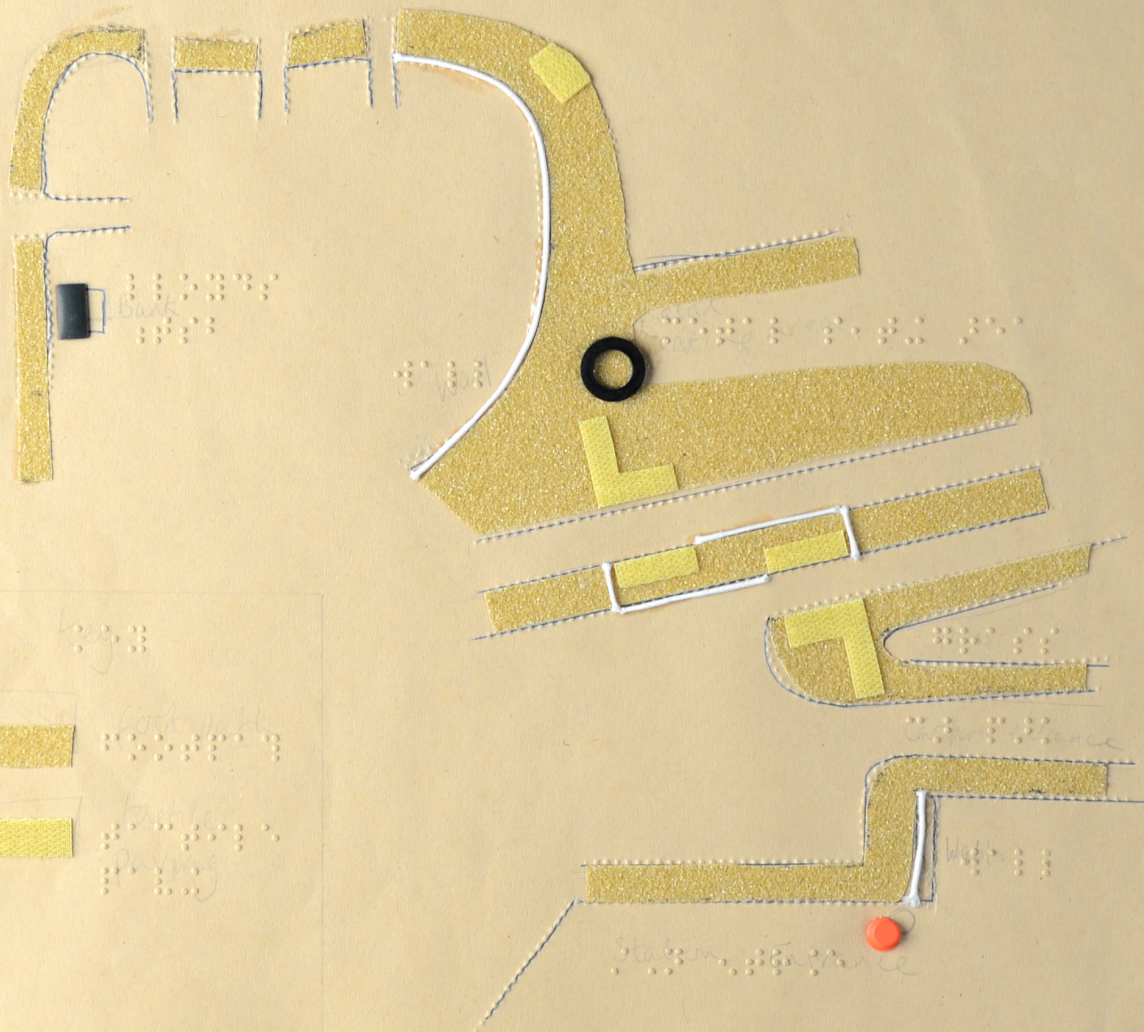
מכשירי רפואה וציוד רפואי

מכשירי רפואה וציוד רפואי

מכשירי רפואה וציוד רפואי

Dewsbury station to ● Lloyds TSB + hole in wall.

Braille line of text at the top of the page.



Legend for the map:

- Yellow rectangle: Lloyds TSB
- Yellow rectangle: Lloyds TSB

> st. george's square--key

roads

outline of main buildings

bb britannia building

bus stops

leader line

water feature

trees


>

*Fig. A vacuum form key for St. George's Square.*

*The master version of this key is located on the next page.*


*The map and its master version are also included in this archive.*


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> st. george's square--key

roads

outline of main buildings

bb britannia building

bus stops

leader line

water feature

trees

>

*Fig. A key for St. George's Square.*

*The map and its master version are located on the next page.*

St George's Square key

St George's Square key



St George's Square key



St George's Square key



St George's Square key



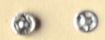
St George's Square key



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St George's Square key



St George's Square key

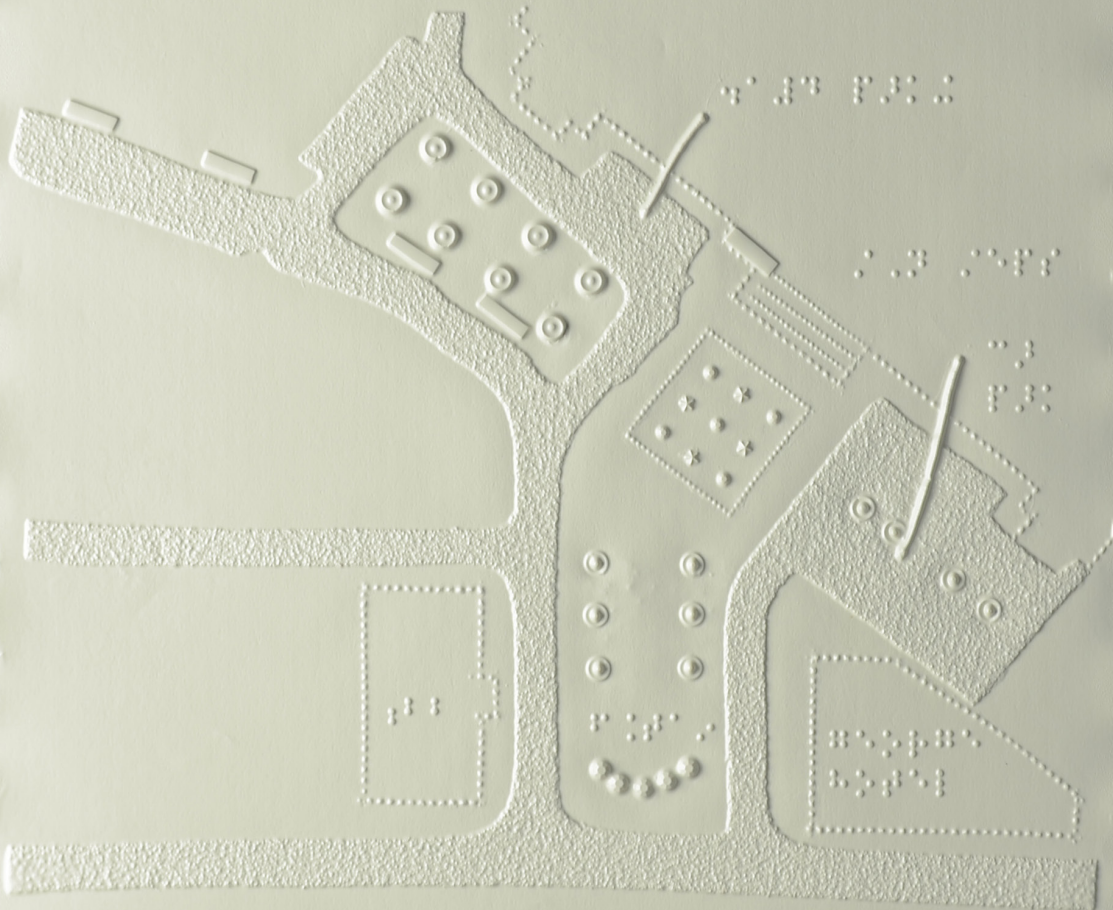
> st. george's square

disabled parking  
station steps  
car  
park  
bb fountain george  
hotel

>

*Fig. A vacuum form map of St. Georges's Square.  
The master version of this map is located on the next page.  
The key to the map is located on the previous page.*

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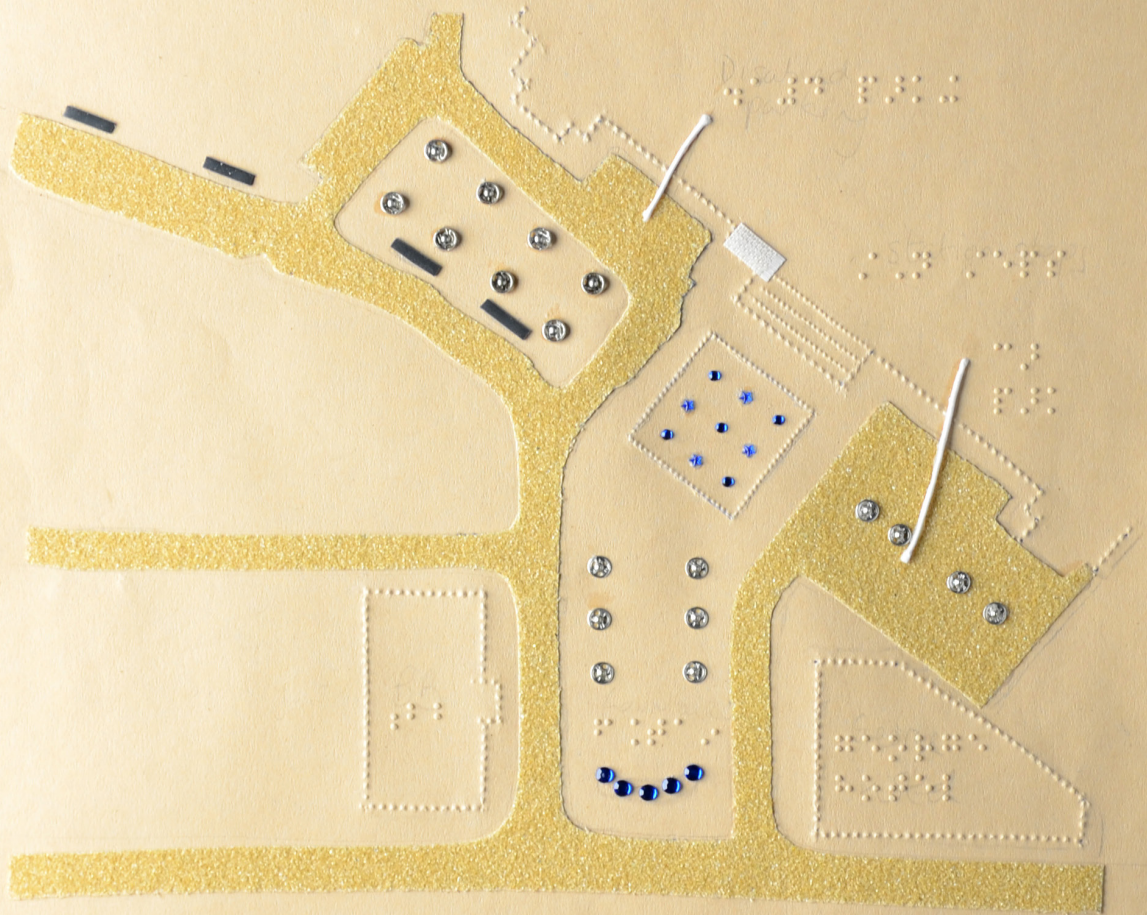
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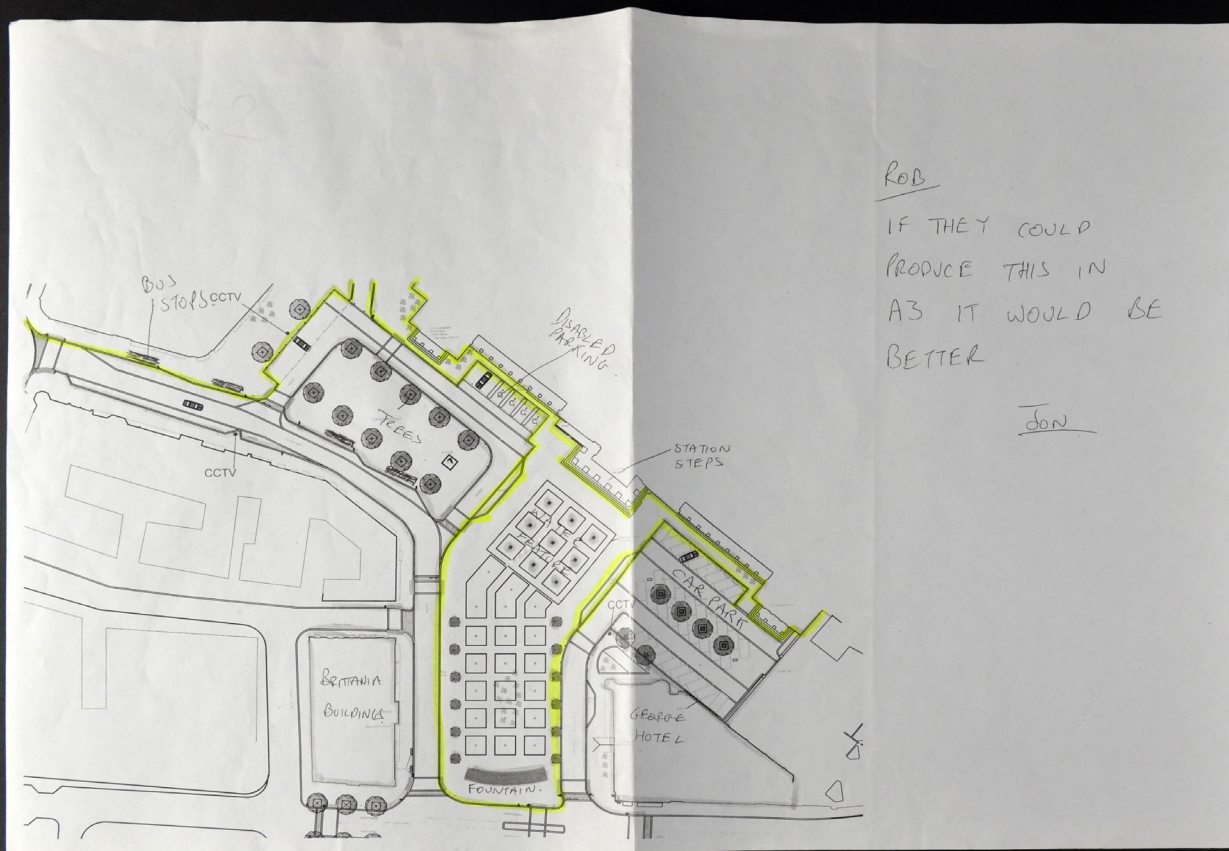
disabled parking  
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*Fig. A vacuum form map of St. Georges's Square.  
The master version of this map is located on the next page.  
The key to the map is located on the previous page.*

St. George's Bay  
1974

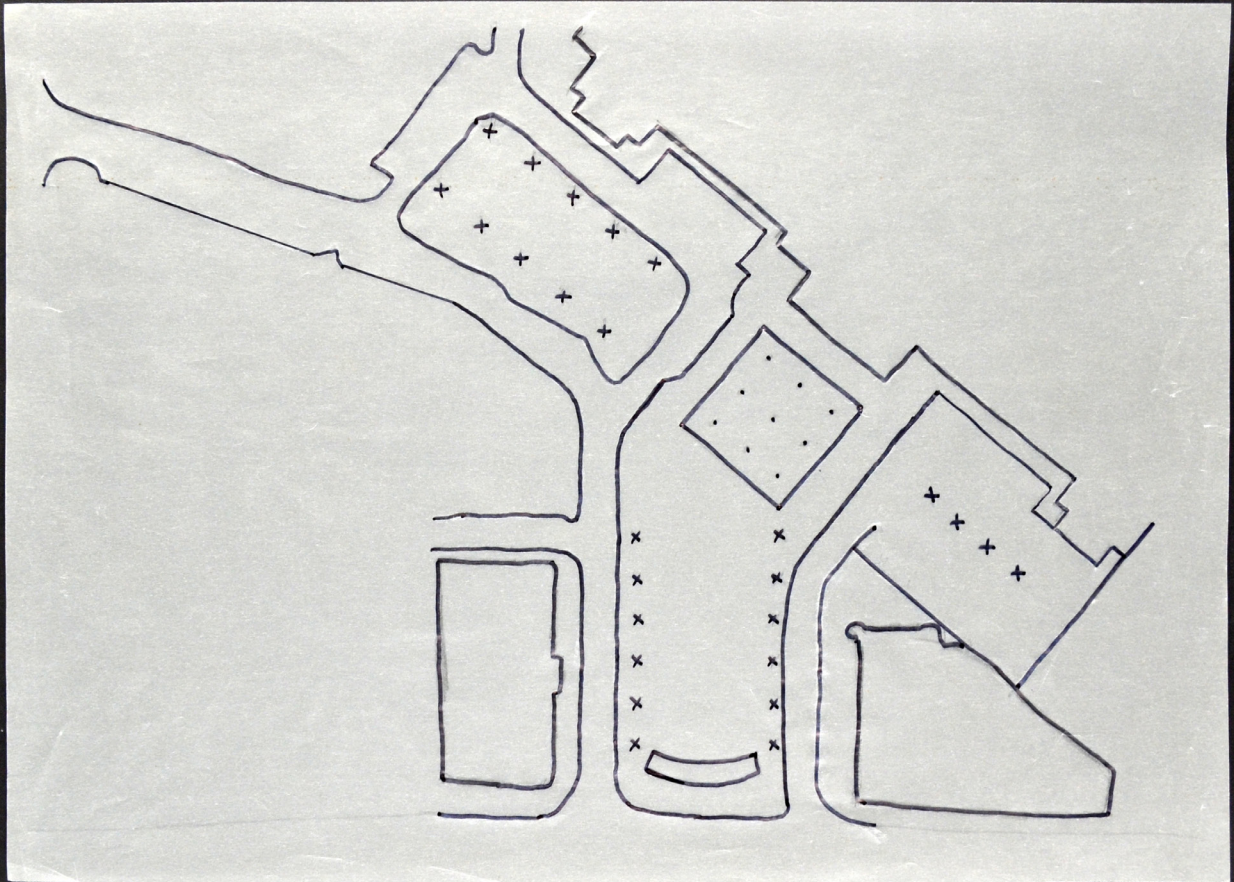




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Fig. The original rough map of St. George's Square.

Non tactile writing: [ROB IF THEY COULD PRODUCE THIS ON A3 IT WOULD BE BETTER JON], [BUS STOPS], [DISABLED PARKING], [STATION STEPS], [CAR PARK] BRITANNIA BUILDINGS], [FOUNTAIN], and [GEORGE HOTEL].



>  
*Fig. A simplified tracing paper sketch of St. George's Square.*



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