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# Collaboration across design disciplines to create a new designer maker's tool

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## Abstract

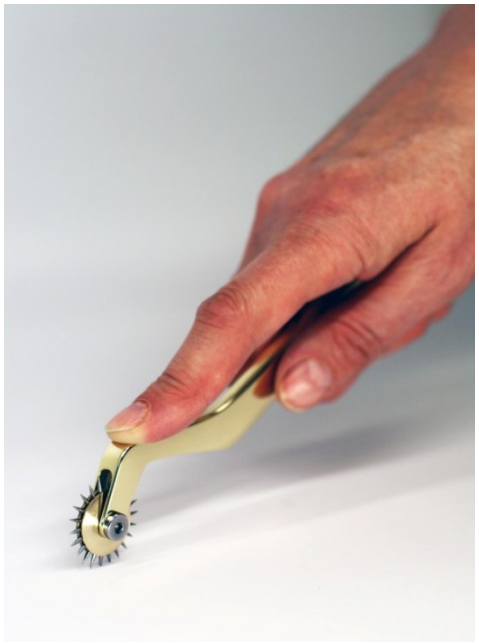

***Figure 1*** *Final Design*

This cross discipline collaboration was initiated to create a design tool that enhances creative use and accuracy in fashion pattern construction, a tracing wheel. A tracing wheel aids the pattern designer to translate a 3D Moulage design developed on a mannequin into a flat paper pattern. This pattern can then be used to create a final garment with accuracy in the desired cloth. The Moulage process is used by couturier houses to obtain complex shapes that are difficult to achieve through flat pattern cutting.

The manufactured tracing wheels available in the market are generally made from plastic and a cheap metal wheel. They look like toy cowboy spurs. The spur wheel is the pricking implement that rolls through the calico prototype to obtain a 'traced' pattern. The differing tracing wheels available lack tactile ergonomic use and/or do not leave a defined 'prick' in the paper required to obtain an accurate pattern.
The case to hold this tool will be of equal importance to the tool itself, a protective barrier that holds the respected tool as a jewel. A maker and their tools have a synergy. As in Sweeny Todd talking about his razors as an extension of his arm; "these are my friends, see how they glisten, see this one shine, how he smiles in the light, my friend, my faithful friend" (Sondheim, 2010) The product designer in conversation with the fashion designer have worked through the problems of use in current and vintage tools. Both designers have contributed to the process in exploring flatware designs (cutlery) for weight and hand feel, making sketches, CAD representations and modelling in OBO Model Board. Through several iterations the finalised design has been executed in brass. The weight of the Brass in the product is hoped to give a better hand feel and a positive user experience. It is intended to translate a cheap plastic tool to one that has greater worth, feel and responsiveness to inspire further creativity in pattern translation. A tool that may engender continued pleasurable use in creative pattern cutting.

## Author Keywords

Moulage; Pattern Wheel; Tool; Ergonomics; Materials Exploration; Dialogue.

***Figure 2***
*Existing Plastic handle Tracing Wheels The tool on the left has burs left by the plastic molding processes that are sharp in the palm of the hand. The tool on the right has a pressed metal wheel with blunt serrated points.*

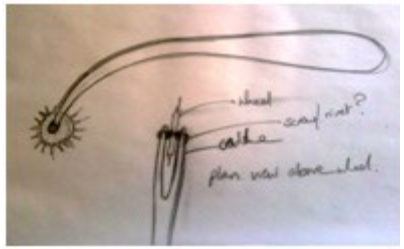

***Figure 3***
*Pre sketch that initiated the collaborative conversation*

## Research Imperatives

This practice based research was a response to the inadequacies of a pattern cutting tool, the tracing wheel. A tracing wheel aids fashion design pattern cutters to translate pattern pieces accurately onto paper. Designers will often moulage an idea on a mannequin, molding, draping, easing, shaping and forming fabric around a substitute human form. This 3D construction is dismantled from the mannequin with all the annotations and traced through the fabric with the pin pricks from the tracing wheel in order to obtain a flat pattern that when cut in the desired cloth will form the final garment. The current tracing wheel tools vary from those with cheap plastic handles with sharp burs left from the molding process to those with wooden handles on a metal shank with thin pressed serrated wheels that leave a blunt impression on the pattern paper. *Fig 2*

Danny Duquemin-Sheil from Northumbria Designers in Residence has been building a body of work that explores tools for everyday living. The Designers in Residence latest inquiry is to form a partnership for a collaborative project. Danny and Fashion Design Academic Sarah Morehead discussed tools in fashion design and the increasingly disposable nature of tools that did not enhance the user's performance but possibly hindered the processes through discomfort in use.

This new tracing wheel tool was to sit comfortably in the hand, feel smooth to touch, keep the wrist at a consistent angle and have greater aesthetic appeal than those already available for purchase. The cost of the tool would be considerably more expensive than current disposable models and possibly equal in value to a good knife. Like any artist, having the right tools to craft your work is vitally important. Having a connection to those tools that they become an extension of your physique adds to this interplay of body and tool.

## Research Process

Initial conversations between the two designers were about the tool, its function, existing products and their strengths and weaknesses. The cheap, disposable products available on the market were neither visually appealing nor ergonomic in handle design. *Fig. 4*

***Figure 4***
*Examples of existing products, their handles and wheel structures*

Danny became aware through demonstration from Sarah of what the tool should be able to do and the short comings of existing tools. This led to a series of rough sketches to explain in more detail the tool's function and aesthetics.*Fig.3*. Each designer discussed 3 D forms that could be relevant to the design and making of a more elegant tracing wheel tool. Danny bought different sculptural Japanese bamboo knifes, spoons and strainers whilst Sarah shared an understanding of how historic cutlery might inform the process. (Brown, 2001) The simple forms of the molded and cut bamboo were very elegant. *Fig.5*. The Pistol and Rattail designs of 18th century cutlery offered a tactile shape that could sit across the palm of the hand with comfort. *Fig.8*. Through conversation and overt and discreet demonstration each practitioner gained knowledge and understanding of the materials

***Figure 7***
*CAD illustration of wheel area*

***Figure 5***
*Japanese Bamboo Tools*

***Figure 8***
*Contemporary Pistol Flatware*

and processes required to create the tool. Discreet demonstration as in the hand movements and body gestures that accompanied the conversations which gave a richer understanding of the joint process we were undertaking.

Through exploring, handling and feeling the shapes of modern bamboo and traditional cutlery the first developments, sketches and model in OBO modeling foam were produced. The tool was to fit an average size 7 hand. In the first model the handle fell into the cup of the hand, from user experience this can cause pressure when pushing the wheel into the small bones in this area resulting in pain. The second iteration was elongated to sit on the mound of flesh, the Hypothenar muscle group opposite the thumb group of muscles called the Thenar. *Fig. 6* the length of the tool was now established along with the upper girth and comfort in the palm. Focus was now placed on how the fingers curved around the tool to grip the handle. The underside area of the tool where the fingers curl back to grip was skived and pared to enable an internal precision grip. The forefinger should direct and control the wheel as a drawing implement. The area above the wheel needed to be of sufficient width to comfortably rest the pad of the finger at a relaxed angle. The shape of the tool was to enable good grip and minimal effort in wrist movement allowing an imaginary straight line through the pad of the forefinger through the hand and up the wrist to the forearm. *Fig.1* All of these parameters had informed the subsequent models. At each stage we discussed the evolving aesthetic. To Sarah, the now functional tool needed to have a more jewel like aesthetic and to encompass the elegance of fine dining. For Danny the tool had become an elegant bird like form.

Danny designed the steel spiked brass wheel through CAD and provided the details to enable a local engineer company to provide a costing. *Fig. 7* Dialogue with Tom Jones from M Machine, the specialist in this area of manufacture, offered two ways of executing this component. Handmade would cost £300 and to have a production tool made for batch work would be similar. At this point we discussed refining the spiked wheel from an older tool for inclusion and attachment to our newly formed handle. This wheel was ground and polished to give a more considered aesthetic appeal to the pinched brass structure that holds in the conical steel points. Danny made a special wooden clamp to hold the wheel whilst grinding and polishing the faces of each side of the hub. He developed a tool to create another tool. The sex bolt that holds the spiked wheel in place was purloined from an old Anglepoise light. This dictated the size of the central hub hole and is aesthetically larger than desired.
The box is of wooden construction with the inner area routed and lined to hold the instrument in place. The lining will be in crushed velvet or similar to reflect the inside of a snooker case, jewel box or cutlery canteen, (see link to Maria Theresia Vienna). The new tracing wheel is considered as an item to be cared for much in the same way as a snooker player carries their own identifiable cue in its bespoke case. This tracing wheel should also have its own ceremonial space.

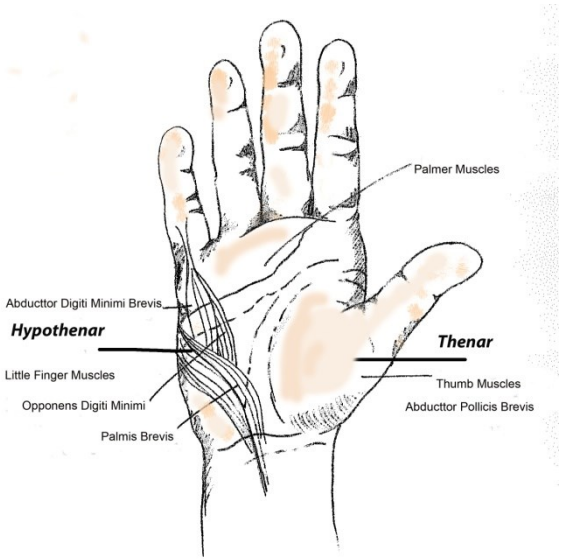


***Figure 6*** *Hypothenar and Thenar*

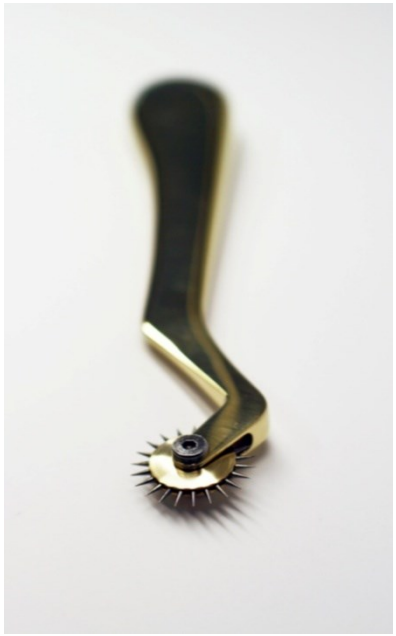

***Figure 10***
*Finished design*

***Figure 11***
*Wheel Section, Sex Bolt is too large*

## Research Outcomes

The journey and understanding between each different design discipline, 3D product and fashion, has led to a wider knowledge in hard and soft materials and the performance qualities of hand tools. The process has brought a mutual acknowledgement in how we explain and communicate ideas through pre sketch, actions, conversations, metaphors and the different vocabularies of each discipline. Performance of the user is inextricably linked to the performance of the tool and has impact on the creative flow and intentions of the creator. Disposable tools impinge on how we feel about our craft processes whilst using them. We are more conscious of the negative sensations of the tool in use. A tool that becomes a seamless extension of our selves and where we become less conscious of its presence enables an interrupted creative flow. When we put the tool away, look after it, we take ownership of its function and ability to perform for us in a pleasing manner. This in turn builds pleasurable memories of positive use, creating a virtuous circle of care, use and performance.

***Figure 9*** *Filing and refining final tool*

It is understandable that sons wish to care for their fathers tools which although grey and worn through time have a stronger construction, feel and lasting performance. Good tools have emotional resonance. This tool in solid brass has elicited conversations about similarity to flatware. Flatware, cutlery, also has to feel comfortable in the hand as a discreet but pleasurable tool to aid dining. Affluent travelers' during the 18th century carried their own flatware housed in elegant boxes, (see Britannica reference). This tracing wheel has been created with the same consideration. The tool is expensive in comparison to its disposable counterparts. It was not necessarily intended for mass manufacture and would be comparable in price to a good pair of drop forged English bespoke shears. However, it could be cast in brass to make the tool more economically viable as a product. As many musicians are aware, practicing with a beautifully made instrument aids positive feedback through both sounds and touch. The tracing wheel tool was intended to aid the connectivity of man to craft and the wielding of materials in creative flow. Just like the musician, the greater connectivity to the tool, the greater the reward in learning, performance and tacit understanding. Final designs Fig.10,11,12

## References

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***Figure 12*** *Finished design*