

(THOUGHT) PROCESS DRIVEN: THE INCONSONANT IMPRINTS OF MIND AND MACHINE

*“Are limbs, so dear-achieved, are sides
Full nerved, still warm, too hard to stir?
Was it for this the clay grew tall?”—Wilfred Owen, Futility*

*“Paradoxically, the ability to transform memory is the norm, while the problem in PTSD is that the full brunt of an experience does not fade with time.”
— Bessel van der Kolk, Post-traumatic Stress Disorder and Memory*

by NR Catren

Washington, D.C., is a memorial-heavy town. The National Mall and surrounds contain a plethora of them, consecrated between 1885 and 1995—but it wasn't until 2016 that the World War I Centennial Commission selected sculptor Sabin Howard (b. 1963), architect Joe Weishaar (b. 1991), and their design, *The Weight of Sacrifice*, to memorialize the First World War.

By the time this memorial is complete,¹ more than a century will have passed since the “war to end wars.”² But considering its far-reaching effects, this should not be surprising. The Great War, having wrenched our global paradigm from humanism to industrialism, is perhaps only beginning to feel approachable—and authentic memorialization achievable—as we near the centenary of its armistice.³ Leaving ten million soldiers and seven million



civilians dead, World War I was mechanized atrocity on a grand scale. Howard observes that “after the war there was no longer a sense of God or divine order—it heralded the beginnings of modernism. This war was, well... crazy making. Ideally, we memorialize the past in order to not repeat past mistakes.”



Enter *A Soldier's Journey*, Howard's 65-foot raised sculpture relief at the heart of the selected design. The relief will be comprised of three sections—beginning, middle, and end—and each section contains within itself a beginning, middle, and end. Its narrative forms an arc from family and love through battle and war, to the great void and war's far-reaching cost.⁴ The soldier central to the narrative physically enacts, through a driving 'X' composition, the transformative journey experienced by those directly involved in the First World War.

Implicit to this sculpture is an ironic circularity that is not only thematic, but extends to the process behind its creation. *A Soldier's Journey* is a story of the fight to preserve a civilization that had changed into something unrecognizable by war's end. Because of *how* the battle was waged, it carried with it the leitmotif of predestined loss. In a similar way, the nature of any chosen artistic process unavoidably affects outcome. Certain techniques might be selected as the most effective means to an end—but the means can also utterly transform the end.

Howard was chosen for this memorial because he was one of perhaps three artists successfully working in a completely traditional manner.⁵ The Commission, Howard explains, "had a vision for an amazing sculpture with the historical relevance that it could have been made in 1918."



Given this, how did Howard end up using digital technology for the first time ever while making this memorial sculpture? Simply put: he had no other choice. Utilizing new sculpting technologies enabled him to meet insanely tight deadlines, save money, and help the Committee and others toward an understanding of his vision and the work's potential. In a symbolic paradox that might be seen to mirror the war's global effects, new technologies quickly became intrinsic to the sculpture's realization. The struggles and challenges inherent to *A Soldier's Journey*

are due only in part to its monumental nature; temporal issues are also at play.⁶

Time was an issue from the start. Howard is used to composing by means of meticulous hand drawings,⁷ but this became unfeasible considering the project's monumentality

and the stringent deadlines involved. He needed to find a way to hybridize the process without letting the quality of his work suffer.

Howard chose models for the expression they brought to the composition.⁸ While they acted out scenes, Howard took iPhone burst pictures to quickly pinpoint dramatic



Opposite page, top: Wall render; **bottom:** The concept drawing. **On this page, top:** Paul Emile Cendron burst; **middle:** First day discussing methodology—from left to right: Sam Gao, Richard Taylor and Sabin Howard.



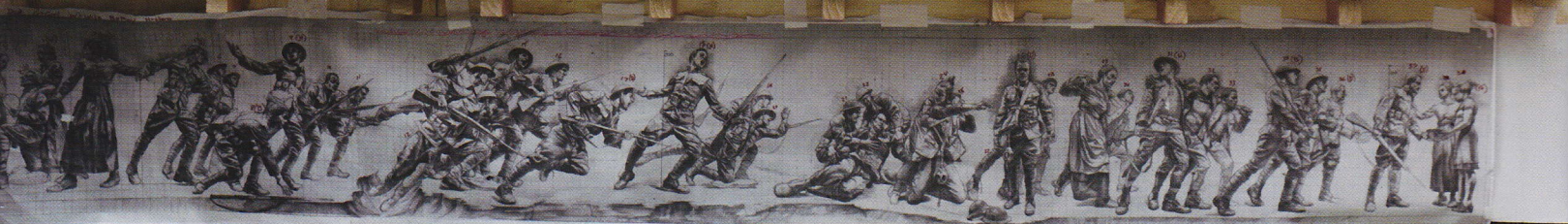
Photos: Courtesy of Sabin Howard and Richard Taylor (Weta Workshop).



peaks, then sent selected photos to Weishaar, who placed them in Photoshop® under Howard's direction. Thus began a four-month collaborative process that combined Howard's drawings and composition with Weishaar's technical support. Each day, remembers Weishaar, "I would send him a high resolution copy of the composition that he could print and

draw on top of, to plan the next day's photos." Sabin then spent a further three months on a final drawing used for concept approval.

One of the main challenges in the implementation of *A Soldier's Journey* is that people cannot picture it. Similar extant sculptures can't be referenced, because they don't ex-



ist.⁹ Hours after receiving concept approval, Howard realized that to retain funding he needed a way to offer the Committee a concrete concept of the finished sculpture. “Without the time-saving technology of Weta Workshop,” says Howard, “this project would have died.”

Weta Workshop¹⁰ is a Wellington, New Zealand-based design and manufacturing company that serves the world’s creative industries. Starting thirty years ago the company was built from the ground up by Richard (b. 1960) and Tania Taylor.¹¹ Taylor explains that “on a chance meeting at Sabin’s studio, I had the good fortune of seeing his conceptual illustration for the memorial sculpture. I expressed to him that we would love the opportunity to work with him to create the maquette of the drawing.”

Howard—believing that the “inter-digitation of creativity and business is essential in a project like this”—agreed. He would spend months collaborating with Weta Workshop to create a 1/6-scale model of the entire sculpture relief. Throughout the process, these strange bedfellows have intelligently interwoven Howard’s traditional techniques with Weta Workshop’s sculptural technology in order to produce a maquette of Howard’s vision for Committee review for an extremely tight deadline.¹²

Why Weta Workshop? Howard sought the ability to process and adjust possible iterations of the 3D sculpture quickly. Taylor explains: “At Weta Workshop we have 300 artists and technicians working on a minimum of seven to ten film, television or manufacturing jobs per year. A number of our staff are proficient in both sculpting and Zbrush¹³—this, coupled with our nine milling machines, twenty 3D printers, laser cutters, plasma cutters, and CNC¹⁴ mill beds... enables us to work from initial sketch to final cast or maquette. This significant infrastructure enabled us to finish Sabin’s complex project within a very short time.”

Since the Weta Workshop was able to provide a completely holistic service on a huge scale, the interweaving of the traditional and technical could happen intuitively. Howard closely compared his hand-drawn vision with the mechanized outcome every step of the way. “Throughout the process, the drawing always brought us back to what the piece would look like,” explains Howard. “The drawing was the template.”

High relief can be seen as a meeting point between drawing and sculpting. In conjoining pictorial and sculptural space, it has the potential to become a theatre through which the viewer sees into a different realm—one that, paradoxically, often speaks with far more immediacy and eloquence than any three-dimensional representation of reality.

There were two primary artistic challenges involved in translating Howard’s vision into high relief: discovering the correct spatial depth, and getting it to read in perspective by means of reduction and foreshortening. Though Howard points out “there is not much that is flat in this relief,” neither are any of the figures completely in the round. Each figure is perspectival, to some extent—and this specifically shapes the emptiness around it. In such an epic continuous narrative, told in high relief, the shape of the spaces between is as essential to the story as the figures themselves. After all, music without surrounding silences is not composition; it is only noise.

Taylor agrees that relief holds far more challenges than sculpting in the round. “We put the sculptures into a VR system so that we could view the layout, the relief and the composition as if we were standing in the correct eye line and head height were the sculpture in situ.” ZBrush “allowed us to experiment by compressing the human form as required by scaling up and down, and by forcing the perspective on different figures.” To gather as much information as possible for the digital sculpting process, a 3D scanner was used to take more photographs of models and equipment under Howard’s direction.¹⁵

Opposite page,
top: Challenges of
high relief—spaces
between; **bottom:**
The drawing was
the template.

On this page:
Zbrush—Richard
Taylor supervises
digital sculpting.





Then began the testing: composing, milling, analyzing, correcting, milling again, and so forth—in the end, they ran six rounds of tests to arrive at the final depth, which in some places extends to as much as $\frac{3}{4}$ of the total height. The individual pieces were milled out of polystyrene using Weta Workshop's home-built 5-axis milling machines,¹⁶ and were then put together and compared to the final drawing to ensure consistency. Next, they were 3D-printed to produce a better vision of the figures in the round. "When Sabin was satisfied with our 3D print," says Taylor, "we sent the digital data to our partner's facility in China, where they made the final 3D prints on a higher resolution machine that delivers very large prints cost effectively." These prints were returned to Weta Workshop, where silicone molds were taken of each of the 120 pieces, then poured in urethane.

After Sabin hand-finished each piece, they were re-molded and replicated in resin using autoclaves to assure bubble-free castings. Weta Workshop's model-making team assembled the pieces, while chasing seaming and other imperfections, and mounted them onto steel strapping and backing board. Finally, each piece was finished in faux bronze and reassembled for photographing.

Why so complicated? "The process may seem quite convo-

luted," says Taylor, "—a fairly elaborate way to achieve something that could be done far more simply had it just been hand sculpted, molded, and cast. Time was the deciding factor. Due to the tight deadline, a digital process—using digital sculpting and robotic manufacture—was a successful and efficient way to achieve the required goal."

Had Howard worked entirely with traditional techniques, the cost of the initial part of this project would have tripled. Timewise, working with Weta Workshop has quadrupled savings. These are not vague estimates; Howard is intimately acquainted with all physical and fiscal trade-offs involved in this collaboration.

So how will Howard create the full-sized relief? In order to carry the full force and drama of *A Soldier's Journey* through to the final stage, Sabin is planning to use digital tech only for the enlargement process. The pieces will be enlarged without detail and everything else will be traditionally sculpted.

He will completely avoid reverse scanning¹⁷ because it drastically reduces surface. "A lot of companies will tell you it's better because it reduces seam clean-up in the bronze finishing process—but you lose your surface. Many sculptors create a 42-inch figure, digitally enlarge this, and call it done," Howard observes, "but tool marks are changed by enlarge-

ment; their meaning and proportions change. Also the height, the width, the X Y Z axis—all of this changes utterly when enlarged. In addition, at a different scale, things simply *appear* different. Figures never translate directly from a smaller scale.”

It also remains important to Howard that the work is all done from start to finish under one roof. One hundred and twenty separate pieces means a lot can go wrong, and as he observed with Weta Workshop, “In a cohesive workshop there is a trail of responsibility; there is give and take—backtracking and troubleshooting are possible.” To this end, he is researching different foundries in order to find out what they can provide in terms of time, quality, integrity, and large-scale production capacity.

Howard is the first to admit he doesn’t know much about digital technology—but he knows what his work should look like, “and this is why I need to have absolute trust in the people who *do* understand the tech. There is a lot of pitching and pressure from different companies to convince me that their company’s product is what I want. And often, it’s just not true.”

The final phase will take about four years. For this, he needs to find a foundry closer to home that suits his artistic and technical needs—one that can work traditionally, manage more and larger pours, and handle large sheets without buckling. Howard has observed that many western foundries tend to cast in 18-inch sections. In a work of this size, such small casting is antithetical to flow and there are too many lines to refinish.¹⁸

At the foundry, Howard will disassemble, number, and label each of the maquette’s 120 parts for 3D scanning. Full 2-meter

high scale replicas from the final ZBrush files will be milled out of middle-density blue extruded polystyrene, with a 5mm offset.¹⁹ While these are still on the milling machine, a molten layer of plasticine is poured over them.²⁰ After this, the pieces are re-milled without the offset, thus creating a “fairly accurate replica of the final sculpture into the plasticine.”²¹

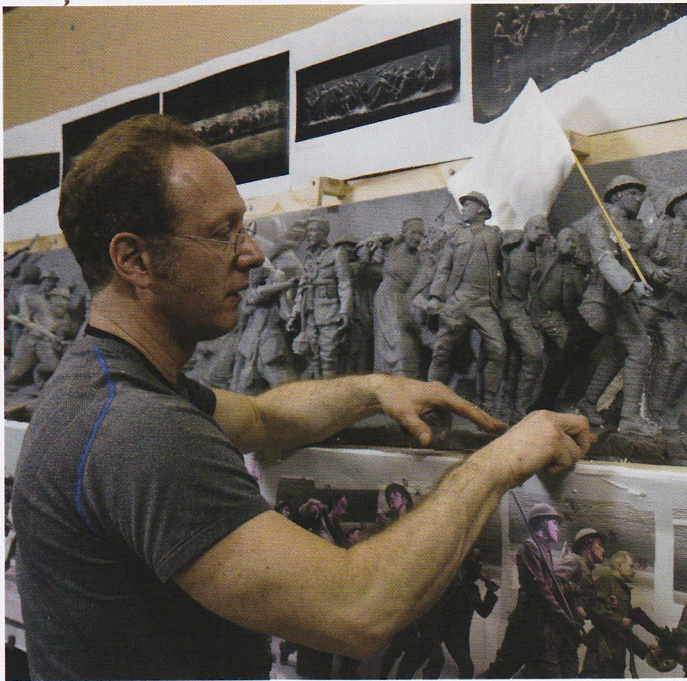
The figures that are more active—lean forward more—will need to have steel armatures inserted. Taylor describes this process, which consists of “hot-wiring through the poly and plasticine to split the figures in half. Then we carve out the cavities with a hot-wire scoop and install the steel armature. Using urethane foam, we glue the two pieces back together and touch up the seam.” With these machine-enlarged pieces serving in essence as armatures, they will be reassembled on the wall and taken off and on as Howard continues with his traditional surface sculpting.²²

And that is when Howard is reunited with his technology of choice—traditionally crafted Milani Metal tools. Made by a family in Bagni di Lucca, Italy, they represent Howard’s Roman apprenticeship with Paolo Carosone. “I learned how to model from Paolo,” explains Howard. “This was the missing link in my creative process. His tools changed the way I thought, towards thinking about surfaces as continuous. This conception creates more surface tension, increases surface flow. The surface is an explanation of what’s going on *under* the surface.”²³

The imprints of the human mind and those of the machine-

Opposite page: Weta Workshop home built 5-axis milling machine at work. **On this page:** Preliminary milling test of clay.





mind tell very different tales of intent. Howard emphasizes that a sculpture's surface is integrally bound to the *disegno*²⁴ that runs through the creative process from a composition's inception to its completion. "It is a product of the process, forming directional lines, and thought-process driven—driven by the thought process of its creator. [The surface] is much more varied than with a machine; the entire impetus is different. Machines do not create an underlying structure of surface energy."

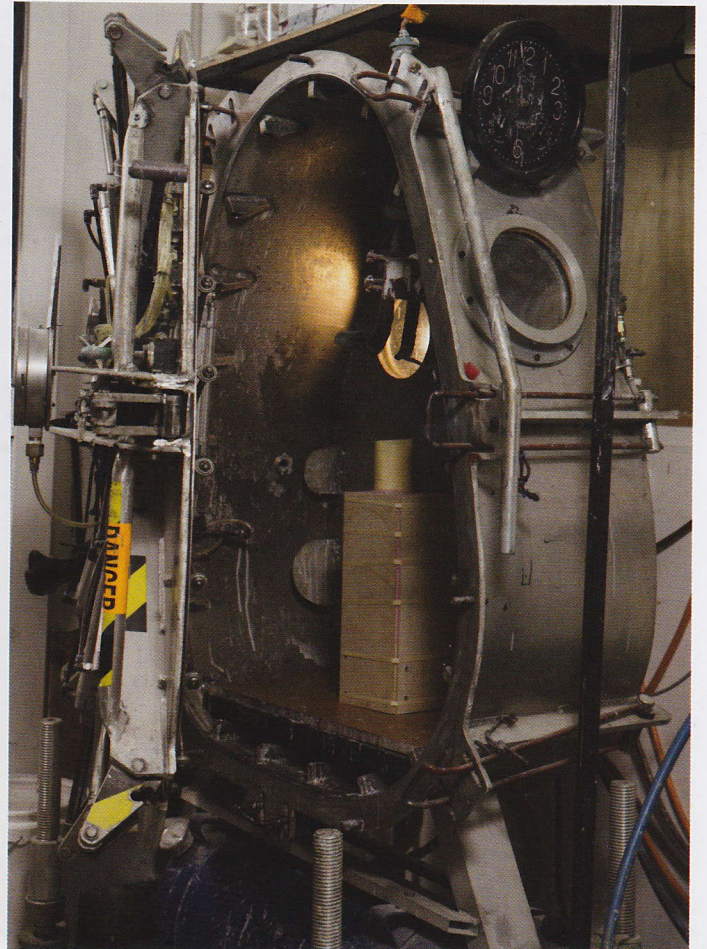
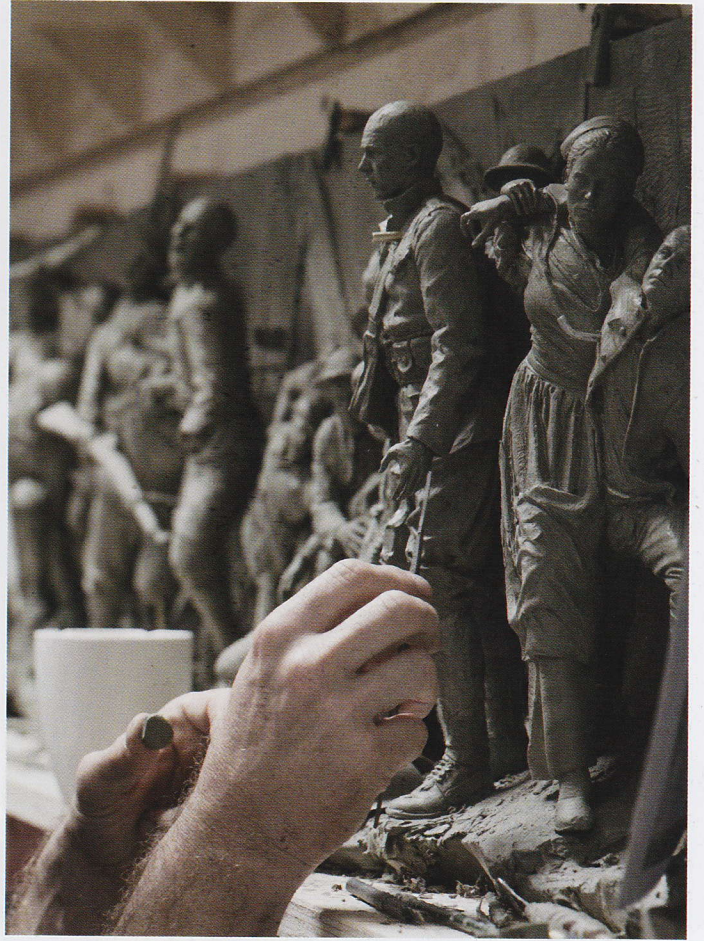
Impetus and intent are what separate machine-driven technology from traditional fine art methods. The processes are driven by diametrically opposed priorities. The goal of technology is often to imitate the real—but in humanist-driven fine art, replication is not the end goal. To imitate the real, 3D scanners and digital sculptors scientifically recreate the coordinates of real life objects. But, as Picasso said, "To tell the truth you must tell a lie." In Howard's process, "the figure... goes from reality to an abstract system. I think, so I see things machines *don't* see. Thought process is driven by this; artistic creation is driven by this. When we introduce a digital component—mechanical looking—there exists no human construction pattern, and art is without draughtsmanship."

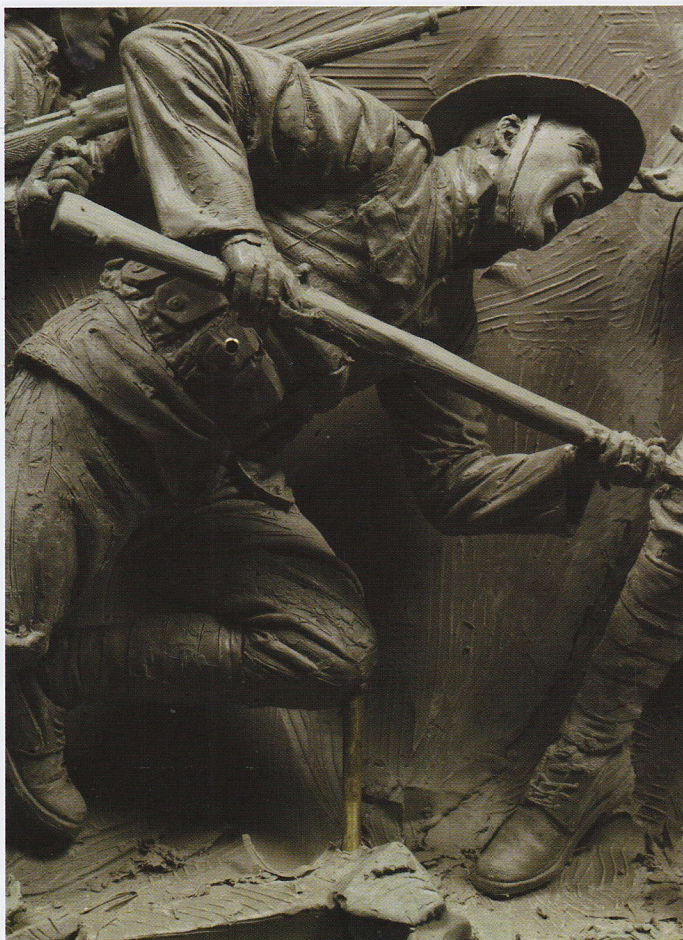
So, with all of the paradoxical time constraints placed on individuals in this era of time-saving devices, is traditional sculpture becoming an endangered process? Howard believes it is. Certainly, artists who learn and teach it comprehensively are difficult to find. As Taylor observes, "Sabin has spent his artistic career... focusing with almost monk-like dedication on the disciplines required to achieve art at the level of excellence he does." Few people these days understand the need for such discipline.


When we lose important things forever, they tend to slip quietly away. After all, when something is facing extinction it doesn't have the time or energy to make a fuss—witness the hedgehog, the honeybee, or the ragged amnesiac mind of the shell-shocked soldier. *A Soldier's Journey* could symbolize our potential to come full-circle in a century—to sometimes say no to the machines, in order to observe what is essential and what has been lost.

On this page, top: Sabin Howard with styrofoam maquette iteration; **middle:** Initial data (3D print) used to mold for clay; **bottom:** Silicone mixture poured over the clay maquette to make rubber molds in sections.

Opposite page, top left: Digital clay before being sculpted; **bottom left and top right:** Sabin Howard hand finishing surface; **bottom right:** Autoclave—compression chamber to reduce bubbles in resin molds.





Is Sabin Howard literally scraping back our humanity? The answer may all depend on your definition of “high tech.” 

Natalie Catren is a free-range freelance writer based in the UK. Equally uncomfortable on either side of the Atlantic, she hopes one day to live in a lighthouse.

*All quotations are from the author’s several phone and email interviews with Sabin Howard and his wife, writer Traci L. Slatton, an email interview with Joe Weishaar, and an email interview with Sir Richard Taylor.

NOTES:

1. Completion is now estimated in the early 2020s.
2. An initially optimistic and later cynical descriptive used for WWI, based on a 1914 compilation of articles by H. G. Wells entitled *The War That Will End War*.
3. November 11th, 1918: “The 11th hour of the 11th day of the 11th month.”
4. Howard refers to the first two as Venus and Mars; it might then be fair to ascribe the third section Parcae—the three spinners of Fate.
5. From among 350 global entries.
6. There is also a great deal of unforeseen ideological push and pull: for instance, the *Catch-22* challenges implicit in fitting a neo-humanist memorial within the modernist constraints of the Pershing Park, as it now stands—the derelict Friedberg design having been declared a significant cultural landscape only after approval of the new memorial design.
7. For the past twenty years Howard has drawn and sculpted from life—primarily actors or dancers, because “they are specialists in how bodies move in space to tell stories.”



Tool marks are changed by enlargement; their meaning and proportions change.

8. By pure chance, many of them turned out to have close lineal ties to WWI. One of his actors had a great-grandfather who was killed in the war and a great-uncle who survived it only to kill his wife, his daughter, and himself with his service revolver when he returned home.

9. Although Sabin cites St. Peter's Basilica, Rome, as an influence on *A Soldier's Journey*.

10. From the Maori word 'wētā'—the common name for about seventy unusually large insect species indigenous to New Zealand. There are tree, ground, cave, giant, and tusked wētā.

11. The workshop first achieved international renown after winning multiple Oscars and BAFTAs in 2002 for its design work on *The Fellowship of the Ring*.

12. July of this year.

13. ZBrush is a 3D software—created by Ofer Alon (aka "The Pixelator") and Jack Rimokh—that is more akin to sculpting than other modeling software. In addition to your everyday run-of-the-mill pixels, ZBrush stores information on an object's lighting, color, material, and depth—the sum of which forms their proprietary "pixol."

14. Computer Numeric Controlled.

15. Such scanners generally use laser or white light to capture the x y z coordinates of three-dimensional objects for digitization.

16. "... with a fidelity of 0.1mm, driven off Delcam Software." (Taylor)

17. The rapid prototyping process in which CNC machines use 3D scanning combined with digital sculpting to quickly and accurately reproduce an object without the use of molds.

18. Gloucestershire foundry Pangolin Editions, who have cast such monumental works as Damien Hirst's *Monstrosity* and Nick Bibby's 460cm high *Indomitable*, are a potential fit.

19. This offset reduces overall volume very slightly, to provide an adequate finishing surface.

20. Taylor hypothetically prescribes 8–10mm; Sabin increases this to about a ½-inch, to enable more cutting and deeper form.

21. Taylor.

22. When this is complete, the finished bronze will be produced using traditional lost-wax methods.

23. Howard first studied under Walter Erlebacher, of the German Bauhaus. After this he apprenticed with Tony Visco. "They taught me structure and separation of form," says Howard.

24. This is *disegno* in the traditional sense—not simply "drawing" or "draftsmanship," but including the technical discipline and mental ability to create and conceive ideas from root to fruition.



Opposite page, top left: Maquette details, surface markings; **bottom:** Sabin Howard applying patina; **top right:** Javier Murcia cleaning up poured clay sculpture.

On this page, top: Milani metal tools—Sabin Howard's technology of choice; **bottom:** Retouching machine surface.