

A SYMPHONY OF MATERIALS

“It is remarkable to me how materials that were developed by people to make tools and buildings end up being used to make musical instruments.” This remark by composer Molly Herron might as well speak for artistic endeavour in general through the ages: from Egyptian pigments derived from experiments in glassmaking to Naum Gabo’s nylon-filament webs, materials innovation driven by other priorities has always been quickly embraced by artists.

Often, however, advances in materials have been used simply to substitute traditional fabrics for new ones, while keeping the design or the function unchanged. Chrome yellow could replace arsenic-laden orpiment, carbon fibre might supplant Pernambuco wood, but still the new materials were used to paint sunsets or make violin bows. For Herron’s composition *Assembly*, on the other hand, commissioned by the Hopkins Center for the Arts at Dartmouth College in New Hampshire, USA, and premiered in May, she explored how materials both old and new could be used in entirely novel types of instrument to create a non-traditional sonic landscape.

Since 2016, Herron has worked with students at the Thayer School of Engineering at Dartmouth to design instruments from scratch, in collaboration with materials scientist

Ulrike Wegst and engineer and educational specialist Vicki May. *Assembly* was, Herron says, much indebted to Wegst’s research on the acoustic and mechanical properties of woods used for musical instruments^{1–3}.

Assembly was structured according to what is in effect a chronology of materials for musical use. The first movement drew on the acoustic repertoire of the most ancient instrument materials: bone, grass and skin, mindful in particular of the bone flutes discovered in Germany and dated to over 40,000 years ago. The second movement used instruments of wood, particularly dense woods like those of Central and South America that European colonists began to import after the discovery of the New World.

Metals have an old provenance in music too, of course: bronze trumpets were used in Greece and Rome. But it was during the Renaissance that brass instruments related to the trumpets and trombones today began to appear. *Assembly*’s third movement took in not only more recent metallurgical innovations such as aluminium and titanium, but also twentieth-century synthetics such as nylon and carbon fibre.

“We were really focusing on the materials themselves”, Herron says. “What does this material want to do? What is its true nature?” Musicians and engineers have in common, she



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adds, that “we both think of things that don’t yet exist, and make them exist.”

What does it all sound like? The piece was performed by singers along with instrumentalists from the percussion ensemble Tigue, “one-half new music ensemble, one-half art-rock band”. One description might be medieval plainchant meets Javanese gamelan — which, perhaps unsurprisingly, then ends up not far from the sonic palette of Steve Reich. The only text for the singers was the names of the materials used: “tungsten-silver-zinc-carbon-fibre-nylon...”, moving Wegst to comment that “I have never [before] heard a composition that was truly dedicated to the materials used in the making of the music”. Let’s hope it’s not the last. □

References

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2. Wegst, U. G. K. *Annu. Rev. Mat. Res.* **38**, 323–349 (2008).
3. Wegst, U. G. K., Oberhoff, S., Weller, M. & Ashby, M. F. *Int. J. Mat. Res.* **98**, 1230–1237 (2007).