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Ancient seashell resonates after 18,000 years

Almost 80 years after its discovery, a large shell from the ornate Marsoulas Cave in the Pyrenees has been studied by a multidisciplinary team from the CNRS, the Muséum de Toulouse, the Université Toulouse - Jean Jaurès and the Musée du quai Branly - Jacques-Chirac¹: it is believed to be the oldest wind instrument of its type. Scientists reveal how it sounds in a study published in the journal *Science Advances* on 10th February 2021.

The Marsoulas Cave, between Haute-Garonne and Ariège, was the first decorated cave to be found in the Pyrenees. Discovered in 1897, the cave bears witness to the beginning of the Magdalenian² culture in this region, at the end of the Last Glacial Maximum. During an inventory of the material from the archaeological excavations, most of which is kept in the Muséum de Toulouse, scientists examined a large *Charonia lampas* (sea snail) shell, which had been largely overlooked when discovered in 1931.

The tip of the shell is broken, forming a 3.5 cm diameter opening. As this is the hardest part of the shell, the break is clearly not accidental. At the opposite end, the shell opening shows traces of retouching (cutting) and a tomography scan has revealed that one of the first coils is perforated. Finally, the shell has been decorated with a red pigment (hematite), characteristic of the Marsoulas Cave, which indicates its status as a symbolic object.

To confirm the hypothesis that this conch was used to produce sounds, scientists enlisted the help of a horn player, who managed to produce three sounds close to the notes C, C-sharp and D. As the opening was irregular and covered with an organic coating³, the researchers assume that a mouthpiece was also attached, as is the case for more recent conches in collection of the Musée du quai Branly - Jacques Chirac. 3D impressions of the conch will enable this lead to be explored and verify whether it can be used to produce other notes.

The first carbon-14 dating of the cave, carried out on a piece of charcoal and a fragment of bear bone from the same archaeological level as the shell, provided a date of around 18,000 years. This makes the Marsoulas conch the oldest wind instrument of its type: to date, only flutes have been discovered in earlier European Upper Palaeolithic contexts; the conches found outside Europe are much more recent.

In addition to immersing us in the sounds produced by our Magdalenian ancestors, this shell reinforces the idea of exchanges between the Pyrenees and the Atlantic coast, more than 200 kilometres away.

Further information:

- Listen to the sound of the Marsoulas conch: https://soundcloud.com/cnrs_officiel/marsoulas-shell-conch-sound/s-234KE5bFZO1
- See the 3D model: <https://sketchfab.com/3d-models/triton-700k-0bddff3405144c7b8f91f902e28bcc9b>
- The American Association for the Advancement of Science (AAAS) is organising an embargoed video news briefing with Carole Fritz, Gilles Tosello and Philippe Walter on Tuesday 9th February at 9 am US Eastern time / 3 pm CET. For more information, please contact: veronique.etienne@cnrs.fr.

Notes

¹ The laboratoires involved are the *Travaux et recherches archéologiques sur les cultures, les espaces et les sociétés* (CNRS/Université Toulouse - Jean Jaurès/Ministère de la Culture), the *Maison des sciences de l'homme et de la société de Toulouse* (CNRS/Université Fédérale de Toulouse) and the *Laboratoire d'archéologie moléculaire et structurale* (CNRS/Sorbonne Université).

² Covering a period between around 21,000 and 14,000 years BP, it is characterised by worked animal bones and antlers and extensive exchange networks. The Altamira and Lascaux caves are the most famous examples.

³ As the quantity is limited, analyses have not been able to identify its nature.



At 31 cm in height, 18 cm in diameter (at the widest point) and up to 0.8 cm thick, this conch, which bears witness to a colder sea, is thus larger and thicker than more recent ones.

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Reconstruction of the instrument being played. In the background, a red dotted buffalo decorates the walls of the Marsoulas Cave; similar motifs decorate the instrument.

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>> Other pictures are available upon request.

Bibliography

First record of the sound produced by the oldest Upper Paleolithic seashell horn, Carole Fritz, Gilles Tosello, Guillaume Fleury, Emmanuel Kasarhérou, Philippe Walter, Francis Duranthon, Pascal Gaillard, Julien Tardieu. *Science Advances*, 10 February 2021. DOI: [10.1126/sciadv.abe9510](https://doi.org/10.1126/sciadv.abe9510) (the link will be active after the embargo is lifted).

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