Drawn Toward God through Music and Chemistry

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Music and Chemistry are Pervasive

?

Music

Chemistry

Albert Einstein's Credo

"The most beautiful and deepest experience a man can have is the sense of the mysterious. It is the underlying principle of religion as well as all serious endeavor in art and science. He who never had this experience seems to me, if not dead, then at least blind. To sense that behind anything that can be experienced there is a something that our mind cannot grasp and whose beauty and sublimity reaches us only indirectly and as a feeble reflection, this is religiousness. In this sense I am religious. To me it suffices to wonder at these secrets and to attempt humbly to grasp with my mind a mere image of the lofty structure of all that there is."

-Excerpt from Einstein's Credo

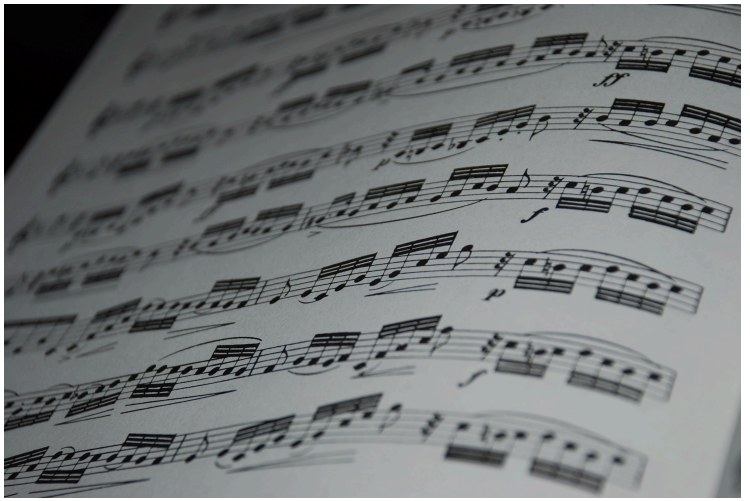
Awe and Wonder

Music

Chemistry

Music

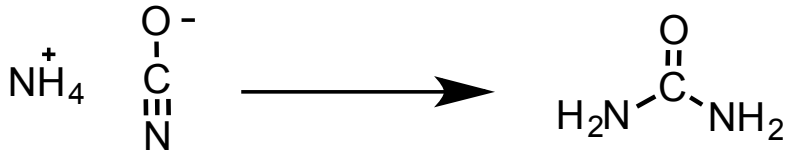
"The science or art of ordering tones or sounds in succession, in combination, and in temporal relationships to produce a composition having unity and continuity."



"Music." *Merriam-Webster.com.* Merriam-Webster, 2015. Web. 7 August 2015.

Organic Chemistry

Wöhler's Synthesis of Urea, 1828



ammonium cyanate

urea

organic compound isolated from urine

"I can no longer, so to speak, hold my chemical water and must tell you that I can make urea without needing a kidney, whether of man or dog."

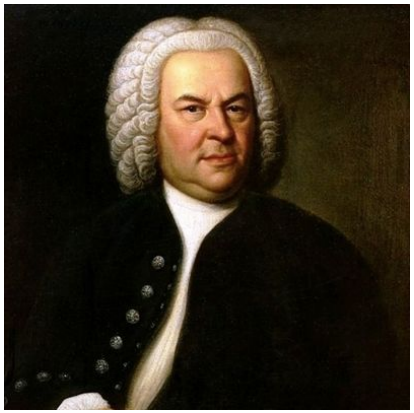
-Friedrich Wöhler

Wöhler, F. *Annalen der Physik aund Chemie* **1828**, *88*, 253-256.

Common Features of Music and Chemistry

- Sequence of components (notes, reactions)
- Creative process
- Technical training; Art and a way to worship

The Bach Cello Suites



Soli Deo Gloria

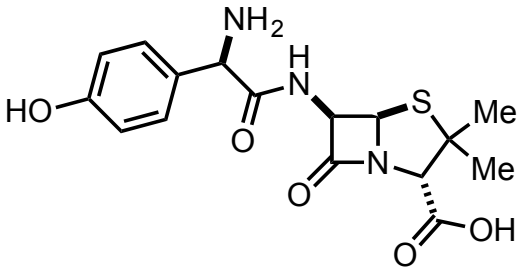
Johann Sebastian Bach (1685-1750)

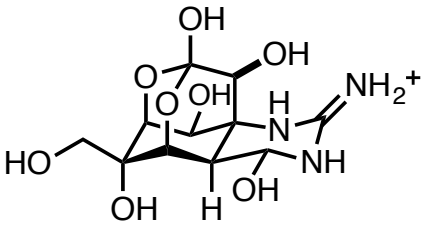
Suite I Prelude

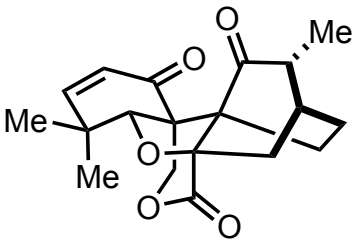
Suite V Prelude

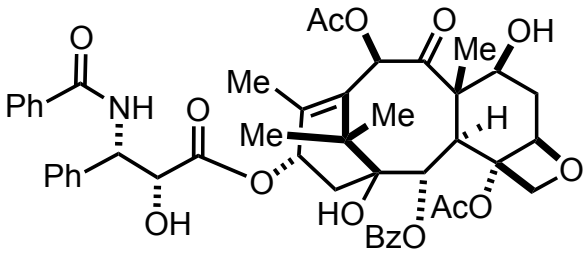
Recordings performed by Justin Su

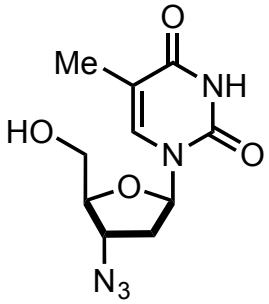
In Awe Through Organic Chemistry

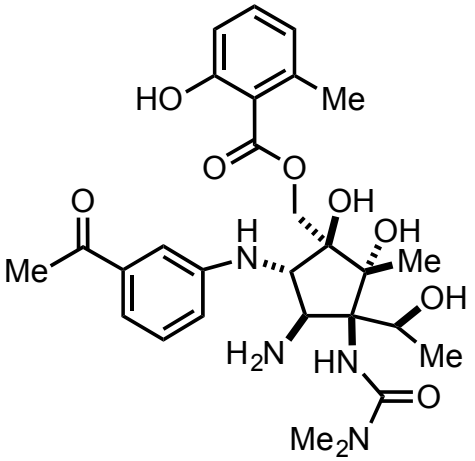










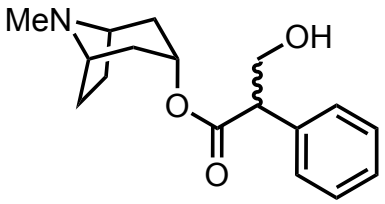


Creativity in Organic Chemistry

Sir Robert Robinson
Nobel Prize 1947

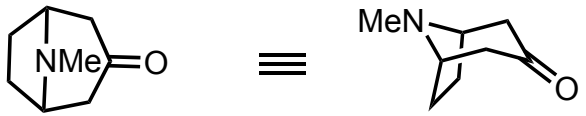
tropinone

Synthesis of Tropinone



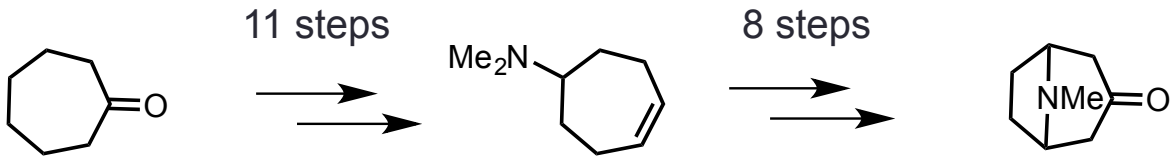
atropine

Scarce nerve agent antidote in WW1



tropinone

Willstatter's Synthesis (1901)

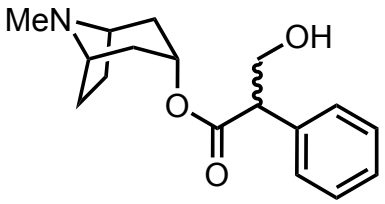


cycloheptanone

19 steps total
0.75% overall yield

Smit, W. A.; Bochkov, A. F.; Caple, R. "Organic Synthesis: The Science Behind the Art." **1998**, Chp. 3.
Willstatter, R. *J. Berichte* **1901**, *34*, 3163.

Synthesis of Tropinone



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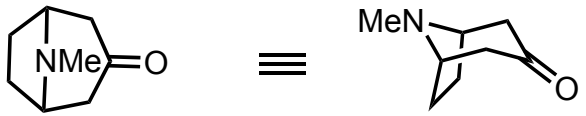
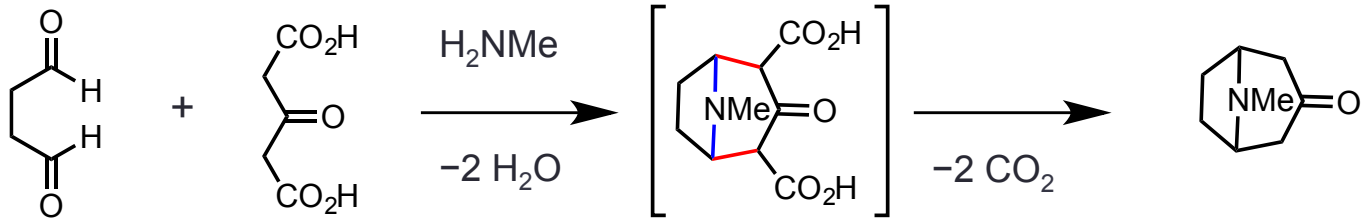


tropinone

Robinson's Synthesis (1917)

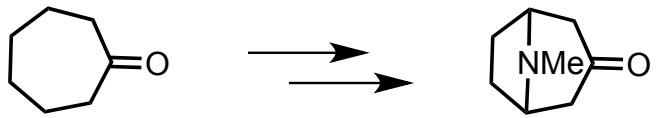


1 step total
17% overall yield

Smit, W. A.; Bochkov, A. F.; Caple, R. "Organic Synthesis: The Science Behind the Art." **1998**, Chp. 3.
Robinson, R. *J. Chem. Soc.* **1917**, 762.

Overview

Willstatter's Synthesis (1901)



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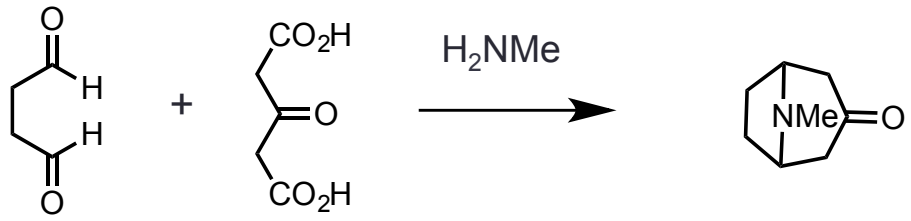
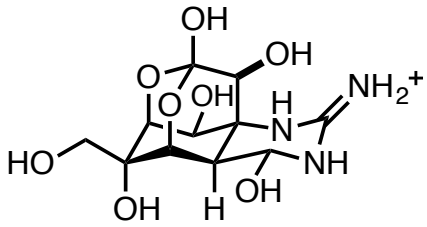
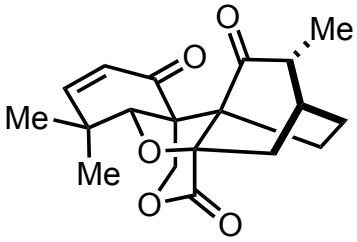
Robinson's Synthesis (1917)

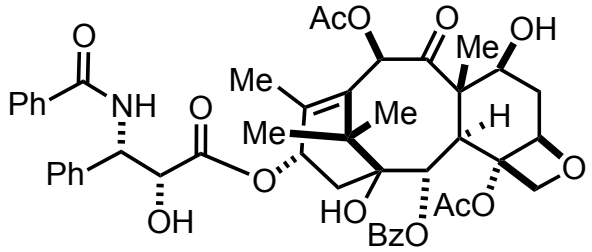


1 step total
17% overall yield

Inspiration in Music and Chemistry







- Rules and principles
- Role of artistic inspiration

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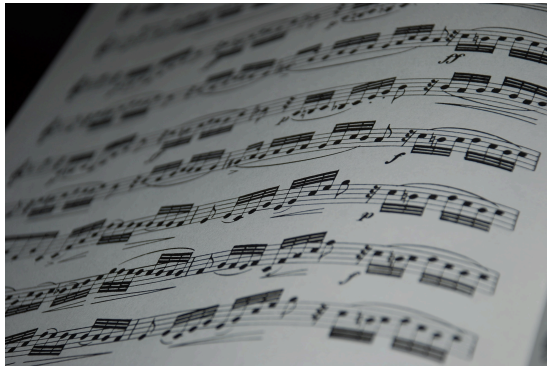
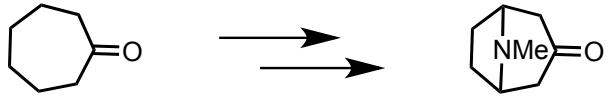
Awe Inspired by Mystery



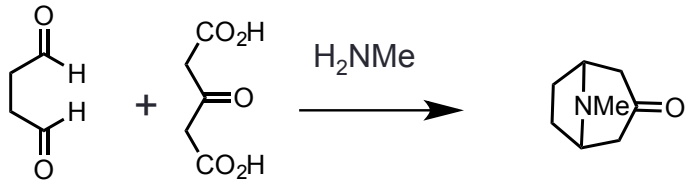
The Extraordinary from the Ordinary

Cello Music

Willstatter



Robinson



Natural Products Synthesis