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<b>Title</b>	An equilateral cone circumscribed about a sphere ...
<b>Call Number</b>	Vd1 +776H
<b>Creator</b>	Hawkins, John, Sir, 1719-1789, Tacquet, Andre, 1612-1660
<b>Collection Title</b>	A general history of the science and practice of music / by Sir John Hawkins in five volumes
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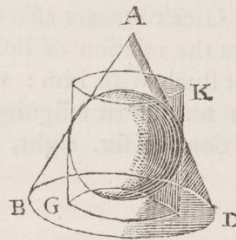
## Chap. 2. AND PRACTICE OF MUSIC. 27

Other writers attribute the discovery of the consonances to another, namely Diocles, who, say they, passing by a potter's shop, chanced to strike his stick against some empty vessels which were standing there; that observing the sounds of grave and acute resulting from the strokes on vessels of different magnitudes, he investigated the proportions of music, and found them to be as above related †; notwithstanding which testimony, the uniform opinion of

sphere, is to the whole superficies of an equilateral cylinder inscribed, that is to say, as 2 is to 1. For the circumscribed is to the spheric superficies as 12 is to 8; but the spheric is to the inscribed as 8 is to 6; therefore the circumscribed is to the inscribed as 12 is to 6, or 2 to 1. Vide Theorems selected out of Archimedes by Andrew Tacquet, printed at the end of Whiston's Euclid.

As to the diatesseron, the proportion of it is precisely the same with that which subsists between the superficies of a sphere and the whole superficies of a square cylinder inscribed therein, viz. 4 to 3. Ibid. Prop. xxxiv.

But which is admirable, the sesquialteral proportion of the diapente, and of the same interval continued, is demonstrated by Tacquet himself, by a sphere, a right cylinder, and an equilateral cone thus disposed:



His words are these: ' An equilateral cone circumscribed about a sphere, and a right cylinder in like manner circumscribed about the same sphere, and the same sphere itself continue the same proportion; to wit, the sesquialteral, as well as in respect of the solidity as of the whole superficies.

' For by 32 of this book, the right cylinder G K encompassing the sphere, is to the sphere, as well in respect of solidity, as of the whole superficies, as 3 is to 2 or as 6 to 4. But by the foregoing, the equilateral cone B A D circumscribed about the sphere, is to the sphere, in both the said respects, as 9 is to 4. Therefore the same cone is to the cylinder, both in respect of solidity and surface, as nine is to six: wherefore these three bodies, a cone, a cylinder, and sphere, are betwixt themselves as the numbers 9, 6, 4; and consequently continue the sesquialteral proportion.' Q. E. D. Prop. xlv. at the conclusion of the Theorems of Archimedes by Tacquet.

Farther the same author shews, that the same sesquialteral proportion holds betwixt an equilateral cone and cylinder circumscribed about the same sphere, in respect of their whole surfaces, their simple surfaces, their solidities, altitudes, and bases.

Archimedes was so delighted with the thirty-second of his propositions, above referred to, that he left it in charge to his friends to erect on his tomb a sphere included in a cylinder, and Tacquet seems to have been little less pleased with his improvement on it, for he has given the figure referred to in the demonstration of it, in the title page of his Theorems selected from Archimedes.

† Vincent. Galilei, Dial. della Musica, pag. 127.