

The Ocular Harpsichord of Louis-Bertrand Castel

Castel motivated the analogy between sound and light by the supposition that both were vibrational phenomena. By way of a rhetorical question he wondered whether "sound and light do not equally consist in the insensible wiggings of the sonorous and luminous bodies, and of the media that transmit them to our ears [and to our eyes]?" And as tones are modifications of sound and colours are modifications of light, this implied an analogy between tones and colours. For arguments for this view he did not refer to one of the then current light theories of Newton, Malebranche or Descartes, but to the work of his Jesuit predecessor Athanasius Kircher, whom Castel at a later occasion called "my true, my first, and as it were my only master". From Kircher Castel derived a number of observational analogies between sound and light: they both are reflected by plane surfaces; both can penetrate into denser media and are refracted in the process; and both can be concentrated in a focus by a hollow mirror. Moreover, the speaking trumpet or ear trumpet, Kircher's own invention, seemed the perfect analogue of the telescope. These observations sufficiently supported the hypothesis that sound and light were manifestations of the same kind of physical process.

It was already Kircher who had concluded that, if this were true, there had to be an analogy between the art forms of tone and colour. According to Kircher: "If, when a musical instruments sounds, someone would perceive the finest movements of the air, he certainly would see nothing but a painting with an extraordinary variety of colours." And again: "The colours also have their harmony, which pleases no less than music, and this analogous harmony even has a very strong power to excite the affects of the mind." Castel cited these passages with delight, and added examples of his own of how painters talked about colour tones and dissonances of colours and musicians about the design of a composition and the figures of a song.

Apart from Kircher, Castel mentioned a second authority for his cherished analogy: the *Opticks* of Newton, the French translation of which he had recently reviewed for the *Mémoires de Trévoux*. As is well known, Newton had distinguished seven distinct colours in the spectrum, i.e. red, orange, yellow, green, blue, indigo and violet, and in Proposition III of Part II of Book One he recorded his measurements of the space that each colour occupied in the spectrum. He then mentioned that these relative widths corresponded exactly with the differences in the length of a string when it sounded the successive notes of the diatonic scale. Newton, however, gave no clue whatsoever to what was to be concluded from this correspondence. Castel could not fail to notice this: "Here is all the analogy that this great geometrist has managed to find between the tones and the colours; where does this analogy lead to, where does it come from? I do not get any the wiser about it." Nevertheless, it was clear that any colour music needed a colour-musical scale, and Castel was quick to adopt Newton's succession of colours as a scale with violet as its fundamental tone. That Newton had explicitly rejected any physical analogy between light and sound, mainly because he thought that treating light as vibrations of a medium was incompatible with the rectilinear propagation of light, seems not to have bothered Castel.