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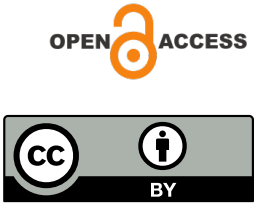

Venetian Clouds and Newtonian Optics

Modal Polarity in Early Eighteenth-Century Music

Bella Brover-Lubovsky

By common consent, modal mixture (the pairing of the major and minor keys over the same tonic) is acknowledged as a fundamental resource of mature harmonic tonality that acquired primary syntactic role and formal importance only in the late 18th century. This article aims to disprove this view by: 1) showing that modal mixture had been extensively employed by North-Italian composers already at the turn of the 17th to the 18th century; 2) reviewing these composers' use of modal polarity through the lens of contemporaneous scientific theories and artistic practices.
Rhetorical and grammatical aspects of binary oppositions and modal transportability of parallel major and minor keys are analyzed in the music of Venetian composers (Antonio Vivaldi, Tomaso Albinoni, Antonio Caldara, Benedetto Marcello). Their innovative treatment of modal mixture corresponds with the simultaneously emerging aesthetics and pictorial imagery of clouds and the new *chiaroscuro* techniques in Venetian art (Giovanni Battista Tiepolo, Sebastiano Ricci, Giambattista Pittoni, Francesco Guardi). I suggest a semantic approach to modal mixture through the lens of »Venetian« clouds with their morphological function of reflecting light and reciprocating colours between objects.
This link between Venetian music and art is further considered through the prism of contemporaneous optical theories, as stimulated by Isaac Newton and advanced by his translators and exegetes in the Veneto, giving special scrutiny to Francesco Algarotti's *Il Newtonianismo per le Dame* (1737). Algarotti widely addressed Newton's theories of reflected light and of the transparency and opacity of objects, explaining their relevance and applying them to various cultural phenomena. The exploration of modal mixture in music thus mirrors the all-embracing impact of new scientific theories on the intellectual climate of the Veneto.

The interaction and mutuality of major and minor modes or keys – two opposed yet complementary tonal patterns – is certainly one of the logical and syntactical cornerstones of harmonic tonality. In the music of the 18th century the issue of consanguinity and complementary opposition of major and minor keys may be considered in three possible ways[1]:

1. *Ionian-Dorian modal-hexachordal relations*: major and minor keys that share the same diatonic collection with the final of the minor key a major second above the final of the major key;

1 For the theory of a major-minor frame for harmonic tonality as a twofold system see Atcherson, *Key and Mode*, pp. 222–226; Burnett/Nitzberg, *Composition*, pp. 142–153; Cohn, *Introduction to Neo-Riemaniann Theory*; Lester, *Major-Minor Concepts*, pp. 215f.; Ribeiro-Pereira, *A Theory of Harmonic Modulation*, pp. 129–133; Norton, *Tonality*, pp. 171–189.

2. *Ionian-Aeolian diatonic relations* (»relative keys« in modern nomenclature): major and minor keys equally sharing the same diatonic collection with the final of the minor key a minor third below the final of the major key;
3. *Chromatic relations or parallel keys*: major and minor keys with different diatonic collections sharing the same final (»modal mixture«).

Theorists of major-minor tonality almost unequivocally emphasize the meaningful historical succession of these pairings of opposed scale patterns that developed over time from modal to diatonic and then to chromatic:

> A broad historical division could thus be outlined to portray the evolution of the harmonic system: whereas the dual polarity of relative keys constitutes the original paradigm for diatonic tonality in Baroque music that of parallel keys embodies the typical chromatic tonality of Romantic music.[2]

Walter Atcherson, much earlier, spoke about the national-stylistic dimension of the major and minor pairing in the 17th century, adding that the interchange of the major and minor third over the same fundamental has been an essentially English phenomenon, while the hexachordal pairing has been assimilated by the French.[3]

By common consent, however, the »standard dual matrix of Baroque style has been the diatonic third-relationship.«[4] In the mean time, the third form – the *modal mixture* of major and minor keys sharing the same fundamental – is acknowledged as an essential resource of the mature harmonic tonality that emerged and acquired primary syntactic role and formal importance only in the late 18th and 19th centuries, in works of Mozart, Schubert and their contemporaries.[5]

In the following essay I aim to disprove this view by showing that modal mixture had been extensively employed by North-Italian composers already in the first half of the Settecento (17th century). Secondly, the concept of modal polarity in this repertoire will be approached against the intellectual and cultural background of the time and viewed through the lens of contemporaneous scientific theories and artistic practices.

1. Modal mixture

Venetian composers of the early Settecento, especially Antonio Vivaldi (1678–1741), Tomaso Albinoni (1671–1751), Antonio Caldara (?1671–1736) and Benedetto Marcello (1686–1739), explore the distinction and consanguinity of parallel keys most intensely, squeezing the utmost from the figurative, rhetorical and grammatical resources of their opposition and symbiosis. Normally they combine the parallel major and minor within the same composition, thus attaining the strongest possible

2 Ribeiro-Pereira, *A Theory of Harmonic Modulation*, p. 132.
3 See Atcherson, *Key and Mode*, p. 225; Brover-Lubovsky, *Tonal Space*, pp. 91–104.
4 Ribeiro-Pereira, *A Theory of Harmonic Modulation*, p. 123.
5 Grave, *Recuperation, Transformation and the Transcendence of Major over Minor*, pp. 27f.; Haimo, *Parallel Minor as a Destabilizing Force*, pp. 190–193; Wheelock, *Schwarze Gredel and the Engendered Minor Mode*.

dramatic contrast between emotional polarities and lending variety to the chordal syntax. These composers' subtlety and inventiveness in juxtaposing major and minor keys built over the same tonic have no visible roots in Italian music prior or coeval to them (where the main vehicle for major-minor interchange remained the *tierce de Picardie*: raising of the minor third in the tonic triad in a cadence) nor in other national styles.[6] They recognized that major and minor keys with the same tonic are most intimately related. An sudden lowering of the third of a major tonic triad that creates an effect of a momentary »shading« was perceived as a bold innovative device.

Among the multifarious patterns of modal mixture, the most outright and abundantly used is a twofold echo-like presentation of the same or slightly varied motif applied successively in major and minor. It is important to note that the major key holds a primary and the minor key subservient status in terms of general tonal organisation; the cadential six-four chord exclusively being in major. The Venetian composers of the early Settecento have a marked fondness for this kind of modal interchange, employing it in different structural conditions, ranging from the ritornellos and vocal periods in da capo and church arias and monumental choral movements in liturgical compositions to concerto and sonata movements. In addition to this echo-device, these composers deploy a whole range of rhetorical gestures in which a change of mode may appear either as a momentary »flash« or, conversely, as a long-range digression.

We may observe these qualities in Emilia's magnificent aria »Nella foresta leone invitto« from Vivaldi's late opera *Catone in Utica* on a libretto by Pietro Metastasio (1735, Act 3, Scene 9). Here modal mixture and general softening of tone amplify a mood of compassion and tenderness, wonderfully contrasting with the masculine *alla caccia* style of the opening. A switch to the tonic minor is accompanied by additional temporary changes such as a reduction of the dynamic level and textural simplification. A four-bar pianissimo phrase in F Major is shaded by a similar one in the parallel F minor, in which the wide leaps are filled with expressive scales, with the lightening of texture being achieved by omitting the horns during the second phrase.

Modal mixture in Roberto's aria from another late Vivaldi opera, *Griselda*, on a libretto by Apostolo Zeno (1735, Act 3, Scene 4; Fig. 1) perceptively reflects the sharp contrasts of mood and highly expressive imagery of Zeno's text which highlights the protagonist's emotional shifts and fluctuations between his »poor aching dying heart« and »a suddenly shining ray of hope«.[7]

In other vocal pieces, minorisation and general softening of tone similarly amplify a mood of compassion or tenderness. Text settings with modal mixture used to underscore emotional contrasts resemble the traditional polarity *gravità – piacevolezza* in Cinquecento madrigal poetics and may be viewed as a continuity within Venetian humanistic tradition.

6 For the survey of the parallel major-minor relationships in Vivaldi's music see Brover-Lubovsky, *Die schwarze Gredel*, pp. 106–109; *Tonal Space*, pp. 102–111.

7 The complete text of the first strophe: »Moribonda quest'alma dolente / va cercando del seno l'uscita / ma un bel raggio di speme lucente / mi prolunga nel seno la vita: / forse il fato cangiar si potrà.«

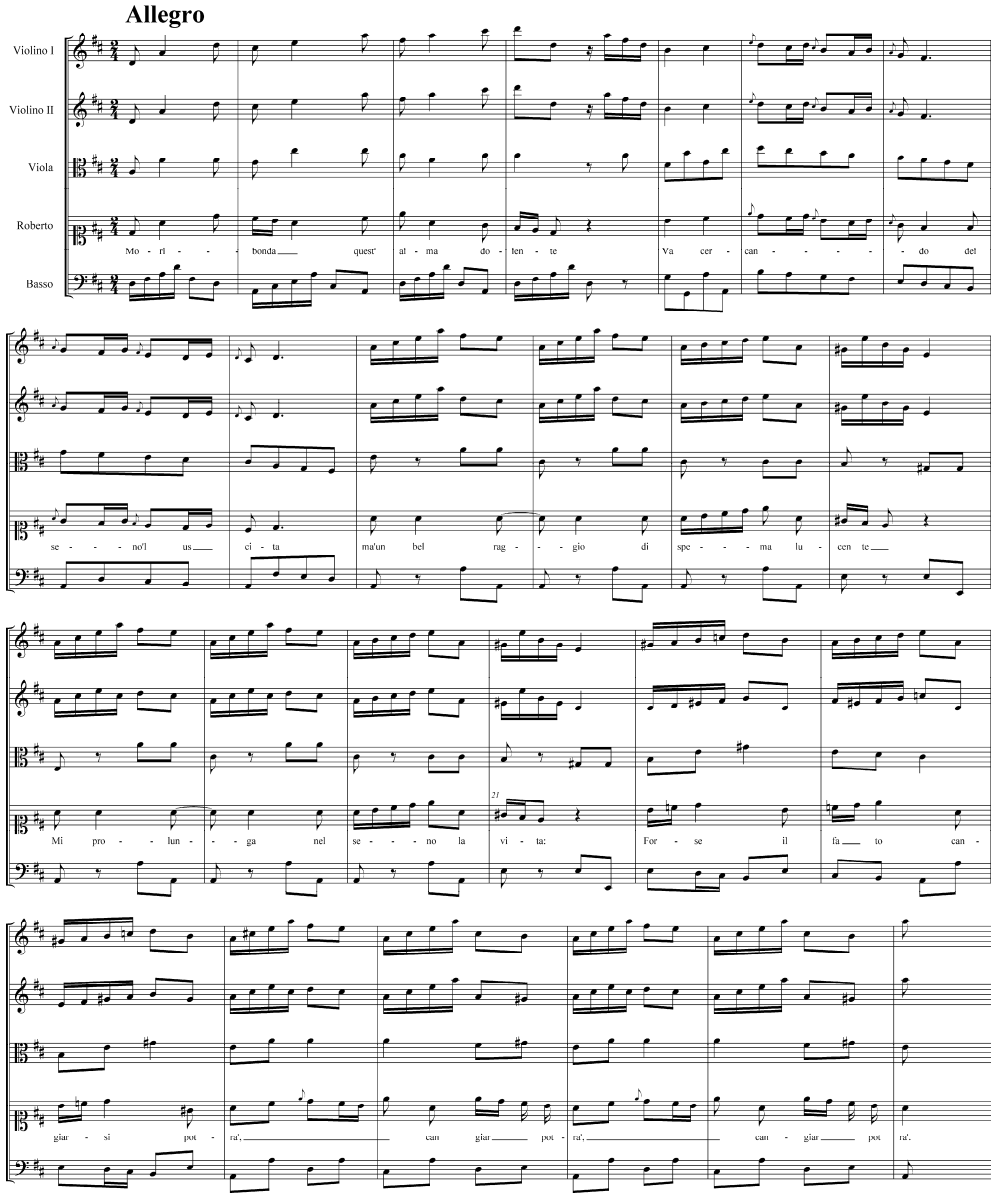

Figure 1: Antonio Vivaldi, *Griselda*, Act 3, Scene 4, »Moribonda quest'alma«, mm. 18–42.
(from: *Italian Opera 1640–1770*, ed. by Howard Mayer Brown, New York / London: Garland 1978.)

»Flashes« of the parallel minor key are typically found in concerto ritornellos by the Venetian composers. The opening Allegro from Tomaso Albinoni's late *Concerto a cinque* in D Major (op. 10,6, 1735) displays truly galant rhythmic subtleties, playing with short motifs that emphasize the tonic major third (Fig. 2). Measures 9–12 of the opening ritornello (repeated in mm. 69–72, in the closing section), introduce a

delightful example of modal mixture and dynamic softening based on a D minor variation of the opening motive.

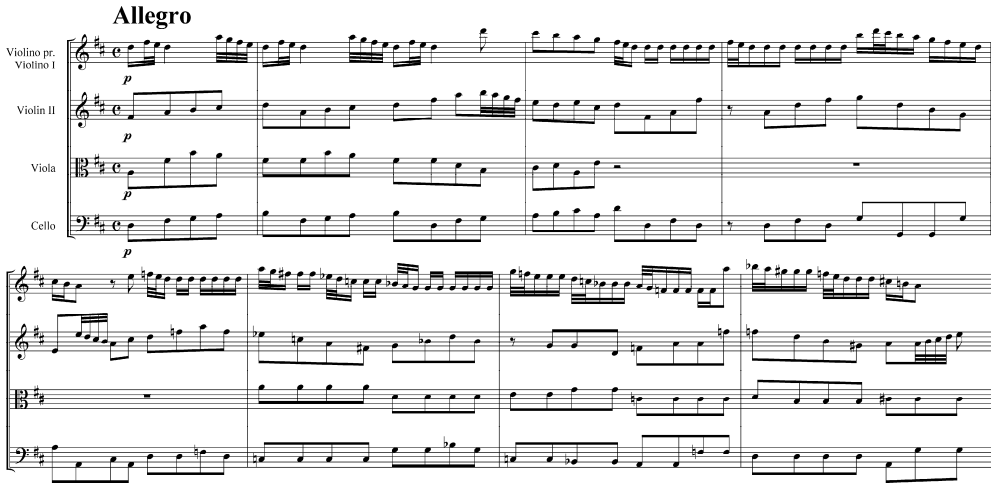

Figure 2: Tomaso Albinoni, *Concerto a cinque* op. 10,6, first movement, mm. 5–12.
(*Tomaso Albinoni. Instrumental Music*, ed. by Walter Kolneder, Adliswil/Zurich: Edition Kunzelmann 1997.)

The abundant employment of modal mixture by the Venetian composers of the early 18th century may shed considerable light on the development of major-minor tonality and shake our confidence with regard to the »discovery« of modal mixture by the late Classical and Romantic composers a whole century later. The intimate reciprocity of major and minor keys attains strong emotional power in the Venetian works. Vivaldi, Albinoni, Marcello and their colleagues exploit its dramatic and rhetorical potential and simply enjoy its refreshing change of tone colour through expanding the tonic function. Their proclivity for transporting thematic material between modally contrasting tonalities must be acknowledged as one of the most remarkable hallmarks of the Venetian local style and can take credit for bringing a whole range of highly original uses into pan-Italian and wider European musical lingua franca.

2. Venetian clouds

This treatment of modal mixture in music blends with the simultaneously emerging aesthetics of cloud shading and innovative chiaroscuro techniques in Venetian painting, especially in works on canvas and frescoes of Giovanni Battista Tiepolo (1696–1770), Sebastiano Ricci (1659–1734), Giambattista Pittoni (1687–1767) and Francesco Guardi (1712–1793). These artists deploy their colour palette in a specific way that does not create the main contrast simply between lighter and darker figures, as was traditional for the Venetian school in the wake of Paolo Veronese (1528–1588). The mid-Settecento chiaroscuro contrasts rather emerge between three planes:

1. the dark-coloured figures of heroes, crowds, animals, architectural background and accessories;
2. the reflected opaque light of the clouds inhabited with angels, putti and all kind of flying others;
3. a radiant blue sky that emanates pure light.

Art historians have analyzed the morphological contrasts of light and shade in the works of Giovanni Battista Tiepolo by emphasizing the firm subject identity and substantiality of his clouds:

> Tiepolo likes clouds for their malleable form, their sponge-like ability to absorb light, and the opacity that enables them to be strongly reflective. *He transforms a secondary pictorial resource into a primary one.* [...] Figures can be cloud-determined: the bouncy, free-floating, frequently up-ended postures of the angels on his ceilings are responsive to the gravitational field of the clouds they inhabit rather than to a viewer below.[8]

Bold dramatic contrasts in which the clouds' generalized tonality of opaque beiges and grey hues is juxtaposed against complementary colours is one of the most characteristic effects of this style. It is especially important that these clouds – which usually occupy a significant part of the painting's surface – serve a merely metaphorical function, appearing in such genres as allegory, apotheosis, mythological and historical paintings. Tiepolo's frescoes *Allegory of Merit Accompanied by Nobility and Virtue* (1757–58, Ca' Rezzonico, Venice), *Coronation of the Virgin* (1754–55, Santa Maria della Pietà, Venice), *The Apotheosis of the Pisani Family* (1761–62, Villa Pisani, Strà), *Glory of Spain* (1762–76, Madrid) and many others eloquently exemplify this quality. It is also worth noting that other genres of Venetian painting – landscapes, pastorals and urban views, represented mainly by Tiepolo's contemporaries Giovanni Antonio Canal (Canaletto) (1697–1768) and Marco Ricci (1676–1730) – treat clouds that carry a primary subject function in a different style and technique.

The aesthetics of cloud shading has been discussed by art historians as a Rococo image and pictorial device, a corollary of the new sciences and Enlightenment ideology.[9] Svetlana Alpers and Michael Baxandall draw direct parallels between Tiepolo's shining white light and »the atmosphere [...] of a lucid Newtonian world of unrefracted luminance« to Newton's revolutionary optical discoveries of the nature of light.[10]

Through the lens of »Venetian« clouds – with their morphological function of reflecting light and reciprocating colours between objects – I suggest approaching contrasts and mutuality of parallel keys in music. *Chiaroscuro* devices arise virtually simultaneously in Venetian music and art of the first half of the 18th century. Both musicians and visual artists use the contrast between light (major key) and shaded clouds (minor key over the same tonic) as a pictorial and expressive tool, exploiting its mimetic potential and enjoying its refreshing change of tone colour. Even more astonishing is the morphological correspondence in which the parallel-minor inser-

8 Alpers / Baxandall, *Tiepolo*, p. 32. Emphasis B. B.-L.
9 Ibid., pp. 80–99; Baxandall, *Shadows and Enlightenment*, pp. 17–32; Damisch, *A Theory of Cloud*, pp. 178–181.
10 Alpers / Baxandall, *Tiepolo*, p. 31.

tions are stripped of their thematic identities, shading and repeating the major-key statements in modified form. These devices should be considered through the prism of coeval theories of light and colour, as stimulated by Newtonian beliefs and advanced by his translators and exegetes in Northern Italy.

3. Newtonian optics in the Veneto

In the early Settecento, Venice and its hinterlands became one of the most stimulating centres of scientific and intellectual activity, filled with open-minded readings and exegeses and burgeoning scientific materialism. Venetian and Paduan academic traditions, built on extensive international ties and thriving on lively debate, formed a strong element in a lay culture attuned to those ideological problems that arose from the unique political, social and juridical status of the republic and offering an alternative to the hegemony of the Roman Counter-Reformation in other regions.

In 1710 a new periodical, *Giornale de'letterati d'Italia*, was founded in Venice under the supervision of such celebrated men of letters as Apostolo (1668–1750) and Pier Caterino Zeno (1666–1732), Francesco Scipione Maffei (1675–1755) and the scientist Antonio Vallisnieri (1661–1730).[11] The journal aimed to represent the best in literary and scientific writing in the Italian peninsula while appealing mainly to a general audience. Its aims and style neatly reflected its contributors' firm belief that social reform could be fostered through cultural and scientific renewal. As Massimo Mazzotti recently stated, »the Giornale was emblematic of the new modes of commodification and consumption of culture«.[12] It was intended to espouse a wide spectrum of current scientific theories, including the areas of mathematics, experimental physics, astronomy, geology, botany, anatomy and others. Many of the prestigious Italian contributions to contemporary European scientific debates appeared in its pages.

Activity of local illuministi such as Antonio Conti (1677–1749), Francesco Algarotti (1712–1764), Paolo Mattia Doria (c.1661–1746), Giovanni Rizzetti (1675–1751) and Giovanni Crivelli (1691–1743) created ties between the Newtonian ideas and their tramontane interpretations in fields including natural philosophy and culture.[13] More than in any other time period, the wide-ranging knowledge of scientific theories was extended to a wider public and became the common patrimony of intellectuals and artists throughout the entire Veneto.

Notwithstanding the pivotal discoveries in celestial mechanics and infinitesimal calculus exposed in Newton's *Principia*, even greater interest was fired in this cultural region by his optical theories of heterogeneity of white light, including its refrangibility, refraction and reflection. In Newton's words, the purpose of his *Optics* (1704) was »not to explain the Properties of Light by Hypotheses, but to propose and

11 *Giornale de'letterati*; Ferrone, *Intellectual Roots*, pp. 89–121; Israel, *Enlightenment*, pp. 677–683; Dooley, *Science, Politics, and Society*; Mazzotti, *Maria Gaetana Agnesi*, pp. 93–96.

12 Ibid., pp. 94f.

13 Conti, *Prose e poesie*; Doria, *Delle opere matematiche*; *Difesa metafisica*; Rizzetti, *De luminis affectionibus*, *Saggio dell'antineutonianismo*; Vallisnieri, *Istoria della generazione dell'uomo*; *Nuove osservazioni*; Crivelli, *Elementi de fisica*.

prove them by Reason and Experiments.«[14] A subtle blend of mathematical reasoning and careful observation, it was considered a model of experimental science and stimulated many similar experiments held in the Veneto (as well as elsewhere through Europe) between the late 1720s and 1740s.[15]

Our consideration of modal mixture and chiaroscuro assumes further significance in the context of synaesthetic ideas in scientific and philosophical circles and with regard to the fascination with a systematic commonality between pitch and light. Newton's biographer David Brewster calls the theory of transparency and opacity »the loftiest and profoundest of all his speculations; it has been very generally admitted by philosophers, both of our own and of other countries«[16]:

> Newton [...] sought to determine the manner in which particular rays are stopped, while others are reflected or transmitted; and the result of this profound inquiry was his theory of the colour of natural bodies. Transparency arises from the particles and their pores being too small to cause reflection at their common surfaces – the light all passing through; Opacity from the opposite cause of the particles and their pores being sufficiently large to reflect the light which is »stopped or stifled« by the multitude of reflections; and colours from the particles, according to their several sizes, reflecting rays of one colour and transmitting those of another – or in other words, the colour that meets the eye is the colour reflected, while all the other rays are transmitted or absorbed.[17]

Throughout his observations Newton refers to the opacity and complexity of clouds, using »cloud« in both direct meaning – as a physical body reflecting light – and as a metaphor: »The same I have observed by viewing the spot by the like reflection of the sun and clouds alternately.«[18]

A traditional citadel of Cartesian rationalism, the Venetian scientific community persisted in its sceptical and perplexed attitude towards Newton's experiments; while accepting his incontrovertible results, the local scientists tended to reject and reinterpret their underlying premises. A famous experimentum crucis with prisms and mirrors – the pinnacle of Newtonian empiricism – was repeated by quite a large number of North-Italian scientists and literati. In 1727 Scipione Maffei of Verona acquired the prisms from Abbé Conti (who in turn had purchased them in England) to replicate the Newtonian demonstration of the decomposition and recomposition of white light.

Giovanni Rizzetti of Treviso repeated these optical experiments several times before noble Venetian and Paduan scholars. Rizzetti replicates the Newtonian experiment with prisms (a plain surface) and with various other materials such as lens (a spherical surface), a local fossil which he calls »vitrus astroitus« (or Girasole) and with Murano glass, and deployed them against different backgrounds (dark or

14 Newton, *Opticks*, p. i.

15 Thomas Christensen reports that a similar preference was given to the optical part of the Newtonian sciences by French lay public. See Christensen, *Rameau*, pp. 145f.: »Throughout the eighteenth century, the *Opticks* was considered a model of experimental science. Unlike the forbidding *Principia* with its difficult and intimidating mathematical abstractions, the *Opticks* was a relatively accessible work: it took a common-sense, empirical approach to natural science that even those with no scientific background could follow.«

16 Brewster, *The Life of Sir Isaac Newton*, p. 86.

17 Ibid., pp. 84f.

18 Newton, *An Hypothesis explaining the Properties of Light*, p. 265.

light). He proved that the dispersion of light refracted by these bodies generates a different spectrum from the one demonstrated by Newton. In his works *De luminis affectionibus* (1727) and *Saggio dell'anti-newtonianismo sopra le leggi del moto e dei colori* (1741) Rizzetti rejected Newton's interpretations. A similar dubiousness was evidenced in Giovanni Crivelli's *Elementi di fisica* (1731), where, in the section concerning optics, he binds the *Esposizione delle dottrine del sig. Newton circa i colori* with the *Obiezioni del sig. Rizzetti*.[19]

This intellectual ambience also provided the background for Francesco Algarotti's famous work *Il newtonianismo per le Dame*, which appeared in 1737.[20] Ten years earlier, Algarotti then a fellow of the Istituto di Scienze in Bologna, had been entrusted with conducting the reproduction of the Newtonian experiment using prisms bought in England at the request of the Roman mathematician Celestino Galiani.[21] Algarotti's international celebrity status was due mainly to this major work – a populariser of epoch-making Newtonian science, through which his ideas widely permeated both the natural philosophy and artistic endeavours of the time. Algarotti's overt aim was to represent the scientific discoveries by converting their rational arguments (which were appropriate for male readers) into a sensuous style appealing to the educated female public. His six dialogues with a fictional Marchioness, the form of which *Il newtonianismo* takes, with all their rococo style and frivolous expression, actually translate the great scientific discoveries into the language of senses. Therefore, among the entire bibliography of the Newtonian exegeses, Algarotti's book remains notable for his overt application of the relevance of physical phenomena and their explanations to the emotional implications these discoveries can make in arts, letters and music. An emphasis on the systematic commonality between science and art recurs in his discourse:

> I am pleased, that Poetry and Natural Philosophy have one common Date; since for the Reason you will not perhaps think this Transition so strange, that we have made from one to t'other upon my Account. The Transition that our Philosophers made from a slight Knowledge of Things to an Ambition of unfolding Nature and penetrating its Effects, was much stranger. This, in the Language of Philosophy, is called making Systems.[22]

Later, Algarotti advances a plea for practical and artistic applications of scientific findings: »By these Means will your dextrous Philosopher compose not only the Finery of Silks, and the variegated Beauties of a Garden, but all the Elegance of Paolo Veronese or the Delicacy of Titian.«[23] Algarotti's prescription remains fascinating both as a description of this affinity and as a neat rationalization of artistic taste.

One of the central ideas of Il Newtonianismo is its author's advancement of the then extremely popular synaesthetic theories based on a compound nature of sound

19 Crivelli, *Elementi di fisica*. See Ferrone, *Intellectual Roots*, p. 98.
20 Algarotti, *Il Newtonianismo*.
21 Ferrone, *Intellectual Roots*, p. 96.
22 Algarotti, *Il Newtonianismo*, p. 19.
23 Ibid., p. 69.

and light with their manifold implications.[24] Newton himself had stimulated the colour-harmony enterprise by distinguishing seven spectral hues and by adopting the Dorian scale for the purposes of analogy. Rizzetti, too, elaborates this sound-light affinity, stating, for example: »In the same way as a sound strikes the ear, the movements impressed in the fibres of the body by force of the lighting objects, are oscillating as well.«[25] With regard to light dispersion, Rizzetti refers to the experiment in which he »proved that on the piece of paper put at some distance from the prism one can see a solar spectrum of the seven colours distributed on the spaces which are proportional to the musical tones.«[26] Algarotti as well expounds this consanguinity between the »system of Light and Sound, these two new brothers in Natural Philosophy«[27]:

> The Harpsichord of Colours, and the Music of the Eyes [...] gives a still greater Confirmation to this new Alliance [...]. This Harpsichord is indeed a new Invention, but is not therefore the less true or real. Upon moving the Keys of this Instrument, instead of hearing Sound, you will see Colours and Mezzo Tintos appear, which will produce the same Harmony as Sounds do. The Sonatas of Rameaux [sic!] or Corelli will give the same Pleasure to the Eyes when seen upon this philosophical Harpsichord, as they do to the Ear when they are played upon the common Sort. The Concords of a Piece of Purple and Scarlet will raise the Passions of Love, Pity, Courage, or Anger in our Souls: This surprising Instrument is now making beyond the Mountains [...]. The transient Pleasures of the Ear will be fixed in the Eye; you may continually enjoy the fine Airs of Farinelli wove in a piece of Tapestry.[28]

Algarotti widely addresses Newton's theories of reflected light and the transparency and opacity of objects, explaining their pertinence and transporting their deductions and applications to many cultural and artistic phenomena. Our consideration of the connection between modal mixture and *chiaroscuro* contrasts achieves still greater importance due to such synaesthetic ideas in scientific and philosophical circles and the general public's fascination with the pitch-sound systematic commonality.

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The Enlightenment aesthetic was founded on the internal relations within a work of art, which could in turn be classified and studied scientifically. My aim here is to show how the practical exploration and theoretical recognition of modal mixture in Venetian music of the 1720s to 1740s coincides with the new technical and aesthetical assimilation of clouds in Venetian painting which in turn mirrors the all-embracing impact of new scientific discoveries and theories on the intellectual

24 Christensen, *Rameau*, pp. 143f.: »The correspondence between sound and color seemed too fortuitous to be ignored by Platonically inclined thinkers who were convinced of the harmonic unity of nature. On account of the great prestige of Newton's endorsement of the idea, French scientists, including Mairan and Buffon, and philosophers like Malebranche, Condillac, Voltaire, Diderot and Rousseau (to say nothing of Germans like Goethe!) enthusiastically debated the color-sound analogy, although not all were equally convinced of its validity.«

25 Rizzetti, *Saggio dell'antinewtonianismo*, p. 109. See Bortolato, *Giovanni Rizzetti fisico*, pp. 344f.

26 Rizzetti, *Saggio dell'antinewtonianismo*, p. 110.

27 Algarotti, *Il Newtonianismo*, p. 123.

28 Ibid., p. 223.

climate of opinion in the Veneto. It can thus be argued that mere technical devices in music and their theoretical acceptance were as deeply rooted in the local cultural and intellectual ambience as were the new and controversial patterns of experimental thought.

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Jerusalem Academy of Music and Dance

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