

## Music, a Science and an Art: the 18th-Century Parting of the Ways<sup>1</sup>

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The City of Bath is famous in the 18th century, both in the annals of music and of science, for the person of Sir William Herschel and it could not be otherwise than that an investigation and presentation of these aspects of Bath's cultural and intellectual life in this series of lectures and its concomitant Exhibition should find in this remarkable polymath a natural focal point. Others in the course of these lectures will describe and discuss his accomplishments as musician and as scientist; it falls to my lot to consider the fact that he was both, and to find in this coincidence perhaps a means of gaining an insight into the relation of music and science in the 18th century – the changing relation, I may say, and I need hardly emphasize that I do not pretend to a complete explanation of all aspects of this complex process, nor of the decisive changes of musical style associated with it. I propose simply one point of view prompted by the interesting case of Sir William Herschel, musician and astronomer.

Versatility was not uncommon in the 18th century. In an age which was inspired by a confident belief in the unlimited capacity of the human intellect, and in which a wealth of exciting new discoveries stimulated curiosity in many directions, it is only to be expected that many found it natural to stretch their intellects in the investigation of a variety of subjects. Of course, a good deal of this diversity of interest and activity achieved no more than to warrant recognition as a healthy and admirable dilettantism, but the 18th century presents us with a surprising number of cases of men whose achievements in several fields of endeavour or areas of interest were so considerable that a career in any one of them would have been regarded as bringing sufficient honour to even the most ambitious. One thinks, for instance, – among 18th-

1. In September 1977 the Holburne of Menstrie Museum of the University of Bath mounted an exhibition to illustrate the important role played by the City of Bath in the 18th century as a centre for both music and science. During the period of the exhibition (22 September – 29 December 1977) the University of Bath also sponsored a series of lectures centred, like the exhibition itself, on the figure of Sir William Herschel (1732 – 1822), musician and astronomer. A valuable catalogue, *Science and Music in 18th Century Bath* by Anthony J. Turner (Bath 1977), was published to accompany the exhibition, but plans to publish the series of lectures as a collection were eventually abandoned for economic reasons, wherefore this lecture, the first of the series, has kindly been released for publication here.

century Englishmen alone – of Stephen Hales, theologian, parish priest, natural scientist, inventor; of Joseph Priestley, theologian, philologist, politician and natural scientist; Edmund Cartwright, clergyman, agriculturalist and inventor and Sir Edward Jones, barrister, politician, classical scholar, orientalist and poet, to mention but a few chosen at random. But in spite of familiarity with such formidable examples of versatility, the career of William Herschel seems to us particularly remarkable, surprising, unlikely.

Why should this be? It is simply that our view of the nature of art, conditioned as it is by the Romantic 19th century, cannot tolerate the idea of that kind of versatility in which creative ability of a high order in the arts, especially music, is required to share the temple of the human mind with intellectual activities demanding a rational process of thought. And indeed, after about 1800 it is difficult to call to mind any important instance of its happening. To be sure, Carl Maria von Weber has been credited with a certain flair for science due to some minor improvements he is supposed to have made in the technique of lithography, but these were perhaps neither very inventive nor very genuine – at least recent biographical accounts have referred to his »imagined« technical improvements. A case might be made out for Alexander Borodin, however, who did valuable work as a chemist, especially in the early part of his life, as a result of which he never quite lost the reputation of being rather an amateur as a composer. That this should be a criticism in the 19th century, which it would not have been in the 18th, is in itself an indication of the change in attitude to artistic creativity, and to what was expected of the composer in the way of inspiration, originality and dedication, which had taken place.

The history of earlier times, on the other hand, is liberally sprinkled with the names of artists, including musicians, who regarded science of one kind or another as within their natural competence, and of scientists whose range of investigation encompassed music. One thinks in this connection of such figures as Philippe de Vitry, Bishop of Meaux, poet, composer, mathematician and theorist associated with the *Ars nova* of the 14th century; of Leonardo da Vinci; of Thomas Campion, physician, poet and composer; of Johannes Kepler, Athanasius Kircher, Marin Mersenne, René Descartes, Galileo Galilei and Christian Huyghens, all learned writers on science, philosophy and music; and, as we enter the 18th century, of Henry Aldrich, Dean of Christ Church, theologian, logician, architect and composer, and of Benjamin Franklin, statesman, writer, scientist and musician.

Versatility occurs in the 19th century too, in spite of an increasing tendency towards specialization, but after 1800 it tends to occur within, not across, the borders described above which enclose what might be described as »defining« (rational) and »communicating« (expressive) areas of activity. We know on the one side, for example, the work of Alfred North Whitehead and Bertrand Russell in which the rational activities of mathematics and philosophy approach one another. On the other side, starting with Carl Maria von Weber and continuing with Robert Schumann, E. T. A. Hoffmann, Hector Berlioz, Franz Liszt and Richard Wagner, we have a line of musicians who also

cultivate literature – for whom, indeed, the arts, especially music and poetry, tend to merge into one.

And between the two periods – that is to say, the period, extending up to the 18th century, of what we may call general intellectual versatility which did not discriminate against the arts, and the period from c. 1800 in which the arts are separated into a special category incompatible with other forms of intellectual activity – stands the figure of Sir William Herschel. Does the fact that in mid-career he gave up art to follow science, that having made music his life as performer, composer, teacher and conductor for some thirty years he should – apparently without regret – abandon it c. 1780 to devote himself exclusively thereafter to astronomy, tell us anything about this change of attitude? The answer is both yes and no. We must be careful not to grasp too eagerly what on the face of it may appear as the embodiment of a decisive event in the history of thought, to regard the unsuspecting Sir William as »the thought made flesh«, so to speak. Too many other factors would have to be taken into account if an attempt were seriously to be made to use Sir William Herschel's career as a demonstration of a philosophical dilemma: the first condition alone would have to be that his abilities as a musician and as a scientist were in perfect balance, and of that we have no assurance. We know his achievements as an astronomer that gave him the reputation, even at a later day, of being »without equal«. His achievements as a musician, however, are as yet not well known and we have no such evaluation of his accomplishment in that field by his contemporaries, let alone by posterity. Dr. Charles Burney, the first great historian of music, knew him well, so it is somewhat disquieting to discover that, whereas his *History* includes mention of William's brother, Jacob Herschel of Hanover, as a composer, Burney seems to have regarded William primarily as a guarantee of scientific accuracy for his own lengthy *Poetical History of Astronomy*. It is, at first glance, more encouraging with regard to Herschel's musical reputation to find his name included among the great in Charles Lamb's *Free Thoughts on Several Eminent Composers*, but the compliment proves to be equivocal at best:

»Old Tycho Brahe, and modern Herschel  
Had something in 'em; but who's Purcell?«

The question convinces us that as a musical authority Lamb was seriously deficient (he said himself he »had no ear«) and the coupling of the name of Herschel with that of Tycho Brahe suggests again that, as far as Lamb's experience went, what they »had in 'em« was more likely to have been a reputation for good astronomy than good music. The unworthy thought presents itself: was the apparently unfamiliar Purcell named because he rhymes with Herschel, or does Herschel owe his place among the »eminent composers« to a name which provides a unique rhyme with Purcell? All the same, if we must treat the case of Herschel's double career with circumspection as an *actual* demonstration, a particular example, of what happened to the relationship between music and science in the 18th century, we can, I think, with good conscience accept it and learn from it as a *symbolic* demonstration, at

least, of the change that came about in this ancient relationship, since it is a change in attitude towards the nature of music, one which was to make it incompatible with science, and on this Herschel has had something significant to say.

As Claude Palisca has made clear,

»it is important to keep in mind in analyzing music's relationship to science that music, unique among the arts, is at the opening of the scientific age [the 17th century] inseparable from science. It is not surprising under these circumstances that the areas of musical thought most affected by the scientific revolution were those bordering on the fields of science that underwent the greatest transformation. These . . . were astronomy and dynamics.«<sup>2</sup>

The conception of music as one of the mathematical sciences was an ancient one; it had been given a classic formulation already in the 6th century by Cassiodorus: »Music is the discipline which treats of numbers« (*Musica est disciplina quae de numeris loquitur*), which was still being echoed in 1712 by so original a thinker as Gottfried Wilhelm Leibniz when he wrote: »Music is the hidden arithmetical exercise of a mind unaware that it is calculating« (*Musica est exercitium arithmeticae occultum nescientis se numerare animi*).<sup>3</sup> Hence Handel's friend, Johann Mattheson, the composer and influential writer on music, can be accepted as expressing the true attitude of the times when he writes in 1739 (in *Der vollkommene Capellmeister*) »Music is a science and an art« (*Musik ist eine Wissenschaft und Kunst*). Music is explained in exactly the same terms by other learned Germans contemporary with Mattheson, such as Meinred Spiess, Friedrich Wilhelm Marpurg and Jakob Adlung, and also in England, by William Tans'ur, for instance. A provincial church organist and singing teacher, Tans'ur may not be reckoned among the learned – and certainly he expresses a becoming humility – nevertheless his *A New Musical Grammar, or The Harmonical Spectator* (1746) is an excellent treatise, widely and long in use, and in its description of the nature of music it can be supposed to express an attitude which was current in the England of his day. His treatment of the subject is rather extended but his language and formulations are so quaintly charming that I cannot resist quoting him at length:

»Musick, the Subject of this Discourse, is a Science of Sound; or an Art that Teaches how to bring all Sounds to the Ear, whether Grave or Acute; . . .

Many years have I laboured in this Divine Science, under the Denomination of a Master of Musick, and have been acknowledged as such by my Pupils; when, alas, I knew, and acknowledged at the same Time, that I fell a great Way short of it.

2. »Scientific Empiricism in Musical Thought« in *Seventeenth Century Science and the Arts*, ed. H. H. Rhys (Princeton 1961), p. 93.
3. See H.Hüschen, »Frühere und heutige Begriffe von Wesen und Grenzen der Musik« in *Report of the Eighth Congress [of the International Musicological Society]*, New York 1961, ed. J. Larue (Kassel 1961), Vol. I, p. 393f.

Any Person that is qualified for such a Title must not only be a Grammarian, but also a Master of Letters and Languages, in order to unfold what is locked up in the Closets of the Learned – He must be an Arithmetitian and able to explain Numbers, and even the Misteries of Algebra; and also a Geometrician, to evince in great Variety, the Original of Intervals, Consonant and Disonant; by the Mechanical Division of a Monochord – He must be a Poet, to conform his Thoughts and Words to the Laws of precise Numbers; and Distinguish the Euphony of Vowels and Syllables, etc. He must be a Mechanick, in order to know the exquisite Structure of all Instruments, Wind, Stringed, or Pulsatile. A Mettalist, to explore or find out the different Contemporations of Grave and Acute Toned Metals, for casting Bells for Chimes, etc. He must be an Anatomist, to shew the manner of the Sense of Hearing – An Harmonian to lay down the Demonstrative Rules for Composing, etc., and he must be so far a Magician, as to excite Wonder, by bringing into Practice all the admirable Secrets of Musick; Such as Sympathetic and Antipathetic between Consonant and Discord; Together with the artifice of Tubes, for the strengthening and continuing of weak Remote Sounds, and melorating those which are Strong, etc. – But stop here, What a Field of Learning must I pass through to be justly called Master of Musick? – A Title that no one could ever justly claim, yet attain to.«

Thus we find the concept of music as a science and an art, or of music as an art based on a mathematical foundation, operative both in the Germany where William Herschel was born and received his musical training, and in the England to which he came in 1757 to pursue his profession. And indeed we have Herschel's own words for it that it was a view to which he subscribed, for, in an autobiographical account that he sent to a German magazine after his discovery of the planet Uranus had established his fame as an astronomer, he stated: »That I might acquire a perfect knowledge of the theory as well as the practice of music, I was set at an early age to study mathematics in all its branches, algebra, conic sections, infinitesimal analysis and the rest.«<sup>4</sup> Though more economically expressed, this seems to be saying essentially the same thing as Tans'ur. What is more, there is nothing in it to suggest that as a mature man in the 1780s he found this programme of musical education or the concept of the nature of music that lies behind it in any way mistaken or invalid.

It is, of course, a concept consistent with the rationalist philosophy which provided the background for the Enlightenment. But it was becoming increasingly apparent during the 18th century that Rationalism had not provided an adequate explanation of the dual nature of music. It had done well

4. E. S. Holden, *Sir William Herschel, His Life and Works* (London 1881), p. 4; quoted also (in German translation) by F. L. Gerber in *Neue hist.-biog. Lexikon der Tonkünstler* (Leipzig 1812–14) (art. »F. W. Herschel«).

enough on what I have called the »defining« side, but it still left some important questions unanswered on the »expressive« side, where it was concerned primarily with the doctrine of the imitation of nature. The major problem, undoubtedly, was the question of how to account for the original idea, the fresh inspiration out of which the work of art is shaped. The idea of inspiration, a Divine Gift, created spontaneously out of nothing, is of course associated in our minds with the Romantic image of Genius, and indeed it is essential to it. Already early in the 19th century it had been repeatedly formulated, for example by August Gathy in his *Musicalisches Conversations-Lexikon*, where he describes genius as »a driving power, a divine instinct, guided by a divine thoughtfulness. It is the original, the inborn, it cannot be learned, it expresses itself unconsciously, it manifests itself in a high degree of characteristic productivity . . . . Although it owes everything to itself and cannot be acquired through study, it can perfect itself through study.«<sup>5</sup> The idea did not originate in the 19th century; it had cropped up often before, but it was surely the impassioned description of the quality of genius in the article which Jean Jacques Rousseau wrote for his *Dictionnaire de musique* (1768) that could be said to have placed a stumbling-block in the path of Rationalist philosophy that it could neither spring over nor go around.

As it happened, the attempts to grapple with the problem of musical genius, represented by the writings of Rousseau and others, coincided with the appearance on the English scene of a number of preternaturally gifted musical children. When the eight-year-old Mozart visited London in 1764 he was studied by the Hon. Daines Barrington, who submitted a report to the Royal Society in 1769 which began with these arresting words: »If I was to send you a well attested account of a boy who measured seven feet in height, when he was not more than eight years of age, it might be considered as not undeserving the notice of the Royal Society. The instance which I now desire you will communicate to the learned body, of as early an exertion of most extraordinary musical talents, seems perhaps equally to claim their attention.« After having given an account of the young Mozart's complete possession of the various technical abilities required for musical re-creation, Barrington says, »Having been informed, however, that he was often visited with musical ideas, to which, even in the midst of the night, he would give utterance on his harpsichord; I told his father that I should be glad to hear some of his extemporary compositions. The father shook his head at this saying, that it depended entirely upon his being, as it were, musically inspired.«<sup>6</sup>

Ten years later, in 1779, Dr. Charles Burney contributed an »Account of an Infant Musician«, William Crotch of Norwich (b. 1775), who began manifesting his completely unprompted natural musical abilities at the age of 2 years and 3 weeks. Dr. Burney also included in his report mention of the remarkable

5. Quoted after E. Lowinsky, »Musical Genius. Evolution and Origin of a Concept«, in *The Musical Quarterly*, 1 (1964), p. 325.
6. »Account of a very remarkable young Musician« in *Philosophical Transactions [of the Royal Society of London]*, lx (1770), pp. 54–64.

gifts of Charles and Samuel, the children of the Rev. Charles Wesley, about whom Daines Barrington later published another report. It is here that Dr. Burney straight-facedly asserts that »Samuel Wesley before he could write was a composer, and mentally set the airs of several oratorios, which he retained in memory till he was eight years old, and then wrote them down.«<sup>7</sup>

Another prodigy, who was not studied by the Royal Society but who should certainly not be overlooked in this assembly, was Thomas Linley, junior, the son of Sir William Herschel's distinguished rival in Bath and friend and fellow-student of the young Mozart in Italy. It is interesting, by the way, to note that study in Italy represented (in the 1770s) the elder Thomas Linley's alternative to the study of »mathematics in all its branches« which Herschel considered necessary to the education of a gifted young musician.<sup>8</sup>

Music was clearly becoming an embarrassment to Rationalist philosophy which could not provide a logical explanation of its nature, of the fact that it could be mastered instinctively by children, and that its geniuses received their ideas in a mysterious manner, spontaneously, perhaps even in the middle of the night. The young William Herschel – who stated that his favourite maxim was »Tout est dans l'ordre«<sup>9</sup> – was very conscious of the fact that in the case of music knowledge of this order did not bring with it understanding. In a letter to his brother Jacob (22 February, 1761), after admitting that the love of music is his principal passion and that listening to a favourite piece of music can give him more pleasure than can be had from love, friendship and tenderness, he bursts passionately: »Oh God, the Benefactor who ordered the laws of Harmonious sound, Concords, Consonances, Dissonances, Modulations, Movement, Measure; in all this one sees the hand of God, of a Creator, of a Benefactor and of an Incomprehensible Being. We are composers, you and I, but what do we know of music? Nothing, nothing at all.«<sup>10</sup> Note how in the next century this anguished objectivity of the Rationalist has become the superior subjectivity of the Romantic when Robert Browning, in his dramatic monologue *Abt Vogler*, has the musician say »The rest may reason and welcome; 'tis we musicians know.«

But neither could Empiricism, the other main philosophical ingredient of the Enlightenment, cope with the problem of the nature of music and musical genius. According to John Locke the mind was a *tabula rasa* at birth on which experience immediately began to write. According to this theory we should all start as equals, which the evidence of these prodigies made clear we obviously do not. As Dr. Burney wrote in his report on the infant Crotch,

7. *Philosophical Transactions [of the Royal Society of London]* lxxix (1779), pp. 183–206.

8. Another of Thomas Linley's children, Ozias, who also became a musician, was instructed by Herschel in both music and mathematics.

9. C. Lubbock, *The Herschel Chronicle* (Cambridge 1933), p. 28.

10. *Ibid.* p. 24.

»It has likewise been imagined by some, that every child might be taught music in the cradle, if the experiment were made; but to these it may with truth be said that such an experiment is *daily* made on every child, by every mother and nurse, that is able to form a tune, on every part of the globe. In Italy the *ninne nonne*, or lullabies, are fragments of elegant melodies, become common and popular by frequent hearing; and these, though they help to form the national taste, are not found to stimulate the attention of Italian children to melody, or to accelerate the display of musical talents at a more early period than elsewhere.«<sup>11</sup>

With these reports to the Royal Society one could almost say that Science put musical Genius under its microscope – and ended up announcing the discovery of a new species. From having had the meaning »Natural ability, quality of mind« (1649), »natural aptitude (and inclination)« (1643), in the 17th century, Genius is elevated in the mid-18th century to mean »Native intellectual power of an exalted type; extraordinary capacity for imaginative creation, original thought, invention, or discovery. Often contrasted with talent« (1749).<sup>12</sup> Immanuel Kant attempted to limit the concept of Genius to the Arts; Herder insisted it could apply equally to scientific discovery of an inspired kind, but from Herschel's own – and his sister Caroline's – accounts of his scientific *modus operandi* one might be tempted to think that when his biographers write of his »genius«, they may be using the word in yet another sense, namely Carlyle's, according to which »Genius means transcendent capacity for taking trouble, first of all« (*Frederick the Great*), which agrees pretty well with the famous definition of another scientist, Thomas Alva Edison, to the effect that »Genius is one per cent inspiration and ninety-nine per cent perspiration«. <sup>13</sup> Whether or not the term was ever applied to Herschel as a musician I have not been able to determine.

Side by side with the »old« idea of music as an expression of order – that »there is music where ever there is a harmony, order or proportion«, as Sir Thomas Browne wrote in *Religio Medici* – a new concept of music as an expression of thoughts and ideas can be detected taking shape in the 17th century. A singularly interesting example occurs in what was probably the first English work of science fiction, Bishop Francis Godwin's *The Man in the Moone: or a Discourse of a Voyage Thither*, published in 1638 but written some years earlier. This tells the story of one Domingo Gonsales, a Spaniard, who, in a »flying chariot« drawn by birds called »Gansas«, a species which has characte-

11. C. Burney, *op. cit.*, (see note 7), p. 206

12. *The Oxford Universal Dictionary on Historical Principles*, rev. and ed. by C. T. Onions (3rd rev. ed. Oxford 1955), p. 785.

13. Cf. the anonymous article »The Musician Astronomer« in *Zeitschrift der internationalen Musik-Gesellschaft*, ix (1907–07), p. 22: »It may be surmised of Herschel that his magnificent astronomical feats were rather the natural consequence of new facts acquired to human vision through the patient development of mechanical agency, than indication of any great intuitive mental ability; . . . he represented untiring labour . . . .«.

ristics of both swans and eagles and which migrates annually to the moon, travelled to the moon and found on arriving there a kind of Utopia. He continues,

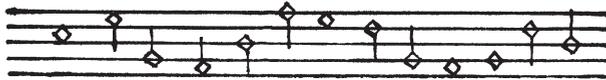
»I settled my selfe immediately to the learning of the language which (a marvellous thing to consider) is one of the same throughout all the regions of the Moone, . . .

The Difficulty of that language is not to be conceived, and the reasons thereof are especially two:

First because it hath no affinitie with any other that ever I heard.

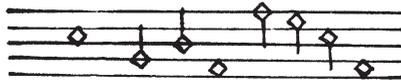
Secondly, because it consisteth not so much of words and Letters, as of tunes and uncouth sounds, that no letters can expresse.

For you have few wordes but they signifie divers and severall things, and they are distinguished onely by their tunes that are as it were sung in the utterance of them, yea many wordes there are consisting of tunes onely, so as if they list they will utter their mindes by tunes without wordes: for Example, they have an ordinary salutation amongst them, signifying (*Verbatim*) Glorie be to God alone, which they expresse (as I take it, for I am no perfect Musitian) by this tune without any words at all.



Yea the very names of Men they will expresse in the same sort.

When they were disposed to talke to mee before my face, so as I should not perceive it; this was *Gonsales*.



By occasion hereof, I discerned means of framing a Language (and that easie soone to be learned) as copious as any other in the world, consisting of tunes onely, whereof my friends may know more at leasure if it please them.

This is a great Mystery and worthier the searching after then at first sight you would imagine.

Now notwithstanding the difficulty of this language, within two months space I had attained unto such knowledge of the same, as I could understand most questions to be demanded of mee, and what with signes, what with words, make reasonable shift to utter my mind.«<sup>14</sup>

14. See H. N. Davies, »Bishop Godwin's 'Lunatique Language' in *The Journal of the Warburg and Courtauld Institutes*, xxx (1967), pp. 296–316. With regard to Bishop Godwin's musical background it is worth noting that Matthew Godwin (or Goodwin), organist of Exeter Cathedral, was his brother.

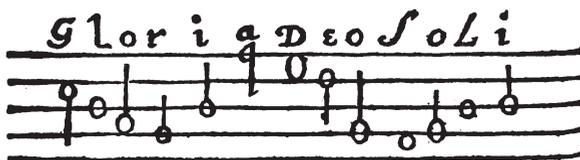
This same Godwin and his son Thomas had some years earlier sent King James I a proposal (without explanation) for a means which they had conceived »for conveying Intelligence in Besieged Towns and Fortresses and receiving Answers therefrom.« In 1641 another bishop, Dr. Wilkins, demonstrated that the musical examples in *The Man in the Moone* – and presumably also the secret means of conveying messages offered to King James I – use a simple substitution cipher. »By this you may easily discern,« he wrote, »how two Musicians may discourse with one another, by playing upon their Instruments of *Musique*, as well as by talking with their instruments of speech.«<sup>15</sup>

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Where the five Vowels are represented by the Minnims on each of the five lines, being most of them placed according to their right order and consequence, only the letters K, and Q, are left out, because they may be otherwise expressed.

According to this Alphabet of Notes, these words, *Gloria Deo soli*, must be thus contrived.



By this you may easily discern how two Musicians may discourse with one another, by playing upon their Instruments

15. J. Wilkins, *Mercury: or the secret and swift messenger. Shewing, How a Man may with Privacy and Speed communicate his Thoughts to a Friend at any distance* (London 1641). Our facsimile illustration is from the 1694 edition; note that in this, as in all editions except the first, the third and fourth notes of the example *Gloria Deo Soli* are mistakenly placed a degree too high. Furthermore, the letters j and F appear to have exchanged places and cases (f and J) in the alphabet of the key.

Bishop Wilkins' solution is not entirely satisfactory (strictly applied his system results in the unintelligible HCORIADEOSPEI and HOISACGS for the two examples above, instead of in GLORIA DEO SOLI and GONSALES as was obviously intended) – but that may, of course, be due to Gonsales' admitted imperfection as a musician, as a consequence of which he has copied down incorrectly the notes which he heard.<sup>16</sup> But even if it were completely without fault as a solution of Godwin's examples, a substitution cipher is too literal an application of the art of music and falls far short of his vision of a universal language since in order to acquire meaning the musical notes must be translated back into one of the terrestrial languages. This is clearly not »the language . . . one of the same throughout all the regions . . .« that he »discernes«, though it may well be the more explicit language he had in mind for a code in time of war. What seems to be envisaged by Bishop Godwin is the use of musical sounds as a universal language for direct communication, an idea which excited much interest in the 17th and 18th centuries. Dr. D. T. Mace has referred to this as »the great seventeenth-century debate as to whether modern music was merely 'harmonious' or a potentially expressive language capable of taking over the work of the word.«<sup>17</sup> The climax of attempts to prove the latter case was surely reached with François Sudre's *Langue musicale universelle* (Paris 1866), which he demonstrated with the assistance of a young boy whom he had trained in the language of tones. Sudre's language gained the approval of a number of learned societies, including the French Academy, in the last century.

I cite this as an extreme case of the change of attitude which came about in the course of the 18th century concerning the nature of music and which substituted the idea of music as a language of communication for the idea of music as a demonstration of divine natural order. But there are plenty of examples which state the case abundantly clearly without imposing intolerable restrictions on music's peculiar and mysterious artistic nature. Thomas Mace, for instance, wrote in *Musick's Monument* (1676),

»Musick speaks so transcendently, and Communicates Its Notions so Intelligibly to the Internal, Intellectual, and Incomprehensible Faculties of the Soul; so far beyond all *Language of Words*, that I confess, and most solemnly affirm, I have been more *Sensibly, Fervently, and Zealously Captivated*, and drawn into *Divine Raptures, and Contemplations*, by Those *Unexpressible Rhetorical, Uncontroulable Perswasions, and Instructions of Musicks Divine Language*, than ever yet I have been, by the best *Verbal Rhetorick*, that came from any Mans Mouth, either in *Pulpit*, or elsewhere.«<sup>18</sup>

16. See H. N. Davies, »The History of a Cipher, 1602–1772«, in *Music & Letters*, xlviii (1967), pp. 325–329; see also my »Letter to the Editor«, *ibid.*, xlix (1968), pp. 195–196.

17. D. T. Mace, »A Reply to Mr. H. Neville Davies's 'Dryden and Vossius: A Reconsideration'«, in *The Journal of the Warburg and Courtauld Institutes*, xxix (1966), p. 310.

18. T. Mace, *Musick's Monument* (facs. ed. Paris 1958), I, p. 118.

Here we are made unmistakably aware of the approximation of the arts of music and poetry that comes to expression when Christian Friedrich Schubart equates the two in his adaptation of the 7th-century aphorism *Poeta nascitur non fit*. He begins his essay *Vom musikalischen Genie* (1784–5) with the words »No proverb is so true and so appropriate to the nature of the matter as this ancient one: Poets and musicians are born.«<sup>19</sup> So now it is music and poetry that belong together, not as two ways of measuring time, as formerly, but as two forms of inspired expression, and their relationship characterizes the Romantic period just as the relationship of music and mathematics had been characteristic of the ages up to the Enlightenment. The new concept could scarcely be more clearly expressed than it was by the Danish composer Niels Wilhelm Gade, who inscribed over his youthful overture *Nachklänge von Ossian*, Op. 1 (1840), the work with which he won international recognition, a motto taken from Uhland: »Formel hält uns nicht gebunden, unsre Kunst heisst Poesie.« The scientific revolution and Rationalism led to a reconsideration of the nature of music and to the realization that its two aspects, as science and as art, had reached the parting of the ways.

I don't suggest that these philosophical considerations necessarily directly governed composers' creative processes, though it is hard to imagine that they did not in some way affect their attitude to their work insofar as they represent commonly accepted ideas at the time. It would be interesting to know Sir William Herschel's aesthetic position, which is perhaps explained in a letter (18 October, 1761), listed by Lady Lubbock as being about »expression in music«, to which I have regrettably not had access. We know that he was at an early stage of his life in England associated with Charles Avison of Newcastle, the author of an original *Essay on Musical Expression* (1753) which took exception to the Rationalist theory of imitation, and that in company with Avison and others he played a great deal of Italian music, which probably contrasted markedly with the music on which he had been brought up in Germany. To what extent he shared Avison's modern view that what music does can more properly be described as »expression« than »imitation« would no doubt be made clear by his letters (another dated 19 April, 1761 is listed as dealing with »fugues« and »music must express emotion« – a nice juxtaposition of topics!), but however that may be it is difficult to ignore the significance of two facts in particular which suggest that Herschel's personal view of music belonged to an age that was passing, as perhaps he realized. First, he says in a letter to Jacob (31 March, 1761): »There are two kinds of happiness or contentment for which we mortals are adapted; the first we experience in *thinking* and the other in *feeling*. The first is the purest and most unmixed.«<sup>20</sup> Music was apparently to prove unsatisfactory to him from this point of view for he subsequently wrote »It is a pity that music is not a hundred times more

19. Quoted after E. Lowinsky, *op. cit.*, p. 325.

20. Lubbock, *op. cit.*, p. 25. It is perhaps not without interest to note that Herschel reportedly did not like poetry.

difficult as a science.«<sup>21</sup> The second fact is that he gave up the practice of music, without hesitation and without regret, in order to devote himself to the science of astronomy. He gave up the harmonious image of the heavens – what Addison calls »all of heaven we have below« – to gaze upon the heavens themselves.<sup>22</sup>

On New Year's Eve, 1839, we are told, a Requiem composed by Sir John Herschel was sung by his assembled family within the great tube of his father's 40 foot telescope. This was the tube through which 50 years earlier King George III had led the Archbishop of Canterbury by saying »Come, my lord bishop, I will show you the way to heaven.« Could anything be more romantic than this picture of a Requiem, an example of Herschel's abandoned art, being sung within the instrument of his triumphant science, before that instrument was sealed up forever? This pious ritual has an undoubted appeal as a symbolic act, but only a physical approximation, not a reunion, of music and science could be achieved: their ways had parted.

#### Resumé:

Artiklen er identisk med et foredrag, afholdt i september 1977 ved Holburne of Menstrie Museum, Bath Universitet, – det første i en foredragsrække over emnet »Naturvidenskab og musik i Bath i det 18. århundrede«.

Alle bidrag havde som deres naturlige brændpunkt personen Sir William Herschel (1732–1822), der opnåede udmærkelse både som musiker og som astronom. Herschels skift i løbebane fra kunst til naturvidenskab er her betragtet som et symbol på den forandring som musikæstetikken gennemgik i det 18. århundrede.

Den traditionelle opfattelse af musikkens dobbeltnatur – den var både kunst og videnskab – som var almindeligt accepteret ved det 18. århundredes begyndelse, blev anfægtet gennem en voksende interesse for spørgsmål såsom genialitetens væsen, indfaldets rolle i den skabende proces samt karakteren af musikkens udtryksmuligheder, som trodsede rationel forklaring. Konklusionen, at genialitet og indfald var hævet over naturens lov, og at musik ikke bare i sig selv var et udtryk for naturens orden, men en måde hvorpå følelser og sindsbevægelser kunne udtrykkes – efter nogles mening kunne selv tanker og

21. *Ibid.*, p. 31.

22. The description of Herschel's study given by the actor John Bernard: »[it] resembled an astronomer's much more than a musician's, being heaped up with globes, maps, telescopes, reflectors &c under which his piano hid, and the violin-cello, like a discarded favourite skulked way in one corner«, evokes a picture of the study of a renaissance humanist, a rather more disorderly equivalent to Botticelli's »St. Augustine«, Carpaccio's »Cardinal Bessarion« or Holbein's »Ambassadors«, perhaps.

ideer overføres, som var musikken en form for sprog – bidrog til udformningen af den filosofiske baggrund for det 19. århundredes romantik og førte kunst og naturvidenskab til en skillevej, hvorfra Herschel valgte at følge naturvidenskabens vej.