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ON THE VALUE OF THE DISSONANCE IN MUSICAL THEORY.

BY JOSEPH GREEN, (Author of the "Tritone.")

THE characteristic of modern music is a particular harmonic relation called the key; producing what we generally understand by the term "modern tonality." The key is certainly a recent discovery; but the supposition that it is a thing invented by musicians, as they would invent a scale or any arbitrary arrangement of notes, has resulted even to this day in different appreciations of its importance in musical theory.

The key was strongly represented in the tetrachordal system of the ancients. But the mode of construction, and what we know of the employment by the Greeks of the diatonic scales is the best evidence we possess that they were unacquainted with harmonic effects beyond those derived from the simplest combinations. And early in the Christian era, when the traditions of Greek music must have been comparatively fresh, the diatonic scales were not only retained, but subsequently reformed at the instigation of St. Gregory, in a sense which was a still wider departure from the principle of tonality derived from harmonic relation; that is to say, in the Plagal Church modes the principle of tonality was less apparent than in the original authentic modes. This however was only the accidental result of a certain artificial device; for in point of fact there were no essential differences between any of the church modes or any of the Greek scales. The differences which did exist, namely, in the order of tones and semitones, could not of themselves, and independently of general harmonic relation constitute any real theoretical distinction.

To adopt a medical illustration, the ancient theorists and their more modern imitators confined themselves too closely in their musical disquisitions to the physiology of the subject; and the practice of the musicians was hampered by their precepts. Recent theorists have on the other hand, by the study of the pathology of the question, built up an art which is disparaged as empirical, but is nevertheless more true to nature.

The starting point of the harmonicians, as it still is of our modern physicists, was the well known fact that the simpler the fraction representing the ratio of a musical interval, the more perfect is the consonance. They naturally enough looked upon the consonance as the normal condition, and the dissonance as the abnormal condition in music. Hence from very ancient times to that of Guido Aretino, and again five or six centuries beyond to the supposed innovations of Monteverde and the subsequent invention of the series of keys, we find the gradual progress of harmony illustrated in a cautious departure from the unisonal system, and finally by the slow admission into the art, firstly of the perfect concords; secondly, the imperfect concords; and lastly, of the dissonance. And moreover, even up to a comparatively late period, the art has been encumbered with a systematic avoidance, or with a tenderness in the treatment of a dissonant interval called the *tritonus*—an interval later musicians have found not only inoffensive, but the one above

all others which contains the dynamical principle, the principle of life, motion and reproduction in harmony. In what Mr. Karl Engel calls the pentatonic, or in any other ancient scale, or possible system of music where the tritone is wanting, the effects must be at once rigid and vague; suggestive of the monuments and the mysticism of that old world from which we, in common with the Greeks, and the Hebrews before them, have probably received the partially comprehended rudiments of a musical method. The same vagueness and want of repose is sensibly felt in the "*diatonic scales*," where following the Greek system, the tritone is present, but pinioned to a fixed place in the system, and doing duty as indicator of the position of the semitones in relation to the initial notes of the different modes or scales, which are made to pass under it like so many horizontal slides. The church modes are founded on that method;* with the additional complication of giving the same finals, or nominal key-notes, to the four plagal modes, as to the four authentic. But by the modern and more simple harmonic system all the modes are easily reduced to the one natural scale, or to one of the two modern modes to which the tritone employed is proper. This becomes still more apparent by the transposition of the Gregorian tones, said to be formed on the diatonic scales. Dissecting the tones or tunes, and reducing them to the modern tonality, we find they are formed by arbitrarily joining together the tetrachords of different scales, and of different modes. Their vagueness and solemnity, so appropriate to the service of religion, are due in part to that diversity, and want of fixation of key and mode in the various endings, and as far as the solemnity is concerned to the monotony of the effects produced by the limitation of the compass of the melodic phrases, the ambit of which is in point of theory tetrachordal. In choir practice it depends upon the arbitrarily chosen dominant, around which note, as a pivot, the melody is made more or less to revolve.

In regard to the Greek system it is more than probable that if ever the mystery is to be unravelled, the task will be accomplished by the guidance of modern lights, and by trying back from the technical to the abstract theories.

The difficulties of the subject may in part be ascribed to the fragmentary and purely theoretical nature of the writings of the ancient harmonicians that are extant. But it is quite as likely that the difficulties were attributable to inherent defects in the Greek methods; and as some one has once observed, were a musician of the time of Pericles restored to us to explain the practice of his art, it is possible we should not be much wiser than we are at present, except that certain suspicions would be converted into certainties, and we should have the positive

* In regard to the whole question as to the affinity between the Greek music and that of the primitive church, I venture no opinion. For my technical purposes, the acknowledged facts as related in modern works are sufficient. The differences which do exist between the Ambrosian and Greek octaves disappear with many other distinctions when brought to the modern test of the harmonic basis of the scale; and as I have suggested in the text, the Gregorian additions were a retrogression towards the Greek forms. There is in this question, even in our day, a theological or rather sectarian element very dangerous to historical or scientific truth. And from the little knowledge I have of the subject, I presume that the controversies at the present time, turn as they seem to have done in the days of Arius and of St. Ambrose, on the origin of the melodies employed in the liturgy. But amongst the general public the matter becomes mystified by a certain confusion in our common terminology. The words scales, modes, tones and tunes we all of us employ without much care as to their precise meaning.

assurance as to the superior simplicity and comprehensiveness of the modern system.

That system, in regard to theory, is an example of a retrogression from the complex to the simple; a retrogression which the living writer who has identified his name with the evolution theory, has told us, is at a certain phase of the process of evolution, a general and looked-for result. But modern musical theory has not altogether receded towards that of the ancients; it has only worked downwards by other ways, and finally rested on the same physical or mental facts of our nature to which the ancients had to conform, whilst they nominally ignored them.

These natural facts have their musical illustration, firstly, in the resolution of a dissonant interval, and finally, in the more complex harmonic combination known as the *key*, which proceeds from that resolution. The key, as a natural product of sensation, however much its causes may yet escape analysis, is as distinct and immutable a natural fact, as are the common phenomena of consonance and dissonance which have lately been reduced to a very simple physiological explanation by M. Helmholtz.

It has long since been ascertained that the difference between an ordinary sound and a musical sound depends upon the secondary vibrations called "harmonics," produced by the subdivisions of the vibrating substance, over and above the fundamental vibrations of its whole length or contents.

Not counting replicates, which are repetitions of the fundamental note in a different pitch or octave, the harmonics beyond the first two are mostly dissonant with the fundamental note, which with its first three distinct harmonics, constitute practically a complete dissonant chord, as the combination comprises all the typical consonances and dissonances. Were these harmonics as perceptible to our senses as the fundamental sound, the resulting dissonant combination would imperatively demand a resolution into a consonant chord; and we know by common technical principles in music that such resolution to be satisfactory must be on a chord whose fundamental note is four degrees higher in a diatonic scale than the original sound.

To a certain extent, difficult to define owing to the varying capacity of the sense of hearing in different persons, the harmonics are audible, and are distinguishable from the fundamental sound. They might therefore affect the mind not only in regard to timbre or quality as in one musical sound, but also as a combination of sounds. It perhaps requires no great stretch either of the imagination or of scientific method to concede that from the complex nature of an individual sound, the relativity, which is the essence of music, commences with the monosound itself;* and the fixed relation of an apparently

* In the language of popular science, each musical sound is as a fundamental note, the "chief of a faction." Two sounds with their separate corteges of harmonics represent strife and disagreement, ending in certain cases in silence caused by the interference of different sound waves. The complex materials of a single sound are decomposed prismatically by the organ of hearing; and the mind receives, without analysis, one general impression, just as we accept the sensation of red or blue without analysing the mixture of colours comprehended in any single colorific effect. Concord is only a relative expression, and is represented in music by the octave. All other intervals are more or less distinctly dissonant, and proceed in a regular gradation of dissonance from the fifth or fourth to the tritone and semitone. This general principle as to the relative perfection of consonance in the octave and the comparative dissonance of other intervals as explained by Helmholtz, must be so familiar to the reader, through Dr. Tyndall's lectures, that I do not think it necessary to reproduce the mere series of harmonics by which it is demonstrated.

abstract musical sound is to another distant from it a fourth in the ascending scale; affording as it were a faint reflection of the common technical and harmonic process by which in music the key is established.

Hence, on such an assumption, every single sound would be what musicians call a dominant,—the generator of a tonic and scale, rather than the tonic itself. But in the first instance it is only the generator of the inferior scale called the tetrachord; the dominant and the tonic comprising the interval of a fourth, which is afterwards filled up by intervening notes according to mode or genus. The complete scale formed by the joining of two tetrachords would not therefore be an arbitrary or mathematical pre-arrangement of the notes, but on the contrary, a result of a prior and natural harmonic phenomenon.

The octave being a replicate and obvious completion of a scale, the first technical process, and the first clear indication of the key, is the division of the diapason by the introduction of a fifth, thus:

producing the intervals of a fifth and fourth. The figure 5, that destroys the original relation of the monosound and its replicate, represents the dominant which invokes the tonic No. 1, or key note, four degrees higher.

The above division is called by the harmonicists, arithmetical; the numeral representatives of the divisions being in arithmetical progression, as 2, 3, 4.

Taking the fourth first in order, thus:

the division of the diapason is harmonical, the numerals being in harmonic progression, as 3, 4, 6. But the two divisions musically considered are precisely the same in principle, the one being the inversion of the other. In the latter diagram the No. 4 becomes the tonic, and the dominant is represented by the figure 1. In other words, of the extreme notes of the separate interval of a fifth the lower note is the tonic, and the upper note the dominant of a certain scale and key. Of a fourth, the inversion of a fifth, the upper note is the tonic and the lower note is the dominant.

From these explanations it is clear that on the supposition that every individual sound is in musical relation a dominant or fifth of a scale, it is only the first-mentioned division of the diapason into diapente and diatessaron that need be taken into account in regard to one particular key. The harmonical divisions of the same scale into diatessaron and diapente changes the key. For instance, the division C—G—C is the key and scale of C. The division C—F—C is the key and scale of F. But if we take the original division, and invert the position of the notes commencing on the fifth, thus:

G—C—G,

we have the harmonical division of the scale of G $\sharp$, but in the key of C $\sharp$. And this latter division represents what are called the Plagal modes, which, according to modern theories, are simply inverted positions of the authentic. The Gregorian re-

formers of the Church music seem to have had an inkling of the truth when they assigned to one of both series of modes the same finals. But in all probability their arrangement was an accidental departure from an intended imitation of Greek methods, and was determined only by considerations of pitch and other practical requirements of the quire; otherwise they would have proceeded still further, and have reduced all the eight modes to one key.

A recent French writer on the music of the Greeks has, in common with many others before his time, expressed a regret that the ancients should have obstinately based their system on the interval of a fourth instead of a fifth. It is thought that had their attention been first directed to the latter interval, they could not have failed to penetrate the secrets of the science we now call harmony. But such opinions seem to indicate very arbitrary notions in respect both to the Greek and modern systems. The two systems are in fact identical in principle, as far as that principle is apparent in the construction of one scale. The modern series of keys is simply a question of the displacement of the tritone. It being understood that the system of the ancients was melodic, their instinctive preference for the "fourth" is easy to comprehend. And inasmuch as relatively the fourth is more dissonant than the fifth, it was more likely, from that cause alone, to lead them in the direction of modern improvements. From the glimpses we can obtain of Greek theory and practice, we see occasional efforts to burst through the restraints of a fixed diatonic and tonal system; but there are no traces of the abandonment of the tetrachordal basis which has survived during so many centuries, and now adapts itself to modern harmony. The pentatonic scale, whose antiquity seems to defy research as to its origin, must have been well known to the Greeks. That imperfect and emasculated scale was, if based upon anything, based upon the interval of the fifth. The Greeks, perhaps, instinctively rejected that scale; and we, in our time, have certainly either to alter the melodies founded upon it, or make them conform to modern usage, and to natural phenomena in the harmonization.

When the Greek philosophers united the arithmetical and harmonical divisions, and formed the scale by two disjunct tetrachords, thus:

$$1 \quad \cdot \quad \cdot \quad 4 \quad 5 \quad \cdot \quad \cdot \quad I,$$

the musicians must have been on the verge of anticipating subsequent discoveries, and adopting a system of harmony and temperament. That they did not do so, was probably due to the backwardness of the mechanical arts, to their cumbrous system of notation, and perhaps to an unreasoning conservatism characteristic of their craft. The skeleton scale, as it is formed in the diagram above, really includes three keys. If we sing the melody of a complete and diatonic tetrachord in ascending C, D, E, F, we find the natural repose is on the F, as the key note. Again, if we take the tetrachord in descending F, E, D, C, the repose is on the C, giving to each tetrachord two tonics, according as we employ it in ascending or descending. This melodic illustration of the key depends for its effect upon the harmonic process already described, and which underlies the Greek system. In the ascending tetrachord, the initial note is the fifth or dominant of a

complete scale; and in the descending tetrachord, the dominant understood is four notes below. The subject is made plainer in the following diagram, showing the heptachord formed by conjunct tetrachords:

$$G \quad \cdot \quad \cdot \quad C \quad \cdot \quad \cdot \quad F,$$

giving three distinct tonics, the final notes of each tetrachord in ascending and descending.

When we exceed the limits of the tetrachord we have no further repose or indication of key until we arrive at the completion of the second tetrachord in a scale of conjunct tetrachords, or at the octave in a scale of disjunct tetrachords. The interval of the fifth has no melodic repose; and even as an harmonic interval its repose, though greater than the fourth, is inferior to the octave, the only true consonance. The fifth and fourth, as already shown, when they consist of the same notes but in a different pitch, as C to G or G to C, have more or less the same harmonic value. The superior melodic value of the complete tetrachord in the diatonic system was a sufficient reason for its adoption by the Greeks.

The wonderfully simple discovery of the moderns, of repeating the same arrangement of disjunct tetrachords in different degrees of pitch, comprehends all that was useful in the various modes adopted by the ancients of filling up the two tetrachordal divisions.

Comparing the ancient and modern systems as both finally reposing on the same harmonic process, and facts of sensation, we can dispense with the well worn allusions to minute diesis, the employment of which could not alter the functions of an harmonic combination any more than the subdivision of the octave into twenty or forty degrees instead of twelve, would add a single chord generically distinct from the combinations already known. A more minute and mathematical subdivision would only make certain chords more in tune, and repeat existing phenomena by multiplying the number of keys, whilst some of those we have nominally in the list are impracticable in regard to signature and notation. And in modulating for instance from C $\sharp$ to D $\flat$, the absolute difference even on a violin is almost inappreciable. The difference which does exist depends upon the context and general key relationship, and is often due more to the imagination than to fact. The idea of adding variety to modulation as far as the harmony is concerned, by employing a number of keys differing in pitch less than a semitone, is difficult to realize. Small intervals like a comma, or even an enharmonic diesis, perceptible enough in a slow strain of melody in unison, cannot affect in the slightest degree the generic nature of a whole chord, the natural functions of which depend upon tonal relation, and causes more complex in operation, but more simple in theory than abstract mathematical measurements. As I now wish to show, the key and therefore the functions of intervals and chords depend upon the dissonance, implied or expressed in all combinations.

In endeavouring to establish a theory of sensation, it is sometimes asserted that consonance is generated by dissonance, because the first follows the latter in obedience to a natural desire for the resolution of a dissonant interval. But so broad an assertion is evidently an example of a common error in logic.

On the other hand, consonance as represented by the one consonant interval, the octave, may be con-

sidered the normal condition to the ear, as white light is to the eye. But neither consonance nor white light has in the abstract any real value. Our impressions of both are relative; and art, either in sounds or colours commences with a first departure from the normal condition. Hence, though it be wrong to assert that consonance is generated by dissonance, it may be right to maintain that the basis, the starting point of a true technical theory of music, is the dissonance. The Greeks, by reason of the unisonal nature of their music, overlooked the importance of the dissonance, thus preparing an obvious defect and void in their system, otherwise so ingenious and so firmly braced on a framework, consisting of the extreme notes of the tetrachord.

It may be said that the musical system of the Greeks bore some resemblance to their notions of astronomy. Everything in the system was flat and horizontal, neatly riveted to supports whose foundation was purely hypothetical. The system had no centre of attraction, by a reference to which their artificial modes and scales could be tested and adjusted. The moderns possess that test in the harmonic relation called the key, powerfully represented by one single interval, the tritone, which determines the tonic, and, less directly, the mode.

The subject is too trite, and the details would be too technical for present purposes, to describe the devices by which the ancients avoided that interval, or the terms they employed to distinguish the regular from the augmented tetrachord, containing three whole tones, which formed the *tritonus*. Their rejection of it was natural, as it immediately destroyed the only representative they had of key in the melodic effect of the tetrachord. The same instinct of harmony no doubt led the musicians to reject many of the genera concocted by philosophers, who divided and tortured the melodic disposition of the moveable notes of the tetrachord, till finally, as some people imagine, the ancient Greek music reappeared in the more simple Gregorian tones. Whatever may have been the origin of those tones, it can be presumed they may have come to us through the Greeks, though they were not of Greek invention any more, perhaps, than was the natural diatonic scale, which the mathematicians only rearranged according to their system. Mr. Engel tells us that the so-called pentatonic scale was in existence among nations whose history is anterior to the era of Greek legends. There is, however, no sufficient ground for supposing even that scale to have been the primitive one. It seems, on the contrary, to be rather an artificial result of the manipulation of the natural major and diatonic scale, by the simple excision of the two tritonic notes *si*, *fa*, and probably, for melodic reasons, akin to those which subsequently led to the more prominent features of the Greek scheme.

(To be continued.)

THE HANDEL FESTIVAL.

If any doubt existed as to the possibility of permanently establishing a triennial festival in honour of Handel, it must have been thoroughly dispelled by the unexampled success, both in an artistic and a pecuniary point of view, of the fourth celebration given during the past month, like its predecessors, at the Crystal Palace. We are not of those who believe that the greater the number of executants in a musical work, the greater must be the effect, nor are we by any means disposed to endorse the assertion, so often advanced, that Handel would have been in an

ecstasy of delight could he have lived to hear his compositions with every part, vocal and instrumental, multiplied *ad infinitum* in the choral portions, whilst the solos are sung precisely as he wrote them; but such a magnificent demonstration as that presented at this triennial festival has perhaps scarcely a right to be judged purely on artistic grounds, for there is something to be seen as well as to be heard when upwards of four thousand performers assemble, under the experienced direction of one mind, to render homage to a genius, the admiration for whose works in the land of his adoption time has deepened almost into a worship.

Although at all these festivals three days only are devoted to the performances, the Rehearsal has now become a recognised fourth day, for not only are tickets sold to the public on this occasion, but a kind of programme is duly considered, many pieces which are too familiar to need rehearsal at all being given, to satisfy those who naturally expect to hear the choicest specimens to be sung during the festival. Little therefore need be said of this preliminary performance, which took place on Friday the 16th ult., and was attended by a large audience. The selection included some of the finest choruses from the "Messiah," "Solomon," and "Israel in Egypt," the whole of the "Dettingen Te Deum," the Organ Concerto in G (a most welcome novelty) performed by Mr. W. T. Best, and several solos, which brought all the principal vocalists forward, with the exception of Mr. Sims Reeves, who was unfortunately too hoarse to attend.

On the first day of the festival, Monday the 19th ult., the "Messiah," as usual, attracted an enormous audience, every available place being occupied. The Oratorio was preceded by the National Anthem, which was given with the full orchestra and chorus, as arranged by Sir Michael Costa, and had a fine effect. Unfortunately Handel's original manuscript of the "Messiah" has become so familiar lately to the general public that everybody is beginning to ask why the Sacred Harmonic Society (through whose exertions the fac-similes of the manuscript score were scattered abroad) still persists in deviating from the expressed intention of the composer by assigning the air "But who may abide" to a contralto, instead of a bass voice, and by transposing the second part of the soprano air "He shall feed His flock" to suit a contralto. We have alluded to this matter before in our notices of the Oratorio at the Three Choir Festivals; but, although it may be answered that the conductors at these performances are timid in disturbing traditional readings, this reason can hardly apply at a festival especially promoted to glorify Handel by the Sacred Harmonic Society, and we shall be glad indeed if this Association (to which the lovers of sacred music already owe such a deep debt of gratitude) would initiate a reform of these and some other abuses which could be pointed out did our space permit. The principal parts in the "Messiah" were excellently given by Madlle. Titiens, Madame Lemmens-Sherrington, Madame Trebelli-Bettini, Madame Patey, Mr. Vernon Rigby (Mr. Sims Reeves being still indisposed), Mr. Kerr Gedge and Mr. Santley. With few exceptions, the choruses were delivered with extraordinary vigour and precision, "For unto us," the "Hallelujah," and the final chorus, "Worthy is the Lamb," bringing out the power of the vast choir to the utmost advantage. A violent storm of rain at one time caused a short cessation of the performance, and even marred a solo by Mr. Vernon Rigby; but the effect upon the audience soon passed away, and Mr. Rigby deserves every commendation for his perfect self-possession under the somewhat trying circumstances.

Wednesday was the "Selection" day; and a programme of unusual interest was provided. The performance commenced with the "Dettingen Te Deum," a work which, being almost exclusively choral, it is needless to say was magnificently rendered throughout. The effect created by the movement "To Thee Cherubim and Seraphim continually do cry," the supplicating chorus