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Origin and Construction of the Diatonic and Chromatic Scales

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CORRESPONDENCE.

THE FAUST LEGEND.

TO THE EDITOR OF "THE MUSICAL TIMES."

SIR,- In common, doubtless, with many of your readers I have greatly enjoyed Mr. Corder's papers on the musical treatment of the Faust legend. I trust he will not think it ungracious on my part to express regret that, among the items omitted, are the instrumental Quartets by Hermann Schumann wrote enthusiastically of three Quartets and a Quintet by this composer, all written on passages from Goethe's "Faust"; they were performed in private about the year 1838, and were the first compositions that brought the young musician into notice, although he had contributed some remarkable articles to the Neue Zeitschrift für Musik. Perhaps Mr. Corder would supplement his admirable essay by a few words on these compositions, which it is to be feared are unknown in this country. I have never met with the name of Hirschbach excepting in Schumann's writings and in Mendel's Lexicon. He was born at Berlin, February 29, 1812, and for all that I know is still living.—I am, Sir, yours faithfully,

STEPHEN S. STRATTON.

Birmingham, June 21, 1886.

[Schumann's remarks upon Hirschbach are thoughtful and interesting, but it is rather doubtful whether the composer deserved such serious attention. Modern presentday judgment would probably decide that he was one of those ill regulated geniuses who, perhaps, from insufficient or badly directed study, have failed to become genuine artists. As to the Quartets themselves, Schumann says in one place that the mottoes from "Faust" are put "mehr als sur Erpläsung" (more for expanent the most). Schmuck als zur Erklärung" (more for ornament than use), and in another that they were probably affixed after the compositions were written, a course of proceeding which he himself frequently adopted. In any case, they have no more connection with the "Faust," legend than sundry Overtures by Schulz, Sefried, and other small fry, which consideration for the patience of my readers induced me to pass over. I might at least have mentioned their existence, however, and am obliged to Mr. Stratton for the reminder.—F. C.]

THE WAGNER PERFORMANCES AT BAYREUTH.

TO THE EDITOR OF "THE MUSICAL TIMES."

SIR,—It may interest some of your readers to learn that the performances of "Tristan und Isolde" and of "Parsifal" are not postponed, as was at first announced, on account of the death of the King and the Laudes-Trauer. The rehearsals begin on June 29. As some of your readers may wish to know how to get housed, a difficulty I have myself encountered on former occasions during the performances at Bayreuth, I may mention that at Ruprechtstegen, on the Nürnberg and Bayreuth line, is a very comfortable establishment, where there is a good cook, everything clean, host most obliging, situated in lovely scenery among dolomitic limestone crags, where a visitor can be en pension for four shillings and sixpence a day, all included. special train for the performances from Nürnberg halts at Ruprechtstegen, in going and returning, so that one can lunch there, attend the performance at Bayreuth, sup at Bayreuth, and return to sleep at Ruprechtstegen; more-over, the ticket of admission to the theatre gives the holder free passage on the line to and from Bayreuth to the performance. The second class from Charing Cross to Nürnberg, express, is just £4. Ruprechtstegen is an hour on by train.

As visitors have on former occasions found a difficulty in getting accommodation, and when they have got it have found the accommodation very dear, this hint may be of use to them.—I remain, yours faithfully,

S. BARING-GOULD.

ORIGIN AND CONSTRUCTION OF THE DIATONIC AND CHROMATIC SCALES.

TO THE EDITOR OF "THE MUSICAL TIMES."

SIR,—Having recently had occasion to consider the ratios of the intervals of the chromatic scale, I was surprised to find that the majority of writers on the subject ascribe the ratio 25:24 to the ordinary chromatic semi-tone, and 9:5 to the dominant seventh. The former error evidently arises from neglecting to note that A in the key of G must be a comma (81:80) higher than A in the key of C if the accepted ratios of the scale are to be respected. Thus, measuring from Tonic A, we get $\frac{5}{3} \times \frac{2}{3} \times \frac{7}{4} \times \frac{1}{2} = \frac{135}{25} = C_{\sharp}^{\sharp}$; whereas, measuring from Submediant A, we get $\frac{5}{3} \times \frac{1}{4} = \frac{25}{24}$. The interval is, however, more properly measured as two perfect fifths from B, thus: $\frac{15}{32} \times \frac{3}{2} \times \frac{3}{2} =$

A similar neglect of the comma gives us the false minor seventh $\frac{9}{6}$, instead of $\frac{1}{6} = \frac{4}{3} \times \frac{4}{3} = \frac{94}{3}$, as we find it in the familiar series of whole numbers—24 27 30 32 36 40 45 48, extended to the octave of the fourth, thus:—

These positive and commonly quoted errors, and the absence from the text-books of any satisfactory account of the nature of the diatonic scale, have impelled me to examine the subject anew. Some of the results of my

inquiries are briefly as follows.

The whole musical scale, diatonic and chromatic, including every possible interval deducible from the accepted ratios 24 27 30, &c., is founded on the three prime numbers 1, 3, and 5; I being the primary root, 5 the secondary root, and 3 the generator, thus:-

Natural Scale of Twelfths.

Primary Root. Secondary Root.
$$\begin{bmatrix} \mathbf{I} & \mathbf{3} & \mathbf{9} & \frac{5}{9} & \frac{5}{8} & \mathbf{5} & \mathbf{15} \\ \mathbf{C} & \mathbf{G} & \mathbf{D} & \mathbf{D} & \mathbf{A} & \mathbf{E} & \mathbf{B} \end{bmatrix}$$
Tonic Group. Mediant Group.

Multiplying by 9, we get the above in whole numbers-

27 81 5 15 45 Multiplying by the various powers of 2, we bring the whole series within the limits of one octave-

96 72 108 81 80 120 90 Reduced to its simplest form, and omitting the fifth term, this series is seen to be identical with the accepted ratios-

Let it be observed that the mathematical order in any of the above series of figures (and, indeed, in any arrangement of the scale whatever) is precisely the same, whether estimated upwards from the tonic or downwards from the mediant.*

The number I is the primary, natural, sensuous, and obvious root of the scale, because it is the simplest prime number from which ratios can be measured.

The number 3 is the natural generator of the scale, because it is the simplest prime number from which the ratios of notes, other than octaves, can be formed.

The number 5 is the secondary, inverse, and purely mathematical root of the scale, because it is the simplest

* From this indisputable fact there follows the inevitable corollary, that the only perfect inversion of a melody is that in which the tonic of the original becomes the mediant of the inversion, and vice versa, the supertonic being the same in both, thus-



A melody, thus inverted, has the same mathematical identity with the original, that the form of the reflection of an object in a looking-glass has with the form of the object itself.

Bayreuth, June 20, 1886.

prime number from which ratios can be formed, other than octaves and other than those formed by r and r.

The chromatic scale is merely an indefinite extension of the double series of fifths or twelfths constituting the diatonic scale; the ratios of subdominant, tonic, dominant, and supertonic being found in the tonic series, and those of submediant, mediant, and leading-note in the mediant series.

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The dash / represents the ratio of the comma $\frac{81}{80}$: the inverted dash >, the inverted comma $\frac{8}{89}$.

Thus we see that every possible note of the true scale is represented by a dual series of perfect fifths separated by the interval of a comma (81:80) and continued indefinitely in both directions, as follows:

Mediant Series.
$$\sqrt{1}$$
 $\sqrt{2}$ $\sqrt{3}$ $\sqrt{4}$, &c. $Tonic\ Series$. $K\sqrt{1}\ K\sqrt{2}\ K\sqrt{3}\ K\sqrt{4}$, &c. Here $\sqrt{\frac{3}{2}}$; $K=\frac{81}{60}$. The accepted diatonic scale arranged in fifths, thus:

is identical with *any* four successive terms in the lower series followed by the next three successive terms in the upper series.—Yours faithfully,

JOSEPH GOOLD.

Stratford House, Nottingham, June, 1886.

TO CORRESPONDENTS.

- *** Notices of concerts, and other information supplied by our friends in the country, must be forwarded as early as possible after the occurrence; otherwise they cannot be inserted. Our correspondents must specifically denote the date of each concert, for without such date no notice can be taken of the performance.
- Our correspondents will oblige by writing all names as clearly as possible, as we cannot be responsible for any mistakes that may occur.
- Correspondents are informed that their names and addresses must accompany all communications.
- We cannot undertake to return offered contributions; the authors, therefore, will do well to retain copies.
- Notice is sent to all Subscribers whose payment (in advance) is exhausted. The paper will be discontinued where the Subscription is not renewed. We again remind those who are disappointed in obtaining back numbers that, although the music is always kept in stock, only a sufficient quantity of the rest of the paper is printed to supply the current sale.
- Organist.—All the Universities require a preliminary Art examination for Musical Degrees; but there are several institutions that grant certificates and diplomas for musical qualifications only. These are often advertised in The Musical Times.

BRIEF SUMMARY OF COUNTRY NEWS.

We do not hold ourselves responsible for any opinions expressed in this Summary, as all the notices are either collated from the local papers or supplied to us by correspondents.

ABERDARE.—A brass band contest took place in the new recreation ground on Whit Monday: first prize, £10; second, £5; third, £2. The bands in competition were—Volunteer Band, Mountain Ash (Mr. Shaw, bandmaster), Volunteer Band, Tredegar (Mr. Lott), Carnarvon Band (Mr. Parry), Merthyr Volunteer Band (Mr. R. Jones), Volunteer Band, Aberdare (Mr. Morris), Aberaman Band (Mr. Prestwood). The adjudicator, Mr. J. C. Bawden, Merthyr, who was locked up in a watch-box during the progress of the competition, gave a detailed criticism of the performances of each band, and awarded the first prize to Mountain Ash, the second to Tredegar, and the third to Aberdare.—On the 3rd ult., an excellent Concert was given at the Temperance Hall for the benefit of the funds of the Sguborwen Brass Band. The programme was contributed to by the Aberdare Choral Union (Mr. Rees Evans), Aberdare Glee Society (Mr. D. Jones), Miss Devorald, and others.

Bangor, Co. Down.—An Organ Recital was given by Mr. Thos. H. Crowe, on the 19th ult., in the Parish Church. There was a large attendance to hear the fine new organ of three manuals and forty stops lately erected by Mons. Anneersons. The following programme was performed: Organ Sonata, No. 6 (Mendelssohn), Melody in F (Wesley), Elegy (Silas), Nazareth (Gounod), Andante (Mozart), Grand Offertoire in D (Batiste). On Whit-Sunday the services in the Parish Church were choral, and comprised Te Deum (Smart in F), Jubilate (Garrett in F), Anthem, "Lovely appear," Redemption (Gounod), Evening Service (Bunnett in F).

Brighton.—On Friday, the 11th ult., Mr. A. Lester Draper gave an interesting Lecture, in the Odd Fellows' Hall, on "The Influence of Music." In commencing the Lecture, Mr. Draper said that his intention was to prove, if proof were necessary, the truth of the assertion of Dr. Stainer in his preface to "Music of the Bible," that no art is exercising such a strong influence over the human race as the art of music. Having referred to the music of the ancients in a rapid but comprehensive manner, showing the high estimation in which the art was held by the Jews, Egyptians, Greeks, and Romans, he spoke of its value as an educational element, showing how it had in this, as in the other respects, been sadly neglected in England until quite recently. He quoted opinions of eminent scholars and masters of our public schools proving what excellent results had been produced by the introduction of good music as a part of a boy's education, and maintained that their minds would thus be raised to noble thoughts beyond the commonplace ideas of every day life; and that a course of study in the theory of music might prove as good a discipline as many other subjects of school routine. He then considered its effect on literature and the drama as a means of recreation, and very fully as a part of divine service. The Rev. W. O. Purton, B.A., Rector of Kingston-by-Sea, presided.

Burnley.—At Barrowford Wesleyan Chapel, on the 5th ult., Dr. C J. Frost gave a Recital on the organ, which has been rebuilt and enlarged by Messrs. Driver and Co., of Keighley. The programme included works by Chauvet, Deshayes, Grison, Guilmant—a Capriccio winning especial favour for its pleasing character and the effective manner in which it was rendered by Dr. Frost—the concluding piece being the "Hallelujah" chorus.—Trinity Sunday being also the anniversary of Her Majesty's accession, was the occasion of a special service at Holy Trinity Church, on the 20th ult. There was a church parade of the 3rd Lancashire Rifle Volunteers. The National Anthem was sung by the choir and congregation accompanied by the band of the regiment (J.). Renwick, Conductor). The proper psalms, lessons, and prayers were used at the morning service, and the National Anthem again sung at Evensong, when the anthem was Gounou's "Send out Thy light," the bass solo being sung by Mr. W. Arnold.

CARDIFF.—An attractive Japanese Village was opened, on May 25, at the Park Hall, in aid of the funds of the Cardiff Choral Society, and Organ Recitals and Concerts have been held in connection therewith.—An Eisteddfod was held at the Banqueting Hall, St. Fagan's, on Whit Monday, in aid of the Infirmary at Cardiff. Mr. R. Forrest, Lord Windsor's agent, presided in the morning, and the Rev.