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FEBRUARY 1, 1875.

JOHN HULLAH, Esq., VICE-PRESIDENT, IN THE CHAIR.

ON THE FALLACIES OF DR. DAY'S THEORY OF
HARMONY, WITH A BRIEF OUTLINE OF THE
ELEMENTS OF A NEW SYSTEM.

BY CHARLES EDWARD STEPHENS, Esq.

(Abbreviated.)

In the present state of scientific knowledge in general, it may appear incomprehensible, to those who have not pursued it in the direction of music, that we should have arrived beyond the middle of the nineteenth century of the Christian era without any work having yet appeared which has set forth even the elements of that science in a light which has carried conviction and met with general acceptance. I am not speaking here of the excellent treatises of Sir John Goss, John Hullah, Henry Lunn, Henry Banister, Alexander Hamilton, &c. These, and numerous others, do not profess to treat of the recondite view of the subject, but solely to supply the young student with practical applications of accepted facts. What is still wanting, despite numerous endeavours, is a work which shall convincingly trace the materials and combinations of the Harmonist to their true source, and show him (as I believe to be the case) that those materials and combinations are not arbitrary and conventional, but are supplied by Nature herself—thus enlarging his views, and, in fact, laying before him all of which, as a Harmonist, he can avail himself.

The earliest serious endeavour to this end was one which, considering the general state of scientific musical knowledge at the time, reflected the highest honour on its author—Rameau. He had predecessors (and notably Zarlino, Mersenne, Descartes), who had pointed out the intimate relations between numbers and certain acoustical phenomena known as harmonics; but Rameau thence proceeded to the construction of secondary harmonies, by the arbitrary addition of thirds. It will be found that the addition of thirds is precisely what *does* happen in the constitution of chords, but, with Rameau and numerous of his successors, these thirds were simply assumed, not derived; sometimes they were *superposed*, and sometimes *subposed*; and there was no basis for their selection, beyond the circumstance that they were convenient to make up combinations of which the ear approved, and thus the principle of harmonic generation, with which such theorists started, was afterwards set at naught.

It is not my purpose—indeed, time would not permit me—to even faintly trace the history of the science, and to show you how successive didactic writers thereon made attempts to supply *data* which they imagined to embody the truth, or all that they deemed necessary thereof. The name of such writers is Legion. They all differ in important points in their views of the subject, and they furnish countless diversities of opinion between two extremes—one of which is perhaps represented by M. le Baron Blein, who excludes every consideration which cannot be supported by acoustical phenomena; and the other by Gottfried Weber, one of the chiefs of the army of unbelievers, who, even in his own work on Theory, admits that it embodies no theory at all, and says that the little we know of truth consists only in observation of what sounds well or ill in such or such combinations of notes, and that all attempts to deduce these logically on a fundamental principle, and to transform them into a philosophical science or system, are vain.

It is more than probable that the labours of the vast majority of these writers have long since ceased to exercise any direct influence, but within our own time it was reserved for Dr. Day—a gentleman in the medical profession, but also of very extensive general attainments—to make one more attempt, which is the chief subject of my address this evening. The Day theory is based on the general assumption that any note which can be used in connexion with any particular key must have an absolute existence in that key, and that this applies not only (as previously taught) to diatonic, but also to chromatic notes. This is, briefly stated, the ruling speciality of this theory. It had doubtless struck its author that in music (modern music especially), in any given key, we frequently find chords comprising notes not in the diatonic series in that key. Such chords must be very familiar to those here present: such as, for instance, in the key of C major, chords comprising what is called the raised fourth of the scale—F sharp; similar chords, with also an E flat; various chords in which an A flat appears; chords known as those of the Extreme Sixth, with an A flat and an F sharp, and sometimes also an E flat, combined; chords containing an A flat and a D flat, such as that popularly known as the chord of the Neapolitan Sixth, and some others. These chords comprise, in the aggregate, every note special to the chromatic scale, and Dr. Day evidently felt that the mere cataloguing of such combinations as chromatic chords, without attempting to supply their derivation, was altogether unsatisfactory. At the same time, the transient way in which they are mostly used not appearing to him to justify the idea that they involved any change of key, he betook himself to diatonic roots in the key, whence these chromatic notes and chords could, as he thought, be derived, and so be brought within the key. The roots which he adopted for this purpose are the tonic, the dominant, and the supertonic—i.e. C, G, and D, in the key of C; and superposing third upon third,

and pushing the assumed availability of the harmonics to the extreme limit of the interval of the thirteenth, he established his theory of fundamental chords on those three roots, comprising (all with major third and perfect fifth) chords of the minor seventh, the major and minor ninths, the eleventh, and the major and minor thirteenths, which chords include every chromatic note I have already named. The reasons which he gives for taking these three notes as roots, and no others, are, in his own words, '*Because the harmonics in Nature rise in the same manner: first the harmonics of any given note [C], then those of its fifth or dominant [G], then those of the fifth of that dominant [D], being the second or supertonic of the original note.*' He then adds, as a reason for not pursuing this system further, and adopting the last obtained fifth [A] as a root, that it is *a little too sharp*. I beg you to particularly bear in mind these words, because they manifest a solicitude for correctness of pitch, which elsewhere Dr. Day so utterly disregards. Curiously enough, too, this very note, which he here singles out as being too sharp, and consequently unavailable as a root in the key, is afterwards specially assigned by him as such, as we shall find in due course.

Dr. Day then proceeds to show the treatment of his several fundamental chords before named, and this treatment includes certain restrictions as to what succeeds them, so as not to confuse the tonality; and he maintains that these so-called fundamental chords, including, in the aggregate, an entire chromatic scale, are then strictly in and belonging to the key.

[Mr. Stephens here illustrated on the Pianoforte as far as the Chords of the Ninth.]

It has doubtless struck some who have followed me thus far, that the successive superposition of thirds, to constitute chords, leads, from this point, to combinations which, in their entirety, are simply intolerable. I should be taking a mean advantage if I were to suffer such a misinterpretation of Dr. Day to strengthen, even transiently, my case against him. The diagrams now before you give you those chords complete, in order that you may clearly see their alleged derivation; but in their practical use they are subject to certain restrictions (and notably to that which, as a general rule, prohibits a discord and the note on which it resolves from being heard at the same time), which restriction, I may observe, exists in all systems comprising such extreme chords.

[Mr. Stephens here illustrated the use of the remaining Chords already spoken of.]

You will thus have found that, formidable as some of these chords in their entirety appear on paper, when certain notes, in accordance with certain principles, are eliminated from them, they furnish, with their less formidable-looking brethren, an explanation, according to Dr. Day, of many things which are very common in musical composition, and are certainly not satisfactorily accounted for by other theorists. But, at the very outset,

we find that—although presumably only after many anxious endeavours to discover a better path—Dr. Day brought himself to adopt sounds, not for what they really are, but for just what he wanted them to be. The very first chromatic note at which he arrives is the so-called harmonic minor seventh, from the tonic root—the '*son perdu*' of Rameau—the '*bête noire*' of theorists in general—nominally B flat. And here, at once, the head and front of my objections will be anticipated. The so-called B flat, so obtained, is not the B flat which is available in the scale. It is, as you are all doubtless aware, too flat for any position in that scale. It is not a true major third under D; it is not a perfect fifth under the true subdominant; it is not in the ratio of a minor third with the dominant, &c., &c., and it is simply unusable. I will not, however, dwell longer on this particular seventh, since the partisans of Dr. Day may perhaps take refuge for a moment, and urge that when it is used in the *key of C*, and not to effect a modulation into that of F, it ought, perhaps, to be of the lower pitch of the harmonic minor seventh; so I pass on at once to Dr. Day's next fundamental chord of the seventh—namely, that on the dominant root, G, consisting of G, B, D, and F. Here, again, we find the harmonic minor seventh too flat. It is not the true subdominant F in the scale, a perfect fifth below C, and it is simply, like all the harmonic minor sevenths, unavailable. This will be doubly obvious in Dr. Day's remaining fundamental chord of the seventh, namely, that on the supertonic root, consisting, in the key of C, of D, F sharp, A, and (nominally) C. Here again, of course, the harmonic seventh (nominally C) is flatter than the true C of the scale. To 1,039½ vibrations of the former there are 1,056 of the latter; and so this harmonic minor seventh on the supertonic, declared by Dr. Day to be strictly in the key, *positively contradicts and is at variance with the key-note itself*. This instance clearly admits of no palliation whatever, and it is indeed, to me at least, marvellous that Dr. Day was not stayed by this startling anomaly, and thereby convinced that he was proceeding in error.

I have now to speak of the next chord in order, as derived by Dr. Day, from his three roots of Tonic, Dominant, and Supertonic—namely, his fundamental chords of the major and minor ninths, consisting of the chords of the minor seventh, just animadverted on, with the major or minor ninth added. In regard to the major ninths, that on the tonic root is the true note in the scale (the solitary instance of such truth in the whole of Dr. Day's sixteen deductions of discords from his three roots); but the major ninths on his dominant and supertonic roots are too sharp for the position assigned them in the scale. In regard to the minor ninths on the three roots in question, we find that to obtain even an approximation to the true sounds, we must travel in the harmonic series to no less an altitude than the fifth octave (the nodal point of $\frac{1}{17}$ th of our stretched string), and

when at this altitude found at last, they are not in any one case of the pitch which Dr. Day assumes them to represent.

Up to this point I have been speaking of intervals which may, in one sense, be termed *flexible*—I mean which could, perhaps, be slightly out of tune without immediate detection by any but a keenly sensitive ear; but I now come to speak of another interval, the perfect fourth, which, under the name and at the distance of the eleventh, is the next note added by Dr. Day to his fundamental chords, constituting his chord of the eleventh, and comprising the intervals of his chords of the ninth, just considered, with that of the eleventh added. This chord of the eleventh, contrary to all the rest, he allows *only on his dominant root*, as I have already explained to you (with his reasons) when at the pianoforte. Now this interval, the perfect fourth in harmony, is one which you know has given theorists some trouble. Many have not known whether to class it as a concord or a discord, but two things, essential to our present investigation, are certain: the first is that the perfect fourth is not what I have, for want of a better term, called 'a flexible interval'; and the other is that no perfect fourth whatever exists as an harmonic from a root. Dr. Day's assumption of it, therefore, as one of the component intervals in his fundamentally-derived chords, is one of the most astounding things in his whole system. He is elsewhere urgent on the subject of roots—will admit of no combination which cannot be traced (at least according to his method) to a root or roots; and yet here, suddenly, in his chord of the eleventh, he discards his *alter ego*, and boldly adopts, as the chief characteristic of that chord, an interval which has actually no harmonic existence whatever. It has been urged, in extenuation, that this eleventh on the root is an expansion of, not a dereliction from, the principles previously established in the Day theory. How can we accept such an oblique and evasive plea, and, for the sake of mere expediency, admit that as a fact which is absolutely non-existent?

I now come to the last of Dr. Day's fundamental chords—namely, those of the thirteenth, comprising, on the *Dominant* root, the intervals of his chord of the eleventh on that root, with the addition of the major or minor thirteenth, equivalent, as far as the mere alphabetical name of the notes is concerned, to what are termed the major or minor sixth, but requiring different treatment as notes of Harmony. The systems of Derode and Sabbatini included also this interval of the thirteenth, and the latter termed it in that case the *dissonant sixth*. On the Tonic and Supertonic roots Dr. Day also places these chords of the thirteenth, but, as you have just heard, the chord of the eleventh not being admitted by him on those roots, his chords of the thirteenth thereon appear, as you see by my diagram, without the interval of the eleventh. Here is another striking anomaly. Dr. Day has built up his chords by the successive superposition of thirds; but, by rejecting these as the eleventh to his tonic and supertonic roots, his chords of the thirteenth on those roots

are denuded by him of one of the very links which led to their presumable existence. With regard to the thirteenthths themselves, I will merely remark that, in all three cases, the major thirteenthths, as derived by Dr. Day, are considerably too flat for the true notes in the scale; and as for the minor thirteenthths, we find them not till we arrive at the sixth octave of Harmonics, and there, at last, at the high nodal point of δ_1^1 st part of our stretched string, are sounds again flatter than those as which Dr. Day adopts them.

It will have been found, from these remarks, that every harmonic beyond the third and fifth in Dr. Day's fundamental chords, has proved at variance with the note which he assumed it to represent, with the solitary exception of the major ninth on the tonic. But, further, not only do these Harmonics so contradict the true scale, but they necessarily present hopeless and irreconcilable contradictions among themselves. For instance, if the E, fourth space, treble stave, as deduced from the tonic root, give 1,320 vibrations in a second, the so-called E, the major thirteenth from Dr. Day's dominant root, would be flatter, and give only 1,287 vibrations in the same time; while the so-called E, the major ninth from his supertonic root, is, on the other hand, sharper, and would give $1336\frac{1}{2}$; and thus we have no less than three different pitches supplied us by Dr. Day's roots in the key, for one and the selfsame note, and that the major third, in that key! Again, the note A, third space, treble stave, as derived by Dr. Day from his tonic and dominant roots, has 858 vibrations per second; while the A, as derived from his supertonic root, has no less than 891, thus supplying us with two pitches for the note A in the key of C, both of which, as it happens, are at variance with the true A of the scale. It is needless for me to further pursue this point, and show you the complete chaos which consequently exists among the intermediate intervals in Dr. Day's fundamental chords.

Dr. Day's chord of the eleventh on the dominant, of which I spoke in due order, leads me now to the consideration of what I conceive to be his utterly erroneous views (shared, however, by other modern theorists) respecting the subdominant and the subdominant triad. Every musician must feel the great value and importance of these constituent attributes of a key. The tonic and dominant triads, alone, do not, under all circumstances, positively determine a key; but with the addition of the subdominant triad, or even only the subdominant note added to the dominant triad, they do so, and, as I shall presently endeavour to prove, the note F, as a *root* in the key of C, and the triad on that F, are rightly termed by the older theorists *sub-dominant*, as constituting a determining and governing power in the key. Now although, in the earlier part of Dr. Day's work, he makes a transient admission of the subdominant as a *root*, yet, in the second part of that work, where his own speciality and idiosyncracies are more directly set forth, he distinctly tells us that

the common chord on the *subdominant* is to be considered as a part of his chord of the *eleventh* on the *dominant*. I must here remark, parenthetically, that it appears to me that when Dr. Day had committed himself to the adoption of the *supertonic* as a root in the key, he saw the difficulty of also including the *subdominant* as a root. Had he done so, he must have permitted the same chords thereon as on his other roots, and this would have brought about 'confusion worse confounded.' It would have occasioned, for instance, the enharmonic diesis between the G flat, the minor ninth on this *subdominant* F, and the F sharp, the major third on his *supertonic* chords; and consequently one or other must, according to his own arguments, have been out of the key. But, besides this, the treatment of the chromatic chords so derived from the *subdominant* F as a root, would have been impracticable so as not to obscure or destroy the tonality of C. For these reasons, therefore, as it seems to me, Dr. Day, in this second part of his work, discards the *subdominant* as a root, and, as I have just observed, tells us that the chord of F, in the key of C, is to be considered as part of the chord of the *eleventh* on the *dominant* G—namely, the seventh (F), the ninth (A), and the *eleventh* (C). Now, as I have already shown you, the seventh, so derived, is *too flat*, while the ninth is *too sharp*, and the *eleventh* is simply assumed, having no harmonic existence whatever. Can we consistently accept that a chord, which is absolutely one of the determining and governing powers in connexion with the key, can be composed of such dependent, contradictory, and illusory materials as I have described?

The next chromatic chord with which I have to deal in Dr. Day's system is that familiarly known as the chord of the extreme sixth, on the minor sixth of the scale, comprising, in the key of C, an A flat and an F sharp, with C, or C and D, or C and E flat, to complete the harmony—these three forms of the chord being popularly known as the Italian, the French, and the German. Dr. Day, finding it impossible to deduce these notes from a single root, offers a solution of the problem in a double root, thus:—deriving the A flat as the minor ninth of his dominant root, G; and the F sharp, and the C, together with the D or the E flat, from his *supertonic* root, D. I need here only recapitulate that the A flat, so derived from G, is not found till the fifth octave of harmonics, and, when found, is not of the pitch assumed by Dr. Day. Then, in the German form of this chord, the E flat, as derived by him from his *supertonic* root, is open to precisely the same objections, while, as we have already seen, the so-called C, common to all three forms of the chord, is, as derived by him from this *supertonic* root, distinctly at variance with the key-note itself.

The remaining chromatic chord which I purpose noticing in Dr. Day's system is his triad on the minor second of the scale—namely, on D flat in the key of C, of which we are told that D flat is the root. This is the chord which is frequently used in

its first inversion, which is popularly known as the chord of the Neapolitan Sixth. Now, of course, the alleged D flat root is the so-called D flat which, according to Dr. Day, is *in the key*, as the minor ninth on the tonic root; and, as we have already seen, we find it not till we arrive at the fifth octave of harmonics. Besides the extraordinary singling out of a note at such an altitude as a root in the key, when we arrive at it, it is not a true major third below our true subdominant F, and therefore it cannot be accepted as the root thereof; and when the A flat, as derived from such D flat, is added to complete this triad, both the so-called root and the fifth are at harmonic variance with the third. Yet more: in the course of my address, when speaking of Dr. Day's choice of the Tonic, the Dominant, and the Supertonic, as roots in the key, I also gave you his reason for not pursuing this system further—namely, that the last fifth, so obtained, is out of tune, and consequently unavailable as a root. How completely does he contradict himself now, in offering a minor ninth, at the high nodal point of $\frac{1}{17}$ th of our stretched string, and not of the correct pitch after all, as a root in the key!

I now pass on to remark how, in marked contrast to his endeavours to account for everything, both diatonic and chromatic, in the major mode, Dr. Day has not made similarly complete endeavours in regard to the minor mode. He points out what he considers the true form of the minor scale—namely, that with the minor sixth and the major seventh, both ascending and descending, in which it is quite refreshing to say that I entirely agree with him; but he makes no attempt to establish the chief characteristic of the minor mode by deduction or otherwise. It is clear that here was a difficulty which baffled even the zeal and determination of Dr. Day, and he suffered himself to lapse into the inane statement, that the minor third on the tonic is a purely arbitrary interval, from which we are compelled to infer that the minor mode itself is simply tolerated, rather than allowed, in the system under notice.

It has been seen that Dr. Day's primary aim and problem was to derive, within the key, all chromatic notes and harmonies which could be used in connexion with that key. Up to the point I have reached, he appears rather to have sought to discover a theory which would explain and legalise common practice in this direction; but having thus, as it were, fixed his views, he thereupon proceeds to dogmatise. As I have shown you already, in regard to his subdominant triad, so he throughout considers every chord in the diatonic series as derived from one or other of his three roots in the key. Thus he holds that the *diatonic* triad on the supertonic in the major mode (D, F natural, and A, in the key of C) is part of the chord of the major ninth on the dominant G. Similarly, the triad on the submediant (A, C, and E, in the key of C major) is to be considered as part of his chord of the major thirteenth on the said dominant. And then, proceeding on this principle, he actually excludes the triad on the mediant

of the major mode (E, G, and B, in the key of C) on the ground, in his own words, '*that it appears to belong to another key—that it cannot have the tonic for its root, as the major seventh from that root is part of it*' (while, as we have seen, Dr. Day's roots give the so-called minor sevenths only), and he goes on to show that, for various other reasons, it cannot be a part of any other fundamental chord in his system. The gist of all this is, that he interdicts the triad on the mediant of the major scale, simply because he cannot find, according to his views, a root for it in the key—or, rather, because it does not conform to his tonic root, according to which, as we have seen, the B natural should be the harmonic so-called B flat. This rejected triad on the major mediant is permitted to make a sort of furtive appearance only in a sequence, the symmetry of which would be destroyed by its absence; but, in its *first inversion*, it is freely permitted without let or hindrance of any kind, and Dr. Day makes no attempt to explain away his illogical teaching, that a chord which is *out of the key* in its first form is, nevertheless, *in that key* when used in its first inversion. Something prohibitory in regard to this chord is also advanced by Fétis and other theorists. To me it seems pure dogmatism. That the chord is not much used is true—the same may be said of the diminished triad on the leading-note, of the extreme triad on the mediant of the minor scale, and of some other chords; but its use or its non-use is a question for the composer—its availability is the only question for the theorist. Now, Dr. Day admits that there are instances in which the best writers (Handel especially) use it, but adds that he thinks '*always with bad effect, the chord having nothing whatever to do with the key.*' As Handel is thus singled out as a chief culprit, I will first give you extracts from some of his works, to enable you to test Dr. Day's verdict.

(Illustrations from Handel, followed by others from Sir John Goss, Stephen Heller, and Mendelssohn, the last-named including the War March from 'Athalia,' which furnishes instances of the use of the Chord in question, not only in its first form, but also in its second inversion.)

These, Mr. Chairman, Ladies and Gentlemen, are a few instances, culled at random, of the—am I to say *bad*?—effect of that chord which is positively forbidden by Dr. Day.

Similarly, his unyielding views respecting tonality lead him to deny the possibility of any modulation during the course of a pedal-note; and it is remarked, with an obvious aim at cogency, that the key-note and the dominant being the only notes available as pedals, if the key were changed thereon, they would then cease to be either the one or the other. It would take me a very long time to fully combat this view in words, and to show how keys in certain affinity with that represented by a pedal-note may be transiently used thereon; so I will here content myself by offering you a few well-known instances where such transient modulation *does* occur on a pedal-note, leaving you to draw your own conclusions on its prohibition by Dr. Day.

(*Illustrations, including the Tonic Pedal at the opening of Mendelssohn's Pianoforte Concerto in G minor; and the Dominant Pedal, commencing at the 21st Bar of the second part of the slow movement in Beethoven's First Symphony.*)

Among such transient modulations is that on a dominant pedal (G in the key of C major), by means of a chord with a major third on the submediant (A), proceeding to the minor triad on the supertonic (D). This is of such frequent occurrence that Dr. Day evidently felt it necessary to account for it in some way; so, still steadfast to his prohibition of modulation on a pedal-note, he here clumsily admits the submediant (A), as an exceptional root in the key, in this particular case only; and it has been urged, as a sort of further explanation, that it seems to be a consequence of the notes of the Minor Supertonic triad being all traceable to the Dominant root (which, by the way, I have shown you that they are not), that this said exceptional fundamental harmony on the submediant (elsewhere to be considered unavailable, as being out of the key) may be used on a dominant pedal, if followed by this minor supertonic triad. Even from Dr. Day's point of view, I confess I do not see the force of this reasoning, which merely amounts to saying that a fundamental chord on the submediant, which chord has no connection with the key, may yet be used, provided it is followed by another chord which *is* in the key. But, besides this, the said chord on the submediant, on a dominant pedal, can be eligibly followed by other chords than that particular one insisted on by Dr. Day, and thus his whole argument falls to the ground. (*Illustrations.*)

Finally, on this head, I will show you that this transient modulation, by a fundamental chord on the submediant of a major scale, can also take place even on a Tonic pedal, of which Dr. Day takes no cognisance whatever, and which still further frustrates the conditions he imposes.

(*Illustrations, including the Third Bar of the Allegro of Mozart's Overture 'Don Giovanni'; the Tonic Pedals in the Coda of Beethoven's Pianoforte Sonata, Op. 26, and in the Coda of Mendelssohn's War March in 'Athalia.'*)

And so, in this matter, Dr. Day has again dogmatised, and not only so, but, in this instance, he has done it in direct opposition to himself. You will remember that, when speaking of his selections of the Tonic (C), Dominant (G), and Supertonic (D) as roots in the key, I told you he said we could not carry the system further—i.e., adopt the last obtained fifth (A) as a root in the key, because it is a little too sharp. Yet here, at last, he has himself admitted this very note in that capacity, involving, moreover, the enharmonic diesis between its major third (C sharp) and the minor ninth (D flat) on his tonic root, on the strength of which, alone, one or other must, according to his own arguments elsewhere, be out of the key.

There are other points in connexion with Dr. Day's views, my objections to which would be merely a recapitulation of what I have said in other cases ; so I pass on, lastly, to make one solitary appeal to auricular sense and innate conviction. Straws, it is said, show which way the wind blows, and true it is that small matters are frequently conclusive tests of important ones. In Music, besides our notes of harmony, we have what are called discords of transition, comprising passing notes, auxiliary notes, &c. Here, on my diagram, you will first see a short chromatic passage in the key of C, with the notation ordinarily employed (C, C sharp, D, D sharp, E). Here you will see the same passage, with Dr. Day's notation (C, D flat, D, E flat, E), according to his derivation of those notes and the chords with which I will presently accompany them. The mere materialist might say, 'What does it matter whether you write C sharp or D flat, D sharp or E flat, in such cases, especially in music for the organ or the pianoforte, where the sounds are identical?' True, in one sense, though this is not argument ; but, in ornamenting these notes of harmony, for experiment, with the auxiliary notes above them, the result differs very materially, according to which notation you adopt. Thus, the auxiliary note above C sharp is D ; but if you write D flat instead of C sharp, the auxiliary note above is then an E. Similarly, if you write D sharp, the auxiliary note above is E ; but if you write E flat instead of D sharp, the auxiliary note above is then F ; and so the passage is dissimilar in actual sounds in the two cases. I will now play the two passages, with harmony—first, in accordance with the usual notation :—

Illustration.

and, secondly, according to that of Dr. Day :—

Illustration.

I could indefinitely prolong such tests, but it is needless ; and with this solitary appeal to innate conviction, and without one further word of comment, leaving the verdict to yourselves, thus end, for the present, my remarks on Dr. Day's 'Theory of Harmony.'

I now proceed to speak, very briefly, of the elements of a new

system, to which a very careful and lengthened study of the subject has led me. At the very outset, I adopt the views of the older theorists, but it is in the extension of the system, to embrace the whole range of harmony, diatonic and chromatic, that its speciality consists. I first assume, as a *central* point, my key-note only; and then everything is added, by deduction, &c., in the direction pointed out by natural facts, and invariably in conformity therewith. Beyond the key-note, I view every note which can, in the way I will show, be taken as a root, as a *remove* from that key-note, and consequently only in a certain degree of affinity with it—my system thus resembling, in some degree, those to which the name of Omnitonic has been given. From each of my roots I deduce *two* harmonics of another name *only*, the two such harmonics which arise earliest in the illimitable series, and which experience has proved to be the chief and most important. You are all, doubtless, aware of the illimitability of harmonics, that only a selection from them can possibly be included in any musical system, and that the desideratum is to know where to leave off. I do so at that note which presents the first barrier—the harmonic minor seventh, about which I have already said so much, and I adopt only the third and fifth (and, of course, their octaves and that of my root). This process, taking my key-note, C, as a root, gives me E and G. I then take, as a new root, that note which stands in what I term the first degree of affinity with C—namely, its first harmonic of another name, G; and this G, as a root, gives me B and D. What then is to be done to increase our resources? Pursue the same system of affinity, but look backward as well as forward; and as I took G as the first new product of C, so I now take, on the other side, that note of which C itself is the product, and so I surround my key-note with its nearest relatives. That note is F, the true and honest subdominant, and properly so named, as being one of the governing powers in connexion with the key, and under the key-note in its true harmonic position; and this F gives me, as its third and fifth, A and C. You will thus further recognise the appropriateness of the otherwise unmeaning term of *submediant*, as applied to the sixth note of the scale. As I have shown you, the true subdominant F is, in harmonic position, below the tonic; and the A thence derived is the *midway* note between the two, and hence its name, *submediant*.

In my diagram you will perceive, first, my subdominant root and its adopted products. I have carried these up beyond their first completion, for a reason which will immediately become obvious. Then come the key-note (at its true harmonic distance of the twelfth from the subdominant root) and its adopted products, carried up also sufficiently high for my purpose; and, lastly, my dominant root (also at its true harmonic distance of the twelfth from the key-note) and its adopted products; and then, immediately, the major diatonic scale, with its exact order of tones and semitones, is supplied by my three roots, which are

linked together, as you have seen, by nature, thus showing that that scale is no arbitrary invention or assumption by man, no mere bubble of fashion, no creature of the hour—but an actual suggestion of nature, primeval with creation itself.

You will next see these notes arranged in close harmonic order, commencing with the subdominant, followed by the key-note, and then by the dominant, each with its adopted products; and after the last of these, we simply resume the original series, temporarily displaced by the others, and we go on again.

My theory then is, that these various roots and their adopted products, standing in certain degrees of affinity with each other, can be heard in combination—according, of course, to certain principles; and we thus have, up to this point, the whole range of what is termed diatonic harmony before us. Diatonic triads, diatonic chords of the seventh, ninth, eleventh, and thirteenth are all here. Take, for instance, the diatonic chord of the eleventh on the subdominant. It includes the subdominant and the tonic triads, and part of that on the dominant. This chord is, of course, not explained by Dr. Day's system, as it has a major seventh and an extreme eleventh.

Extending my system further, I next arrive at my roots in a *second* degree of affinity with my tonic or central note—namely, D above, and B flat below. The former gives me, as its adopted harmonics, F sharp and another A; the latter is the parent of F, as F was of C, and gives me also another D. Then also, by a natural process of affinity—which, with many other points, I must not now stop to explain—I arrive at that grand desideratum, the minor thirds from my roots, which furnish me with the true diatonic series in the minor mode; and it is important to remark that this natural process gives me the key-note and the subdominant triads *minor*, but the dominant triad *major*, thus establishing the true minor scale, with the sixth minor and the seventh major. I also thus find my chromatic scale, or rather one of the forms thereof; and while no other system with which I am acquainted furnishes a radical harmony to the chromatic scale, mine does so, and every note can be accompanied by the triad of which it forms a part according to the roots I have indicated—this being, perhaps, some evidence of the soundness of my derivations. (*Illustration.*)

The keys and chords in affinity with my tonic I call cognates of that key, and, in the case of C major, they include, besides what I have already shown, D minor, E minor, and A minor, the dominants of which furnish me also with C sharp, D sharp, and G sharp, and give me another form of the chromatic scale in connexion with my primary key. This form of the chromatic scale can equally be accompanied in a similar manner by the true basses, with triads only; but as in this case the bass progression occurs twice in the chromatic scale itself (E, F; and A, B flat), the use of that progression also in the bass, with triads, involves two dreadful instances of consecutive fifths and octaves. If you

will overlook this incident in consideration of the real point at issue, you will fully realise what I mean by the natural bass to this, my second form of the chromatic scale in connexion with C major. (*Illustration.*)

Lastly, for the present, my two A's, two D's, &c., being, as you know, by their derivation, of different pitch, and it being indispensable to limit our system and establish a cycle of keys, temperament here comes to my aid. It would be shallow to rebuke me here, and accuse me of ungenerosity to Dr. Day in respect of his three E's of different pitch, in not suggesting that temperament would remove the difficulty in his case also. Dr. Day's three E's are derived by himself from what he claims as roots in the key, which is untenable when we find their results at variance with each other. But my two D's, two A's, &c., are derived from roots only more or less in *affinity* with my key-note, their origin being a *remove* therefrom; and so I claim temperament to reconcile little family jars between the more distant branches. I then show how, the family feuds healed, some of the extreme branches may, under certain conditions, amicably commingle; and we thus not only arrive at the whole range of ordinary chromatic harmony, but we have also available, and legalised, such chords as that at the beginning of Haydn's Chaos, consisting of B, D, A flat, and F sharp; and I also obtain a variety of combinations and treatments, some of which I have never yet met with in musical compositions, and others that are, to say the least, rare. (*Illustrations.*)

I have thus very briefly laid before you a bare outline of a new system. I do not invite discussion on this part of my address, as I have necessarily treated it in a very cursory manner. But, reserving to myself the right of reply, I shall be pleased if any champion of the Day theory will break a friendly lance with me, only let him not say merely that it is expedient, or convenient, to accept Dr. Day's false derivations as true. Dr. Day professes to obtain these from roots in the key, and we have a right to require that they be what he asserts them to be—otherwise those deductions are false and untenable. If convenience and expediency instead of truth be all that is aimed at, then away with science, and assume all, and try not to make that appear scientific and philosophical which has no claim to such distinction.

DISCUSSION.

The CHAIRMAN, after expressing the thanks of the Association to Mr. Stephens for his paper, called on Mr. Ellis to give his promised illustrations.

Mr. ALEXANDER J. ELLIS, F.R.S., said that his object was to make some of the chords proposed by Dr. Day audible, because it is not possible to judge of the effects of such systems of harmony as that advanced by Dr. Day, which were dependent on peculiar intonation, by means of instruments tuned, as the pianoforte, in equal temperament. He was not able to exhibit all of Dr. Day's chords, but he could show some of the most important. So far as he had hitherto been able to discover, systems of harmony, before Dr. Day's, were of four kinds: *Octaval* (founded on the octave only, as in equally-tempered instruments, which have of course no other interval strictly in tune); *Quintal* (founded on the octave and fifth, including of course the fourth, the defect of the last from an octave, and the extensions of these three intervals by an octave, forming the only six consonances recognised by Greek writers on Music, to whom the thirds, which Mr. Ellis played, were necessarily dissonant); *Tertian* (founded on the octave, fifth, and major third, including the fourth as before, and the minor third as the defect of a major third from a fifth, and the sixths as defects of the thirds from an octave, with the extensions of all these intervals, and hence comprising all the consonances generally admitted in modern music); and, finally, *Septimal* (including all tertian, and also the results of introducing the harmonic or subminor seventh). Mr. Poole, in Silliman's 'American Journal of Science and Arts' (Vol. 44, July 1867), describes an organ with 100 pipes to the octave, in which 39 of these septimal tones are introduced to play the dominant seventh in all major and relative minor keys. Mr. Ellis's instrument, which was none other but Sir Charles Wheatstone's symphonion, had been tuned for the purpose of exhibiting the effects of the septimal chords employed by Mr. Poole, and it served also to show the effect of the most characteristic chords of Dr. Day's system. Mr. Ellis then proceeded, by means of this instrument, to exhibit the effect of the chord C, E, G, subflat B (the septimal note), D (of the key of C, sharper by one comma than D in the key of F, the nonal tone), and to compare it in all its parts and inversions with the chord of C, E, G, flat B (in the key of F, being the true fifth below it), D (of the key of F), and showed especially the superiority of C, E, G, subflat B, to C, E, G, flat B, in all inversions, and also the superiority of E, G, subflat B, to E, G, flat B, in all inversions. Then he showed that G, subflat B, nonal D (of the key of C) gave a peculiar minor chord, not much inferior to the true minor, whereas G, flat B (of the key of F), and D (of the key of F) produced a strong dissonance. He further illustrated the effects by playing '*Leise, leise*' from '*Der Freischütz*,' in F—first as a melody with subflat B, and then harmonised by means of the above peculiar chords, so as to show their effect. Finally, Mr. Ellis stated his belief that the advantage in a few chords derived from using the septimal tones was not sufficient to compensate for their theore-

tical difficulties (on which he forbore to enter), and that nothing but noise would result from using the harmonic eleventh, thirteenth, and seventeenth, reduced to the usual octaves, as proposed apparently in Dr. Day's system.

The CHAIRMAN having stated that it was now time to close the meeting, it was decided to adjourn the discussion till four o'clock at the next meeting, and to close it at five o'clock, in order that Mr. Hullah's paper might come on at the usual time.

ADJOURNED DISCUSSION.

MONDAY, MARCH 1, 1875.

WILLIAM POLE, ESQ., Mus. Doc. Oxon, F.R.S., occupied the chair.

Dr. W. H. STONE, M.A., acted as secretary, in the absence, from indisposition, of the Hon. Secretary, Mr. Charles K. Salaman.

Mr. WILLIAM CHAPPELL said there was one point in Mr. Stephens's paper on which he had to comment—viz., where Mr. Stephens (according to the report in the 'Academy') spoke of the high order of harmonics, and said: 'To produce even these approximate representations, it was necessary to take harmonics so high, that they have no real existence as musical notes. Thus the twenty-fifth harmonic is employed.' 'A similar derivation of the minor third from the nineteenth harmonic is given in a well-known modern work on Harmony.' What he wished to observe was that the twenty-fifth harmonic was employed, and necessarily employed, because if we want semitones at all, we must begin with 17, and go up to 31 in the octave; in fact, there is no possibility of getting a semitone from the root, or fundamental note of any scales, if you take less than 17. 17 is the C $\sharp$, in the scale of C, and 19 is D $\sharp$. It makes no difference whatever in the scale, whether it be taken from 16 to 32, or from 8 to 16—because 16 is the same note as 8, only an octave higher. The ratio of 16 to 8 is the same as 2 to 1. A true octave scale of tones and semitones must be from the sixteenth to the thirty-second part of a string—the even numbers being the tones, and the odd numbers the semitones.

There was one part of this report which he did not understand, and thought it must be a misprint, where it said that the only harmonics Mr. Stephens admits are the twelfth and the tierce; under the conviction that it is a mistake of the reporter, he refrained from comment.

As some of the members did not absolutely know what the

harmonic scale was, he thought it desirable that they should hear it; and, therefore, he went to Sir Charles Wheatstone, recollecting that in one of his early lectures, perhaps some fifty years ago, he had exhibited this instrument, on which he produced all the harmonic intervals. At that date harmonium or Eoline springs had not been invented, and he therefore placed a common jew's-harp at the end of the tube. It is very deficient in power, but still, with perfect silence in the room, the notes are audible. He was sorry to say that the tube or the piston which works in it was not quite perfect, and the sound was therefore very feeble; but on agitating the tongue of the jew's-harp, and then moving the piston up or down the tube, the different intervals are easily distinguishable—by those, at any rate, who are near it. It produces a perfect two-octave harmonic scale from C, both in ascending and in descending order.* There is a slide by which it can be adjusted. If it is put at half the length of the tube the octave sounds, and in the same way every one of the harmonics in this harmonic scale, taken from his 'History of Music,' could be obtained. He would say that the numbers prefixed to the sounds were the most essential things in the scale—much more important than the numbers of vibrations, which are difficult to count. If any one learns these numbers by heart, he knows the ratios of all intervals; the 9 is the ninth of the string or pipe, the 10 is the tenth, and so on. He would further add that Mr. Stephens's own plan seemed a very sound and practical one. This tube showed that from the C you could get all the 16 tones and semitones from C; they come directly from it, but you can sound no F, no Bb, and of course no A, because our A is out of tune in the scale; it is tuned as a minor tone, when it ought to be a major, in nature. Therefore, so far as Mr. Stephens's paper was concerned, he thought the system he proposed was perfectly just in science. He did not profess to give opinions in practical music, but in science he thought it a perfectly just and true system.

Mr. BANISTER said, that although he had not thoroughly gone into the question with regard to the mathematical points, yet he was exceedingly pleased, not only with the views enunciated by Mr. Stephens, but with a brief conversation he had with him some months previously, when he went over the theory with regard to harmony in a way which seemed to him exceedingly clear. He was quite fascinated with the theory—so much so, that in case of another edition being called for of a little work he had published some time ago, he should be pleased to give an epitome of Mr. Stephens's theory, it seemed so exceedingly clear and able.

* The instrument employed was a tube-like part of an organ-pipe, of about two feet long, fitted with a piston, and having a jew's-harp, tuned to c, fixed to the open end of the tube. From this one c, every note of a true scale was produced with great rapidity, by drawing the piston up and down. [Mr. Chappell has since fitted up a tube with a harmonium spring instead of a jew's-harp, thus making the scale audible in any room.]

Mr. ALEXANDER JOHN ELLIS, F.R.S., said that with regard to Dr. Day's theory, he had attempted at the last meeting to make those present hear the effect of the chord of the major ninth with the harmonic seventh in the chord of C,—thus, C, E, G, the harmonic B $\flat$, and the D which was the perfect fifth to G—and to show that that was really superior to the ordinary chord where the B $\flat$ was got from the subdominant. But he wished to ask the question whether Dr. Day's system had ever been tried upon instruments with sustained tones tuned to it. He did not know how the 11th and the 13th were tuned—whether they were the 11th and 13th in the scale, or whether they were the harmonic 11th and 13th, or in what way they were produced; and he wished to know whether those gentlemen who adopted Dr. Day's system had really tried it in practice, or whether it was not to them merely a paper theory, which the equal temperament would represent as well as any other paper theory.

Mr. CHARLES E. STEPHENS said that, from his conversations with some partisans of this theory, it seemed to him they adopted a purely paper view of the question. When he said that no perfect fourth existed from the root, and consequently those chords, called chords of the 11th, were not existent in nature, then refuge was taken immediately in the assertion that we ought to adopt the F nature gives us, not the F we require as our subdominant F. Mr. Ellis's suggestion that these chords should be tried, tuned according to these natural principles, ought to be placed before the Association on some occasion, when they would be able to judge of the effect for themselves. He felt that we must have a finite system in music, and therefore we must discard those intervals which warred with nearly every other. The harmonic minor seventh, as Mr. Ellis showed on the last occasion, would thus be seen to be not available for musical purposes, and, as he showed us, chords in which it is comprised were simply hideous. They give us a major third which is considerably beyond a major third; in fact, they war so with our musical system generally that they must be discarded. When he endeavoured to pin an adherent of Dr. Day's system to the circumstance of there being no less than three separate pitches in that system for one particular note of the scale, that is, the major third, he replied, 'Yes, it is true; but if voices were not vitiated by practising so on our limited system, we should perform those chords truly, and should feel them in tune.' They would sing one pitch to E, if you spoke of the Triad; another pitch if you talked of the Dominant, calling it in that case the major sixth; and another pitch, again, if you took the Supertonic as the root. It was, therefore, maintained even to that extent by lovers of that theory—that they would change the pitch of a note in accordance with the note of the chord with which it is accompanied.

Mr. JAMES HIGGS, Mus. Bac. Oxon, said that there was a real difficulty connected with the subject which had not been met, or

in any way alluded to. Any theory of harmony might be said to have for its object to set forth the rules which regulate the combination and progression of notes used by musical composers. The objections Mr. Stephens had made to Dr. Day's theory had been to a great extent based upon the fact that certain of the harmonies are not identical with the sounds the musician employs. But Mr. Stephens's theory of adjacent triads seemed to be open to precisely the same objection. He (Mr. Higgs) ventured to believe that composers have always had fixed-toned instruments in their minds, and that they have always written in equal temperament. If that be so, the thirds and fifths, upon which Mr. Stephens's system is founded, deviate from the practical musician's notes just as do Dr. Day's higher harmonics. He thought it easy to show that composers have always written in equal temperament, for on any other supposition—if we take any simple composition by Haydn, for example—we find, as soon as he moves out of his original key (let us suppose C major) into the key of the dominant, he will use notes as the harmonics of the original supertonic, which either are not identical with the notes of the original scale, or are not in tune in the new key. But he (Mr. Higgs) declined to believe that Haydn intended different sounds for the A and C, according to whether these notes represented the sixth and octave tonic of the original key, or the fifth and seventh of the supertonic as the dominant of the new key. He knew it was sometimes asserted that string-players did make these distinctions. He was not a string-player, and was therefore not competent to speak in any practical way upon that point; but he would judge of this paper theory by paper-work. In one of Beethoven's later quartettes, in F, there is a slow movement in D $\flat$: it closes in D $\flat$ major, and instantly the violoncello, which has been on D $\flat$, takes C $\sharp$ for the *Intermezzo*, which is in C $\sharp$ minor. Now, he considered it was never intended by Beethoven that the sound should waver up or down. Practical musicians would say one thing, and mathematicians would say another, but he believed Beethoven intended that the same sound should be produced. What is wanted of a system of harmony is to deal with the tones that composers use, and such a system he believed Dr. Day's to be. He held that the beautiful power of the human ear, which Mr. George Macfarren so eloquently alludes to in more places than one, fully explained the whole mystery—a power which he claims for the ear of being able to hear, not the sound actually sounded, but the sound that should be sounded. In that way, and in that way alone, could the thirds and fifths derived from the adjacent system be reconciled with the notes that practical musicians have ever used; and by such a means he believed all the discrepancies of Dr. Day's theory might be simply explained. He by no means pretended to understand the whole of Dr. Day's theory, but the more he had been enabled to look into it, the more his opinions had gradually come round to the belief that the theory did give

a system of harmony of the highest practical value to musicians. He believed the essential point to be this, that composers had always written in equal temperament, and that equally-tempered instruments were best calculated to interpret their compositions. Much of the art of musical composition consisted in the ambiguity of a note—taking a note as belonging to one key, and leaving it as belonging to another; and that could only be effected by thinking of some one note, not of two or three.

Mr. CHARLES E. STEPHENS replied that Mr. James Higgs's remarks pointed to the very great importance of temperament—because without temperament we should cease to have music altogether. And his remarks about the change of the $D\flat$ into $C\sharp$ were quite pertinent; it is absolutely certain that Beethoven intended no change of pitch to take place on that note. But the question of Dr. Day's theory, or any other theory, did not affect that question in the slightest degree. All must come to this, that we eventually make a cycle of keys, and returning to $D\flat$ we consider it the same as $C\sharp$. But his system did not present the same contradiction that Dr. Day's did; it did not give two or three pitches for the same note, as deduced from different roots in the key. Dr. Day's system, on the contrary, supplied more than one pitch for the same note in the key, and consequently he maintained that such a system could not be tenable—that it was a contradiction in itself. Whatever number of notes might be necessary to make a perfect scale available in all combinations, one thing certain was, that the major third in the key of C did not admit of being treated in three different pitches, according to the three different chords in the key you accompanied it with.

The CHAIRMAN stated that, after a great deal of study of the subject, he was a little inclined to be what Mr. Stephens called an unbeliever. He had some doubt whether any theories, in the sense that they are now spoken of, were sufficient for the purpose, and he was not in bad company in holding that opinion. The first unbeliever of note was, as Mr. Stephens said, admitted on all hands to be a very eminent theorist in Germany, and one whom Germans have always held in great reverence—namely, Gottfried Weber. He was certainly an unbeliever in the same sense—that is, he was of opinion that no *à priori* theories of harmony were sufficient to account for the facts observed. That was many years ago, but there had lately been another corroboration of the same idea, in an excellent article, only just published in the last number of a large and elaborate Dictionary on Music, now appearing in Germany, the 'Deutsches Musikalisches Conversations Lexicon.' It was written with great care, and evidently great knowledge, by Otto Thiersch, on the subject of Harmony. He found the author of this was also to a large extent an unbeliever, like himself. He gives a minute account of almost all known theories of harmony. Although there had been some deep thinkers and writers on Harmony in England, those in Germany had been ten times as many; the Germans were very highly educated in music,

and theories of harmony broached and published in Germany were legion. The writer of this article gives an analysis of them, pointing out what he considers the good and bad points of each. He had copied out one sentence at the end: 'Thus all these systems of harmony either rest on untenable assumptions, or are wanting in practical consistency; and they are altogether insufficient to explain even the works of the acknowledged classical masters, to say nothing of the way in which they so commonly attribute monstrosities and errors to the compositions of the more modern school.' In the course of his remarks he mentions the opinion of Weber, and gives a very good account of his doctrine in one sentence. Weber was a man who, although a great theorist, conceived that, in treating harmony, we should view it in a practical light, and the writer of this article gives this sentence as the sum and substance of Weber's doctrine: 'Weber only seeks to make the pupil acquainted with the chords that are used in music, and does not attempt to explain them, or give their derivation.' Then he gives a long account of Helmholtz's views, not his acoustical theory, but his remarks on Harmony, musically considered, which had not yet been published in England. However, Helmholtz, although he does a great deal to deduce chords and harmonic progressions by theoretical rule, appears by no means confident of the sufficiency of the explanation, and he is a man who, if theory were competent to explain all these things, ought to be able to do it. He says—quoting from Otto Thiersch: 'The system of scales and modes, and all the network of harmony founded thereon, do not seem to rest on any immutable laws of nature. They are due to æsthetical principles, which are constantly subject to change, according to the progressive development of knowledge and taste.' That, of course, is the same thing as saying that no *à priori* theory of harmony can be constructed which is sufficient, because, if harmony depends only on æsthetics and taste, it cannot depend on physical natural laws. Then again he says: 'Helmholtz is quite aware that pure physical and physiological principles will not suffice for the explanation and derivation of musical rules.' There was no time now to go into the subject at length, but it was remarkable what a number of theories had been made, and also what immense contradictions they involved with each other. No better instance of this could be brought forward than that of Dr. Day. It had, however, recommended itself to eminent men, amongst others to Mr. George Alexander Macfarren, who spoke highly of it; and also to some extent to the Rev. Sir Frederick Gore Ouseley, who, however, did not entirely agree with it. Now we were shown grounds why the theory is insufficient, and in some cases bad; but such objections, he believed, might be raised to almost any theory that attempted to go to the origin of things. He was inclined to think, with Weber, that systems of harmony would be much better if they, like many books of harmony, were confined to statements of facts. We find

certain things done by eminent men, and the most useful course is to state clearly what they consist in; the chords and progressions of which they are composed might be classified and explained. He did not think that we are, at the present, able to say, as some elaborate systems do, that because of certain laws of nature, such and such things are right, and such and such things are wrong. To assert that there are laws which shall regulate what kind of musical composition is good, and what kind of musical composition is bad, was, he thought, going on the wrong tack; it had proved so over and over again, because, if we were to go back, and see what people thought of musical theory years ago, we should find that, as knowledge and music advanced, old rules were upset by later views of composers, which were instantly coincided in by the hearers. To form rules which would be set aside by exceptions, and at last totally subverted as music advanced, seemed like beginning at the wrong end. There was more than one analogy for this view. Take the case of language. If anybody were to set to work to show why, on natural principles, it is proper that verbs and nouns should take particular forms, it would be very foolish and inconsistent, but that does not do away with the necessity for grammar. We find certain rules established by the best authors and speakers, and we tell pupils that such and such things are right, being sanctioned by the best authorities. Again, take botany. If anybody were to say that, in the nature of things, a plant should grow of a particular shape, or a flower of a particular colour, he would evidently be going beyond common-sense and reason; but that does not get rid of the necessity for the classification of botanical facts, which may be laid before the student, in order to furnish an easy method of giving him knowledge. Following out that idea, so long as systems of harmony are statements of what may be called musical facts—that is, explanations of what has been done by the best writers, and what has been found to be pleasing to the hearers,—and so long as they lay down rules of that kind as examples for the student to follow, they will be good, and will be incontrovertible, because they do not touch on this forbidden ground. But he could not help thinking that to go deeper, and to attempt to explain all music, and all the infinite complications of musical composition, upon theoretical, physiological, physical, or mechanical principles, is to go to an extent which is not only unnecessary but untenable, and calculated to lead the student into the supposition that he is to act upon unknown mathematical views, instead of what he ought to be guided by—the practice of the best composers.

Mr. CHARLES E. STEPHENS remarked that what the Chairman had said about the observance of the practice of the old masters was of course most important and judicious, but he maintained that the facts of harmony are supplied by Nature herself, and he grounded some of his objections to Dr. Day's theory on that principle. Nature might have chosen that two notes of different

pitch should never be consonant with each other; but she has chosen that certain notes bearing a certain ratio to one another shall be consonant, and consequently it is incontrovertible that Nature herself has given you at least the foundation for harmony. To discard this, and rest everything on what this person has done, or on what sounds well, is certainly not the view that teachers of our art ought to take, because it is their duty to make themselves masters of the truths of science, in order that they may lead their pupils aright.