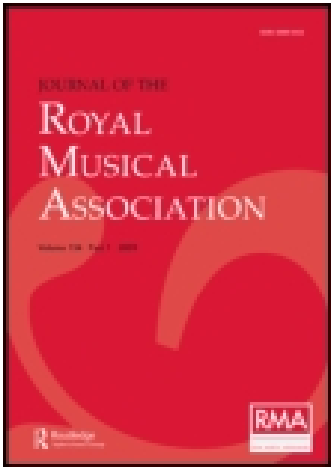

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April 19, 1910.

F. GILBERT WEBB, Esq.,

In the Chair.

CONTINENTAL CHIMES AND CHIME TUNES.

By W. W. Starmer, F.R.A.M.

I am very pleased to have a further opportunity of speaking to you on the subject of chimes, and of completing the part of the subject I was unable to deal with in my last paper given before this Association about two years ago. On that occasion I was only able to treat of chimes and chime tunes of our own country. To-night I propose to deal with Continental Chimes as fully as possible, both as to the music played, and as to the mechanism which is employed to produce it, comparing them with such as exist in England. As far as possible, I shall endeavour to make this paper complete in itself, although there will be, of necessity, references which will presuppose a knowledge of some things I have already fully set forth here on previous occasions. To give an accurate knowledge of the finest Continental Chimes, I have decided to take in detail one of the best known, and for this purpose I have chosen Malines, of which I shall give the fullest particulars. I have been fortunate enough to obtain them through the courtesy of the officials, and of M. Jos Denyn, the famous carillonneur, in particular, as well as by my own personal observation on the many occasions I have visited the city. A comparison with our own chime mechanism and chime music will accentuate

the differences which exist, and this comparison I shall frequently draw in the course of my remarks.

In the tower of the Cathedral of St. Rombold there hang forty-five bells, the largest weighing nearly eight tons, and the smallest but a few pounds. Thirty-two are by the famous master of bell-founding, Peter Hemony (1674), the remainder being the work of Wagheven, Steylaert, Dumery, Van den Gheyn and Van Aerschodt.

The bells, with the exception of six large ones used by the cathedral, are hung "dead," *i.e.*, "fixed." They are carefully arranged so as to admit of the satisfactory egress of the sound, the large bells being placed low down in the tower, the small bells being hung near the outer walls at the top of the tower, at a height of 300 feet. The tower is a very fine one, and, although unfinished, it is 324 feet in height.

The clappers are connected with the carillon clavier, and necessarily strike the bell from the inside. The chimes are played by means of hammers (ninety in all), which strike the bells from the outside. In some instances there are as many as four hammers to each bell, so as to ensure the quick repetition of the note when required. The connections between the chime-machine and the hammers are made by means of wires, squares, &c., just as in our own chimes. These vary from fifteen to forty feet in length. Although the connections are in appearance somewhat clumsy, they require a very nice adjustment.

The chime-barrel is made of gun-metal, with two rim cogs and a centre guiding cog. It was cast in 1733, completed in 1734, and is 5 ft. 3 in. in diameter. It contains 16,200 small holes, into which the studs are fixed. The circumference of the barrel is capable of containing 180 bars—108 for the hour, 48 for the half-hour, 8 for the quarter-hour and 2 for the half-quarters. The driving-weight is 1 ton 6½ cwt., being about 4 cwt. in excess of that which is absolutely necessary for the purpose. The weight is wound up twice in every twenty-four hours, and this can be done by one man. The chain to which the weight is attached is over ninety feet long, and is wound round an oak drum fixed on the axle of the chime-barrel, so that the weight-force exerted is direct, *i.e.*, there is no gearing. The steel "studs," or "catches," are fixed by means of screw-nuts on the inside of the barrel.

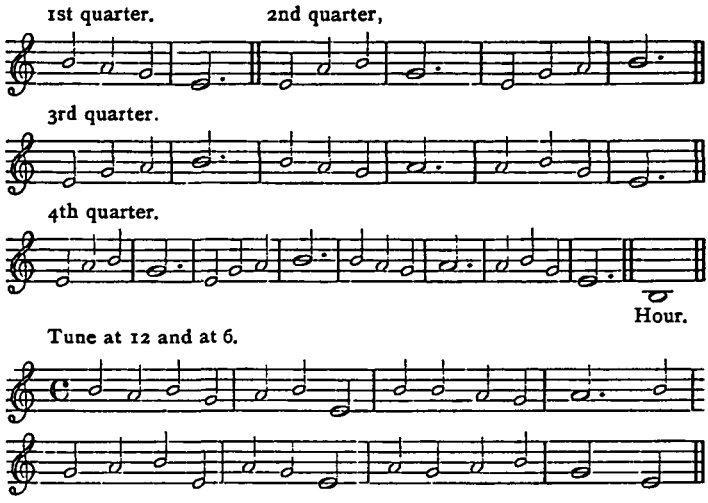
The Chimes are set twice a-year, at Easter and in October, and as the barrel is a permanent part of the mechanism, the Chimes can only be altered by a rearrangement of the studs. This takes about four days to do. There are no interchangeable barrels such as we have in England—a disadvantage; but against this must be set the greater accuracy

of the rendering of the music obtained by using a large barrel, although it has so much more to do. Nowadays chime-barrels of such solidity as that at Malines are no longer made. The cost of the bells, clavier and chimes at present day charges would be about £6,000.

In my previous paper I described how the most modern English mechanism for chimes relieves the barrel of the playing, the pins merely releasing the triggers. The Malines barrel has to do everything, consequently the weight resistance to be overcome is great, and this is why it is necessary to have a driving weight of 1 ton 6½ cwt. The mechanism throughout is clumsier than one would expect, taking into consideration the excellent results obtained; and the fact that it has been working so successfully for nearly 200 years shows that the very best has been got out it. With the skill now available for the construction of such a mechanism, and with the careful and regular attention which should be given to the proper adjustment of the same, even better results could be obtained. In our own country many of the disgusting exhibitions we are forced to listen to, and which in many instances set people against chimes, are the result of gross carelessness and inattention to the proper upkeep of the chime mechanism. In many instances when chimes are put in a church and set going, there seems to be a general idea that they will work for the next century without any attention whatever. If mechanical chimes are to be successful they require very frequent attention and regulation. The chimes at Malines would never have been so satisfactory if it were not for the fact that they are under the constant care of an expert specially employed to look after them, and who almost lives in the tower.

We now come to the consideration of music played by the chimes. On the Continent the quarters and the tunes are much more elaborate than anything in our own country. Our quarter chimes and tunes consist of melody only. On the Continent the music is in two, three, or more parts. With us the uniform plan of the music for quarters is to increase the length of the chime as the hour proceeds; thus in ting-tang quarters (the simplest) 2, 4, 6, 8: 20 notes in all. In Westminster quarters 4, 8, 12, 16: 40 notes in all; ten sets of four notes, which, if further examined, will be found to consist of five changes of four notes twice played. The "runs" or "changes" in domestic chiming clocks are nearly always arranged in the same way. Such quarters as Guildford, Bow, Beverley Minster (the longest in the Kingdom), although not following the arrangement of the five sections twice repeated, proceed in the same manner as regards the increase in the length of the chime as the hour progresses. This plan is not followed to any great extent on

the Continent. However, those of the City Hall at Copenhagen are on these lines. Here are the notes of them:



Turning to famous Continental Chimes, and to those of Malines in particular, what do we find? (1.) That the hour is divided into eight parts instead of four as with us; the quarters being sub-divided into $7\frac{1}{2}$ minutes (half-quarters). The half-quarter in each instance consists of a short, quick flourish of two bars in length; (2.) That the quarters before and after the hour are comparatively short and of equal length—about four times as long as the half-quarters; (3.) That the half-hour is at least four times as long as the previous quarter; (4.) That the hour is at least twice as long as the half-hour; (5.) That the hour to come is struck after the half-hour quarter, on a smaller bell than that used at the hour.

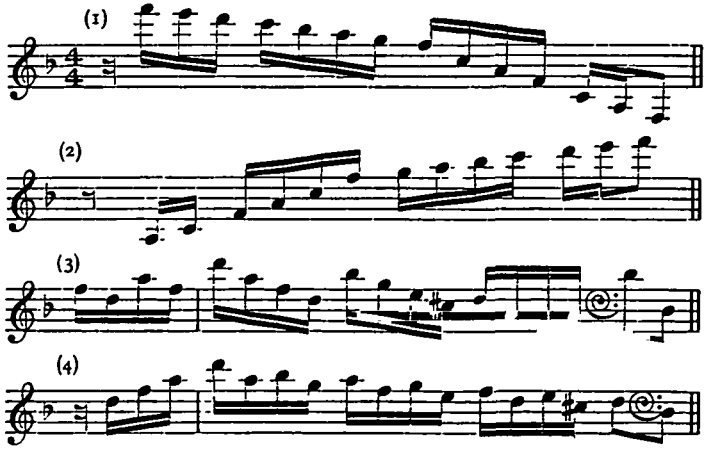
The considerations as to the music most suitable for chimes are much the same as for carillon music, with reference to the number of notes which should be used at the same time. In the latter, chords of more notes can be used because the player can make a good effect *arpeggiando*. In chime music, however, chords of many notes are ineffective. From the examples to be played it will be seen that the melody is very frequently played in octaves—the bass being as strong as possible in its progression, and suggestive of the harmony. Occasional chords are introduced, and then only in extended positions. Pieces in the minor mode are, perhaps, the most satisfactory. Minor chords, and chords of the diminished seventh, are particularly effective. *Arpeggios*,

scale-passages, &c., sound well, and can be played with considerable rapidity. All the music must be arranged with the greatest care, and requires a good deal of knowledge and experience. Sometimes chords of many notes are to be heard, but the effect is always unsatisfactory, owing to the disagreement of the harmonic tones of the bells. Generally speaking, two-part writing is, in my opinion, the most effective. Three-part writing is good, but, for the reasons already stated, the music suffers in direct proportion to the multiplicity of the parts. For bell music it is always desirable, particularly when the heavy bells are being used, to keep the part immediately above the bass a good distance from it. In this respect there are many points which are peculiar, and which differ from the general practice of composition. There is much less freedom in writing music which is to be satisfactory for bells, and the limits are very clearly defined. The special considerations I have mentioned must be observed.

On the Continent, in many instances, the music played by the chimes is badly arranged for them. A common fault is the setting of chords with too many notes, simply because the notes are available, and irrespective of those special considerations which bells demand.

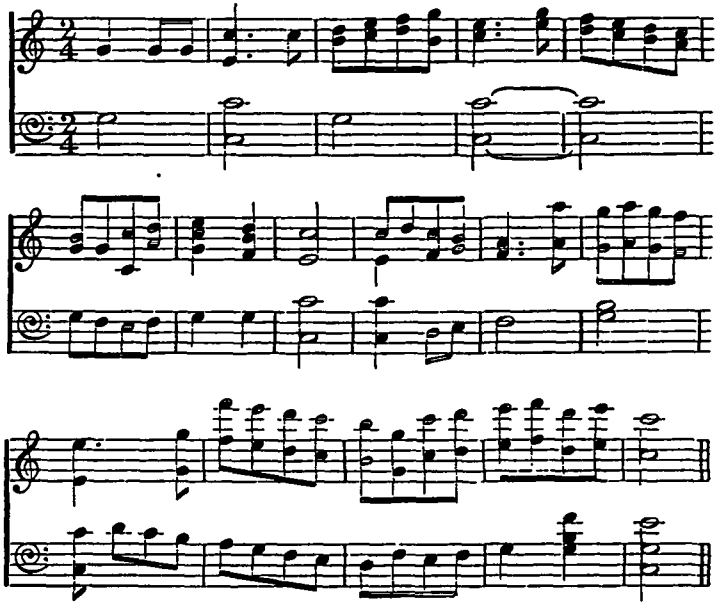
The examples I shall give of the music played by the Chimes at Malines and Utrecht will illustrate what I have said in connection with the special requirements of music for effective chime-playing. The music as set on the chime-barrel at Malines necessitates the playing of 60,000 notes every twenty-four hours.

MALINES.—HALF QUARTERS.



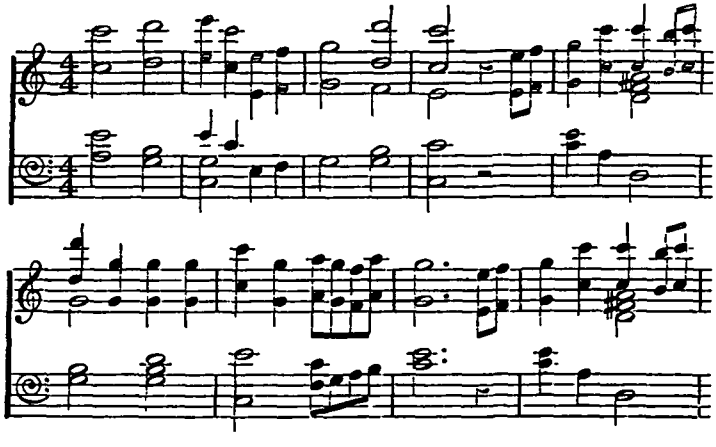
MALINES.—QUARTER.

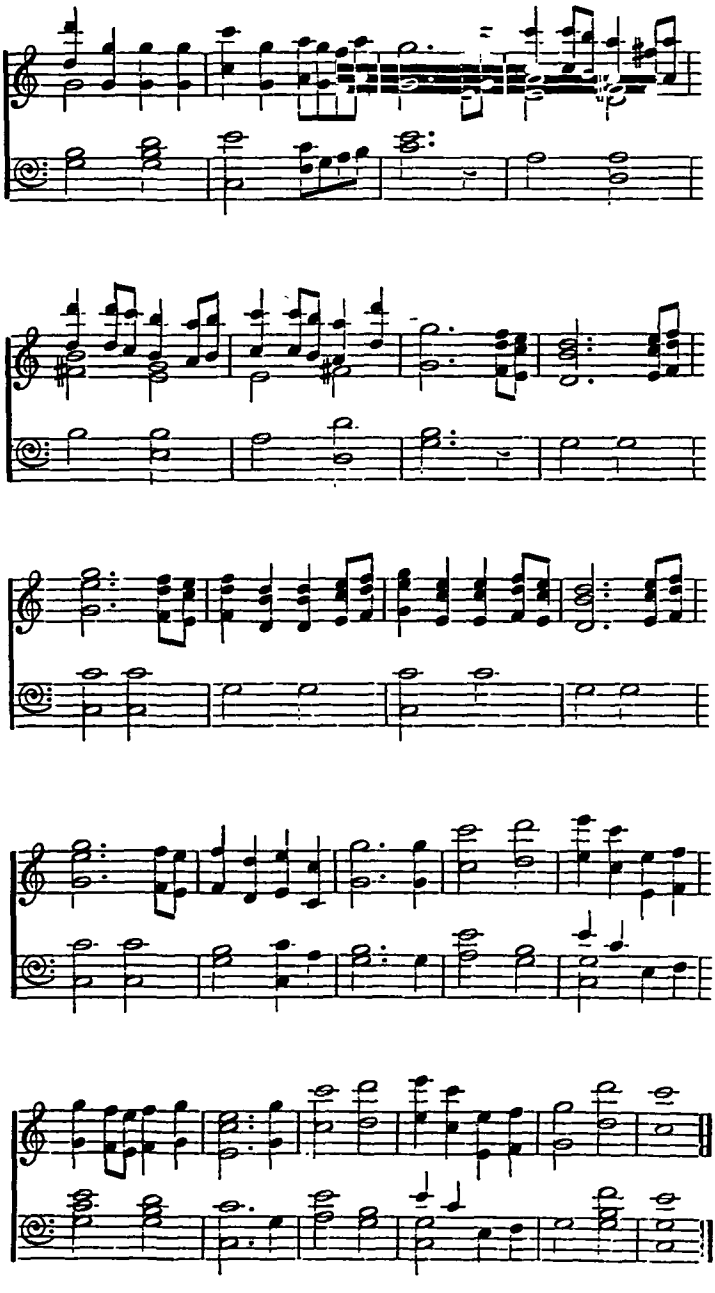
Local song of the town of Ypres.



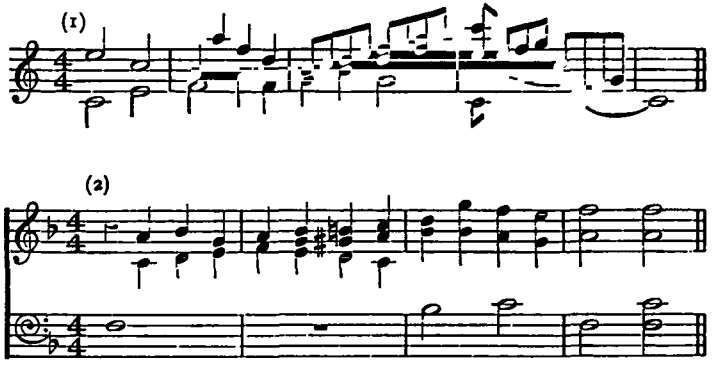
MALINES.—HALF-HOUR.

Finale de la cantate flamande, "Le Triomphe de Groeninghe," by Ch. Mestdagh.



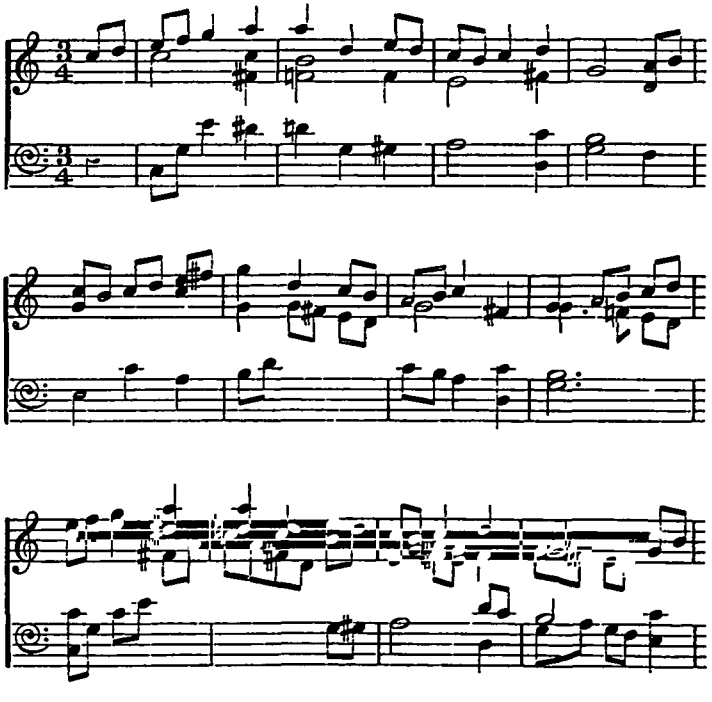


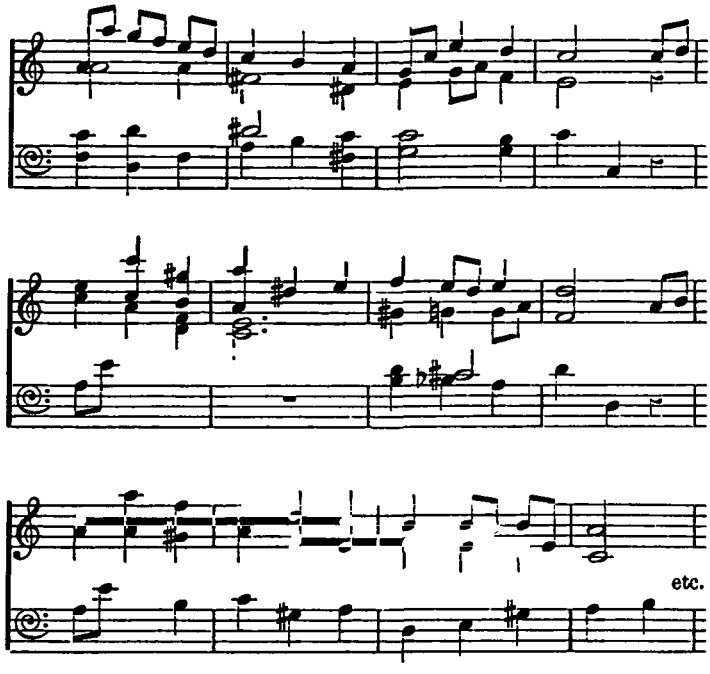
UTRECHT.—QUARTERS.



UTRECHT.—HALF-HOUR.

Menuetto by Arn. Wagenaar.

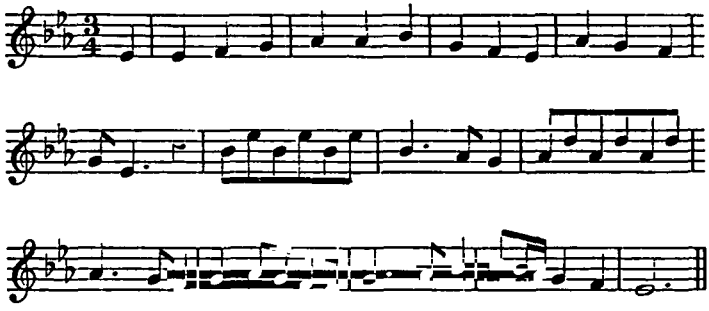




The setting out of the music, for transference to the chime barrel, is generally written in 4-time irrespective of the proper time of the music. The reason of this is on account of the surface of the barrel being divided into so many bars—each bar into four beats—and each beat subdivided into 2, 3, 4, or 6 parts. In other words, each bar can be divided into four, eight, twelve, sixteen or twenty-four parts, and although the music must be accommodated to the mathematical arrangements of the barrel, the possible subdivisions are ample for the requirements of any music suitable for chimes. The subdivisions of the beats are obtained by means of the difference of size, &c., of the "studs" or "catches." Although we speak of the chime barrel containing so many bars, it will be obvious that they are only convenient mathematical divisions which may or may not coincide with the correct barring of the music: *e.g.*, four bars of 3 time take the same space on the barrel as three bars of 4-time, &c.

From the examples I have played, you will be able to form a good idea as to the type of music set upon the chimes. The arrangments made include folk-songs, well-known melodies, operatic airs, national melodies, chorales, &c. In

many instances original compositions specially written for the bells are played. With few exceptions the music is of real worth. As the compass of the carillon available for the chimes is rarely less than three octaves chromatic, there is no mutilation of the music, such as we not infrequently hear in England when well-known melodies are altered to suit the available bells, in such a manner as to be a burlesque on the original. Here is an example of a tune you all know so well, but which I am sure you will not be able to recognise from the first four bars. It has been played for many years by the Chimes of a well-known church in Lincolnshire, and no doubt we are indebted to the clockmaker's genius for such a piece of vandalism :—



In conclusion, I must thank the Association very heartily for giving me the opportunities of placing before musicians the results of my study and research on the subject of Bells, Carillons and Chimes. This paper completes the work I began over twelve years ago, and I must say that the papers I have written for the Association have been a very great incentive to persevere with, and overcome, difficulties which at times have been very great. My original intention was to write one paper on Bells and Bell Tones, but here I am to-day completing the fourth. However, the ground has been covered, and I daresay you will want to hear nothing more about bells for some time to come. Of the orchestral uses of bells there is much to be said, and perhaps at some future time I may be allowed to speak to you on this subject.

The information contained in the four papers I have been privileged to give is only to be obtained from the different volumes of the Musical Association Proceedings, and this testifies to the originality of the work done and to the utility of the Association.

DISCUSSION.

THE CHAIRMAN.—The subject of Mr. Starmer's paper is not one that at first sight appears to lend itself to discussion, for Mr. Starmer would seem to possess nearly all the knowledge attainable; but, as usual when a subject is closely examined, different points are perceived and various problems are suggested. Mr. Starmer must have devoted an enormous amount of time and study to Chimes and Chime-tunes, and the paper he has just read us is most interesting. I must admit I have no great affection for English chimes; usually the bells are so out of tune that the sounds become irritating when repeated every hour, and unless a better system is adopted in England I do not think there will be a public desire to have chimes multiplied. The fact that tunes in the minor mode sound better on bells than melodies in the major scale is curious, and seems to call for explanation. Perhaps it is because our ears are more sensitive with regard to any deviation of pitch in the major third than in the minor. It has often seemed to me that slight deviations are not so objectionable in the intervals of the chord of the diminished seventh as in a common chord. It must also be remembered that the minor third makes a greater appeal to the imagination than the major, owing to its inherent pathos, and it is possible that this pathetic element is intensified in such chords coming to us from bells at a distance. The height at which bells are usually placed is an important factor in the effects they produce, for of chimes it may truly be said that distance lends enchantment. I must admit there seems to me something alarming in half-quarter chimes, because if the chimes are of any length the ringing would be well-nigh continuous. A friend of mine has a fancy for chiming clocks, several of which play at the quarter-hours, and as some of the clocks are fast and others slow, quiet moments are rare. The four lectures which Mr. Starmer has now given us on the subject of bells and chimes increase the value of our annual volumes in a notable manner, for up-to-date knowledge on the subject is difficult to find. We are therefore very much indebted to Mr. Starmer for his informing papers on the subject.

Mr. STATHAM.—I should like to propose a vote of thanks to Mr. Starmer for the paper, partly because I have had considerable interest in the subject, as Sir George Grove laid forcible hands on me and compelled me to write an article on Carillons for his Dictionary of Music. One thing the lecturer did not refer to was the mechanism.

It appears the old German mechanism had a lever which had to lift the hammer for every note; and it was an English firm—Messrs. Gillett & Bland—who introduced a new mechanism by which the hammer was kept raised; the action of the lever being only to let it fall. The result of this was that the time was very much more even. There were none of those checks that occurred under the old system when the lever had an extra-heavy hammer to lift. I should like to know whether this method has been adopted at all on the Continent. While we are behind the rest of the world in music, we are before them in mechanism; just as in the case of organs, the Germans built organs before we did, but the English have made the greatest advances in organ mechanism. As an example of the distortion of a tune on the chimes, I once played at a church in the East-End, and on my way there I had to pass another church where "Abide with me" was played on the bells. In order to save one bell, A♭ was played instead of A♮ at the end of the second line, thus destroying the modulation. A reference has been made to the very long chimes for the quarters, and the fact that they might become rather wearisome. On one occasion they were a great delight to a great French poet, Victor Hugo. He was kept awake by the chimes in a Flemish city (I forget which), and wrote a charming little poem saying how at each repetition of the chimes he seemed to see a fairy dancing down from the sky and shaking showers of notes out of a silver apron. But one can imagine that to people dwelling permanently near such chimes they might be a source of irritation, and even an occasion for legal proceedings.

Mr. STARMER.—With reference to the bells and the minor modes, one particular reason why these sound so well is the fact that in a bell one of the most prominent tones, if it is properly tuned, is the minor third. As to the mechanism of carillons, Mr. Statham will find a full description of the machine he mentions in my last lecture, and also of another machine which is an improvement on it—I mean the more recent invention of Messrs. Smith & Sons, of Derby. It differs from Messrs. Gillett's machine principally in the sub-division of the driving power. Each hammer—or set of hammers—has its own special mechanism driven by a separate weight, instead of the motive power required being derived from one source, as is the case with other machines. Consequently the weights are so adjusted that the driving power is at all times more than adequate for the proper working of the hammers, individually and collectively. There is one other more complicated mechanism of the same type I know of in Paris, but I have never seen anything like it in Belgium or Holland, where large chime barrels are

always used, with music as elaborate as I have given to-day, the barrel being required to do the whole of the work of raising the hammers.

Mr. COBBETT.—Have you ever heard any bells that are properly in tune? As a violinist, I am a little sensitive to intonation, and both in England and on the Continent I have been troubled by them. When the chimes are played on the pianoforte, of course they are in tune, at least as nearly so as is possible with the temperament of the pianoforte; but how does that compare with the actual bells at Malines?

Mr. STARMER.—One of the best bells is the great bell at Erfurt. I could tell exactly which of the bells at Malines are good and which are not so good. But you must bear in mind they have been put up at different times. They have to play 60,000 notes every twenty-four hours; and therefore the bells, especially the smaller ones, are very much worn, and I am sure they are not so perfect as they could be made at the present time. In England, I think a very good place for Mr. Cobbett to make a pilgrimage to is Beverley. There are some very fine bells in the Minster, and also in St. Mary's Church. All the tones of each bell are accurately tuned, and each bell is perfectly tuned to its proper note in the scale. I should be very pleased to give Mr. Cobbett an introduction to my friend Canon Nolloth, who would be delighted to tell him about them. The bourdon bell there is very fine indeed; it weighs between seven and eight tons. Go to the back of the choir, and you will hear the bells to the best advantage. In every bell the hum-note, the strike-note and the nominal are perfect octaves to each other, and the minor third and fifth are in exact tune. Quite recently I had to state that a certain bell was out of tune, yet there were those who were ready to assert that it was in tune. As a matter of fact, as proved by the evidence of the forks, it was twenty-six vibrations sharp. In England for centuries past only one note (the "nominal") in each bell was tuned, no notice whatever being taken of the four lower component tones, which were left to take care of themselves and which in most instances helped to mar the musical effect of the bell. In the bell of Erfurt you will find the nominal, strike-note, and hum-note in octaves, and the minor third and perfect fifth between the strike note and nominal in tune. In small bells the tones above the nominal are not of sufficient power to be of any importance.

THE CHAIRMAN.—Mr. Starmer spoke with great sympathy of the bells having to strike so many notes. I feel more sympathy with the people who have to hear them.

Dr. SOUTHGATE.—I think it is customary that the tales we hear should have a moral at the end. It seems to me a

moral may be deduced from Mr. Starmer's statement that when one is ordering bells they should not expect to get perfection through cheapness. That is the fault, it seems to me, of our English bells that he has dilated upon. When one learns the large expense of those Malines bells, and compares it with the trifles paid for carillons in England, one sees there is some reason for the difference, and the parsimony explains why tunes are mutilated. I was once asked to see about some tunes for a carillon, and I did so; but when I heard them played I wished I had had nothing to do with them. They had not enough bells, so the foreman put in the nearest sounds he had got. I remember when I was complaining about it to a gentleman who was concerned in the matter, he said, "Look here, you organists do just the same thing sometimes. When you are playing the bass of a hymn tune on the pedals, and you want a note below the bottom C, you invert the part and take it in the octave above." I am afraid some of us do so, but still there is a difference between this octave-necessity, and substituting other notes on the bells. The organ bass does not strike the ear so prominently as a tune on the bells. All those who have to do with advising on the purchase of carillons should ask for what is wanted, and insist on sufficient money being expended. Our Chairman spoke about the minor third being possibly more pleasing, or as not being of so much consequence if it was a little out. That reminds me of the minor third in the scale of the Scotch bagpipe. I was concerned in the investigation of this interval on a number of instruments, and found it was a very curious third, neither major nor minor, and what I thought was still worse, no two instruments could be found to agree. I will not ask your opinion as to how you like the bagpipes, but that was a peculiarity we noticed. I may say we found the fourth on the bagpipe was always absolutely true. I would ask our lecturer if he can tell us whether there is any difference in the tone according as the bells are struck on the inside or the outside? I would like to tell him of a bell I have heard. It is an old Burmese bell, not a large one, but with a pure tone. It is of the usual shape, but at the bottom there is a series of tangs about three inches long. It has the most beautiful tone I have ever heard, and I should like to ask if he has met such a bell, and why there should be such a distinction in the tone?

Mr. STARMER.—I am perfectly sure the best tone is obtained by the clapper striking the bell at the proper spot on the sound-bow from the inside, but I think there is one in this room who can answer this authoritatively, and I would ask Mr. Taylor to give us his ideas on the subject. With reference to Burmese bells, I have not seen any

but very small ones, which had nothing special about them as regards tone. I am quite sure those ornamentations would not improve the tone, and would most likely impair it.

Mr. TAYLOR.—Of course there may be no difference in the actual pitch, but I think all will agree that if anything a finer volume and richer tone are produced when a bell is struck from the inside, though the difference is only small. With regard to the Burmese bell it is possible to produce from bells of various shapes a tone which in itself is fairly satisfactory. But I think it would be found if such bells were placed in a church tower to be struck so as to be heard at any distance, you would find the tone very inferior. So far as I can understand, nearly all the Burmese and Chinese bells are very gently struck; and I think the small bell to which Dr. Southgate refers sounds so well only when struck gently with a soft hammer. In that way you produce practically the fundamental tone; but in all the shapes in use the overtones are very different from those given by the proper shape, and are very inharmonious, but by striking a bell softly and gently only the fundamental tone is produced.

Dr. SOUTHGATE.—Why is it that in striking a metal plate you get the major third, but when it is turned up into a bell you get the minor third?

Mr. TAYLOR.—I am sorry I cannot tell you how they arise. I do not think there is anyone living who can give a scientific reason for it.

Mr. STARMER.—I put this question to a very eminent scientist, and his reply was very characteristic; "We know something of the vibrations of a metal plate; bend it, and we know less; out-turn the rim and we know still less."

The meeting concluded with a vote of thanks to the ecturer.