This article was downloaded by: [Korea University]
On: 30 December 2014, At: 03:07
Publisher: Routledge
Informa Ltd Registered in England and Wales Registered
Number: 1072954 Registered office: Mortimer House, 37-41
Mortimer Street, London W1T 3JH, UK

Proceedings of the Musical Association

Publication details, including
instructions for authors and
subscription information:
[http://www.tandfonline.com/loi/
rma18](http://www.tandfonline.com/loi/rma18)

Mental Processes in Music: An Essay

J. Swinburne F.R.S.
Published online: 28 Jan 2009.

To cite this article: J. Swinburne F.R.S. (1918) Mental Processes in
Music: An Essay, Proceedings of the Musical Association, 45:1, 29-52,
DOI: [10.1093/jrma/45.1.29](https://doi.org/10.1093/jrma/45.1.29)

To link to this article: <http://dx.doi.org/10.1093/jrma/45.1.29>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy
of all the information (the "Content") contained in the
publications on our platform. However, Taylor & Francis,
our agents, and our licensors make no representations or
warranties whatsoever as to the accuracy, completeness,
or suitability for any purpose of the Content. Any opinions
and views expressed in this publication are the opinions and
views of the authors, and are not the views of or endorsed
by Taylor & Francis. The accuracy of the Content should not
be relied upon and should be independently verified with

primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

CHARLES HARFORD LLOYD, Esq., Mus.D.,

VICE-PRESIDENT,

IN THE CHAIR.

*MENTAL PROCESSES IN MUSIC.**AN ESSAY.*

BY J. SWINBURNE, F.R.S.

CONSIDER the case of a competent organist reading a fairly complicated item at sight ; he has before his eyes three sets of five lines with curious marks on them, and the control of mechanism of a complex instrument in front of him, on both sides, and at his feet. Dealing with the marks on the staves he has to remember that one on a particular line or space means that he must put down a corresponding key, at a particular instant, accurate within a very few hundredths of a second. He has also to raise his fingers with equal accuracy. He has to remember that sharps or flats at the signature alter the meaning of the marks. He has to remember that the meaning of the marks is also affected by the clefs, and he has at least two of these. The area of paper that is sharply focussed on his retina is narrower than a single stave, so he has to read what is on the three, or perhaps four in little bits in advance, piecing them together at the right moment. When an Alpine mule comes to a rough piece he stops when it is under his nose and plans out his pedalling. He then goes on, and puts each foot precisely right on each bit of rock. But the organist may not stop. He has to arrange his fingering and pedalling in advance at full speed. He has to remember the positions of his stops, and must take his eyes off the print to change them or to change manuals ; and as far as is possible in such a case, he has to arrange his stops in advance. But all this is the unmusical mechanical part of his work. He must realise what each passage means before he plays it ; and when he plays it he must phrase it properly, adjusting the duration of his notes with extraordinary precision. If he

is a very competent musician, he will appreciate the construction of the piece as he plays it, remembering the subjects, and following the modulations without forgetting the main key ; and, if asked, he will transpose it all as he plays. While he is doing this, he may carry on a conversation about golf ; but most likely he will not. This is one feat. Take another case ; a man thinks out a symphony movement in the train and then writes out a full score to record on paper, in a complicated and ridiculous way, what he has produced in imagination, while his wife reads the paper to him.

These feats are very marvellous, but the working of the mind in music has been very little studied ; and it seems clear that study would be useful, though it is not easy. The main difficulty is to know what people can do, and how they do it. The more able the musician is, the less conscious he is of difficulty ; and therefore the less likely to know or say how he works. There are, however, some matters which may be discussed, and it is because this is a mere attempt that the word " essay " is used in the title in its original meaning.

LEARNING TO PLAY THE PIANO.

When a child begins he is told that the lines and spaces carry marks named according to letters. He begins by learning F,A,C,E, as spaces and E,G,B,D,F. He may wonder why the natural major scale begins on C and not on A, but gets so accustomed to it that he never finds out. But the main point is that he has to learn the letter names of all the notes of the scale. He then starts work on the keyboard, and learns that each of the notes has its name. He is then taught on seeing a mark on the stave to say " That is B " and to look at the keys and say " This key is B," and then to play it. When he plays better he does not go through this mental process at all ; he sees a mark on a line, and it suggests playing a certain note, and he plays it. This is a simple example of the need of the study of mental processes in music. It is clear that the pupil is taught badly ; he should be taught from the beginning that a mark on a given line or space corresponds with a key on the piano without the unnecessary trouble of thinking of its name and the name of the part of the piano. This assumes that the connection of mark with note without intermediate realisation of sound is right. This touches a larger and more difficult question, which will come up later.

Playing an instrument like the piano or organ is very largely a matter of pure skill. What most people call studying music is not studying and is not music ; it is merely

acquiring finger skill. I do not know if much has been done in the study of the psychology of finger skill. One point stands out at once ; that a new piece should be played slowly enough for absolute accuracy and correct fingering the first time ; as if played inaccurately to begin with, the inaccuracy has to be conquered. It does not follow that it is best to begin slowly ; because the whole difficulty may be in playing rapidly, and to accustom the mechanism to play slowly is to that extent bad. Beginning slowly is generally advocated, but most performers prefer to play a few things that are too difficult for them, and need much practice, to acquiring the power of playing generally. The public thinks more of a performer who can play one or two very difficult items, than of a musician who has a wide range, and can play everything, except a few pieces written to be specially troublesome.

A new piece should certainly be played with concentrated attention. It seems to be a good plan to put a half got-up piece away for an interval. I believe psychologists say you are learning to skate during the summer. I know nothing about psychology, I am sorry to say.

The theory of five-finger exercises, scales, and arpeggio exercises is that music is a kind of agglomerate of such things, so that if you practise the exercises, music becomes easy. There may be a fallacy here. In real music you get the various components in the right proportion, and you get them in the forms in which they really occur. But a much more important point is that in playing music you are doing and learning infinitely more than in playing exercises. This is a large subject, and as exercise playing is practically universal, I am probably a minority of one, and as I have put these views at length elsewhere* I will not develop them here. Moreover the subject of this essay is not skill in execution, but the basis of what may be called pure musicianship.

WHAT IS A MUSICIAN ?

It is difficult to define musicianship. The public regards a popular singer who may know nothing of music, or a violinist who plays a fabulous number of notes per minute and plays only one line, as an eminent musician.

Take such a man as Mozart, or Mendelssohn. Imagine he injures his hands so that he can no longer play ; and abstract his originality so that he does not compose. He is no longer an executant or a composer, but is just as highly developed a musician as before ; but in what does his musicianship consist ?

* *Musical Standard*, December 21st, 1912.

The foundation is ability to imagine music in his head, and to do so fully and accurately; and to remember it. Such a foundation automatically includes a knowledge of what is wrongly called theory. An ordinary person talks good English without studying grammar; and to him a grammar is a mere epitome of what he knows already. Similarly, anyone with musical ability, who is familiar with good music, knows "Harmony." The harmony text-book is merely a very one-sided attempt at a musical grammar, having something the same relation to music as the old green Latin grammar of our youth has to real Latin. Similarly, the musician is, owing to his grasp of music, quite a good contrapuntist, and it would no more strike him to write bad counterpoint than to use some of the progressions forbidden in the beginning of text-books.

A musician such as this example would hardly have to study text-books; any more than a poet has to study grammar, prosodies, or treatises on syntax.

Music is, however, scarcely a mother tongue, and even the greatest musicians have found the good of studying text-books. Beethoven's "Studies" is a monument of patient work, but it is a very curious record.

It is probable that the examinations for the degrees of Doctor or Bachelor of Music are intended to test pure musicianship: skill in playing an instrument being of no account. It is doubtful whether musical degree examinations are, in fact, tests of musicianship. It might be possible to pass without knowing what the written work sounds like. The paper work in the Royal College of Organists' Examinations is also, broadly, a test of pure musicianship, and the organ work is, mainly, applied musicianship.

The definition here given should rather be that of technical musicianship. The musician must also have what may be called musical feeling. Many people have musical feeling very fully developed without any technical musicianship at all. A really good violinist must have violin technique and musical feeling; he need not have technical musicianship, except in a minute degree, though he sometimes has it.

A singer ought to be able to read a single part at sight. Many people spend years "studying singing." What they do is wrapped in mystery; perhaps their energies are devoted to eliminating some of the tricks learned from former teachers. To most of them a line of music either means nothing, or, if they can play the piano, it suggests pressing keys, a process that has nothing to do with singing. The choir boy or choral society singer gradually acquires the ability to read a part at sight. The process is difficult to analyse. The sound of

the other parts helps, by keeping him right as to key and chord, and a choir will read correctly what none of the members could read alone. It is probably a very mixed mental process, involving reading by interval from the last note. The sol-faist, of course, reads according to the movable Doh system; and if he has approached the old notation through the sol-fa, it is to him merely an absurdly clumsy way of expressing what can be put much more clearly and simply in letters.

It would be interesting to know how players of brass instruments learn. They must know the sound they want, so as to arrange the cavity of the mouth to produce it; while the print also tells them which valve to work. Then the horn player is continually transposing. The only instrument tutors I have seen give no instructions at all on reading music. Perhaps players learn without instruction, or even knowing that they have learnt.

Printed music thus speaks two languages. It gives instructions as to the muscular movements of the player, and it conveys to the mind of the musician the idea of something to be heard, apart from any instrument. To teach a child two languages at a time is doubtful practice, but to teach them with the child under the impression it is learning only one would be much worse. Ear training for piano and organ students is now making way, but it is not generally realised that the student is learning two languages at the same time.

Reading a single line is comparatively easy, but even a single line may be difficult if read entirely alone. It is difficult to read a voice part of Spohr's with the accompaniment covered up. But the difference between reading a single part and several is enormous. And reading in several parts, is again, not nearly so hard as imagining; in fact, long though the jump may be from reading a single part to reading several, that from reading a composition to imagining it without the print is very much greater.

One of the difficulties in studying this subject is knowing what one can do, and it is very much more difficult to know what others can do. You cannot ask a competent musician what he can do and what he cannot. And he probably does not know. It is quite easy, for instance, to think you can imagine music accurately, when you really imagine the treble and an approximate bass, with vague harmony between.

It is largely the result of our notation that it involves two completely different mental effects. Some day we may have the Janko or similar keyboard in which all keys are alike, and a corresponding notation. Thus, the present five-line staves with the intermediate line between them would do. All the lines would represent notes a tone apart, and so would

the spaces. No signatures would be necessary, though a mark to show the keynote line or space would help. All ascending major diatonic scales are then three lines and four spaces, or three spaces and four lines; and corresponding lines on all staves represent the same note. There is no hope of altered notation; the real question is whether it would not be better to read the present notation musically instead of mechanically. It is possible, of course. Probably many sol-faists do so. I knew one who was an organist of a small church. To him the print suggested sounds, and he played the sounds by ear. It made no difference to him what key he played in. Unfortunately, his parson ousted him to put in some personal favourite, and my friend had access to no other organ, and stopped. He was not a keen musician, and this rather goes to show that even the ordinary notation can be read musically if taken so at the beginning. A large part of a student's or even a musician's energy is spent on a struggle between the mechanical and the musical treatment of his notation; and in the long run he might, perhaps, go farther if he had never given way to the mechanical at all.

TRANSPOSITION.

There are two kinds of transposition at keyed instruments; transposition of familiar music, and transposition at sight. I do not know how people generally transpose. Books tell you to analyse the music, and study the harmony of it and so on. Taking first the case of transposing music you know, I think the mental processes consist of reading the print musically and then playing the music by ear in the new key. Playing by ear wants definition. If a piece is known with a treble or melody, it is quite easy to play the melody in any key. In fact it may be known without the print having ever been seen, so that it is in no particular key to the player. That is the most elementary form of playing by ear. If it is known well, it can be played complete, and again it does not matter in what key it is played. There are two difficulties here; one is to know the piece complete in every detail, and the other is to know which keys to put down to produce the sounds you want. The first is the great difficulty. The actual playing by ear is probably much more common. In transposing music he knows, the print keeps the player in touch with the details, and if the music is quite familiar it resolves itself into playing by ear in the new key. But there are all sorts of helps. He remembers that he is transposing up or down so many semitones or tones. He plays by intervals, noting that a part goes up or down a third, or whatever it

may be. An octave chord is played mechanically with two thirds at the bottom, two thirds at the top, or one at the top and the other at the bottom, leaving the sound to come right. Notes common to two chords are noticed and used as pivots or binders. There are so many unmusical helps to transposition that it may be possible to rely on them almost entirely. That is no doubt, why it is more difficult to transpose an augmented fourth, or a fifth up or down. In the case of transposing at sight musically, the process involves first reading the music in its printed key and knowing the sound of it, and then playing it by ear in the new key. Of course, there are the same unmusical helps available. Liszt, I believe, used to transpose the "48" for practice. One wonders what his object was. Perhaps he did it to make sure he had a proper grip of them as music. Whether he transposed with the print before him I do not remember. One of our cathedral organists pays Bach's organ works the same painful compliment. It would be interesting if any experienced accompanist, accustomed to difficult transposition at sight before an audience, would tell us exactly how he does it.

MEMORISING MUSIC.

Many people, especially children, are able to play pieces without the print, after a little practice. There are several mental processes available and they are commonly confused. The first and commonest is finger or muscular memory. This kind of memory is probably most natural because we use it constantly in other connections. All the movements of the body, such as walking or running, are acquired, and then remembered and made subconsciously; and so are less natural acquirements such as rowing, swimming, dancing, skating, and cycling. The mechanism of talking is wonderfully delicate and complicated, but it is quite subconscious; conscious control merely decides what we say. Writing in long or shorthand, or typing, involve subconscious muscular memory. Finger memory is far the commonest. It can always be known, as any slight change disturbs it. The finger memorist cannot play in a key with a big change of sharps or flats. Success in playing, or doing anything else subconsciously depends on not thinking about it. The finger memorist is apt to get put out by a strange piano, with slight difference in touch, and in the feel of the black notes. It is, probably, partly because organ consoles vary so widely that finger memory is not used so much by organists. The difficulties in organ music are peculiar; they do not consist so much in gymnastics as in coördination of movements, and

in the mental grasp of several parts. Again, an organist cannot concentrate on a few very difficult show solos.

Writers on memorising music nearly always give visualising a prominent place. Some evidently visualise the print. No doubt a visualiser practises from one edition. I have only once met a pianist who professed to visualise, and I asked her to write out a bar of anything she could play by memory, and she could not. This does not prove that visualisation did not help her all the same. But I think that anyone who really visualised could write out the music more easily than play it. It is very difficult to trace the real stimulus in such cases. Finger memory plays an important part in getting up a piece and playing from the print. It is probable that in playing something that has involved working up, the mental process is much the same whether the print is there or not. Most likely it is nearly all finger memory, and all the time one is becoming familiar with the music he is unconsciously acquiring a finger recollection of it. In playing without the print, reliance is placed almost wholly on finger memory, with a little extra help from visualisation, and real musical memory. Playing the same thing with the print supplies another help, which may not be so great as it looks. It may be compared to taking your hands off the bar in cycling; the cycle goes all right, but the rider feels uncomfortable, and if he gets nervous he comes to grief.

It has been fashionable for half a century or so for pianists to play by memory, and the idea is that this shows greater musicianship, and that the player, being freed from the need for reading, can give all his attention to the proper interpretation of the music. Whether this is sound or not must surely depend on the way the music is memorised. It would be interesting to know whether the leading pianists can play their repertoires equally easily in any keys, and whether they could write them out in the original or in other keys. It is easy to think one can write out what he cannot. Absolute trial is necessary. Miss Goddard is said to have transposed the solo part of a concerto a semitone when the piano happened to be at the wrong pitch, but the fact that this was mentioned as a feat goes to show that finger is more general than music memory. If that is the case it may be suggested that the fashion is, from a musical point of view, bad. Playing by finger memory does not necessarily help by releasing the mind to be free to interpret better. There may be a strain due to the need of other helps to the memory; and the mere fact that finger memory depends on subconscious working, and, therefore, works best when the least conscious attention is directed to it, tells against artistic performance.

It is said of several pianists, including Saint-Saëns, that their method of playing by memory with certainty is to think of nothing, and let their fingers work.

Music can be memorised apart altogether from playing. Anyone can remember a tune, for instance, even if he does not know his notes and cannot play any instrument. The difficulty comes in memorising a complete composition. For example, Mozart at fourteen, and Mendelssohn, not to mention Burney and Choron, memorised Allegri's "*Miserere*" by hearing it. Mozart heard it once, wrote it out, and corrected the manuscript at a second hearing, while Mendelssohn did not need to check it. The "*Miserere*" consists of 29 bars of four minims each, and is chiefly in minims and semibreves. A five-voice choir sings first, then a four-voice choir, and then the two together. Probably one of the great difficulties was to hear it clearly. There is a much more astonishing story in Shinn's "*Musical Memory*." Attwood lost the manuscript of something he had composed and wanted to score, and Mendelssohn scored it for him from memory. Writing out or playing a composition by ear is merely a proof that it is known. A musician can know music apart altogether from notation or instrument. If Mendelssohn had been born blind, notation would have been nothing to him; and if his hands had been injured so that he could not play he would still have remembered in exact detail almost anything he heard.

PLAYING AND WRITING BY EAR.

"Playing by ear" is generally used by unmusical people to denote the performance of the natural genius who has never learnt any music, but goes to an opera and plays it beautifully by ear next day. I have never met this prodigy, though I often hear of him. It is difficult to eliminate finger memory from playing by ear. Take the case of, say, Mendelssohn after hearing the "*Miserere*" and before writing it down; he could equally well have played it; and in any key, if he had not had the sense of absolute pitch; and this is a musical step in advance of merely remembering it. A musician can think of anything as music in his head; and can then think of each progression or passage in connection with the keys, and the feeling of the hands necessary to play it. This seems to be just as high musical faculty as ability to write. In fact, in some ways it is more difficult for him to play than to write, because a wrong note throws him out and tends to drive what he wanted to play out of his head. Then in writing there is no time element, and he can look back on what is written already, and perhaps correct

it ; and he can begin by writing a sketch skeleton, and then fill it in.

It would be very interesting to know how blind musicians work. It is a mere commonplace to say that absence of one sense increases others : even then the musical feats are very extraordinary. Imagine learning the whole of Beethoven's piano sonatas by heart without seeing the print ! Yet they form only a small portion of the piano repertory of Mr. Wolstenholme, the organ being his instrument. Mr. Hollins has a prodigious memory. He learns by reading Braille, the pianola, and by hearing music played.

COMPOSING.

The most elementary process is to fumble out stuff at the piano and write it down bit by bit. This does not mean that the perpetrator imagines the music first and plays it by ear, and then records what he played ; but that he plays chords and passages till he hits on something he likes. This process need not be discussed.

The next process is to think of a melody, and note it down. Then, later, the composer goes to the piano and fumbles out a suitable accompaniment, no doubt correcting it with a harmony text-book. A newspaper interview with a late eminent song writer gave this as his method of composition. Leoncavallo is said to adopt the same process.

It is possible to manufacture a good deal of music with the help of ink and ruled paper, and very little ear. This demands a thorough mastery of the rules in textbooks, and is a very curious way of working. It seems to be fairly common, but it is difficult to get information. The Royal College of Organists' examiners' speeches on diploma days often throw light on the mental processes of the candidates ; and it must be remembered that these candidates are not beginners, but highly-educated musicians ; on the other hand nervousness may handicap them. It would seem to be impossible to compose much, or even to arrange, without perfecting the power of hearing with the eye, or writing by ear. The case of Wagner is curious. Praeger's "*Wagner as I Knew Him*," describes his method of composing. He practically composed at the piano. This book gave rise to polemics, and Praeger was held to be inaccurate in places, including this statement. It was pointed out that Wagner wrote "*The Ring*," or "*Tristan*," or the "*Meistersinger*," or all of them with no piano in the house. Richter was the authority. But the story went on that Richter used to take the score fresh from Wagner's pen, and retire out of doors and play titbits on a horn !

The harmony of Wagner's early work is bad. It is difficult to say exactly what I mean. Harmony text books contain very little about actual harmony, and still less about progressions. They do not show how a progression in one line rhymes by contrast with a progression in the corresponding part of another line. Or to take a simpler case: many hymn tunes can be played backwards and are still all right according to the text book, but are nonsense musically. To the composer all such things as musical rhyme come without any study; just as good English comes to an author. But Wagner's early works, such as "The Fairies," contain a sort of doggerel harmony. There is less in "Rienzi," and still less in "Tannhäuser" and "Lohengrin"; and it disappears in the later works. I feel sure the opening progression in the "Swan Song," beautiful though it is, was the result of fumbling on the piano. The progression of chords of tonic—submediant—tonic is in itself pusillanimous, it gets nowhere, and was seldom used after Bach's time, and then, apparently, rather by inadvertence. Now it is on every barrel piano. Again, such melodies as the Prayer in "Rienzi," Tannhäuser's song, or the "Pilgrims' Chant," do not seem to carry a natural harmony of their own. When you know them you cannot, perhaps, imagine any other harmony, but the progressions do not go well. If you make up a melody that has not good harmony involved in it, you may try to harmonise it somehow, but the right course is to modify the melody. As a further instance of what may be called pusillanimous progressions or doggerel harmony I would refer to a good deal of the music one hears from restaurant bands, barrel pianos, and so on. Much of this is, I think, called "Ragtime." I cannot find out what ragtime is, but the point is not the time but the inconsequential harmonic progressions.

My contention is, however, that even a composer like Wagner wrote several operas before he had acquired the art of clear musical imagination. A logical critic may point out that there is confusion here between the power of imagining clearly, and of writing down. This would be just, but I do not think it possible that a composer could be developed enough to imagine clearly while still too undeveloped to imagine good music.

Many of the great composers used the piano a great deal, and at the time they were composing. This does not in the least mean that they composed at the piano, or fumbled out their music. They probably extemporised, and tried all sorts of ways of designing a composition. If you imagine a single note, or a common chord, it never comes up to the actual sound, and in the same way music in the head, however

complete its imagination, can never come up to the real thing. Many people profess that they enjoy reading music as much as hearing it, but there is a strong flavour of unwarranted "swank" about such statements. If they were true, no good musicians would go to concerts, and it would have been mere foolishness of the great musicians to learn to play at all. His deafness would have been no calamity to Beethoven. Musical composition would not be limited by the imperfections of voices or instruments. The great composers who used the piano, could play perfectly by ear, and playing gave them a means of producing at once, as fast as they could think; while writing down is a terribly slow process, and will be, until someone designs a system of musical shorthand.

Whether a composer used the piano seems also to depend largely on his memory. There is a difference between imagining music, however complete in detail, and remembering it. From his habit of carrying a sketch-book, it looks as if Beethoven did not remember easily. He used the piano. Chopin is said to have finished a composition in his head, but to have used the piano a great deal too. Weber and Bach both objected to the use of the instrument. Weber composed completely in his head; he argued that finger memory and finger habits came in and spoiled the music at the piano. But if finger habits come in, the extemporiser is not really playing already-conceived music; he is, to some extent, fumbling. I believe Weber started the fashion of conducting without a score. Meyerbeer used the piano, so did Haydn. It is difficult to know what the great composers really did, because the biographers, not having questions of mental processes in their minds, may often make statements that are quite inaccurate. Some idea of Beethoven's method of working can be gathered from his sketch-books. These consist largely of sketches of melodies; but it does not follow that they were not more or less completely harmonised in his mind. He is said always to have carried a jotting-book, so that he did not trust to his memory. It is probably generally much more difficult to remember a tune that grows in one's own head, than one heard externally.

Mozart appears to have completed a composition in his head in detail, and then to have written it down. This writing down seems to have been largely mechanical, as he used to talk or be read to while he was working. It does not follow that the composition in his mind was really complete in detail before writing down; and it is not in the least likely anyone can imagine music as clearly as he can hear it, or anything like so clearly. A simple analogy will illustrate

this. An engineer may design a machine, and think out the details during a sleepless night. Next day he makes a drawing but the drawing is really much more precise and definite than what he imagined. The drawing corresponds to the score. When the machine is made it is according to the drawing, but the drawing does not convey such a full idea to the engineer as the machine itself, though the whole design was his. Similarly, it takes some training for an engineer to read a drawing. When he can read it it is somewhat easier to follow than the engine itself, but the best way to understand a complicated mechanism is to study the machine and the drawing together; just as the best way of understanding music is to hear it with the print before you. Again, an engineer can examine a new machine, and make himself familiar with its working and parts in detail; but he will then find that if he tries to draw it his memory is at fault.

Apart from creative ability or invention, the mental equipment of a great composer seems to include an accurate musical imagination, and especially a good memory; a memory that can preserve even his own mind's creations.

EXTEMPORISATION.

Theoretically, extempore playing is very rapid composition in which the player imagines music, and then plays it by ear. Organists, especially, are recommended to study extemporisation, but it is difficult to see why. Obviously, a composition evolved in this way cannot be as good as one composed at leisure; and it can be heard only once, perhaps a good thing in this case, though bad otherwise. No one but a girl of twenty, or perhaps a Mozart, can take in a good composition on the first hearing, and the enjoyment comes on subsequent acquaintance only. Unless, therefore, the extemporiser can remember his improvisation, it is useless. Metastasio used to extemporise "Poetry," but it is doubtful if his written poems were extemporised. There is no difficulty in making a mechanism that will repeat playing on an organ or piano, and a decent phonograph will record a piano, and especially an organ performance, so if extempore work were really good it would be published.

But extempore playing seldom rises to the level of real composition. My experience of it is too small for me to speak. I can only say that the kind of extemporisation one hears as a voluntary, or when someone is "trying an organ" is not music. It is generally a kind of timeless rigmarole with no plot; and finger memory seems to come even into it, as it is all pretty much alike. It involves playing by ear

to some extent, but each chord or progression suggests the next, and if you (more politely I) put down a wrong note and get an unexpected sound it is perfectly easy to change the course of the performance, and pretend it was so intended. Nearly every organist can make the noise called extemporising, and does so, but the proportion able to extemporise even a definite march or minuet, or anything that is clear cut in form seems small. There may be people who can extemporise a genuine fugue with a countersubject, proper expositions and stretto. Playing a subject and answer with other parts running wild is quite a different matter.

Extemporisers are often advised to prepare their subjects beforehand; but this is not extemporisation, it is merely playing a theme by ear, then producing some connective tissue, and introducing the second theme in the dominant. Then if you have been precautions enough to write out both themes and put them on the desk, you can maul the two about, and if you put down an unmeant or lost chord which does not sound like any kind of amen, you can modulate, and so on till you run dry. Then you repeat the two themes in the same key, give a flourish, and you have extemporised the first movement of a symphony.

SCORE READING.

It is difficult to know how far an orchestral score can be read. Obviously, it cannot be read as a whole at sight. The eye cannot see more than about a square inch at a time. A clever reader can attend to only the most salient lines; but even then he is hampered by all sorts of absurdities. The instruments are not in any regular order, and when you see something coming in the middle of a page you do not know what instrument the stave belongs to, and a glance at the beginning of the page often gives no information.

No doubt a good reader can, at his leisure, build up in imagination from a score, and get some idea of the work. It is a popular notion that a star conductor knows a score in detail, and that if he conducts without it, he knows it by heart. Bülow said it was better that a conductor should have the score in his head than his head in the score; but it does not in the least follow that a conductor has the score in his head because he conducts without it. A very slight acquaintance with the work enables him to do that. It must be remembered that though it is not fashionable, a military band is a fuller and more complicated organisation, and the conductor manages without full scores, because they are very seldom published. There is no glamour about the military

band conductor, but the fact that he conducts complicated music successfully without a full score shows that a full score is not necessary. It is very difficult to get any information as to ability in accurate score reading. It would be interesting to give a fashionable conductor a score with some misprints, and see how many he would notice. Weingartner says that the ludicrous illegibility of a full score does not matter, because so few people can think of more than a very few parts that a rational score would be of no more use to them. On the other hand, how does a man who has lost his sight compose orchestral music? A former amanuensis of Sir George Macfarren's told me that Macfarren used to dictate a score part by part. To imagine an orchestral performance in your head, and hum the bassoon part to be taken down is, to me, at least, an astonishing performance. Playing from full score is evidently a matter of practice and judgment. When the trumpets and horns were written in C it was easy to read their parts, and play them by ear in the key of the piece. Horns in F make this more difficult, and the clarinets give trouble. It is no longer simple transposition, because there are other staves in other keys to be read and transposed. Fétis advises people to read scores by imagining special clefs; it does not seem likely anyone ever used such a system. There is no doubt that good musicians can make a respectable performance of reading scores at sight. Saint-Saëns used to play Rubinstein's to him; and to play a score at sight to the satisfaction of the composer is no small feat. Saint-Saëns said that Rubinstein's scores were not difficult; perhaps the gist is generally to be found in the strings.*

COUNTERPOINT.

In imagining, or in the much more simple case of reading, music which is contrapuntal in character, the mind may imagine the separate parts quite accurately, and in a sense quite fully, without grasping them contrapuntally. This last needs memory not only for the main part and the harmony, but for each part with reference to its individual part.

As a simple example; it is quite possible that out of all the tenors who sing Tallis' Canon frequently, only a small proportion ever realise that their part is the same as the treble. This is because each note is sung mainly as part of the harmony, and with reference to the last note or two, and not as part of a self-contained melody of its own. I have no evidence as to the ease or difficulty people have in, for example, thinking

* *Musical Standard*, January 27th, 1912.

of the treble and tenor of Tallis' "Canon," or even playing them by ear. Again it is easy to hear, or even to play a canon without noticing that it is a canon. It either goes along without any suspicion that the parts are alike, or else there is a vague feeling of similarity. A perfect memory, listening to, say, a Bach sonata, would know exactly when an imitating part stopped imitating. An experiment may be tried on the F major "Toccata," with the two lower staves covered up with a bit of paper. The problem is to play the two parts. Unfortunately, finger memory is likely to come in, but that can be reduced by playing in another key.

It seems likely that the contrapuntal ear of modern musicians is much less trained than that of equally good musicians two centuries ago, simply because their attention was devoted much more to that type of music. I do not know whether it would be an insult to the Members of the Musical Association or the truth, or both, to say that the percentage who know half-a-dozen counter-subjects is very minute. But it is possible our forefathers did not attend to counter-subjects as important; sometimes fugues had none, or the counter-point accompanying subject and answer merely kept a special idiom, a sort of counter-character. Probably Bach could repeat any melody at any interval. Modern musicians, accustomed to sequences and rosalias, might not be behind, but Bach could invent it, or whistle it backwards. The modern ear catches an inversion easily enough, but that is not quite the same as making it. To imagine a subject backwards obviously needs a special training. It is curious that books now give so much attention to the correct tonal answer. This is the one point on which we might expect the modern ear to be a guide. The relation of the subject and tonal answer is fundamental in the modern tune, and a line is constantly rhymed on the principle of tonal answer. It is merely the common play between tonic and dominant.

We may exaggerate the contrapuntal ear training of the past. It was often said of a class of early composers that their work was mere puzzle-mongering.

It seems unlikely that anyone could compose canons in his head at any other interval than the octave. It is also difficult to believe that people can, or could at any date, think in double counterpoint at any interval other than the octave.

We read of extemporised fugues in Bach's time, and people profess to extemporise them now. If a fugue subject is given by a king to Bach, how is the Bach to work it in stretto? Whether a subject will go in stretto depends on the subject not on the extemporiser, unless, of course, he alters it.

The question of counterpoint in ear training is important, but I do not know whether it has received any attention.

ABSOLUTE PITCH.

Many people have a sense of absolute pitch. It is difficult for any one who has not this faculty to realise what it is. It is generally said that a person with this sense can give you any note, and can tell whether an instrument is flat or sharp. This assumes there is some scale in nature at a definite pitch ; which is not the fact. There is no such thing as the note A at a definite pitch. A on instruments has varied in pitch about a fifth, and on different pianos, organs, and orchestras it varies about a tone or more. Of course, the subject may have definite recollection of the pitch his piano happened to be tuned to when he first attended to it. He could not get it from an organ, because an organ changes its pitch from summer to winter. Whether the faculty is of any musical value is another question. It seems as if it would be very inconvenient, and its possession does not appear to have any relation to musical ability. I was staying with a friend who said he had the absolute pitch faculty. He had a grey parrot, and he taught it to whistle tunes, especially bits of Beethoven. He used to tell the parrot what to whistle by name. He would say "Pastoral Sonata," and without other indication the parrot would whistle a few bars, and get some succulent reward. The question arose whether a parrot realised a tune by the relation of notes, or whistled a succession at certain absolute pitches. I found, with a tuning fork, that my friend had not a sense of absolute pitch. I then kept a bit of paper, and whenever the parrot whistled a tune I noted the tune and the pitch. For about a week he whistled each tune approximately at its own pitch. One day, put out in the sun, he seemed to run melodious riot. He whistled most of his tunes, repeating them over and over again, and at all sorts of pitches. It is clear, therefore, that a parrot does not work on the absolute pitch principle ; but I cannot penetrate further into its mental processes.

THE USE OF THE INTELLECT.

It is difficult to determine how far the intellect is employed in doing various things, for instance, in playing a keyed instrument, or in, say, reading music in a railway carriage. Of course, the brain is at work doing anything musical ; and it is likely that the intellect is not the correct technical term for what I mean. One can walk about, and read a book at the same time. In this case the brain works the walking

The question of counterpoint in ear training is important, but I do not know whether it has received any attention.

ABSOLUTE PITCH.

Many people have a sense of absolute pitch. It is difficult for any one who has not this faculty to realise what it is. It is generally said that a person with this sense can give you any note, and can tell whether an instrument is flat or sharp. This assumes there is some scale in nature at a definite pitch ; which is not the fact. There is no such thing as the note A at a definite pitch. A on instruments has varied in pitch about a fifth, and on different pianos, organs, and orchestras it varies about a tone or more. Of course, the subject may have definite recollection of the pitch his piano happened to be tuned to when he first attended to it. He could not get it from an organ, because an organ changes its pitch from summer to winter. Whether the faculty is of any musical value is another question. It seems as if it would be very inconvenient, and its possession does not appear to have any relation to musical ability. I was staying with a friend who said he had the absolute pitch faculty. He had a grey parrot, and he taught it to whistle tunes, especially bits of Beethoven. He used to tell the parrot what to whistle by name. He would say "Pastoral Sonata," and without other indication the parrot would whistle a few bars, and get some succulent reward. The question arose whether a parrot realised a tune by the relation of notes, or whistled a succession at certain absolute pitches. I found, with a tuning fork, that my friend had not a sense of absolute pitch. I then kept a bit of paper, and whenever the parrot whistled a tune I noted the tune and the pitch. For about a week he whistled each tune approximately at its own pitch. One day, put out in the sun, he seemed to run melodious riot. He whistled most of his tunes, repeating them over and over again, and at all sorts of pitches. It is clear, therefore, that a parrot does not work on the absolute pitch principle ; but I cannot penetrate further into its mental processes.

THE USE OF THE INTELLECT.

It is difficult to determine how far the intellect is employed in doing various things, for instance, in playing a keyed instrument, or in, say, reading music in a railway carriage. Of course, the brain is at work doing anything musical ; and it is likely that the intellect is not the correct technical term for what I mean. One can walk about, and read a book at the same time. In this case the brain works the walking

A little examination will show that the mind is thinking of all sorts of irrelevant things. There may be enough spare or wandering attention to enable the player to think out something that is itself difficult, or to talk ; but seldom to talk about anything serious, or to repeat any words by heart, unless they are very well known, so as to come almost automatically.

Apparently, the more attention is concentrated when reading a piece for the first time, the better the performance ; but when it begins to get familiar, and to be played automatically, the greater the attention the worse the playing at the time, but the better the following times. That is to say, concentrated attention makes the muscles learn their business but it interferes with their mechanical freedom for the moment. Nearly everything in music seems to be possible without total attention. Everyone knows he can read a book without taking any notice of the contents. It is just the same in playing, or in reading in the train ; the mental process can go on automatically until some difficulty calls the attention. Bülow used to read scores in bed, and held that while a novel sent him to sleep a score kept him awake. Others may find there is nothing more likely to send them to sleep than reading music, except, perhaps, imagining it.

NERVOUSNESS.

Nervousness seems to arise from anxiety as to doing one's best. It does not necessarily mean that the subject is vain or conceited ; he naturally wants to do his best, especially when it is important professionally. Nervousness may be split into two parts. One is a form of fear, and is evident before a performance. It is akin to fear of actual danger, and has similar bodily effects. It is not peculiar to music ; stage-fright affects every class of person who does anything in public ; but it tends to affect you more if you appear in a capacity in which it is either specially important you should do well, or in which you are a little doubtful of your own ability. This kind of nervousness generally vanishes as soon as you begin to play.

The second kind then intervenes. If a shy man enters a room full of people he feels that his hands are in the way, or that he is walking queerly ; he, therefore, attempts to control consciously what ought to be left to subconsciousness, and does it badly and looks awkward. The nervous player, therefore, tries to concentrate attention on movements that ought to be performed almost wholly unconsciously, and interferes in the middle of them, and throws the performance

out. He may play the easiest passages worst, and be quite successful in reading fairly difficult music at sight, because that occupies his attention more fully in the right way. If the player suffers from both kinds of nervousness at the same time he may make any kind of absurd mistake. A great deal depends on the audience; unappreciative or hostile hearers may ruin the playing of a nervous man; while the feeling that his music is enjoyed makes him play better in public than alone. The effect of alcohol on nervousness is interesting. It may lessen the conscious control, leaving the subconscious free play; thus making anyone who plays from finger memory a better automaton.

Only a part of the subject has been discussed; there are many other interesting questions such as Why do boys whistle? Why does a boulder whistle or hum in a public place, and why does one resent it? What are the relations between Music, Vanity, and Religion? Then there are a whole family of questions relating to the mental effects of notes of the scale, chords, and progressions; and such points as the relation of the minor mode to the tonic and the relative major. There are also the phenomena of music running in one's head. Many people also have a sort of perpetual musical rigmarole going in the head; a tune running in the head being only a particular incident of the rigmarole.

Enough may have been said, however, at least to show the importance of the study of the mental processes in music.

DISCUSSION.

THE CHAIRMAN: We owe a deep debt of gratitude to Mr. Swinburne for his extraordinarily illuminative paper; we seldom have things put so clearly before us. So many points have been raised that it is difficult to follow them all. He says that he has only given a summary of his paper; I hope the whole of it will be printed in the Proceedings, because it will be most interesting to read it in full and to have more completely explained what he has said to us here. There is not the least doubt that finger memory, as regards the piano-forte, is a common form of memory. I remember testing Sir Frederick Ouseley, who said he could play Bach's Fugues by heart. I said, "Will you play me this fugue a semitone higher?" He made the attempt, but after a few bars confessed that he could not do it. Perhaps it was the question

of pitch that bothered him ; I think, more likely, it was a question of fingering. Many people have a good memory for pianoforte music, but a shaky memory for organ music. The organist has to attend to so many things ; he is constantly playing so many different voluntaries that he has not always the time to master any separate piece, much less to learn it by heart. All the same, Sir Walter Parratt, who is one of the very best teachers of the organ in England, insists on his pupils learning to play by heart, and I have heard some of them do so remarkably well. He himself often plays without the book such elaborate things as Bach's larger organ works.

I have had the pleasure of hearing Silas and Guilmant and Ouseley and Wesley all extemporise. I have given themes to the three first named, on which they have extemporised fugues. In the case of Guilmant, he first developed a subject of his own, then the subject I had given him, and then worked the two together. That is an ingenious, and I think, a good kind of extemporisation. If you gave Sir Frederick Ouseley a fugue subject, he would not write it down, but would extemporise on the given subject with great cleverness. It is impossible to say that all the counterpoint was exact, that everything was really quite fit to be put on paper ; still it was very facile and interesting. And curiously enough, it was much more pleasing than his published fugues. Wesley I had the privilege of hearing in the last years of his life. It was at Gloucester. I asked him to extemporise a fugue, which he did. A few months later—he had died in the meantime—I was talking to one of his sons about this extemporisation. The son said, "Can you remember the subject?" I could at that time, and I gave it to him. "Yes," remarked the son, "that was a favourite subject of my father's to extemporise upon!" No doubt he knew perfectly well that the subject would work, and though the episodes were, presumably, extemporaneous, it can hardly be doubted that other parts were in his mind all the time. With regard to absolute pitch, I always feel that it is largely a question of memory. Some people who have good memories have the sense of absolute pitch ; that is, they associate a certain note with a certain sound produced by a certain instrument with which they are familiar. An organist constantly playing one particular organ can very easily sing any note he wants at the pitch of his organ. That is one idea of absolute pitch. But there are people who, apparently, possess it quite apart from association with any instrument. This is more difficult to account for.

MR. D. J. BLAILEY: I was deeply interested in hearing this Paper, and, if I may speak as an outsider, because I can

play no instrument, although I have had to play scales thoroughly, I would offer one or two remarks. I agree entirely with what he said about the teaching of music being connected in the public mind generally with the mere putting down of certain keys on a keyboard instrument. To my thinking, being able to play from printed notes by putting down certain keys on a keyboard instrument is no more a sign of musical education and musical power than putting down the proper keys of a typewriter is a sign of power in literature, or literary power. Again, musicianship, as Mr. Swinburne has said, may exist entirely without the actual power of composing, or without the power of the executant. A man may in one or both have failed, and yet undoubtedly be a musician in feeling, in the same way as a man who appreciates any art, poetry, painting, and so forth, may be said to be an artist, although, perhaps, he may never have been able to execute any work of his own. One practical point with regard to the wind instrument; Mr. Swinburne touched on the horn. I think we have to remember that any wind-instrument player has this power necessarily, in excess of the powers required by the player on a fixed keyboard instrument, in that he must have ear. It is not a question of merely putting down a key, for in most cases on many wind instruments many different notes may come from the same fingering, and the wind-instrument player has to look ahead and mentally read as a singer does—he has to have the note in his ear before he can venture to sound it; so that there is a double mental action going on but in a distinctly combined way. There is the power of reading the sound in the head, and the digital power of touching the right key.

I entirely agree with what Mr. Swinburne has said about absolute pitch. I have never yet heard anyone who really could give one absolute pitch: in fact, there is no such thing, except in theoretic mechanics. The pitch of every instrument is constantly varying, especially organs. It is impossible there can be such thing as absolute pitch; even the tuning fork varies slightly with the weather. This is a matter I have had to give attention to for many years, and so I feel that I can speak definitely about it.

Mr. STATHAM: I should say that the possession of a perception of absolute pitch would be analogous to the perception of delicate shades of colour. There are some people who cannot perceive slight differences of colour, and others who cannot detect slight differences in tone, except relatively. A remarkable instance of the perception of absolute pitch is shown in what is related of Sir F. Ouseley, that, after an absence on the Continent, he remarked, on putting his fingers

on the York organ (I think it was), which had been tuned in his absence, "You have got it an eighth of a tone sharper than before."

In regard to playing from memory, I have a very retentive memory for poetry, but a bad one for music, though I always try to keep up a few memory pieces, and I have found the best way to do that was to keep a clear idea of the musical construction. What is called "finger memory," besides being unscientific, can never be safely depended on.

Mr. WEBB: I knew a lady who had the sense of absolute pitch. If there was a sound in the room she would name the note on the piano; you could not deceive her. She associated it with the pitch on her own piano. I never found her at fault. It may interest some to know that teaching the blind music is now pursued upon the Braille system. Formerly, as doubtless you know, the music to be learnt was played over phrase by phrase until the pupil had memorised it. Now, the notes are reprinted by embossed letters, which the blind read by touch. At the National College for the Blind, in Great Portland Street, W., there are twenty-four teachers, and an ingenious machine for making the embossings.

One point the Lecturer did not touch upon was the memory of the eye. I knew a musician who played the organ very well from memory, who once told me that when he felt uncertain of any portion he conjured up a mental picture of the music page. "I am," he explained, "always particular to memorise the beginning of each page." The memory of the eye is distinct from the memory of sound. I have, myself, the memory of the eye. If I want to refer to a passage in a book I know whereabouts on the page to look whether at the top or bottom, the right or left; I can see the passage mentally. There are many things a musician does unconsciously; the foundation of it all is association. The great thing in learning as in teaching is to set up sequences of associations which are rational and necessary.

Mr. J. PERCY BAKER: May I support what Mr. Statham says as to absolute pitch being a special faculty in many cases? A gentleman, Mr. Edmund Whomes, who read a paper here many years ago on "Key-colour," has an extraordinarily keen ear. His sense of pitch is infallible in regard to any instrument; he seems to have an absolutely unerring sense of the position, so to speak, of any musical sound that he hears. If that is not "absolute pitch" I do not know what you can call it, for no other term has been devised. I do not see any objection to the term; surely there must be such a thing as absolute pitch.

Mr. D. J. BLAICKLEY: A particular sound may be called, say, B according to one scale system—it may be C on another.

Mr. J. PERCY BAKER: Certainly, but is that not rather a question of nomenclature? Pitch has nothing to do with names. I always think of pitch as a series of sounds ranging by infinitesimal degrees throughout the entire gamut. The changes are so minute as to be almost imperceptible, but they exist naturally, and if you cannot give them an absolute name it is because of the imperfections of our nomenclature; our language is not elaborate enough to correspond to the minute divisions in nature. So I submit that name has nothing to do with absolute pitch. When a man hearing a piano says that it is two or three vibrations sharper than what is ordinarily known as concert pitch or philharmonic pitch, he comes as near realising absolute pitch as one can reasonably expect.

Mr. A. M. FOX: As an instance of absolute pitch, perhaps some may remember that when Henry Leslie conducted a choir he had no instrument at all, yet at the end of a long practice he would say to Mr. J. C. Ward, his assistant, "They have dropped in pitch, please give them the note." Mr. Ward would then sing the note, perhaps a third of a tone higher, and this without an instrument. This is what I call the sense of absolute pitch. And he would do it over and over again. With reference to memorising, surely finger memorising is a mechanical thing; you cannot memorise a thing unless you have the music in your head and can sing it there. I play the organ a bit, but I could not play unless I could sing the music from memory. If I cannot sleep at night I often sing through Bach's choral prelude "Schmücke dich." If you cannot sing in your head and know what is coming, finger memory would not help.

Mr. SWINBURNE, in acknowledging the vote of thanks which was accorded by acclamation, said—"I did not mean to imply that there was not such a thing as absolute pitch, and I agree with Mr. Baker's definition of it. All I wished to urge is that it would be worth investigating to see how accurate the sense really is. It is said that a man can remember pitch within a fraction of a semitone. As to finger-memory—probably there are some musical faculties employed too. It is easier for children to learn than for grown-ups. They may know how the thing goes, but I doubt whether they can hear the inner parts at all.