

WHAT IS ELECTRONIC MUSIC?

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In the history of 'Music of our Time', electronic music might be regarded as a final chapter or even a postlude. It seems apart from the main stream development, is the centre of violent controversy and it is ambiguous, as is anything which suddenly obtrudes itself uninvited on an already problematic situation. At the same time it is already of sufficient import to have come to the attention of academic study and pedagogical activity. To the ordinary music lover who listens to contemporary music, Stravinsky, Bartok, and Hindemith are still the key figures; behind them stand Schoenberg, Berg and Webern surrounded by an international troop of twelve-note imitators; electronic music is seen as an enigmatic, extreme development. One thing only is clear: whether it be approved or condemned, it cannot be ignored any longer.

But let us see the situation another way with electronic music as the focal point of a progressive development, connected with the most recent instrumental school of pointillism. Next comes the only recently discovered music of Anton Webern, a point of departure for the present day composers, then Schoenberg's twelve-note music and finally the so-called 'modern classics'. In this arrangement we have at least a certain inevitability of human progress; what was seen as a postlude now seems like our prelude.

Despite the fact that electronic music is the outcome of decades of technical development, it is only in most recent times that it has reached a stage at which it may be considered as part of the legitimate musical sphere. The manner of its birth must in many respects be distinguished from all other beginnings which we have understood to be natural developments. Here there has been no extension of traditional procedure. By the radical nature of its technical apparatus, electronic music is compelled to deal with sound phenomena unknown to musicians of earlier times. The disruption by the electronic means, of the sound world as we have known it leads to new musical possibilities, the ultimate consequences of which can hardly yet be appreciated.

On the other hand there is an essential relationship between electronic music and the traditional world of sound, not only the fact that musical elements are defined by pitch, duration and intensity, but also because of the connection between it and the most contemporary development of musical thought. Electronic music is, and remains part of our music and is a great deal more than mere 'technology'. But the fact that it cannot be expected either to take over or to imitate the functions of traditional music is clearly shown by the unequivocal difference of its material from that of traditional music. We prefer to see its possibilities as the potentialities of sound itself. No position such as this could be reached by a mere transference of the traditional into the electro-acoustical. Here we touch a most widespread misconception: namely, the idea that one can make music "traditionally" with electronic means. Of course one 'can'; but electronic concert instruments will always remain a synthetic substitute. The fact that practically no music which can be taken seriously, artistically, has been written for electronic concert instruments is due precisely to the fact that its use as either soloist or ensemble instrument does not transcend the old means of performance. New ways of generating sound stipulate new compositional ideas, these may only be derived from sound itself which in its turn must be derived from the general 'material'.

Electronic music is based on the composition of electrically generated sounds made audible by a generator, *i.e.* recorded on tape without recourse to any instrument or microphone. Electronic music exists only on tape (or on record) and can only be realised in sound by means of a loudspeaker system. That electronic music cannot be performed on instruments is due to the fact that the number of individual sound elements is so great that any attempt to find means of instrumental realisation is doomed to failure.

There has been much bewailing on the part of 'dilettantes' of the element of spontaneous music-making which is said to be lost in electronic music, these gentlemen conveniently forget that much of what is great and greatest in literature of music from Bach to Schoenberg will always remain outside the reach of their spontaneous music-making. To say that the artist makes music on a platform is just about as true as saying that an Olympic champion wins a gold medal, without mentioning the long preparations, the gymnastic exercises that lead to fitness. In fact 'spontaneous music-making' represents something practised a thousand times, co-ordinated through repeated rehearsal, something which stipulates a well-lubricated, hyper-regular mechanism, an almost unique mechanical production in which its studied precision is nearer to a protracted electronic synchronisation than to 'spontaneous music-making'. It is not irrelevant to point out here that it is in no way the aim of electronic music to replace instrumental music. On the contrary, a deep kinship may be observed between instrumental

music of recent date and electronic music, and the theoretical experiments in the elementary properties of sound phenomena which have been part of the beginnings of electronic music have not been without their influence in the instrumental sphere.

The invention of the valve in 1906 marks the beginning of the development of the phenomenon of electronic music, though naturally the invention had nothing to do with music. It is a coincidence, yet in a higher sense perhaps no coincidence, that at this very time Busoni and Schoenberg were first interesting themselves in the idea of an 'uninterrupted continuity' of musical material, thus touching the limits of instrumental technique. Busoni discussed the fissure of sound material, as it was known in this time, and Schoenberg invented the *Klangfarbenmelodie*. Busoni at that time referred to Cahill's electric organ which, for the first time, enabled a composer 'to attempt to fly'. Schoenberg did not pursue the idea of *Klangfarbenmelodie* in his later work but Webern was able to link it to his idea of a series of proportions which subjected harmony and melody to a common denominator of intervallic proportion. Webern was not able to extend the serial principle to all musical dimensions but did, at least, achieve sound structures generated according to the permutational principles of the series – in this he comes near to electronic music, which takes up his great idea and without imitating it, transfers it to the total organisation of the electronic sphere.

Developments in the building of electronic concert instruments began after 1920. The builders always attempted to imitate the traditional sound, with the exception of Jorg Mager, who stated, referring to Busoni's idea, that it ought to be possible to 'make available to artists of the future all frequencies, melodically as well as harmonically, as well as the partial tones which determine the timbre'. But the decisive means of maintaining and operating sound only became available some twenty years later with the discovery of the means of recording sound on tape.

Electrically generated sound could only be utilised as a genuine compositional element when this technique had been invented. In the ordinary way the tape recorder provides the means of playing back tapes. But the new tape technique which is no longer satisfied with a mere playback is of the greatest significance here. The normal studio technique of broadcasting is transformed into a compositional means. Tape recorder and loud-speaker are no longer 'passive' transmitters; they become active factors in the preparation of the tape. This is the essential secret of electro-acoustical technique. One might say that today we have perfected a 'keyboard' of this elaborate and differentiated sphere of radio transmission; now we lack only the virtuosi to master it.

The composer's equipment consists of a sound generator, a loudspeaker, tape recorder and filter; all this apparatus is to be found in any well equipped radio station. No especially expensive equipment is required, as has been generally suggested, and in fact there is no reason why electronic music should not be produced in any normally equipped radio station. The composer determines each note by its pitch, duration and intensity. Only he no longer has only 70-80 pitch levels at his disposal (this the average number utilized in instrumental music; Bach's *Wohltemperiertes Klavier* utilises 50-55 different pitches), only 6 or 7 intensities from *pp* to *ff* and only minims, crochets, quavers, dotted and syncopated values. He now has at his disposal the entire range of frequencies from 50-15,000 c.p.s., 40 or more precisely calculated dynamic levels and an infinite number of duration values, measured in centimetres on tape. None of this material can be adequately annotated by traditional means. The following example is given to illustrate this new world of microstructures which we have entered. Every musician is familiar with the note a' at 440 c.p.s. The next whole tone above is b' (492 c.p.s.). Within this major 2nd from a' to b', we are able to generate 52 different pitch levels of which, when ordered in a scale, at least each fourth level is heard as a different pitch interval.

The multiplicity of forms of electronic elements far exceeds the possibilities of graphic notation. It is thus necessary to notate differentiations, which are unknown to traditional music, in a way which corresponds to acoustical phenomena. This cannot be effected by an extension of traditional notation; it is better to present the sound procedures of electronic music graphically in the form of an 'acoustical' diagram. Thus 'scores'¹ of electronic compositions resemble precise acoustical diagrams with their coordinates, frequency (cycles per second), intensity level (measured in decibels) and time (cm.p.s.). The composer is required to have a certain amount of acoustical knowledge. In this respect it is to be observed that acoustical conceptions do not always correspond to those of musical theory. Electronic sound is classified as: the tone, the note, the note mixture, noise, sound complexes and impulses.

1. The *tone*: is unknown to traditional music; is without overtones, is pure or sinusoidal; all sound phenomena may be reduced to it. No tonal system in the traditional sense may be constructed of sinus tones; they have no traditional place of a system, no tonal 'character'. Thus the sinusoidal tone system can only be a theoretical system of reference; the composer may build structures out of this system by means of serial organisation.

2. The *note*: is what every musician knows as a tone. It is built up from a series of harmonic overtones (partial, sinus frequencies). Thus, the 'tone' of an instrument is not the tone but the *note* which is immutable in its components, which determine its timbre. These partial components may only be varied by electronic means.
3. In the *note mixture*, the frequencies of the partials are not ordered harmonically; *i.e.* they cannot be expressed in terms of simple numerical proportions. Note mixtures are always sinus tone mixtures and are not the same as 'chords'; they have a higher degree of internal fusion of components and can be regarded as units more similar in category to the single note than to the instrumental chord. Note mixtures only exist in instrumental music where an attack is followed by a long reverberation (bells, pipes, plates, rods, drums). In electronic music, note mixtures may be realised without difficulty in a dynamic form (crescendo, diminuendo and unvaried).
4. *Noise*: defined by specific sound character and approximate 'pitch level'. Only 'blank noise' which fills an acoustic region may be determined in position. Filtered parts of 'blank noise' are called 'coloured noise' or 'noise colour'.
5. The *chord (note complex)* is identical acoustically and traditionally. It must be observed that the note and the chord are clearly differentiated in instrumental music; in electronic music, the note mixture intervenes between the two with its particular levels of fusion of its constituent parts. Note and tone mixtures are electronically 'composed' not according to a harmonic or natural system but according to a composer's predetermined ordering.
6. *Impulse or pulsation*: also known as *Beats* or *Clicks* (regular or statistic); at high dynamic levels corresponds to 'detonation'. Uncontrollable sounds belong to the acoustical but not to the musical domain. They can fairly easily be produced by electronic experimentation or trick recording, and vague and 'atmospheric' effects can be obtained by cutting and assembling tapes. To demonstrate this, it takes two or three hours to construct a minute of good atmosphere music, often three or four weeks for a minute of real music. In connection with incidental music for film or radio, it is worth mentioning that no composer who intends himself to be taken seriously would have ever let himself in for electronic music if its entire resources consisted of vague experiments with noise and if all that could be produced were tapes of atmospheric sound. Whoever is attracted by the idea of the machine which 'makes things easier' and simplifies composition (in fact it makes composition considerably more difficult) is only comparable to the mediocre pianist who 'pedals' his way through the difficult passages of his concerto and hopes to get by faking.

The stereophonic distribution of sound transmitters is a further element of the form of electronic music. The various loudspeaker systems around the hall are the 'concerting instruments' – a conception similar to the distribution of orchestral and choral forces in church or concert hall. This special dimension is incorporated into the very plan of the composition. Multi-channel transmission can only be effected with multiple track tape recorders. At present radio transmission is only single channel. (Single as well as multi-channel versions of electronic pieces exist depending on the purpose for which they are intended.) This spatial projection into the concert hall is seen as an entirely new dimension of the composition.

The basis for production of electronic music was worked out in the Studio for Electronic Music of the Westdeutscher Rundfunk, Cologne, under the direction of the author of this article. The first studies were broadcast in an evening programme of Cologne Radio in 1951 and were performed at the International 'Ferienkurse für Neue Musik' in Darmstadt. In 1953 there was a public demonstration in connection with the music festival in the Concert Hall of the Cologne Radio on the 19th October, 1954; there were seven pieces, in all twenty-eight minutes of music, the second half of the concert being devoted to them. The composers were H. Eimert, K. Goeyvaerts, P. Gredinger, H. Pousseur and Kh. Stockhausen. Of importance for the further development of the medium was a concert in the Cologne Radio at the end of May, 1956, in which the 'Fünf Stücke' by H. Eimert, 'Klangfiguren II' by G.M. Koenig, the 'Oratorio for Pentecost' by E. Krenek and the 'Gesang der Jünglinge' by Kh. Stockhausen were given their first performances. The last mentioned works have in the meantime been issued as three long-playing records by the Deutsche Gramophon Gesellschaft. Since this time several small pieces have been composed by F. Evangelisti, G. Ligeti, G.M. Koenig and B. Nilsson.

Thus was the birth of electronic music. It seems to lack completely that surfeit of abundant vitality which so often characterises new movements. None would have taken the slightest notice if, after the First World War, the younger generation had begun by producing only a few isolated studies. But there

are other beginnings. They come noiselessly and stay unheeded, like a biological transformation which ends in life or death; or like those in which the creative spirit is distilled into the essence of a new material object. The beginnings of electronic music may be seen as falling in this latter category. The composer concerns himself with a material to which the traditional, well-proven ways of his art do not apply. To begin to compose electronically means to select one single element from the limitless range of possibilities of the electronically emancipated material and to realise it in a compositional manner. It compares with the beginnings of polyphony in the music of the Middle Ages; what is practised is theory. So it is that, despite the apparent modesty of the preliminaries in electronic music, the full brunt of an experiment is borne in that a single creative selection and successful realisation can bring us face to face with the absolute nature of music. For this reason there can be no rules for electronic music in the sense of a traditional theoretical investigation of music; that which normally belongs within the scope of theory here remains bound up with the material object. Theory presents musical 'possibility' – this is valid here also, but with quite a different connotation, in that it is no longer permissible to fill out lifeless formal schemes.

These tiny beginnings and the limitless perspectives of electronic music cast a dim light on critics who would maintain that whereas there were 'possibilities' in electronic music, at its present stage it had 'nothing to do with music'. Whether this point of view be the result of misunderstanding or whether expressing the sentiments of yesterday's avantgarde, it is clearly a waste of time to argue against it. Would be one not be forced to the absurd conclusion that composers were occupied with the composition of something that was not music? We are not justified in attacking the authority of the composer from this point of view.

It is certain that no means of musical control could have been established over electronic material had it not been for the revolutionary thought of Anton Webern. Nevertheless, the compositional equipment of electronic music must be more than an extension of twelve-tone technique. There are no gradual transitions from the twelve notes to the micro-structures. The barrier to these latter seems to have been broken at a single blow; we no longer see or hear chaos but rather the note, a sounding structure, consisting of its own analysable components. It is the most fundamental music-forming element. It is essential to have experienced and to know what the nature and perception of a note cannot be realised by simple physical devices of measurement, even if the physical and psychophysical qualities are only differentiated by the most infinitesimal fraction – the ways part here – one leading to nature, the other to music.

One of the most characteristic and prevalent misunderstandings of progressively-minded teachers and critics lies in the idea that music today has a dual existence: on the one hand a skeleton, on the other the living flesh and blood. There are as it were, two separate aspects; one concerned with dry scaffolding, the other with expression and animation. We must point out to these critics that the scaffolding is inherent in the form of the note itself; the elements of construction are derived directly from it. Traditional twelve-note technique cannot suffice for this. In this is contained the fear that notes be lost from their rightful path and the hope that this loss be remedied by excited gesticulation. When the fundamental assumptions of the composer are naked and primitive he becomes involved in tragic-daemonic 'experiences', until we have the abrupt images and naked sensations of Expressionism. From a narrow viewpoint there exist those who are unable to visualise music as anything but 'psychographical': it would be of interest to conduct similar tests on Machaut, Josquin and Palestrina. Once and for all with electronic music we leave this 'psychographical' domain.

Alone among the twelve-note composers, Anton Webern conceived the row non-subjectively, so that to a certain extent it functioned externally. Seen from Schoenberg's viewpoint this would be like cutting the threads of life in music: a silence, a dumbness, an end. In truth, this end is our beginning. If these procedures are made absolute it is not difficult to discern its negative, deadly side, as Adorno has done. It does not seem out of place here to question the possible objectivity of music. Clearly there can be no private self-portrayal identifying itself with Art within the broadly 'objective' historical context of music and of masters of non-subjective music; there can be none of that 'pathetic-bourgeois' pose which associates and presents Art as arrant, tragic-daemonic play-acting.

We know little of how emotion became involved in the practice of music making and even less of its intensity, which was observed for the first time in the 'musica reservata', around 1550. These questions cannot be separated into separate pigeon holes. We must ask: has not music always been made by men? Even Pythagoras' music of the spheres was the work of human fantasy. Is electronic volume control anything else but the old dynamic? Though the directness of tape music has eliminated spontaneous performance, interpretation has remained in a new guise, for composing surely means performing music without the association of time. What is then the human element upon which our humanists are always harping? One might wager that most of them are thinking only of the vibrato of Tchaikowsky's violin cantilena on the G string.

From the viewpoint of heightened *espressivo*, pre-expressive music appears to be subjectively under-developed. It has other traits in common with electronic music; most significant its distinctly material character. The material itself is made to 'speak' – not because it has found voice but because it has been arranged by human device, even if with theological help, at least without pathos and subjectivity in the modern sense.

Evidence of this may be found in the theoretical tracts of the time. They testify to the way in which the material played an active role, as if a secret rationality was contained within it. The validity of this impression is enhanced by the way in which the material itself is hesitatingly, almost blindly tested, leading finally to a logical, conscious procedure directed by intellectual principle. It is not without significance that so many post-Schoenbergian composers have studied the music of the 14th and 15th centuries. Here too Webern set the example. All this only goes to show how false is the argument so often raised against the contemporary composer that the fact that he must actually and, it is said, vainly grapple with the very material organisation of music, separates him from the legitimate concerns of traditional music. It is argued that this is a unique situation which may be compared with nothing. Our illuminating reference to historical precedent does not imply that in any way seek justification in mediaeval theory for electronic music, which is characterised by a meeting of acoustical and compositional developments which are particular to our epoch. A further sign of its integrity is shown by its awareness of Expressionism. It has learned from the work of Debussy, who created form patterns which in the electronic sphere are called 'statistic structures' and which can exist only as a result of the quantitative multiplication and division of sounds in density and augmentation.

Objectivity stipulates objects, but the material of Art is objective in a sense which is different from that of Nature. If the barrier between these two is removed a fatal misunderstanding results. It has been assumed that the fundamental conception of music must be separated from the considerations of Art, and be approached physico-scientifically. According to this conception the definition of a note by its pitch, duration and dynamic intensity may be taken both acoustically and musically. Acoustics concerns itself with the nature of sound; physiological aspects of hearing are concerned with the relationship of duration of the period of 'growth' (*Einschwingdauer*) in the ear or the perception of pitch levels. From the musical point of view the note exists for the listener as a unit and only as such is it recognised and analysed in its triple unity and entity. Nothing more about it can be learned by physical or physiological means. The 'musical' discovery of the conditions of a note's existence – first made by Messiaen, who worked on this basis, if not serially at least strictly modally, is certainly the right way towards electronic music. Here a definition of a note considers timbre as resulting from the proportional strength of partials in fixed frequency.

It would never have occurred to a musician of the 19th century to define a note by its pitch, duration and intensity. At that time the note was understood through its relationship to other notes, and through its relationships to tensions within the structure of a chord. The 19th century did not ask '*what was*' a note, but only '*how did it function*'? In twelve-note music it is still required to function, though it no longer can, and thus its function is no longer measured by any principle inherent in the music, but by an analogy effect.

Webern was the first composer to move on from the single level conception of the twelve-note technique; namely that of a technique of organising pitch levels. In his work, for the first time, we see the beginnings of a three-dimensional row technique – of what in short, we know as *serial technique*. Webern restricted his music to interval and single note, and composed structures which are not in the traditional sense developed in a continuum, but which proceed by autonomous 'leaps', leaps which in the pre-electronic stage could achieve everything but that final step from the bounds of instrumentally tempered sound. Only in electronic music has the real sense of these developments been realised.

The relationship of note to row is only known as a principle of fixed constellation in twelve-note music. In electronic-serial music, on the other hand, everything, to the last element of the single note, is subjected to serial permutation, resulting in a completely new way of composing sound – the poetics of sound, as the mediaeval theorist would have called it. Examination of material inevitably leads one to serially ordered composition; no choice exists but the ordering of sinus-tones within a note, and this cannot be done without the determination of the triple unit of the note. A note may be said to 'exist' where elements of time, pitch and intensity meet; this fundamental process repeats itself at every level of the serial network which organises the other partials related to it. The fact that tone, duration and movement are almost tautologies, testifies the pre-eminence of the time process. The note is subjected to time for its pitch levels and intensity – this we may call the 'tonality' of electronic music.

In traditional twelve-note music the row is already omnipresent yet discursively imperceptible and only determinable with reference to basic shape. This omnipresence remains incomplete; it applies only in one dimension and is only thrown into relief by the simulation of emotion. The procedures of

electronic music cannot be understood from this point of view and from here stem the complaints and criticisms of lack of musical 'connection' and the insensitive or malevolent misunderstandings that proportioning of time and pitch be nothing but a 'calculating game' in which the composer fiddles about with formal problems and builds up a numerical framework which he later transforms into notes. What can one say seriously about such marble games? It remains of significance, however, that the electronic material as a musical material completely answers the conditions of a compositional situation, that is: 'after Webern', the situation resulting from the discovery of 'the single note'.

Critics who have found this position inadequate have found plenty of points of criticism to rise. Two of the most important are, firstly, that music is a 'language', and that exactly in this post-Webern development of musical pointillism and electronic music, it is no longer spoken; and secondly, that the sinus tone is not a fundamental element of musical perception.

The 'linguistic' theorists of music do not refer to what is generally meant by 'musical language'. They mean something else which has been taken out of its narrow context in Schoenberg. They mean a kind of wordless recitation with the accentuation of speech within the corporeality of sound; they refer to the flow and gesture of talking, the sequence of speech inherent in construction, which alone secures connection and context. In answer it must be said that the ear's ability to perceive effective connections is in no way restricted to the unique level of speech elements. Thanks to its many simultaneous dimensions, music is a language of many meanings and for this exact reason it is not formulated speech or talking. If the elementary components of a note are related in a new way, according to new musical principles and not arbitrarily or mathematically, the ear must do as it always has done; it must adapt itself to the demands of the composer and the composed notes rather than depend on fossilised ideas, newly revived. That the problem of appropriation and communication is raised by electronic music in its early stages, no one will deny. It is not to be avoided. On first acquaintance even the ear trained in the perception of a dodecatonic structure is faced in electronic music with a foreign musical language. This book testifies to the fact that it can be learned and is already spoken by some.

The second argument, that the sinus tone is not a fundamental element of musical perception, is rather the product of wishful thinking than of knowledge, and does not stand up to any practical or theoretical examination. It is essential to realise the properties of the sinus tone, on the one hand as a unit of measurement, on the other as a musical phenomenon. It has long been realised that the idea that formulating sound in composition – which means sinus tone composition – is perpetually measurable, is false. Electronic music has its own incalculable relationships of elements in overlaps, volume control of frequency and intensity as well as in non-stationary elements. If anybody is simple-minded enough to imagine a robot violinist performing Handel's Largo with stationary sinus tones, he will immediately be compelled to realise that technique will only provide the homunculus with an electric plush-vibrato soul. This electronic music is not 'another' music, but is serial music. And being so, the series must necessarily be called upon to determine the exactly measurable area between the stationary and the modulating note.

Thirty years ago, in scientific circles, it was fashionable to conduct psychological examinations of the phenomena of sound by studying sound procedures in slow motion. In this way a whole organism of forces, movements, kinetic and potential energies was discovered, though no one is able to hear music thus, as it were, in slow motion. Today the physical magnification of a sound is known, quite apart from any musical, expressionistic psychology, as exact scientific data. It cannot, however, be the function of electronic music to make the sinus tone like the living 'parasite', to feign similarity where disparity exists. Talk of 'humanised' electronic sound may be left to unimaginative instrument makers. This particularly important when, later in this book, we come to deal with aleatoric modulation, which becomes the further removed from music the more it attempts to imitate it and which is only significant when subjected to compositional ordering. Similarly with dynamics: any performance of piano music, which is, to some extent, differentiated in its dynamics (*e.g.* a piece by Mozart, which is made up out of three or four notated dynamic levels) will, when recorded, register at least 30 or 40 different degrees in intensity on a control indicator. It would be pointless to imitate these electronically but of the greatest significance to organise them.

This leads us to an understanding of the compositional microstructure. It runs parallel to instrumental sound not in the manner of accrued imitation, but as an artificial procedure of order. Everything is designed not to escape from the nature of electronic sound, but to go further into it. No composer would set himself this task were he not certain that the idea of order running parallel with Nature was something he could believe.

Our first little pieces of electronic music from the Cologne Studio were composed in this spirit of faith. They are not experiments, inasmuch as experiments forswear music. Nor are they mere products of technology or of the technocratic spirit. There need be no song and dance, as is so

fashionable nowadays, about the human cost incurred in attaining of technical progress. There is no more to it than that a new way of thought has found a new, transformed musical material. Sufficient is it that young composers are fascinated and committed to the great discovery of 'the note' in Webern. No longer is Webern seen at the centre of classical twelve-note technique. Although he was not offered the possibility of thinking serially in terms of microtones, he nevertheless stands at the outermost limits of instrumental material, as if he had already cut off the properties of the past and was on the point of moving on.

The music of the younger generation after Webern has taken the logical consequence of his work. For the second time in our century after Schoenberg, the painfully 'impossible' has been realised. It may be that 'pointillist' instrumental music closes the gap, but only in coming to electronic music can we talk of a real musical control of Nature. Its dependence for reproduction on the loudspeaker, which has almost imperceptibly revolutionised our way of hearing, leads us to reflect whether perhaps it is not the symphony recorded on tape or disc that is the synthetic, and electronic music the genuine article. For in the latter, we may find, is the genuine musical order.

Eimert, Herbert, *Die Reihe* vol.1, Theodore Presser Co, pp. 1-10, 1957.

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¹ See the score of Stockhausen's *Studie II*, published by Universal Edition. UE 12466.