

ELECTRICITY BECOMES MUSIC

Introducing The "Emino"

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PERHAPS the title of this discussion has an ominous resemblance to O'Neill's *Mourning Becomes Electra*. But our theme and belief is that electricity is becoming more musical as time goes on, and that ultimately electricity will undoubtedly find itself becoming to music.

It must be admitted that electricity originally had far from an artistic purpose or application. The whir of a motor may be useful enough, but it is generally not particularly musical. While the electric generation and transmission in effect of power, heat, light, and communications are essential to our particular stage of civilization, yet until recently there has been no artistic aspect to any of these social agencies. It is all very well to cause the wheels of great factories to turn, to carry power from great reservoirs to distant cities, to heat huge furnaces electrically, to light brightly the highways and byways as well as the homes of this land, and to bring instantaneous personal and mass communications to the people. But, in themselves, these are neither artistic nor inartistic services.

It is only recently that electricity has cast an eye toward art and begun to make friendly overtures. In a small way, we find the effect in such changes as the neatly designed home appliances which, besides being useful, become somewhat ornamental. Lighting, in particular, has shown definite trends toward the esthetically satisfying. And we have found it wise and pleasant to clothe that curious electrical device, the broadcast receiver, in more attractive cabinets. Gone is the day when a radio receiver cabinet could be obtained in any wood and design provided only it was walnut of the "Grand Rapids Period."

But these changes have not yet provided much of an instru-

ment for the artist (except perhaps in the case of lighting and broadcasting). And even in these fields, electricity is a secondary agency of art in the main. There is accordingly a novel aspect in the possibility that electricity can produce artistic services or devices of the major or direct types. The first marked move in this direction has been in the realm of electrical music.

What is electrical music? It is music produced by instruments in which electricity is directly controlled by the musician to produce sounds. That is, instead of being music produced by mechanical devices controlled by the player, it is produced by electrical means. It is unlike either radio, wire or other transmission and reception of music originally created on mechanical instruments, such as the string and wind instruments of today. It is also unlike the electric phonograph which is another electric mirror for reproduction of mechanically-produced and recorded music.

There are some ancient prejudices to shatter before electric musical instruments and the music produced on them can be generally accepted by the musical world. Tradition dies hard, and there is something intangible and impersonal to our generation about electricity as compared with the supposed intimacy of mechanical instruments. From time immemorial we have accepted the "naturalness" of music blown on a pipe or evoked from a bowed or plucked string. But electrical forces are just as natural as mechanical forces. The sparks from cat's fur or the shuffled foot in dry weather are at one end of a vast gamut which ends in the flash of lightning. And who shall say that the lightning blaze followed by the deep reverberation of thunder is not a natural music of the storm? We can and should first divorce ourselves from the thought and prejudice that electrically-produced music is less natural or further from normal human needs and expression than music produced by mechanical means. After all, all music and indeed all art is based on physical agencies. Oils, pigments, chisels, mallets, clay, strings, pipes, needles, acids, felt, wood, steel, and brass are among the multitude of prosaic articles which we fashion into works of art or use in artistic creation. Why not that subtle fluid of greatest power—electricity?



Since few of us have a clear idea of the various possible forms

of electric musical instruments—let us call them “eminos” from the initials and for short—a general classification of the various types is worth while. At one end of the group we find a first class of eminos useful only for reproducing music previously produced, generally by present-day mechanical instruments. These eminos include the electrically-driven player piano, the electric phonograph, the telephone-line receiver, and the radio receiver. They are not strictly eminos for the musician since they do not in themselves produce any new effects through the use of electricity but rather a reproduction or enhancement of the effects already produced by musicians along conventional lines. They are essentially re-creating instruments but are not, in themselves, available as creative musical agencies except to a limited extent.

A second class of eminos includes the composite instruments which combine a mechanical musical instrument with an amplifying and, if desired, tone-modifying electrical instrument. Such instruments include normal or modified pianos to which are added electrical amplifiers, tone controls, and loud speakers. By these means the volume, tone color, tone duration, and sound distribution can all be modified at the will of the player. Thus effects not obtainable by the piano *per se* become possible, and an extended musical range is developed.

The third, and ultimately most significant class of eminos embodies the directly-playable and purely electric eminos. These are played by the musician, but they produce all tones by purely electrical means (except insofar as the reproducing electrical loud speakers might be regarded as mechanical devices electrically driven, and analogous to the sounding board of the piano which however is mechanically driven). There have been a great number of such instruments suggested in the past. Some produce sustained notes, like the organ and flute, others produce tones more toward the pizzicati or staccati, like the plucked string or the piano when played in some moods.

Again, some eminos of the third class are played from keyboards much like those of the piano, others from string controls like the violin, some from organ-like keyboards with a multitude of tone modifying stops, and some even by waving the hands in empty space near the instruments!

It is out of the question to list the names of the individual scientists who have worked in these fields producing eminos of the various classes, or to describe in detail the multitude of interesting instruments they have developed. A large book would be required to give an adequate survey of the field together with useful details on the construction and use of these various instruments, many of which display astonishing ingenuity and great promise. In this general discussion, certain broader points alone will be considered.

Assuming the reader has reached this point, he may ask the questions: "Why bother with eminos at all? What can they do which our present instruments cannot accomplish? What hope, if any, do they offer the creative composer as well as the concert virtuoso? Can they bring music closer to the general public?"

The first question to try to answer is that relating to the capabilities of the eminos as compared with the limitations of the musical instruments at present in vogue. The differences are, at least potentially, truly amazing. The emino can have any tonal quality or color (timbre) which now exists or which is capable of production by vibrations of the air. Any degree of mellowness or brilliancy of tone is producible, and under precise control. The harmonic or inharmonic overtones which give to each tone its distinctive quality are under the control of the designer and user of the emino. The mode of attack or formant of each note is controllable. While it is true that the finest instruments of today, played by a master hand, have tone qualities which in general are highly satisfying yet it is certain that there must be a multitude of tone colors not now known or used and capable of production on the emino. Here is a rich realm for musical exploration. We cannot tell what will be found along this road of tonal pioneering, but it is most likely that solo and ensemble effects not now dreamed of, but musically most valuable, can thus be attained. Further, while the finest instruments and players of today give excellent tonal quality in their renditions, the same can certainly not be said of mediocre instruments and indifferent players. To the aspiring but as yet unskilled amateur, the emino will offer an instrument the tonal quality of which will be less dependent on extreme skill and experience. To the neighborhood

listener to the "wolf tones" of the ambitious but unfinished musician, this development should be a boon. The music produced by a beginner on the emino may be uninspired or even maladroit, but it will at least be generally satisfactory in a tonal sense.

A second capability of the emino is an indefinite extension of the pitch range. Today it is a matter of the utmost difficulty to produce mechanically tones of the lower ranges of frequency as well as tones of the higher ranges. Only the tones of the middle register are, on the whole, readily, reliably, and satisfactorily producible. At one end of the gamut we struggle with the 32-foot pipes of the organ or with ever larger "bull fiddles." On the other end, the miniature piccolo valiantly endeavors to be heard clearly despite its trifling dynamic possibilities. So far as eminos are concerned, the pitch register from the lowest and deepest throb to the highest and most keen overtone is readily produced, and with consistent tonal quality. And, what is more, the entire register is producible in one emino instead of a whole family of related but different mechanical instruments. Consider the violin family, for instance. The player of one member of that group will generally be an indifferent performer on the remainder, and his own opportunities (both musical and personal) will thus be limited. On the other hand, the player of an emino has an unlimited range of pitch available in one instrument.

A third capability of the emino, unshared by present instruments, is that it can produce any volume of sound (or dynamic range) which may be desired. It may be poor musical policy to have a full-orchestral effect which jars the plaster loose from the concert hall ceiling or to have pianissimi which are so faint that they cannot be heard above the coughs, whispers, and rustles of the audience. But should effects of either variety be desired—and in an auditorium of any size or even in any desired size of outdoor space—the emino can readily meet the requirements. At the touch of a swell control, the emino can range from the thinnest thread of sound to an earth-shaking tremor. Discreetly used, such a control will give musical dynamic quality never before attained, and to audiences far more vast than those which now can come within the scope of any orchestra of practicable size. Further, while any attempt with present instruments to in-

crease or reduce volume beyond a certain point leads to ruined tone, the same need not be the case for the emino. And the emino can cover the entire register, from lowest to highest tones, without those disconcerting changes in available volume which are inevitable in the present mechanical instruments.

As matters stand, the audience must be within "hearing range" of the performance. This generally means that there can be only a limited audience within a certain hall or open space. But there is no reason why performances given by an orchestra using eminos should not be perfectly reproduced, in three-dimensional effect, in as many halls or places as may be desired. Here we come far closer to the fabled music of the spheres.



Another question might well arise at this point, namely: "If all of these remarkable possibilities are available, why are they not promptly realized on a large scale?" One reason is that, while these possibilities are available theoretically, it will require a great deal of development of the young and difficult art of emino design and building before they can be realized. Another reason is that the full fruition of emino music will necessarily await the development of composers who realize the capabilities of the future eminos and who write masterpieces for such instruments. Further, it will become necessary for generations of musicians to be trained on these instruments so that we may have emino virtuosi as we now have masters of existing instruments.

A sad feature of the situation is that the preliminary steps toward these developments are largely neglected except in the case of a few forward-looking and cooperative musicians and scientists. Human nature being what it is, the situation is quite comprehensible. Let us be realistic and blunt in this connection. The scientists working in the realm of the emino are frequently opinionated, obstinate, musically untutored, narrow in their viewpoint, full of pre-conceived notions, and in general out of touch and sympathy with the musicians of today. The musicians who investigate the first form of any emino—if a cursory and suspicious examination can be called an investigation—are often temperamentally uncooperative, sharply critical to the point of evoking inevitable hostility, without any evident understanding

of initial problems and limitations, without constructive and concrete suggestions to the struggling scientist, and so wrapped up in what they have and what they can do that there is a subconscious stratum in their minds which would rather regret the coming of the emino as a successful musical agency. After all, many of them have little to gain and everything to lose. When one is already at the top of a mountain, the only way to reach the top of a higher mountain is first to descend to the valley and then endure all hazards and hardships of a second prolonged climb.

It is little wonder that, in view of these human factors, the scientists working at eminos have been but little benefitted by professional and skilled musical guidance and direction, and that the musicians have been given scant opportunity to influence the course of events in emino development.

Out of this impasse there are many ways. Individual contacts between musicians and workers in the emino field are highly desirable, with constant friendly interchange of views and criticisms. Mass contacts are also necessary. The eminos, as they are developed to a reasonable extent, should be shown on the concert stage to musical groups; and symposia should then be arranged between the musicians and the scientists whereby each group may benefit greatly from the other. Much self-restraint and understanding will be required in these contacts. It is useless for the scientist to insist on some theoretical ideal or method, as he has so often done. To try to convince the musical world that only legato and andante playing on an instrument where the free-moving but slow hand in space controls pitch represents a forward step, musically speaking, is about as futile a procedure as could be imagined. On the other hand, the musician must keep an open mind if he is to help lead the way to the music of the future. Because a tone quality or an attack or mode of playing is new and strange is no reason for instantly rejecting it as inferior or having a suspicious though veiled hostility toward it. In just the measure that music utilizes the marvelous new forces which are placed at its disposal by the powerful agency of electricity, it will reach wider horizons and fill an ever greater place in the satisfaction of human needs.