WHAT IS MUSIC?

BY

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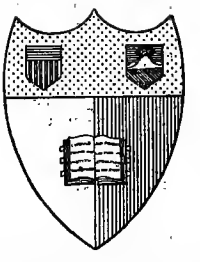

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INTRODUCTION.

THE question, "What is music?" is not new, not recent, not even modern; it is as old as history itself. In the remotest antiquity it has occupied the minds of thinkers, and elicited curious, ingenious, and interesting fundamental theories. I have, therefore, thought it advisable, before setting forth my own views, to give a *résumé* of the various theories current in ancient times, as well as during the middle ages, together with a not lengthy discussion on the theories of Euler, Herbert Spencer, and Helmholtz. The question being in my estimation a cosmical one, I believe that, on the whole, the ancients, in considering so, understood it better than most of the moderns, who treat it too much from a sentimental, subjective point of view. Of course, we must make allowance for the method of expression of the ancients; their language was to a great extent symbolical, and abounded even in what may

be termed compound symbols; that is to say, an originally symbolical expression came to be so commonly understood, that it was used to serve as the basis for still deeper symbols: this is particularly the case with the *number symbolism*, which at the outset was simple enough—as may be learned from the interpretations given to it in Dacier's "Life of Pythagoras," but which later came to be so complicated that it is to us but little more than a *number mysticism*. There are no commentaries incorporated in this little work, and for two reasons: first, because they have no practical value; secondly, because the great aim of the ancient fundamental theories of music is easily perceived even without having a key to the mysterious expressions. This aim is, to show that music is a great part of the cosmos, and not a human contrivance. The ethical and psychological speculations of antiquity on the subject of music are, by-the-way, also deserving of our attention: and, in fact, the sooner we follow the precepts of Plato and Aristotle, deduced from those speculations, the better will it be for our civilization.

In the mathematical and physical branches of the science we have, of course, completely overshadowed the ancients; for, since the publication of Newton's "Principia," there has hardly been a name of distinction among physicists and mathematicians, but it is intimately connected with progress in acoustics; and this is not strange, for, to use the language of Prof. Leslie, "the doctrine of sound is unquestionably the most subtile and abstruse in the whole range of physical science." It occurs to me that the reader might here ask me, "Why, then, do you hold our conception of music to be less true than that of the ancients? If we are superior to them in knowledge, why should we be inferior to them in comprehension?" These questions, I think, can be easily answered. To paraphrase a sentence of Boetius, we have numbers of instrumentalists and vocalists, but *musicians* are rare; in other words, the art and the science of music have become distinct studies, and in consequence our conception of music has become confined and imperfect.

In this little work, then, I have attempted to give the outlines of a *cosmical* theory of music, based on the knowledge of our times, and, whether it be correct or not will be for an intelligent public to judge. For my part, if I have but succeeded in freeing the matter from the subjectivity by which it is now so enthralled, and shown that it can and ought to be treated from a purely objective point of view, I shall consider myself amply rewarded.

In reference to the theory itself, I have only to say that I do not deem it difficult to abstract time from space, when investigating the principles of the beautiful, nor do I believe that much mental effort is required to understand how certain things may be said to *exist* in time, others in space. Of a material body, we can by no means abstract space, for it exists in it; while we may easily abstract time from it when we treat of its beauty. In like manner, in speaking of music, we may abstract the question of space, for that forms no part of its beauty; while we could by no means abstract time, for that is the life of its beauty, its *existence* itself.

WHAT IS MUSIC?

PART I.

I.

CHINESE THEORY.

The ancient Chinese scale consisted of five tones, viz., f, g, a, c, d. These tones were considered symbolical of the five elements—earth, metal, wood, fire, water. The elements as well as the tones were held to have been produced by combinations of the ten original numbers:

The combination of one and five producing water and the tone Yu (d).

The combination of two and seven producing fire and the tone Tsche (c).

The combination of three and eight producing wood and the tone Kio (a).

The combination of four and nine producing metal and the tone Chang (g).

The combination of five and ten producing earth and the tone Kung (f).

Each of these tones was the tonic of a different mode; and, aware of the remarkable internal government in the musical scale, they considered these modes in combination as symbolical of a well-governed people:

The mode Kung of the emperor; Tschang, the minister; Kio, the obedient people; Tsche, the affairs of state; Yu, the whole body politic.

As the art developed itself, however, musicians would no longer limit themselves to the comparatively small number of combinations and modulations capable of being produced by five tones. So, as the spirit moved them, they added new ones, without endeavoring to give any explanation of them, or to refer them to any law. Much confusion in musical matters was the consequence, and the state of affairs became actually unendurable at about twenty-seven hundred years before the present era. Then the Emperor Hoang-Ti, urged by the constant reclamations and numerous petitions of the learned men, finally ordered Ling-Lun, the greatest musician of his time, to put an end to the confusion by establishing music on a new basis of sound principles and fixed laws. Ling-Lun left the capital and traveled toward the high mountains

where the Hoang-ho takes its rise. He followed the stream to its sources, but, while ascending a lofty peak, suddenly felt his feet refusing their support. He sat down and soon fell into a deep reverie. Then appeared to him Fung-Hoang, the wonderful double-bird, which appears to man only on rare occasions, and for the particular purpose of benefiting mankind in general. The male Fung sang six tones, the female Hoang six others, and the deepest tone produced by Fung was Kung, the great tone. Now the waters of the Hoang-ho rushing by likewise intoned the Kung, and Ling-Lun's own voice, when speaking, was in unison with it. Kung was, besides, symbolical of the earth among the elements, and of the emperor in the state, so Ling-Lun at once recognized it as the root-tone, whence all others had sprung. He then returned to the capital and elaborated his new system.[1]

[1] It is a remarkable fact that the very tone Kung which corresponds to our f is considered by modern physicists to be the actual tonic of Nature. Says Silliman, in his "Principles of Physics:" "The aggregate sound of Nature, as heard in the roar of a distant city, or the waving foliage of a large forest, is said to be a single definite tone, of appreciable pitch. This tone is held to be the middle F of the piano-forte, which may therefore be considered the key-note of Nature."

The fundamental tone, the generator of all the others, is Kung. But he alone could not have produced them — he required helpmates. These were Ta-Lu (f♯), the great Helper, and Yng-Tschung (e), the second Helper. The two chief supporters of Kung were Tschung-Lu (b♭), and Lin-Tschung (c), for by their aid he effected the circle of the fifths and of the fourths. The double-bird Fung-Hoang had sung twelve tones—Fung, the male, six; Hoang, the female, six. These twelve tones formed the twelve semitones of the octave. Those intoned by Fung were considered perfect (yang), while the others were imperfect (yu). This was in accordance with Chinese philosophy, which divided things into perfect and imperfect, and held that each thing perfect had a counterpart in something imperfect; such, for instance, was the relation in which man stood to woman, heaven to the earth, the sun to the moon. The twelve semitones were also symbolical of the twelve moons of the year. In the circle of fifths, a begets e, e begets b, etc., as the first moon begets the second, the second the third, etc.

From these beginnings a comprehensive system was developed in the course of time. As I shall, however, only occupy myself with *fundamental*

theories, I cannot follow this development. The very ancient system containing but five tones is, in fact, sufficient to illustrate how the Chinese grappled with the question, "What is music?"

The principle of dignity is manifested in the emperor, likewise in the mode Kung.

The principle of severity is manifested in the minister, likewise in the mode Chang.

The principle of obedience is manifested in the people, likewise in the mode Kio.

The principle of energy is manifested in the handling of the affairs of state, likewise in the mode Tsche.

The principle of magnificence is manifested in the body politic, likewise in the mode Yu.

Now if we remember that, as each mode was the manifestation of some principle as materialized in the elements of the state, so each tone in itself was the manifestation of a principle as materialized in an element of Nature, we cannot but perceive that the Chinese, who took their premises for granted, had a complete and logical theory explaining the power of music over the emotions.

We must not, however, suppose that they considered it necessary for the hearer to bear this the

ory and its elementary significations in mind while listening to music—nothing is more distant from their idea. They believed that each tone and each mode impressed itself according to its characteristics directly on the mind, without the intervention even of thought; that music acted in a primary manner; acted as much upon the person ignorant of its deep signification, as upon the philosopher. The ancient Chinese, moreover, held music in high estimation in consequence of their theory. It is said, for instance, that Confucius after hearing the compositions of Quei would, for three months, think of nothing else, and even refused, for a time, to partake of any food. One of his sayings was: "Desire ye to know whether a land is well governed, and its people have good morals? Hear its music." Ma-Tuan-Li asserts that whoever understands music well is capable of governing. Fo-Hi himself was the inventor of an instrument—the kin.* A number of emperors were skilled musicians and composers. Several are portrayed in the act of performing on the kin.

II.

HINDOO THEORY.

THE musical system which next claims our attention is that of the ancient Hindoos. Though unlike that of the Chinese, it is no less curious and interesting. The latter attempted to account for the power of music over the emotions by a mystic symbolical system. But it was not the characteristic of the Hindoos to enter into such geognostic mysteries. They, too, were susceptible to the influence of music, and to a very great degree; but they were too indolent to seek for the natural cause of the phenomenon—they had a simpler way of doing things. Why spend your existence in the futile effort to untie a knot, when you can cut it, and sever its most intricate ramifications at a single blow?

Music is the invention of the great god Mahada-Krishna, who caused five Ragas to spring from his five heads. The sixth owed its existence to Parbuti. Afterward Brahma himself created thirty Raginits. Each Raga was then personified in a god who protected and governed it, each Raginit in a nymph.

The Ragas were the primary modes, the Raginits the secondary ones. Later Sarasvati, the spouse of Brahma, presented mankind with the most beautiful of instruments—the vina. The demi-god Nared was selected to teach its use. Then Mahada-Krishna endowed the Ragas with the power of magic—the Ragas, in turn, endowed the Raginits. Men, animals, and inanimate Nature, were henceforth compelled to obey them. One Raga was possessed of the power of raising clouds and producing rain. A songstress versed in that mode at one time saved Bengal from an imminent famine by intoning it. Another Raga could cause the sun to vanish. One charmed serpents, another lions and tigers. All heaven is filled with music. The great god Indra is surrounded by Ganharves; they accompany him in war, and sing his praise in peace. Yea, the terrible Shiva himself was charmed by the magic of Ravana's vina. Music is the peer of prayer and sacrifice—it is god-compelling.

The original system was much elaborated in the course of time, so that it grew to contain no less than *sixteen thousand* modes, each of which was governed by one of the sixteen thousand nymphs who attempted to gain the love of Mahada-Krishna

during his incarnation. The nymphs are governed by the thirty Raginits, the Raginits by the six Ragas, the Ragas by Krishna himself. Now, as certain Raginits had affinities for certain Ragas, it was conceived that a general marriage had taken place —that each Raga had been wedded to five Raginits, and that eight sons had been born in each family; that each of the forty-eight sons, called putras, had taken a nymph for a spouse, whereupon the immediate family of the Ragas comprised one hundred and thirty-two heads, all chiefs of modes.

Later, the Ragas were construed as being also gods of the seasons. This was done because there appeared to be a great analogy between the frame of mind produced by each of the Ragas, and the one natural to one of the six seasons into which the Hindoo year was divided. The joyful strains of one Raga were symbolical of the season of blooming; the gay characteristics of another, of the ripening of the fruits; while the sad and melancholy melodies of another, of the fading and falling leaves. In time it became to be considered a grave offense to the presiding Raga of the season, if melodies in any but one of the modes subject to his control were intoned.

How differently the Chinese and Hindoos accounted for the emotive power of music! On the one hand, the gloomy mysteries of the numbers and the elements; on the other, the bright, fantastic, gorgeous heaven of sunshine, marriages, and pleasures! And yet, who knows but that the Hindoo philosophers, who established such a flowery system, were thinkers fully as deep as the Chinese sages—that their original conception and hidden meaning were not as spiritual as those of modern days? It was the spirit of the age to call a force a god—that is to say, to personify the ideal, the spiritual. The first theoreticians probably used the word raga as a sober name, signifying mode. As the tones increased in variety, and by the aid of modulation, changes of rhythm, etc., appeared to become almost unmanageable, or rather irreducible to any system; they were compelled to limit them to a certain number of modes fit for practical use, and this number became in course of time extended to sixteen thousand by some calculation of which we are ignorant. Then came mythological philosophy. The tones, with their wonderful effect on the soul, must have originated in heaven. The next step was to specify how and where they originated, by whom

they were propagated, and then the wildest speculations on the subject were the order of the day. The peculiar poetical character of the ancient Hindoo showed itself in the question, "What is music?" as part of the question, "What is Nature?

III.

EGYPTIAN THEORY.

The Chinese and Hindoo systems never spread beyond the limits of their proper countries. Though based on high and noble conceptions, they were too deeply impregnated with local ideas ever to become generally accepted. Wonderful as they were, yet how inferior were they to the magnificent system of the Egyptians, based on that fundamental theory of unparalleled grandeur which made music the *symbol of the whole cosmos!*

The Egyptians compared the seven tones of the diatonic scale to the seven planets. They originated the sublime idea—which subsequently pervaded all antiquity, the middle ages, and even left its traces in recent times—the idea of the harmony of the

spheres. Music was no longer merely a manifestation of terrestrial forces, or symbolical of terrestrial governments—it came to be considered a manifestation of the celestial, of the spirit which regulates the universe. Harmony was no longer restricted to earth—it came to be the ruling principle of all Nature. The gods were the means through which the knowledge of music was imparted to man. Osiris invented the flute; Isis, the sacred songs. Thot was teacher of the science of harmony, and of the nature of tones as well as of the system of constellations. Their instruments, as numerous paintings and monuments attest, were rich in number and remarkable in construction. Of the details of their system we have, however, but a sparse account. All we know is, that the seven tones of the scale are manifestations of the principle which produced the seven planets—Mercury, Venus, Mars, Jupiter, Saturn, the Sun, and the Moon; and that the ratio between the lowest tone and the highest was the same as between Saturn, the most distant planet, and the Moon, the nearest.

Yet as they were good mathematicians, and, in fact, the inventors of geometry, it is highly probable that they were the discoverers of the mathematical

properties of music—that they found the laws which refer pitch to the length and weight of the material. This supposition is strengthened by the well-known fact that Pythagoras was for twenty-two years a member of the college of priests at Thebes. That, at all events, their systems and theories of music must have occupied a considerable portion of their studies can hardly be doubted. Among their sacred books, amounting in all to forty-two, two entire ones are devoted to music.

The Egyptians were the first to designate music as physic for the soul, and consequently to ascribe to it pathological virtues. They were also, probably, the first hymnographists, and formed the models of all hymns of future times, whether Hebrew or Greek. Moses, as well as Pythagoras, was an Egyptian priest.

The question whether the Egyptians were, after all, not indebted to the Chaldeans for their ideas of music, is still open. That the Chaldeans were still older astronomers is, I believe, admitted. Ancient Chaldean history is, however, so shrouded in mystery that it is hazardous to form a conjecture. It is possible that the Chaldeans, who were the great magicians of their time, and who attributed magical

power to the number seven, may have been the first to notice the relation between the seven in music and in ancient astronomy. Still, without stronger proofs, it would be wrong to combat the claim of the Egyptians to the priority.

IV.

GRECIAN THEORIES.

THE spirit of Egypt was wafted over into Greece. Grecian philosophy and philosophico-musical speculations began about the seventh century before the present era. The opinions and theories regarding God and the world were, among the Greeks, as among other nations, primarily clothed in myths and symbols. The Greek philosophers rejected the mythical speculations, and strived to discover the origin and condition of things, by means of observations of Nature and mathematical calculations. Music, as part of the system of the universe, was at first treated like other forces and manifestations of Nature—it was dressed in the mythical garb; afterward, like them, it was the subject for mathematical calculations and physical observations.

Preëminent among the sages who devoted time to music, and overshadowing them all by the depth of his views and the range of his observations, as well as by the extraordinary influence he exerted on posterity, stands Pythagoras. The Ionian philosophers who preceded or were contemporaneous with him, searched for the origin of things—the original matter from which things were evolved. This was not the plan of Pythagoras. He considered the universe as a cosmos—a perfectly arranged entirety—and searched not for the *origin* of matter, but for the radical principle underlying the cosmical plan. He was essentially a spiritualist—all outward Nature was merely phenomenal in his view, merely the manifestation of something inappreciable by the senses. In his speculations on music, his first object was, therefore, to discover its spiritual cause; for, finding that, he felt assured that he could logically and on natural grounds demonstrate its power, define its object, and fix upon its proper position in the cosmos. The condensed result of his speculations is this: "*All is number and harmony.* Numbers are the guides and preservers of the harmony of the universe. They define form, order, and the laws of things.

In them is contained the *real being* of all things that exist. All numbers are repetitions of the first ten. The ten spring from unity, *which is therefore the origin of all things.* The great number is the number four, the completion of the sacred Tetraktys; for, if added to the first three it produces ten, the limit and summation of the fundamental numbers. In the number one, the point is contained; in two, the line; in three, the superficies; but in four—the first square—is the defining of all bodies. This is therefore the root of nature. Numbers are the spiritual essence of music. What we hear in the vibrations of a material, are numbers. In the motion of the heavenly bodies we see numbers. Music and the celestial bodies are therefore closely related to each other."

Then Pythagoras further showed that consonance is only produced by the ratios expressible in the first four numbers, which are the root of all things. The ratio of the length of strings that produce an octave is 2 : 1; of strings that produce a fifth, 3 : 2; of strings producing a fourth, 4 : 3.

Whether Pythagoras actually discovered these ratios has been doubted of late, and the discovery attributed to the Egyptians. At all events, however,

the reader, unacquainted with the history of music, will be surprised not to find the thirds and sixths classed with the consonants in the above system. Well, the fact is that the Greeks actually considered these intervals as dissonant, for they were entirely unacquainted with the natural thirds, whose ratios are 4 : 5 and 5 : 6—nearly as simple as are those of fourths and fifths—and calculated their thirds by the circle of fifths, which made the ratio of the major third 64 : 81—an actual dissonance. It would hardly be fair to say that the Pythagoreans purposely ignored those consonants, because admitting them would have conflicted with the theory of the Tetraktys; for Aristoxenos, who was opposed to their sect, still classed thirds among the dissonants. In fact, they were not considered as consonants, and barely then, until the middle of the sixteenth century.

So we see that Pythagoras perfectly succeeded in proving that it was the first four numbers which ruled the consonances as well as the dimensions; and that, consequently, all things, whether seen or heard, were numbers and harmony. "Therefore," says Panakmos, a Pythagorean, "it is the business of music, not only to preside over the voice and

musical instruments, but even to harmonize all things contained in the universe." God organized all Nature according to the laws of harmony, was a tenet of the sect. The lyre was considered a symbol of the cosmos. The heavenly bodies were musical instruments sounding forth melodies of indescribable sublimity. The laws of harmony were the same laws that built and preserved the universe. In consequence of his sublime conception, Pythagoras enjoined the practice of music as a highly virtuous and especially meritorious action, "for music," said he, "*purifies the soul.*"

It is not surprising that a theory, so vast, so grand, so deep, with the nimbus of a charming mysteriousness encircling it, should have retained its influence over men for so many hundred years; or that, in a modified form, it should have its defenders even in the present day. Yet it was not without able opponents. Aristoxenos of Tarent attacked it with the weapons of both argument and satire. He ridiculed the Pythagorean maxim not to trust to our senses, but only to mathematical calculations and demonstrations, and boldly declared the ear itself as the highest authority in matters of consonance and dissonance. His followers therefore called

themselves *musici*, while the Pythagoreans denominated themselves *canonici*. He was, besides being a musician, a distinguished philosopher and one of the pupils of Aristotle. His fundamental theory was entirely realistic. He held that "the soul is a tension of the body; and that as vibrations were produced on strings, so the emotions manifested themselves by producing vibrations on the body—the soul acting as tension."

Remarkable for their truth, and the depth of thought they manifest, are the ideas on music of Aristotle. They are in fact so imbued with the modern spirit, that they would appear out of place if cited here. They will be mentioned in connection with the theory of Helmholtz, which author quotes them.

V.

ARABIC-PERSIAN THEORY.

We must now make a great leap—over a number of centuries in which no new systems were developed, and plunge right into the heart of the middle ages—the Arabic-Persian system being the

next to be considered. The Persians symbolized music in the form of a tree. The chief root is Rast (d). From it branch off the auxiliary roots (d♯, e, and f). From each root two branches shoot forth, producing in this manner the twelve semitones of the octave. Rast is symbolical of the original matter to which all things are reducible. The seven tones of the diatonic scale are symbolical of the days and nights of the week, likewise of the seven planets. The twelve semitones of the octave are symbols of the twelve signs of the zodiac. The four roots signify the four elements.

Rast, is fire—warm and dry. Symbolical of the choleric humor, and of the sign Aries.

Erak, is the atmosphere—warm and moist. Symbolical of the sanguine humor, and of the sign Taurus.

Zirefkend, is water—cold and moist. Symbolical of the phlegmatic humor, and of the sign Gemini.

Isfahan, is the earth—dry and cold. Symbolical of the melancholic humor, and of the sign Cancer.

The branches have, with suitable modifications, the characteristics of their respective roots. The Persians called their lute a picture of Nature. The

highest string is fire—the sounds are dry and warm. The next is air—the sounds are clear and light. The next is water—the sounds are dark and cold. The next is earth—the sounds are low and heavy. From the connection existing between the humors and the elements, music has the power of curing diseases.

Diseases natural to a phlegmatic disposition are cured by the sound of the highest string. Hypochondria is cured by the second one. Diseases of the young (who are generally choleric), particularly the jaundice, are cured by the third. Plethoric persons, having a sanguine humor, are relieved by the sounds of the fourth string. Besides being physic for the body, music acts as a great purifier of the soul. "The soul purified by music, longs for communion with higher beings and purer spheres; and, though darkened by the opaqueness of the body, is yet prepared for conversation with the spirits of light, standing around the throne of the Almighty."

VI.

SCHOLASTIC THEORIES.

While the Arabic-Persian philosophers were occupying themselves with their fundamental theories of music in the East, the scholastics, in the West, worked out no less curious systems.

According to them, Tonus is the progenitor of all the tones (modes). The son of Tonus is the first ecclesiastical mode, who, in turn, is father of the second, brother of the third. The second tone is grandson of Tonus—being the son of the first one, and brother of the fourth mode, etc. The ancients beheld in music manifestations of the same causes that produced the elements, or the planets. The scholastics believed as firmly as they in its symbolical nature, but they generally conceived these symbols as mysteriously referable to the Bible. The relation between the plagal and authentic modes was significant of the chariot with wheels inside of one another, described in the vision of Ezekiel. As the plagal and the authentic modes have some notes alike while others are not, they are symbolical of the concordance and divergencies of the

Evangelists. The four tetrachords point to the life of Christ. The gravium is the type of Christ walking on earth; the finalium, of his death; the superiorum, of his rising from the dead; the excellentium, of his ascension. Two tetrachords are typical of his humiliation—two, of his elevation. The plagal and authentic tones are four bridal pairs, coming forth from the Thalamos (bridal-chamber) which is the intersection of the two wheels in the vision.

Marchettus, of Padua, exclaims: "How admirable is the tree of music! Its branches are ordered by numerical ratios; its blossoms are concord; its fruit, sweet harmonies ripening from the blossoms."

The music of the universe is a great unity, and by command of God it governs all things in motion —all things that move in heaven, or on earth, or in the sea, all that which sounds in the voices of men and animals—it is the regulator of days and years.

The octave is the symbol of justice. The fourth is significant of the four seasons, the four corners of the earth, the four elements, the four Evangelists, the four humors. The number four, whose sum is ten, contains all numbers within itself. In its ratios all consonants are expressed—2 : 1 octave,

3 : 2 fifth, 4 : 3 fourth, 3 : 1 twelfth, 4 : 1 double octave. It was not without reason that the tones of music were divided into sets of four by the first musicians.

Nor was it without cause that all music was founded on the first, second, third, and fourth modes; for music depends on the harmony of these four modes, as the cosmos exists only in the harmony of the four elements. The elements of the macrocosmos are warm fire, damp air, dry earth, cold water —but the elements of the microcosmos, which is man, are the four humors—the choleric, sanguine, phlegmatic, and melancholic.

Music was also a symbol of the Church. Like the Church it is a great homogeneity, composed of many heterogeneous parts. Music has a double character—it is cosmical and human; the Bible is, in like manner, divided into the two Testaments. The Church considers two manners of living—the active life and the contemplative one. Under these same aspects music may be regarded. It is contemplative with him who has it in his heart and in his memory — active with him who studies it from books. The former manner is superior to the latter —the knowledge of music cannot be wrenched from

him who has it in his memory and in his heart. The authentic and plagal modes are symbolical of the commandment of love; the former of love to God, the latter of love to man. The three octaves are the three grades of penitence. The *grave* is the remorse of the penitent sinner. The *acute* is the confession. The *superacute* is the remission through his acts of charity. There are three classes of instruments — *Vasales*, *Foraminales*, and *Chordales*. They are symbolical of Faith, Hope, and Charity. A composition is composed of a first, middle, and final part—significant of the mystery of the Trinity. The four ecclesiastical modes refer to the four cardinal virtues—Prudence, Temperance, Bravery, and Justice. Music is written on four lines, without which it would be impossible to recognize a melody; in like manner the Church bases its recognitions on the four Evangelists. Seven sacraments are the keys of heaven; seven clefs open the gates of music. Eight beatitudes are promised by the Sermon on the Mount, in recompense of the four cardinal virtues; so music contains eight modes, based on the four authentic ones. The nineteen tones are symbolical of the nineteen degrees of the Church, which begin at the good laymen and end

with the hermits and martyrs. As the final tone distinguishes the authentic from the plagal, so will Christ separate the sheep from the goats; and as the beginning and middle part of a composition define its end, so will the beginning and middle part of life define the end—whether it will be in a blessed or unblessed death.

VII.

EULER'S THEORY.

This mystical comparison of music to the Church was the last great original attempt to explain the power of music by symbols. The next fundamental theory, the one developed by Euler in his "Tentamen Novæ Theoriæ Musicæ," is characterized throughout by the clear and cold rationalism of the eighteenth century. Euler says that we are pleased with every thing in which a certain degree of perfection is manifested. The perfection of an object is defined by the fact that all its heterogeneous parts act in homogeneity toward a certain end. Therefore, wherever there is perfection, we find order. By

order we understand that all the parts composing an object are arranged according to a rule from which we perceive why a certain part should be in the place it occupies rather than in any other place. In every perfect thing the rule of arrangement is defined by the object in view. This is the reason why order is more agreeable to us than disorder.

There are two ways in which order may be perceived. Either we know the law from which the rule of arrangement is derived, and judge the arrangement by comparison with the law; or we do not know the law, and endeavor to discover it by carefully studying the arrangement. The latter is the case in music. A combination of tones will please us, if we can find the law of arrangement. This explains why a composition may be pleasing to one, and displeasing to another; for one hearer may discover the law of arrangement, while another may not. In the proportion that the law is easily perceived, will an object be pleasing to us, and will it engender joyful sentiments. In the proportion that the law is difficult to find, will it engender sadness.

Euler then adapts his theory to the explanation of the agreeable effect of concords.

In tones, order is manifested in duration and in pitch. Order in pitch we designate by the term interval, order in duration is known as rhythm. In rhythm, two, three, or four notes of one part may coincide with one, two, or three notes of another part, and the regularity of the arrangement, which is easily perceived, causes pleasure. *In like manner, if one, or two, or three vibrations coincide with two, three, or four other vibrations, we obtain a concord, our ear being pleased with the regularity of the arrangement, which manifests order.* When the ratio of the vibrations is irrational, a dissonance is produced and our ear is offended.

Euler even gives a mathematical formula in proof of his assertion that the pleasurable sensation caused by a concord is attributable to the regularity of the arrangement of the vibrations, and that concords approach perfection in proportion as their ratios are expressed by smaller numbers.

On superficial inspection this theory seems well founded. The most perfect consonance is the unison, whose ratio is 1 : 1. The octave comes next, its ratio being 2 : 1. Then we have the fifth, 3 : 2. Next the fourth, 4 : 3; the major third, 5 : 4; the minor third, 6 : 5; and as the ratios become more

complicated, the intervals are, *theoretically*, less consonant. *Practically*, however, the case is somewhat different. Extremely complicated ratios may yet, virtually, be consonants.

Let us take, for instance, the ratio of 2 : 1.9999; this, if Euler's theory were correct, would be extremely offensive to the ear; in reality, however, it is a perfect consonance. No ear would be able to detect any want of concordance. Then, again, how does the soul discover the ratios? In rhythm this is an easy matter. An uneducated man can hear whether two, or three, or four beats of a certain kind are equivalent to one, or two, or three, of another kind. But how is one, unacquainted with the science of acoustics, at all capable of forming an idea of ratios of vibrations? Nay more, a man may make this subject a special study, and still would never attempt to think of it while listening to music; and were he to do so, it would rather tend to destroy the effect that the music would otherwise have upon him.

VIII.

HERBERT SPENCER'S THEORY.

Let us now proceed to the consideration of the theory of Herbert Spencer, as advanced by him in his article "The Origin and Function of Music:"

"When Carlo, standing, chained to his kennel, sees his master in the distance, a slight motion of the tail indicates his but faint hope that he is about to be let out. A much more decided wagging of the tail, passing by-and-by into lateral undulations of the body, follows his master's nearer approach. When hands are laid on his collar, and he knows that he is really to have an outing, his jumping and wriggling are such that it is by no means easy to loose his fastenings. And when he finds himself actually free, his joy expresses itself in bounds, in pirouettes, and in scourings hither and thither at the top of his speed."

"Under emotions of an opposite kind, animals equally display muscular excitement. The enraged lion lashes his sides with his tail, knits his brows, protrudes his claws."

"In children, and even in adults who are not re-

strained by regard for appearances, a highly-agreeable taste is followed by a smacking of the lips."

"In a sensitive person, an agreeable perfume will produce a smile; and smiles will be seen on the faces of a crowd gazing at some splendid burst of fireworks."

"Painful sensations, being mostly far more intense than pleasurable ones, cause muscular actions of a much more decided kind. A sudden twinge produces a convulsive start of the whole body. A pain less violent, but continuous, is accompanied by a knitting of the brows, a setting of the teeth or biting of the lips, and a contraction of the features generally. Under a persistent pain of a severer kind other muscular actions are added: the body is swayed to and fro; the hands clench any thing they can lay hold of; and should the agony rise still higher, the sufferer rolls about on the floor almost convulsed."

"Though more varied, the natural language of the pleasurable emotions comes within the same generalization. A smile, which is the commonest expression of gratified feeling, is a contraction of certain facial muscles; and when the smile broadens into a laugh, we see a more violent and more general mus-

cular excitement produced by an intenser gratification."

"All feelings, then — sensations or emotions, pleasurable or painful—have this common characteristic, that they are muscular stimuli."

"'But what has all this to do with the *Origin and Function of Music?*' asks the reader. Very much, as we shall presently see."

Then follows the development of the theory.

It begins by stating that all music was originally vocal; that all vocal sounds are produced by the agency of muscles, and that muscles are subject to contraction by pleasurable and painful sensations; that, therefore, feeling demonstrates itself in sound as well as in motion; that, therefore, Carlo barks as well as leaps, the lion roars as well as lashes his sides; that in anger or fear gesticulations are accompanied by shouts and screams, delightful sensations by exclamations.

"We have here, then, a principle underlying all vocal phenomena; including those of vocal music, and by consequence those of music in general. The muscles that move the chest, larynx, and vocal chords, contracting like other muscles in proportion to the intensity of the feelings; every different con-

traction of these muscles involving, as it does, a different adjustment of the vocal organs; every different adjustmeut of the vocal organs causing a change in the sound emitted; it follows that variations of voice are the physiological results of variations of feeling; it follows that each inflection or modulation is the natural outcome of some passing emotion or sensation; and it follows that the explanation of all kinds of vocal expression, must be sought in this general relation between mental and muscular excitements."

I do not think that it will be necessary for me to cite the whole development from these data, the reader who may be interested can find it in Mr. Spencer's essay, "The Origin and Function of Music," in the work entitled "Illustrations of Universal Progress."

His *résumé* is this: "Every one of the alterations of voice which we have found to be a physiological result of pain or pleasure, *is carried to its greatest extreme in vocal music.* For instance, we saw that, in virtue of the general relation between mental and muscular excitement, one characteristic of passionate utterance was *loudness.* Well, its comparative loudness is one of the distinctive marks of song, as contrasted with the speech of daily life; and

further, the *forte* passages of an air are those intended to represent the climax of its emotion. We next saw that the tones in which emotion expresses itself are, in conformity with this same law, of a more sonorous *timbre* than those of calm conversation. Here, too, song displays a still higher degree of the peculiarity; for the singing tone is the most resonant we can make. Again, it was shown that, from a like cause, mental excitement vents itself in the higher and lower notes of the register; using the middle notes but seldom. And it scarcely needs saying that vocal music is still more distinguished by its comparative neglect of the notes in which we talk, and its habitual use of those above or below them; and, moreover, that its most passionate effects are commonly produced at the two extremities of its scale, but especially the upper one."

"Once more, it was pointed out that not only extreme, but also rapid variations of pitch, are characteristic of mental excitement; and once more we see in the quick changes of every melody, that song carries the characteristic as far, if not farther. Thus, in respect alike of *loudness*, *timbre*, *pitch*, *intervals*, and *rate of variation*, song employs and exaggerates the natural language of the emotions;—

it arises from a systematic combination of those vocal peculiarities which are the physiological effects of acute pleasure and pain."

"The rhythm of music is a more subtle and complex result of this relation between mental and muscular excitement."

On first inspection Mr. Spencer's theory, I admit, appears very plausible; but at the same time I venture to say that it will not bear critical examination. In the first place, his conception of music appears to me to be far too narrow. He considers music an invention springing from the human brain; but this, after a little thought, must appear erroneous to every one—music is *not* a human invention, *it is part and parcel of Nature.* The laws of vibration, for instance, are as immutable as are those of gravity. The forms of vibration are determined by the great mechanical law of the parallelogram of forces. The manner in which a string vibrates is one of the most wonderful things in Nature. The human ear is of a most marvelous and intricate construction, and its wonders and complications have for the *sole* object the distinguishing of musical sounds, with regard to pitch and quality; a comparatively simple arrangement

would have sufficed for the requirements of language. There is the human throat with its remarkable arrangement for the purposes of *song* alone. A far inferior construction would have served the purposes of language, or for the production of sound incidental to muscular excitement.

But, leaving the consideration of special contrivances, and casting our eyes on the broad expanse of Nature, what an enormous provision is made for music! What an immense material is placed under its control! It can subject to its use almost all things that exist in space! The atmosphere is ever prone to originate music; always prepared to mediate between the producing instrument and the ear. Water, too, is an originator and mediator of musical sounds. All solid bodies have a proneness for music. Before man appeared on the face of the earth the waves of the Ægean Sea sang their mournful tones, the waters sounded forth sad music as they rushed through Fingal's cave, or spent themselves in violent breakers on the German shore. Did not singing-birds exist before the time of man? Did they evolve their singing from speech, or did they develop it from muscular excitement? or did they sing because it was natural for them to sing—

because it was in the plan of Nature that they should sing?

No, music is *not* a human invention. The *progress in music* is of the same nature as the progress in science, it is based on *discovery*. The other arts are *imitative* of things in Nature, or, like architecture, are for the purpose of utility. But music is a *very part of Nature itself*. If, instead of saying music was developing itself, we were to say, new things were constantly being *discovered* in it, we should be nearer the truth. The history of music fully substantiates my assertion. To the ancients music was a most wonderful structure whose gates were closed and barred. They saw but the exterior, and yet so fascinating was that exterior to them, that they imagined a marvelous interior, and were constantly at work in forging keys which were to open its gates. They were conscious of the fact that an immense mass of material for musical purposes was existing, but they were forced to labor in order to bring that mass under subjection—in order to discover the laws which governed and regulated it. The scales were no more invented than were the laws of vibration. Like the latter, they were *discovered*—discovered after

much vain labor. The slow development of music is attributable to the very greatness of its subject-material. Says Helmholtz: "Music finds an immensely rich but entirely unformed material in the tones of the human voice and musical instruments, which it must shape according to purely artistic principles. No consideration of utility, as in architecture — no imitations of Nature, as in the plastic arts — no ready symbols of sound, as in poetry—define, bound, or limit it in any manner. The freedom in the use of the material is unbounded, but it is infinitely more difficult to make good use of absolute freedom, than when some extrinsic marks define the path to be trodden—and this explains the slow development of music."

It is hardly within the scope of the present little work to give a detailed criticism of Mr. Spencer's theory, what has already been said being, I believe, quite sufficient to show its want of solid foundation. That there are many connections between speech and music is understood by the very definition of the terms—for speech is sound and subject to the laws of sound; and that vocal music should have preceded instrumental, is quite natural, for the human throat is the first musical instrument ever

subject to the control of man. Those characteris tics of speech which belong to utterance have, therefore, some musical counterpart, and come actually under the heading of the internal government of the scale. An excited person, whether he speak in one language or in another, will by his very manner of utterance—whether the words he speaks be comprehended or not—show his state of mind, just as passionate music distinguishes itself from calm music—by the laws governing rhythm and the scale. In reading, when coming to a full-stop, we use the tonic of our speech; at a half-stop the mediant; at an interrogation-point, the dominant. All these inflections depending, as we see, primarily on the internal government of the scale. As far as loudness is concerned, as a distinctive mark of song, I must differ from Mr. Spencer. Speech may become louder than song, without once departing from any thing that distinguishes speech from song. I think him mistaken also in the point he makes about the rate of variation. If music had developed from muscular excitement, the rates of variation would have been extreme in the beginning, and gradually reduced by good judgment and artistic taste. The first music would have consisted

of very close-lying sounds, or rather groups of sound, distributed over wide ranges of pitch. An animal that howls does so in no appreciable intervals, but in continuous sounds. In screaming, it uses the highest part of its compass—in moaning, the lowest, and always in continuous sounds. If, therefore, music had originated in muscular excitement, the first music would have contained an extreme rate of variation, which would have been diminished by degrees. The opposite, however, has been the case. The first scale of which we have any knowledge is the Chinese, with but five tones. The most ancient Hindoo melodies are founded on a scale of seven notes; it is true that their system contains quarter-tones which are a nearer approach to continuous sounds than our half-tones, but these were only introduced at an advanced stage, and then not for practical purposes, but to show the arithmetical skill of the philosophers who formed the system.

In fact, what authority have we for assuming so tacitly that language preceded music? Do not all things rather tend to prove that music preceded language? Music is natural—language is artificial. The original man sang long before he talked. All Nature taught him to sing. He uttered sounds for

the mere sake of their beauty, long before he could have taken practical advantage of these sounds, by ascribing symbolical value to them. Language is merely local—music is universal! Language is one of the functions of music—not music of language. Music is greatly aided by language, but it does not depend upon it. Language, however, depends on music; for the only philosophical manner by which we can account for the various inflections and modulations of the voice, which give life to speech, is by ordering them under the musical laws regarding the scale and rhythm. The vital premise of Mr. Spencer's theory is, therefore, an assumption by no means warranted.

With regard to Mr. Spencer's historical proofs, it would take me too far to refute them here in detail. They rest, as he himself implies, mostly on hearsay; and it is, therefore, not surprising that they should either be entirely erroneous or merely part-statements. In no case, however, do even they justify the conclusions he draws from them. I shall, also, not commit the unfairness of giving piecemeal quotations from the rest of his argument, in which so many true and beautiful sentiments are blended. One thing, however, Mr. Spencer appears to forget,

and this is, that melody is a gift of Nature. When Schubert wrote his songs, which penetrate into the very depth of our hearts, he certainly did not arrange the intervals and cadences in the manner Mr. Spencer describes. They poured from his brain, clear and fresh as the water pours from the mountain-spring. Melody is born with the man, it cannot be learned or acquired. And how will Mr. Spencer's theory account for the feelings of melancholy which come over us when we hear the roaring waves breaking on the shore; for the feeling of terror, when tremendous claps of thunder reverberate among the mountains; for the feeling of sadness, in listening to the moaning wind; for the pleasurable calmness, in sitting by the babbling brook; or for the blended feelings that master us when on a summer afternoon, while lying in the woods, we hear birds sing amid the rustling of the leaves? Is it rational to account for these emotions by a method according to which, first, the emotions must cause muscular excitement; secondly, this muscular excitement must extend to the organs of speech; thirdly, that the entirely unmusical sounds thus brought forth must have developed into vocal music, for which, by-the-

way, they have no tendency (for the softening of which they are susceptible has no influence on the development of the singing quality of the voice, fine voices being known to be as common among the unrefined as among the refined); fourthly, that when we hear such manifestations they affect us by some fourth or fifth hand inexplicable retrospective sympathy? Is this rational, I repeat, when we know that we are affected in a *primary manner*, without the intervention of any kind of reasoning?

The following quotation cannot be considered "piecemeal." It contains a categorical proportion, couched in unequivocal terms, and not dependent, for a correct understanding, on any thing that precedes or follows it:

"It is generally agreed that the tones of the human voice are more pleasing than any others. Grant that music takes its rise from the modulations of the human voice under emotion, and it becomes a natural consequence that the tones of that voice should appeal to our feelings more than any others; and so should be considered more beautiful than any others. But deny that music has this origin, and the only alternative is the untenable position that the vibrations proceeding from a vocalist's

throat are, objectively considered, of a higher order than those from a horn or a violin. Similarly with harsh and soft sounds. If the conclusiveness of the foregoing reasonings be not admitted, it must be supposed that the vibrations causing the last are intrinsically better than those causing the first; and that, in virtue of some preëstablished harmony, the higher feelings and natures produce the one, and the lower the other. But, if the foregoing reasons be valid, it follows, as a matter of course, that we shall like the sounds that habitually accompany agreeable feelings, and dislike those that habitually accompany disagreeable feelings."

I would beg the reader to mark the word *untenable;* for, while Mr. Spencer was thus treating of a remarkable natural phenomenon, attempting to make it conform to ideas previously conceived, another philosopher was silently at work, adding the ingenuity of genius to the long experience in similar labors, and wrested the secret from Nature. He proved that the *untenable* position alluded to by Mr. Spencer was the *only tenable one*—was the true cause of the whole matter. Prof. Helmholtz discovered that the *quality* of sound depended on a physical cause solely; on the *form of vibration* pro-

duced by the *order and intensity of the overtones.* And about the "harsh and soft sounds?" The same authority has also settled that question. Either Mr. Spencer refers to isolated or to simultaneous sounds. In the former case, the harshness arises from unharmonious overtones; the softness is owing to harmonious overtones. In the latter case, this harshness or softness depends on the anatomical structure of the ear—dissonances causing *beatings*, consonances being pure in the proportion that they are free from these beatings. The whole question of quality, and harshness or softness, therefore, is definitely removed from the speculative fields of psychology, to the demonstrable ones of natural philosophy, where it undoubtedly did properly belong from the first.

Mr. Spencer, furthermore, gives as a strong indirect proof of his theory, that "on no other tenable hypothesis can either the expressiveness or the genesis of music be explained." I have already had occasion to say that I believe, on the contrary, that his theory is entirely insufficient to account for the power of music over the emotions; and as for the genesis of music, I have, likewise, only to repeat a remark that I have made before, namely,

that music is not a human invention, but a cosmical agent. Man has developed it; but for its genesis, if that question should interest us, we must look back to ages before the advent of man.

IX.

HELMHOLTZ'S THEORY.

And now let us cast a glance into the writings of Prof. Helmholtz, of the University of Berlin. In my estimation, his ideas on the subject are a nearer approach to the truth than any that I have yet had occasion to notice. They are broad and comprising, and rest upon the strongest natural proof. They are objective, and not subjective:

"Melody is motion of pitch. The imponderable material of which tones are composed is admirably suited to follow the intentions of the musician, better able to illustrate all kinds of motion than the lightest ponderable body could be. Rapidity, ponderous slowness, steady moving, wild leaping, all these different characteristics of motion, and innumerable others, may be represented to per-

fection in their minutest shadings and most intricate complications and combinations, by a succession of tones. Now, while music expresses these kinds of motion, it mirrors the state of mind by which they were called forth; for every motion is to us a manifestation of the forces which caused it, and we form, intuitively, a conception of the force when we perceive the motion in which it is manifested. This is true, as much and even more, of the manifestations of force of the human will, and for the motions caused by human incentives, than it is for the mechanical motions of outward Nature. Thus it is that the melodious motion of tones becomes the expression of human states of mind, not of human sentiments (for music, unless aided by poetry, does not accurately define a subject), but of the *states of mind which produced the sentiments.*

"Aristotle, already, had had this conception of music. In his Twenty-ninth Problem he asks, 'Why do rhythms and melodies, which are sounds, adapt themselves to the states of mind, and not the tastes, nor the colors, nor the odors? Is it because they are motions like the actions themselves? The very energy which lies within them is based on a certain state of mind, and produces a certain state of mind.

But such is not the case with the tastes and the colors.' And at the end of the Twenty-seventh Problem he says, 'These motions (namely, rhythms and melodies) are active, and actions are the signs of the states of mind.'"

"Not music alone, other motions also, are able to produce these results; particularly do moving waters, be they in the form of water-falls, or of the waves of the sea, make an impression on us similar to the one made by music. Often, and for a long while at a time, do we enjoy sitting on the shores of the sea to watch the onpouring waves. Their rhythmical motion, showing uniformity though the single particles are constantly changing, produces upon us a peculiar sentiment of calmness and rest, while, at the same time, we are impressed by the picture of a mighty, orderly, and beautifully symmetrized life.

"The motions of tone, however, are superior to the motions of all ponderable bodies in the nicety and facility with which they accommodate themselves to the various forms of expressiveness. On this account the chief function of music is to give expression to the states of mind in a *primary* manner. The other arts can do so only in a *secondary*

manner, by expressing the motives which produced the states of mind, or by giving the words, the actions, the outward manifestations, which poured from the states of mind.

"Vischer's somewhat paradoxical idea that 'the mechanism of the emotions is best studied in their musical expression,' is correct; we have, in fact, no means by which we can express them so exactly and so delicately as by representing them in music."

PART II.

And now, having faithfully transcribed the principal fundamental theories of music, from the remotest antiquity to the present day, I ask, with all due deference, a hearing for my own views.

By the study of physical sciences we find, in the first place, that the universe is governed by laws; by further investigations, proceeding from phenomena or manifestations to the spiritual essence of things, we find that these laws are subservient to great principles. One of these great principles is the principle of Beauty. Beauty is manifested in three great forms—the moral, the intellectual, and the physical. These three classes of the beautiful are by no means distinct and separate things. They are, on the contrary, closely interlinked, have great analogies, and exercise a strong reciprocal influence upon each other; they are, in fact, but different manifestations of the identical cause. I cannot, however, at present attempt to treat of the

beautiful in the absolute; nor can I, difficult as it is to forbear, enter into any speculations regarding the great original analogies: these subjects would lead us from the direct road. I must limit myself to the consideration, solely, of some of the general essential attributes of the physically beautiful.

The physically beautiful is manifested either in *things in Space* or in *things in Time*. The beautiful in things in Space is opened to us chiefly by the organ of vision; the beautiful in things in Time, chiefly by the organ of hearing. In treating of beauty we may, therefore, class things in space under the general head of *visible Nature*, things in Time under that of *audible Nature*.

In visible Nature beauty is a direct emanation of Nature itself, which has taken it under its immediate charge, and developed it from the original voidness without admitting of intervention. Here man can do naught but *imitate* the beautiful. In the beautifying of audible Nature, however, Nature has reserved but an inferior part for its own unaided self. It has supplied the laws under which the development was to take place, but it has left the development itself chiefly to the *absolute* control of man. In the infinite *fields of Time* (if this

expression may be allowable) man *creates* the beautiful. Now as in Time the science and art of music chiefly do for Nature that which in Space the latter does for itself, the vast importance of music in the cosmical plan is self-evident. The whole material of time, rhythm, and the tones, is left to it in its chaotic state to be wrought by it into the highest and purest forms of beauty.

Yet are visible and audible Nature not entirely independent things, with no connection between them; they are, on the contrary, *extremely similar* to each other — they are, in fact, but *different manifestations of an identical idea.* Of their great analogies I shall briefly treat under the headings of *Space and Time*, of *Vibrations*, of *Color and Proportion*, of *Internal Government*, and of *States of Mind.*

I.

SPACE AND TIME.—(REST AND MOTION.)

SPACE and Time are the prime elements of the cosmos. The genesis of Nature may be attributed to Time acting on Space. What they are, what

may be their true essence, whether they be real or ideal, whether they be things or merely names, whether they exist or be nothings—all these questions concerning them in the absolute do not come within the scope of the present little work. I shall merely consider them from the relative point of view, and only so far as is necessary to define the position of music in the cosmos. For this purpose let us cast a glance at their *fundamental characteristics.*

Space is rest, Time is motion. Space is lifeless, Time is life. Space is rest, lifeless, yet in consequence knows no death. Time is motion, life, yet what is life but change, and what is change but death? And still—eternal antithesis!—though in all things the contrary of each other, they are yet the counterparts of one another; though by their very definitions the opposites, they are yet wonderfully similar; though, subjectively, essentially antagonistic, they are, objectively, but different manifestations of an identical idea! For what is Time? It is the Space of motion, the Space of existence!

Both exist forever. In Space, this forever is called infinity; in time, eternity. Yet each particle of Space is infinitesimal but eternal, while

each particle of Time is eternitesimal[1] but infinite. Each particle of Space is infinitely small, but it remains the same, unchanged through all ages; each particle of Time is infinitely short, yet it extends through the whole universe, immeasurable even in the imagination—it is infinite! Space is the limitation of matter; all things material must occupy some space. Time, however, is the limitation of the spiritual, our very thoughts are bounded by it. Space may therefore be considered as the essential limitation of all things material—Time the essential limitation of all things whatsoever. Ideas consequently do not exist in space—ideas are life, they exist in time. The inert matter only exists in space. Matter is lifeless, inactive, put in motion by forces. Forces are ideal, they exist in Time. Consequently Time and Space constantly act upon each other. But Time is but another name for Space—it is the Space of motion.

Now, *what is music?* The *beautifier* of *Time*, is the simple and categorical answer—an answer, too, from which further answers to all questions

[1] I have taken the liberty to coin this word, because I know of none in the English language by which I could have stated the antithesis with equal exactness.

springing from the original question may be deduced; an answer that serves as the corner-stone of the fundamental theory of music itself. It is to adorn the ever-moving Space of existence that music was generated and the germs of its development were placed within it. In the Space of Rest, in visible Nature, Nature itself has undertaken the task of beautifying. And there she has lavished beauties untold and unnumbered. Beauty reigns on the mountain and in the valley, on the hill and in the dale. It is present in the gentle grove as well as in the mighty forest. It is in the little brook and in the magnificent ocean. It is in man and woman, in the birds, in the plants—anywhere, everywhere, it meets our eyes, if we will but see. There are beauties of all kinds and degrees, from the sublime to the graceful, from the magnificent to the picturesque. All this has Nature done for Space—and to do something similar for Time is the grand and holy object of music.

The materials of which music is composed exist only in Time, and here we have the explanation of many of the characteristics of music. Time is motion, is life, yet the sure bringer of change, of death. As it is motion, its influence upon us is

emotional, agitating; as it constantly tells us of change and death, it awakens the feelings of melancholy within us. Music, as it beautifies the passing moments, yet tells us that they are passing, and consequently it is so prone to cause sadness.

We may divide the pleasures arising from the contemplation of the beautiful into two classes—pleasures productive of joy, and those productive of sadness. There is nothing paradoxical in this division. A thing that is beautiful will give pleasure at all times, though it may at the same time cause sadness. A great tragedy will give pleasure, though it may not put us in a joyful mood. So it is with a beautiful poem on a tragic subject. In fact, intense and exquisite delight is perfectly compatible with a frame of mind strongly tinged with melancholy. Nay, even more, joyful sensations, when they become ecstatic, generally have a background of deep sadness.

Now, the characteristic state of mind accompanying the contemplation of things in Space is that of serene joy. Space being rest, does not excite the more powerful emotions, it does not agitate. It has, on the contrary, the effect of calming and quieting the mind. I am, of course, speaking

of the beautiful, purely as such, without admitting of associations of ideas. These, of course, often exercise a powerful influence, and cause emotion by their own force. But they exist as much for music as they do for things in visible Nature, and their consideration at present would only cause useless complications. That beauty in Space has the tendency—and very strongly—to create a serene frame of mind, any one desirous of doing so can easily test. A landscape must be entirely covered with clouds, be exceedingly gloomy, before it causes us to be sad. Let but the sun appear and shine upon the clouds, and they will be tinged with bright colors; the scene will appear more cheerful even than were there no clouds. The opposite is the case in music. Often a *single* minor or diminished chord, introduced into a gay melody, will change its entire expression, rendering it melancholy. Space knows naught of death, its particles exist forever; its beauties are therefore prone to create joy. Time speaks constantly of change and death; its particles are infinitely short, its beauties create sadness.

Then, again, as Aristotle has already said, what are the emotions but motions? And as music is

motion, its effect on them must be great, for motions exercise an enormous influence on like motions, and have a very great tendency to respond to like motions. This is a fact well known to all familiar with the operation of vibrations. "But," it may be objected, "the eye is also an organ capable of discerning motion." To this I answer, that we are at present concerned only about the *beautiful* in motion, and that this is chiefly the province of the ear. The *beauties of motion* open to the perception of the eye are of an inferior kind. The pleasures in viewing dancing or marching do not really come within the range of those caused by the contemplation of the beautiful in the highest sense. In the motion of the waves of the sea, we are more impressed by the natural association of ideas than by the beauty of the motion itself.

There is, indeed, another, higher kind of motion in visible Nature—the motions of the heavenly bodies. Daily the sun rises, and tranquilly and majestically pursues its course in the firmament, to set amid splendor and glory. Then the stars appear, and with equal majesty traverse the skies, set and rise until the king of day again ascends from the horizon and eclipses them by the exceeding power

of his light. Nor is this motion limited to the day and night; as the year moves on, sun and stars move with it. This month the sun rises in one sign, the next month in another, until he has traversed the whole circle of the zodiac. This month Arcturus is the proudest of the starry host shining high above; in the next he is already dethroned, and bright Antares for a brief time assumes his honor. But the beautiful imperial Lyra follows in the wake, and in her turn claims homage as chief of the stars. Less steady wanderers, too, are there in the heavens, the planets moving unconcerned in their orbits, now visible here, now there. The lovely moon, queen of the night, pursues her tranquil course. Now seen but as a silver thread in the west, she waxes lovelier and prouder as she approaches the east, until she almost rivals the sun in the refulgency of her light—but it is only to wane and wane again, until she is seen no more.

There is, too, the subtile motion of the seasons. Now the forest is in the garb of a beautiful green, the garden is fragrant with flowers, the trees are loaded with fruits, the fields teem with the heaving corn. Soon the green changes into numerous varie-

ties of color, the leaves fall and strew the ground, the flowers are plucked from the garden, the corn is gathered from the fields. Then comes winter; snow covers the ground, the water-courses of the mountains and the rivers of the valleys are turned into ice, cold and bright, the mild breezes give way to the fierce blasts of the storm. But spring follows close behind, and wafts the breath of life before him. The snow melts, the ice thaws, the mountain-torrents tear on with renewed and tenfold increased vigor; the pulse of Nature throbs with the freshness of youth. Soon all is again in bloom, the trees are white, the plants begin to shoot forth. Then summer is here once more, and the course of the year begins anew

The motions of the spheres and of the seasons are, indeed, full of sublimity. The ancient philosophers and their followers unto recent times, however, saw in them yet the workings of music. All these motions were to them but the visible manifestations of a transcendental harmony. Therefore does the Pythagorean say, "It is the business of music, not only to preside over the voice and musical instruments, but even to harmonize *all things* contained in the universe." Therefore does the

Scholastic exclaim, "The music of the universe is a great unity, and by command of God it governs all things in motion—all things that move in heaven, or on earth, or in the sea, all that which sounds in the voices of men and animals—*it is the regulator of days and years.*"

A similar sentiment inspired Shakespeare when he wrote:

> ". . . Look how the floor of heaven
> Is thick inlaid with patines of bright gold;
> There's not the smallest orb, which thou beholdst,
> But in his motion like an angel sings,
> Still quiring to the young-eyed cherubins.
> Such harmony is in immortal souls;
> But, whilst this muddy vesture of decay
> Doth grossly close it in, we cannot hear it."

If I were asked to give my own views on these motions, I should say that I do not believe that they properly come under the head of the beautiful in motion. If we admire the landscape, or look up to the starry vault of heaven, our purely æsthetical pleasure does not take in the factor of motion. It is continuous and imperceptible to the eye—it is only by the aid of memory that we know that it exists, and the feeling of awe connected with it

arises solely from the *association of ideas.* Indeed, if we wish thoroughly to examine an object in Space, we require it to be perfectly at rest—its motion as a rule has a tendency to confuse us; and, if the motion be rapid, the object becomes blurred. The very life of the beautiful in audible Nature, however, is motion—it exists in Time and not in Space.

As Time and Space—visible and audible Nature—are the counterparts of each other, there must be great analogies in the manner in which beauty is *perceived* and *produced* in either. Of the analogies of perception I shall now treat, under the heading of vibrations.

II.

VIBRATIONS.

We perceive things in visible Nature by means of light—things in audible Nature, by means of sound. To one unacquainted with physics, light and sound are entirely distinct phenomena, having no connection whatever with each other, and yet

they are intrinsically very nearly related to each other, being but different manifestations of the same cause. Vibrations of a certain rapidity are perceived by the instrument constructed to respond to them—the ear, as sound; vibrations of greater rapidity are perceived by the instrument constructed to respond to them—the eye, as light. And not only are they produced by the same cause, they are also propagated by the same means —undulations. Entering into details, we find the analogies between the two phenomena in almost all of the principal manifestations. Some bodies are transparent, others translucent, others again opaque to light; in like manner some bodies permit sound to pass on through them without practically enfeebling it; others, like thick walls, transmit it much weakened; while others again do not transmit it to any appreciable degree. An instance of the last case is a tunnel. To any one standing at a distance, the roar of a train entering it is hushed, and remains so until the cars emerge, when it is immediately renewed.

Some of the principal properties of light are absorption, reflection, refraction, and diffraction. These are also the properties of sound. That it

may be absorbed can easily be tested, by comparing the sound of a musical instrument in a carpeted and furnished room with that of one heard in an empty room. The echo is a familiar illustration of reflection of sound. The experiments of Sondhauss and Hajech prove conclusively that it is refracted when it enters a medium whose density differs from the one it leaves, in the same manner and under the same conditions as is light. The diffraction of sound has been demonstrated by Seebeck.

It is, however, not only in the physical manifestations of sound and light that we discover great analogies; the construction of the instruments for their perception—the eye and ear—is essentially based on analogous plans. Like the ear, the eye is a membranous structure. The ear is composed of three parts—the auditory canal, with the tympanum, the tympanic cavity, and the labyrinth. The corresponding parts of the eye are the sclerotic coat, the choroid coat, and the iris. The aqueous and vitreous humors present strong points of resemblance with the water of the labyrinth. The difference between light and sound is not in kind, but in degree. Extremely rapid vibrations produce light;

slower ones, sound. The rapid vibrations have, however, a proportionately small amplitude; slower vibrations a proportionately large amplitude. Hence the difference in the anatomy of the eye and the ear. The first is prepared to receive and respond to vibrations of enormous rapidity and small amplitude; the latter to receive and respond to vibrations of comparative slowness, but with a relatively large amplitude.

Tones and colors are essentially the *same* things. Colors are tones of tremendous height of pitch. Tones are colors of tremendous depth of pitch. The ear perceives as tones from 8 (Savart) to 38,016 (Dupretz) vibrations in a second. The eye perceives as light from 458,000,000,000,000 (extreme red) to 727,000,000,000,000 (extreme violet) vibrations per second. From the most acute tone capable of being perceived by the ear to the extreme red color there is, therefore, an interval of about thirty-four octaves. To give an illustration of the enormity of such an interval, let us take the length of the string of the highest C of a seven and a quarter octave piano-forte, which is about $1\frac{3}{4}$ inch, and it will be easy to calculate that a string of the same material and thickness, in order to produce

the extreme red light, would have to be cut down to about $\frac{1}{1000000000}$ of an inch! The rapidity of the vibrations defines the length of the undulations; the length of a sonorous wave produced by 8 vibrations per second is 140 ft.; the length of a luminiferous undulation in the extreme violet ray is $\frac{167}{10000000}$ of an inch; otherwise expressed, while of the former there would be but 37½ in a mile, in the latter there are 59,150 in an inch!

Rapidity of the vibrations is, however, the means of distinguishing tones from tones, and colors from colors, as well as tones from colors; and consequently, difference in *rapidity* of vibrations solely, cannot be considered an intrinsic difference.

The principal phenomena connected with colors —analysis and interference—are also proper to tones.

For colors the triangular prism acts as analyzer; for tones that office is performed by *resonators.* Prof. Helmholtz has constructed a series of the latter, which serve as analyzers for isolated tones—by resolving them into the fundamental and overtones—as well as for those tones of combination produced by the simultaneous existence of two or more independent tones. Interference

in sonorous waves has been demonstrated ocularly as well as auricularly by numerous apparatus.

Having now sufficiently illustrated the identity of the manner of *perception* of the beautiful in visible and audible Nature, I shall proceed to the consideration of the fundamental analogies regarding the *production* of the beautiful in Space and Time.

III.

COLORS AND FORMS.

THE elements of the beautiful in Space are colors and forms. The counterpart of colors having been found in tones, there remains but the question, "Is there also a counterpart of *forms* to be found in music?" This question I answer categorically in the affirmative: *Rhythm is the shape, form, or proportion of things in Time; and shape, form, or proportion, is the rhythm of things in Space.* And this answer is not based on any arbitrary ideas, but on incontestable facts—facts as indisputable as is the theorem that colors are the tones of Space. Time is but the Space of

motion, and rhythm defines that Space in the same manner that the Space of rest is defined by forms. The lines of Space are translated, as it were, into Time, by its means. On entering into an investigation of the prime principles of morphology, we find that the *straight line* and the *curve* are the *fundamental types* of form. In like manner, the fundamental types of rhythm are found in the *dual*, and in the *triple* metre. The geometrical *point* is an impossibility—so is *single* metre. The reason is plain. Rhythm, like form, is based on proportion; in other words, on relativity. We have no perception of rhythm on hearing a single beat. A beat must be defined and bounded by a second one to become a metre, i. e., a measure of Time. The analogy between dual metre and the straight line, and triple metre and the curved line, is by no means a fanciful conception—it has been intuitively felt by musical composers in all times; *and tones spread over rhythms as colors do over forms.*

We cannot, however, overlook the remarkable fact that, while in visible Nature colors play the subordinate and forms the principal part, the order is reversed in audible Nature, where rhythm is sub-

ordinate to tones. Well, this is *necessitated* by the fundamental characteristics of Space and Time, rest and motion. In Space, things may remain at rest; our eyes can take in a great variety of forms simultaneously. They have time to examine beauty—extend comparisons over a wide field. Forms and proportions may establish themselves in unlimited variety; for we have *coexistence* on a large scale. Time, however, is motion. In it, proportions and forms are perceptible by their very motion, and *only* by motion; one tone vanishes as the next comes on. Here there is no room for such an extreme variety of forms; rhythms (though they may yet be infinitely varied and complicated) must be much simpler than the forms of visible Nature.

On the other hand, the tones, which constitute the material of melody, embrace about seven and a half octaves, good for practical purposes; while the colors do not extend over more than one octave. This octave, even, is not entirely visible under ordinary circumstances, its eighth degree being that which is called the lavender light of Herschel, and only produced by concentration. Practically, the whole combination of colors does not exceed the interval of a seventh. There are, therefore, conclusive

reasons why the chief riches of visible Nature lie in forms, while the chief riches of audible Nature are in tones.

There is, however, another factor besides melody and rhythm that enters into the composition of music—*harmony;* and it may be asked whether any analogy for it can be found in visible Nature. To this question I reply that the fundamental theory of musical harmony lies in the very nature of Time. Each particle of Space is infinitely small, consequently no two things can occupy the same space. Each particle of Time, on the contrary, is infinitely large —embracing the whole cosmos—consequently an infinite number of things can occur at the same time. Space, however, is rest, and the mind can therefore take in a large number of particles of Space at once. Time being motion, does not admit of perceiving more than *one* of its particles at once; and, therefore, the simultaneity, compatible with it, acts as a certain compensation for those advantages which, by its definition, rest has over it. I am, of course, using the word harmony in its narrow signification, in the sense of counterpoint, and not in its spiritual meaning. In the latter higher sense, it pervades the whole universe, existing both in Space

and in Time; the soul of the cosmos, says Plato, is musical harmony. The whole topic of colors, and forms, and rhythms, and tones, and harmony, together with them any analogies of detail in these matters, is a tempting and prolific subject for speculation. I shall, however, resist the temptation of going any further into the matter, for it is beyond my scope in this little work to introduce any but plainly demonstrable facts. One thing only I must yet allude to; and this is, that, in instituting comparisons between the beautiful in Space and in Time, we should never forget that in the former case the task of beautifying has been undertaken by Nature itself with the unbounded resources at its command, while in the latter it is left to the limited means of man. Were Nature to beautify Time as it does Space—could we hear, for instance, such a thing as the harmony of the spheres—the sublimity of such music might transcend all possible conceptions.

And now we leave the field of the material analogies, respecting the perception and production of the beautiful in Space and Time, to enter into that of (what may be termed) the spiritual analogies. Those of production I shall class under *Internal Government*, those of perception under *States of Mind*.

IV.

INTERNAL GOVERNMENT.

SEVERAL of the great forces which we see manifested in visible Nature have their counterparts in audible Nature, and prime among these are the forces of *gravity* and *attraction* and the *centrifugal force*. I am not aware that any writer has ever had the boldness to make this assertion in so positive a manner, but certainly the influence of the first over music has been instinctively felt in all times and among all nations, while that of the last two was discovered as soon as it could have been, namely, in the first stages of the development of the science of harmony.

The *centre of gravity* of the musical scale is the *tonic*. The whole history of music tends to confirm this in an unequivocal manner. I have before me, as I write, a volume of August Wilhelm Ambros, wherein I find scraps of melodies from the land of the Esquimaux and from the Friendly Islands, from New Zealand and from Abyssinia, from Corea and from Senegal. Besides these, a number of finished Chinese melodies, a number of beautiful

songs of Hindostan, together with Arabian, Persian, and Turkish airs, and two of the three ancient Greek *nomoi* that have come down to us; and in each one of them, from tutored and from untutored peoples, the audible manifestation of the principle of gravity is unmistakably discernible; all the tones gravitate toward their common centre—the tonic. A characteristic passage from the writings of Aristotle proves indeed, beyond doubt, that the consciousness of the force of the tonic was not only apparent in the practice of music of the ancients, but that they were also aware of its spiritual relation to the other degrees of the scale, and attempted to account for it philosophically. "Why is it," he asks, "that, when the tonic (*mese*) is changed (sharpened or flattened), all the other strings sound out of tune, but, if the tonic is in tune, and one of the other strings is changed, only the changed string sounds out of tune? Is it because not only all the strings are tuned, *but also that they are tuned with respect to the tonic*, and that the latter defines the order in which they appear? But when the basis of the tuning and that which keeps (the melody) together is taken away, there can no longer be the same kind of order." But should the reader be disinclined to

accept the testimony of a single person, no matter of what importance it may be, I have still another powerful proof in support of my argument to bring forward. Let us cast a glance into pre-Ptolemaic astronomy, and what do we find? That the prime principles of modern astronomy, those contained in the Copernican system, were essentially known and taught in the sixth century B. C. by Pythagoras. His doctrine was, that the sun is the centre of the universe, and that the earth has a diurnal motion around its axis, and an annual motion around the sun! Now, we have already seen (in an earlier part of this little work) that the planets and the sun were compared and considered mysteriously related to the tones of the scale. And the sun, the central sphere, was supposed to be the *mese* of the scale—the manifestation of the principle embodied in the tonic. Cicero, however, did not believe in the Pythagorean doctrine of the revolution of the planets around the sun. He was of the opinion that the sun and planets revolve around the earth, which remains stationary. And, in consequence, too, he changed the Pythagorean division of the scale among the heavenly bodies: the sun was no longer *mese*, it became simply the *lichanos hypaton*.

But what did he do with the *mese?* It could not be given to the earth, because she, being stationary, represented silence; so he made *mese* symbolical of *the whole expanse of the firmament!*

In the ninth century, Huebald de St. Amand worked out his "Organum," the first step toward modern harmony. One of the first results of his discovery was the introduction of the *leading note* into the musical scale—the forced recognition of the second great governing principle of the scale—*attraction.* By-and-by *retards* came into use, and showed that this attraction acted in a dual manner —upward and downward. The analogy between it and magnetic attraction with its two poles must I think, strike every one—the attraction of one pole manifested in the retard and the resolution of the seventh, that of the other in the *alteration* and *leading-note.*

The *dominant,* which is in all respects the contrary of the tonic, *is the audible manifestation of the centrifugal force.* In our modern system of harmony, where the principle of tonality is fully understood and recognized, the intensity of this force is even considerably increased by the fact that the dominant is likewise the tonic of the next related

key, and consequently as such exercises an extraneous attraction, tending to oppose, by a secondary gravity, the force of gravity in the tonic.

And now, remembering that the emotions are motions, and consequently in sympathy with like motions, we cannot but be convinced that the foregoing facts serve as explanation for many of the characteristic effects which music has on our emotions. The centre of gravity, manifested in the tonic of the musical scale, is likewise manifested in the *emotions expressive of satisfaction*. I am using this word, not in the sense of contentment, but in contradistinction to the term suspense; this satisfaction need, of course, not have any gay or even cheerful sentiments connected with it; it may in fact be accompanied by extreme despondency: it is but the relief from suspense, or typifying suspense as the question—it is the answer. The centrifugal force is manifested in the dominant, and likewise in the *emotions expressive of suspense*; it is typified in the question. The perfect cadence is universally, and I may say intuitively, recognized as the only manner in which a composition can be satisfactorily closed. But what is the perfect cadence? It is a chord built on the dominant of a key followed by

one on its tonic. And what is the reason that it is the most satisfactory manner of closing a composition? This question is easily answered by a consideration of the data that have just been adduced. The satisfaction is most intense when we have tasted the suspense to its extreme limit; the answer is most complete when it follows the question directly, taking it in to its fullest extent.

Of course, there are different degrees of satisfaction. If the tonic alone is employed and merely doubled in the higher parts, the satisfaction is perfect; if the tonic occurs in the highest part, as well as the lowest, it is nearly perfect; if the mediant is heard in the highest part, a feeling of vagueness—often charming—is superadded; and if the dominant is sounded in the highest part, the vagueness is considerably augmented: the mixture of suspense with the ground feeling of satisfaction creates, in fact, a peculiar weird impression, easily and (as I believe) only explicable by considering the forces that I have asserted to be manifested in the tonic and the dominant.

Before closing this part of my argument, let me refer the reader to two powerful passages taken at random from the works of Beethoven, where he

will find a remarkable corroboration of my conception of the tonic, dominant, and attraction. The first consists in the closing measures of the "Largo Appassionato" of the Sonata Opus II., No. 2. It is impossible to describe the apathy expressed in that cadence. Yet, by analyzing it, according to the principles which I have set forth, we can explain its effect on natural grounds. The A in the bass is the dominant of the key—the manifestation of suspense—and the mind expects it to move on to the tonic toward which it gravitates. It does not do so, however; and, though the upper parts have already entered the domains of the tonic, the bass still clings to the dominant as though in complete abstraction. The upper parts attempt to console—to urge it to abandon the dominant. It does so, but only to return to it as though to a forlorn hope. Then the upper parts finally move on to the tonic and remain there, and so nothing is left for the bass but to follow. But it does so reluctantly, tardily, as if awakening from a reverie. The emotions of the hearer respond to all these movements, and hence are affected as they are. The second passage occurs near the close of the first movement of the Seventh Symphony. It is expressive of an intense

longing that can never be satisfied, of a passionate yearning for the unattainable, or to use a magnificent figure of a modern German poet,[1] it is like "the love of the sea for the moon." This is due to the conflict between the forces of attraction and of the tonic. A seventh is attracted to the degree below it. Here we find the seventh inverted in the bass and in consequence the chord cannot resolve itself on the tonic, but must do so on the chord of the sixth on the mediant. This chord is, however, unsatisfactory, and can never be the concluding one; and the vain attempts of the inverted seventh to resolve itself satisfactorily, repeated and repeated with obstinate fervor, though warned and entreated by the pleading tones of the upper part, constantly obtaining the same discontenting answer, which it is fated to receive, and which it knows that it must receive, is the picture of fervent hope doomed to eternal disappointment.

Let us now pass on to the consideration of the analogies between the *spiritual perceptions* of the beautiful in visible and in audible Nature.

[1] Emmanuel Glaser.

V.

STATES OF MIND.

THE beautiful in Nature, whether visible or audible, is perceived as a state of mind. The contemplation of a beautiful landscape impresses our mind directly, primarily, without the intervention of thought; a certain mood takes possession of us, we know not how, pervades us, masters us, and gives rise to sentiments and thoughts. By listening to a great composition, our mind undergoes the same process—first the mood, then the sentiment, then the definite thought. This order is characteristic of the perception of the beautiful in Nature. Things in Space will be apt to produce the state of mind in which calmness is the predominating feature—things in Time those in which agitation will be more perceptible. It is true that music can also affect us with calmness, but even then it will be what might be called *emotional calmness*, it will be more powerful, more intense. Yet the very capability of music to produce this cheerful and tender calmness is the reason why it can depict pastoral scenes, for by its means it produces a state of mind analo-

gous to the one produced by such scenes; but this depicting must solely depend on the spiritual analogies manifested in the states of mind; if it resorts to other means it will have a degrading effect. This remark applies with no less force to the description of passions and actions by music; such description, to be *true* and elevated, must look to the analogies in the spiritual perception, to the creation of similar moods, by purely *musical* means. *The mission of Music is to create, not to imitate.* I know that a modern school attempts to engraft this degrading process of imitation on music; but to do so its adherents are forced to resort to descriptive programmes, forced to confess that without this extraneous assistance their music is meaningless! Essentially they occupy the same position, as composers, that a painter would occupy who would be compelled to write below his work, "This is a man," or, "That is a cow!" This is no exaggeration, for the object of the painter is to give an accurate representation of something that can be seen; the object of the musician, to create frames of mind from which sentiments and thoughts are to spring; and the painter who is compelled to show by words what he intends to delineate, and the musician

who leaves to words the indirect production of states of mind, come under the same category.

At the same time a painting which fulfills all the requirements of art may yet be made to produce a more intense impression on the beholder by a description limiting the general idea conveyed, and this case finds its analogy in *vocal* music, not in instrumental. But, as the painting must be complete in itself, limited and intensified by the verbal description, but not dependent on it for its position in the art, so in *vocal* music the composition must be complete in itself—must be able by itself to create the desired state of mind, depending on the words for limiting and intensifying its impression. Witness the master songs of Schubert. The music in itself is complete and affects us most powerfully; and therefore, when the effect of the poetry is added, defining and thereby intensifying our sentiments and thoughts, the influence exercised on our emotions by the truly natural combination is simply indescribable.

And as far as this completeness of the composition within itself is concerned, I may add that it is as necessary in the dramatic style as in the lyric. In the classical operas the music, independently of

the words or the action, calls forth the desired state of mind; it is, as it should be, a thing of beauty in itself; and, when the words and action are heard and seen in connection with it, they perform their legitimate duty of defining and intensifying. And I shall be bold enough to say that those operas wherein the music is not beautiful in itself; not capable by itself of performing its legitimate duty of creating states of mind; wherein it is unintelligible to the human soul; wherein it is reduced to the mere so-called word-painting—that such operas are not works of art, but incongruous conglomerates. Incongruous also are those operas wherein the music is composed without the object of producing the state of mind called for by the subject, but merely for the purpose of allowing a vocalist to display his execution. Emphatically I repeat that only such operas are legitimate, and occupy a high position in music, wherein the composer creates by his music the state of mind analogous to that desired to be created by the poet. Let us hear Prof. Helmholtz's opinion on this matter:

"Music is most powerful when combined with language; for language expresses the causes that produce the state of mind, and particularizes the

sentiments which underlie it, while music produces in a direct manner the state of mind connected with the sentiments. When diverse hearers attempt to particularize the impression made upon them by a certain composition, and each one mentions some different situation or sentiment, the ignorant laugh, and call them enthusiasts. And yet each one may be right, for music does not express sentiments or situations, but the entire *frame of mind;* and this frame of mind the hearer cannot express except by describing certain objects which put him in a mood similar to the one excited by the music. But diverse sentiments, under different circumstances, or upon different individuals, may produce similar states of mind, while similar sentiments may in like manner produce different moods. Love is a sentiment. Directly as such music cannot express it. But it can express the dreamy longing for ethereal bliss resulting from the sentiment of love. Religious enthusiasm may, however, produce a state of mind in which a similar longing is the predominant feature. When, therefore, a composition creates such a state of mind, one hearer may translate it as expressing love; another, religious inspiration; without that they necessarily contradict each other."

CONCLUSION.

It must be evident to the reader that, as a necessary result of my speculations and argument, I consider music as being placed above the arts properly so called, as a peer of that higher art which *creates* those untold varieties of the beautiful that are perceived by our sense of vision. It stands in the same relation to Time that the latter stands to Space, it exercises the same functions in Time that the latter exercises in Space. Like those of the latter, its creations are absolute manifestations of the beautiful—are things—they exist for their own sake—*they are because they are;* in the purely human arts, on the contrary, we find but *imitations* of what already exist in Nature, or *descriptions* of things and actions.

And now, in conclusion, let me give a short *résumé* of my fundamental theory of music.

By the study of physical sciences we find that the universe is governed by laws; further investigations show that these laws are subservient to great principles.

One of these great principles, is the principle of Beauty.

Beauty is manifested in three great forms: the moral, the intellectual, and the physical.

These three classes of the beautiful present great analogies, are closely interlinked, and exercise a strong reciprocal influence upon each other.

The physically beautiful is manifested either in *things in Space* or in *things in Time.*

The beautiful in things in Space is opened to us chiefly by the organ of vision; the beautiful in things in Time chiefly by the organ of hearing.

In visible Nature beauty is a direct emanation of Nature itself, which has developed it from the original voidness without admitting of intervention. Here man can do naught but *imitate* the beautiful.

In the beautifying of audible Nature, however, nature has reserved but an inferior part for its own unaided self; it has supplied the laws under which the development was to take place, but left the development itself chiefly to the absolute control of man. In Time, therefore, man *creates* the beautiful.

But as in Time the science and art of music do for Nature that which in Space it does for itself, the vast importance of music in the cosmos, is self-evident.

The forms of the beautiful in Time and in Space

are, however, not separate and distinct things with no connection between them, as they appear to be; but on the contrary there are the strongest and most positive real analogies between them, arising from the very great fundamental analogies existing between Time and Space themselves.

(Time and Space, however, impart their fundamental characteristics to the forms of beauty existing in them. Therefore music, existing in Time, and Time being motion, it is the characteristic of music to be emotive.)

The fundamental analogies between Time and Space manifest themselves in the manner in which beauty is perceived and produced in either.

Beauty is perceived in both by the same means —vibrations—and by instruments that have strong analogies between them—the eye and the ear.

Beauty is produced in both by very similar means. The identity of tones and colors has long been discovered, and I hold that there is the same identity of forms and rhythms. The straight line is manifested in dual metre, the curved line in triple metre. False rhythm, whether we use the word in the wide or in the narrow sense, is equivalent to want of symmetry in things in Space.

The principles that are manifested in the forces governing the universe—gravity, centrifugal force, and attraction—are likewise manifested in the internal government of music.

And, lastly, the spiritual perception of the beautiful in both visible and audible Nature is identical; namely, as states of mind.

As a final result of my speculations, I hold that music is not accidental and human, but dynamical and cosmical.

THE END.

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