

Biddle, Horace Peters

Prose miscellany





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## A DISCOURSE ON ART.

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Art, in its most general sense, is the proper adaptation of the things in nature to the wants of mankind. The arts are founded on philosophy, and directed by science; and are divided into the Useful and the Fine. The useful arts are confined to the works of the hand without any special exercise of the understanding or culture of the taste, and have for their object the improvement of man's physical condition. Their bases are found solely in the wants of the body. They embrace agriculture, the mechanic arts, and the work of artisans; and can not be enumerated without mentioning almost every pursuit of man. They originated very early in the history of our race—for its very existence depended upon them—and gradually advanced throughout the various nations to the present time. Within this century, however, their progress has been exceedingly rapid. The faculty of mind which discovers and produces the useful arts is invention. This power seizes upon the things in the material world, and adapts them to man's advantage.

The fine arts may be defined to be the various adaptations of the beautiful in nature to the pleasures of man. They are divided into architecture, sculpture, painting, music, and poetry. They are under the direction of the mind and heart, rather than the hand,

and have for their object the elevation of our common nature. Each rests upon its particular science; except poetry, which is above all science. Their origin can not be traced; it is deeply hidden in the past. Architecture may have been copied from the mountain and the cavern and the natural pillar; the repose of the human figure in death would suggest sculpture; light and shade, and the tints of flowers, or the rainbow, would soon lead to painting. The origin of music has been attributed to various sources—the moving of waters, the whistling of the winds, the songs of birds, and even to the murmur of the reeds on the banks of the Nile, and to the ringing of the hammers of Tubal Cain. Poetry springs from the soul, transcends science, and soars above matter. It is purely ideal. Different nations, and even individuals, have claimed the invention of fine arts as their own, but their claims have not been allowed. They belong to humanity. As they are based on the love of the beautiful implanted in our nature, their origin must have been almost coeval with mankind; and doubtless many attempts were made to realize them in their different forms long before they took position as distinct arts. The love of the beautiful is innate in man. The child is attracted by beautiful things long before it attains any knowledge of the useful. So in the infancy of nations, the rudiments of the fine arts are found in their earliest history. The soul soon sees the images it loves, and the hand endeavors to embody them forth. The faculty of the mind which creates, understands and appreciates the fine arts, is the imagination. As invention is the founder of the useful arts, so imagination is the creator of the fine arts.

These powers of the mind resemble one another ; indeed, invention is but a part of imagination, the distinguishing difference between them being the fancy. Though fancy and imagination are often confounded together, yet they are different. The fancy is that faculty of the mind by which we see things as they exist only in their brightest and most beautiful light ; but it has no power to reconstruct them into new forms or combinations. The imagination is that power of the mind which constructs ; it takes whatever the fancy selects as bright and beautiful in nature, and forms them into images, pictures, poems. Fancy chooses the material, imagination builds the structure. Thus, invention and fancy form the imagination ; it is a double power, not a single faculty. Invention without fancy deals with the useful but with fancy it forms the imagination, and leads up to the beautiful. The fine arts, then, are based on the beautiful, and are created by the imagination.

What is beauty, or the beautiful ? The definition of beauty has engaged the attention of philosophers ever since the commencement of letters. The earliest speculations on record are by Plato ; and although it is difficult to digest a system on this subject from his dialogues, yet he laid down the true foundation—namely, that beauty exists in *mind* and not in *matter*. There have been many hypotheses suggested since his day, yet none have been able to overthrow this fundamental idea. Xenophon treats of the subject, but offers no system ; and the writings of Cicero abound with thoughts showing a just sense and a fine appreciation of the beautiful. Shaftsbury attributes the

perception of the beautiful to an internal sense: this is a similar view to Plato's. Addison has treated of the subject ingeniously in several numbers of the *Spectator*. Burke's singular and absurd theory that beauty consists merely in the relaxation of the muscular fiber, was demolished by a single line from Jeffrey, by simply directing its votaries to a warm bath. Next to Plato, the most ingenious speculations on this subject are by Diderot. He declared that beauty did not depend upon any inherent quality in the objects themselves but upon their power of exciting certain sentiments in the mind. Thus far he was correct, but he ultimately ruined his theory, by declaring that beauty depended merely upon *relation*. The theory of Sir Joshua Reynolds was that beauty consists of *mediocrity*, or conformity to that which is most usual. Surely this can not be true, for it would rob beauty of all its beauty—namely, its excellence and superiority. Mr. Alison attributes beauty to *association*, which very much resembles Diderot's theory of *relation*. The sense of beauty will doubtless be touched by pleasing associations, but if there is nothing intrinsic in beauty, why should some associations be pleasing and others not? If beauty consists *merely* in association, then we may say that deformity consists in the same thing, for association is alike capable of awakening the sense of either. Indeed, every faculty of the mind may be united to some other faculty, or dis-severed from it, by association. Dugald Stewart appears to take a more correct view of the powers of association as connected with beauty, by saying that it often *suggests* the beautiful; but he does not



venture to build a theory on so narrow a foundation as that asserted by Mr. Alison.

Because beauty is variable—one of its greatest attributes being variety—there have been those claiming to be philosophers who have denied its existence altogether. Because an emotion of the soul can not be defined simply, and fixed as permanent as a cube or sphere, its existence is therefore denied. As well may we deny the existence of the soul itself. Prominent among this negative school stands Voltaire. He says: "Ask a toad what is beautiful, and he will tell you, two round eyes, a big mouth, and a yellow throat. Ask a Hottentot; beauty to him is a black skin, thick lips, and a flat nose. Ask the devil; he will say, a pair of horns, four claws, and a tail. Inquire of the philosophers, and they will answer you with jargon." But his opinions upon this subject are scarcely worth serious attention. He was a great genius, but quite too fond of denying every thing that was beautiful or good.

Beauty, or the beautiful, can not be defined in terms; neither can the sensation of sight, hearing, or touch: yet who shall say we can not see, hear, or feel? Beauty is a sense of the soul, and whatever is capable of touching that sense is beautiful. The means of exciting this perception are almost as various as the things in nature, yet the *sense* itself is forever the same. Creation abounds with beautiful objects; the flower, the rill, the bird, the gem, the plain, the mountain, the sea, the cataract, and the crowning work of God—the sky—are continually awakening the sense of the beautiful in man. The Supreme Being has surrounded us with the means of happiness and pleas-

ure ; His goodness is ever to be adored. His creation is an eternal monument of beauty. Man selects from this vast domain the things which are most beautiful to him, and combines them into art, and by that means opens new avenues to the soul. The fine arts are the legitimate mode by which our aspirations for the beautiful find embodiment. Nor are we left to material means alone to reach the sense of the beautiful ; many of the spiritual qualities have the same effect. There is a beauty in courage, fortitude, heroism. Architecture, sculpture, and painting appeal to the external senses ; music and poetry to the spiritual nature of man ; but all reach the soul : and amidst all this variety of means, throughout the natural creation, the embodiment of the arts, and our spiritual nature, by which the sense of the beautiful is touched, the sense remains the same. The far-off mountain, the flight of a bird, a thrill of harmony, the distant sea, a little child, a brilliant gem, a lovely flower, the rising sun, the vast dome of the sky—these to the external senses have no resemblance, yet how often they touch the same chord in the breast ! A happy moment, a fine thought, a sweet memory, a fond hope, a thrill of love—how different, yet how much they resemble ; for they all appeal to the sense of the beautiful—some through our external senses, and others through our spiritual nature ; yet all reach the same place, and touch the same feeling in the soul.

It is objected to this theory, which attributes the appreciation of the beautiful to a faculty of the soul, that it gives to man a sixth sense. That we do so see the beautiful is a fact established by experience, and if it can not be accounted for but by imagining a sixth

sense, it would ill become philosophy to deny the fact. But this is not the true answer to the objection. If it requires a sixth sense to see the beautiful, it would require still many more senses to account for all the phenomena of the human mind. The body has its senses, so has the soul; and it no more requires an additional sense of the body to see beauty, than it would to see deformity, or to discover the difference between good and evil. Another objection made to this view is, that this internal sense, as it is called, is variable, and therefore can not be true. The sense itself is not variable; the variety exists, as has been remarked, in the means by which it may be excited. It is true that all objects of beauty do not affect all persons alike; neither do objects of any other kind: but this is rather in particulars than in the general. While many persons would disagree about the beauty of a particular natural object—as a flower, a mountain, a landscape, a cloud, or some peculiar view of the sky—yet all persons agree at once as to the beauty of the works of nature. So of any particular work of art, as an edifice, statue, picture, piece of music, or poem; persons may differ as to their individual excellence, but all may agree upon some other work, and that architecture, sculpture, painting, music, and poetry are beautiful arts. A mere difference of opinion about the objects of beauty can not render the existence of beauty itself, nor the sense by which we perceive it, uncertain. The sense of the beautiful is no more variable than any other principle in human nature, and while individuals are produced in endless variety, human nature remains the same; so, while works of art, in all its divisions, vary continually, the love of art,

and the sense of the beautiful, are constant and universal.

Having shown the basis of the fine arts to be the beautiful, which is perceived by the sense of the soul so deeply implanted in our nature, we will proceed to briefly notice them separately; and first of architecture, which may be defined the beautiful in the forms of inorganic matter. Although men built houses, doubtless, of some sort, at a very early date, to shelter themselves from the inclemency of the weather, yet it is not likely that architecture had any existence as an art until a much later period, and it is highly probable that the first efforts of the kind grew out of the devotional feelings of mankind. The tower of Babel must be attributed to this source, however misdirected the feeling might have been. The pyramids of Egypt, the same; and throughout India, Greece, Italy, Gaul, Britain, and the Americas, the ruins of structures connected with the worship of Deity and heroism, of a very early date, still remain. From these to the more modern churches and temples, as man became more enlightened, the transition is very plain and easy. Our monuments at Bunker Hill, Baltimore, Washington, and other places are abiding witnesses of our devotion to courage and patriotism. Throughout the Assyrian and Persian empires there are no remains worthy of the name of architecture; and the Jews, not being an abiding people, left but few monuments of this noble art. The destruction of Jerusalem was so complete, that its style of architecture is left wholly to conjecture. It has been contended, however, that architecture took its rise from Solomon's temple and that in that may be found the

regular orders which were afterwards attributed to Greece. The bright mind and the quick heart of the Greek brought architecture to a high degree of perfection; yet, strange to say, the Greeks were ignorant of the arch—that important tie which afterwards gave strength and grandeur to Roman structures. Doubtless the Greeks were acquainted with the form of the arch, for the bow in the clouds, or the segment of a circle suggests it; but its use was unknown to them, or at least was never applied. It does not appear that the Egyptians ever brought architecture to a high degree of excellence. Their structures were massive but ungraceful. They looked upon mere weight as strength—which is a great error in any structure—and upon mere magnitude as grandeur. Their pyramids and temples are monuments of misdirected power. Unlike that of the Egyptians, grace, simplicity, and harmony formed the pervading spirit of Grecian architecture. The Romans, though they erected many noble edifices, were but the copyists of the Greeks. They added to the original, however, an effeminacy of detail, such as carving and figuring every architrave, molding, and cap, which, by the strict rules of good taste, can not be regarded as improvements. In some of their structures for practical uses, as their arches and aqueducts, they excelled the Greeks. Modern Italian architecture has still further departed from the purity and grace of the Greek, and has outstripped even Rome in fantastic ornament; but modern nations can not be said to have any national architecture. It is but a mixture of the Greek and Roman; indeed there can be no such thing as modern architecture, for the field has been occupied, and the subject exhausted.



All that is good in modern architecture is strictly referable to the Greek and Roman.

The styles of architecture are generally divided into five orders—the Doric, Tuscan, Ionic, Corinthian, and Composite; but these orders blend, and are not essential to the nature of the art, any more than the division into epic, dramatic, lyric, pastoral, and elegiac, are essential to poetry. There are strictly but three orders, however. The Tuscan can scarcely be distinguished from the Doric. The Composite is a mixture of the Corinthian and Ionian, to the confusion and injury of both. The Doric, Corinthian, and Ionic were all known and used in Greece, and must ever be regarded as the highest and truest expression of architectural art. Nothing has since been added to their excellence; and indeed it would be almost as difficult to conceive a new order in architecture as it would be to invent a new form for the circle or the square. Yet we have the modern Gothic order, which was supposed to have originated with the Goths; but this notion can not be maintained. The Goths destroyed; they did not build. The Gothic order of architecture was introduced, or invented, in England, about the middle of the twelfth century. It is not admitted into the classic orders; yet as it is so well known in modern styles, it should be added to the number. Indeed, it has become quite a favorite order. There is a fanciful story that it was suggested by the crossing branches of trees in a thick forest, as the Corinthian order was supposed to have been by sitting a basket in a bed of flowers; but there is nothing of the kind authentic.

The elements of beauty which enter into architec-



ture are simplicity and harmony; simplicity in the general structure, and harmony in all its parts. Grandeur is the great effect to be attained, and without simplicity it can not be done.

Architecture in this—that it has no prototype in nature—differs from sculpture and painting. It deals wholly with inorganic shapes, and has a scope of invention greater than that of sculpture and painting, which are bound by prototypes; but less than that of poetry and music, which are bound by nothing material. Poetry can build castles in the air, which architecture can not do, and music is purely ideal.

Sculpture, which is the representation of the beautiful in organic forms, next presents itself for our consideration. It is the most circumscribed of all the arts, being confined to the *form of organic* objects, but within its scope it is the most excellent. It can not deal with passion, and being denied color, it is limited in expression. Repose is its chief beauty. It is also limited in its grouping, as well as in its subjects. A sculptured landscape, as a work of art, is an impossible thing. This is for the painter. But sculpture has the important advantage over painting of being able to represent all sides of its object in the same work, while painting is confined to one. The antiquity of this art is as remote as that of architecture, and, like that, it lies imbedded in our devotional feelings. Indeed, the love of the beautiful and the adoration of the Supreme Being are feelings which lie close together in the human breast. Though sculpture, in its wider sense, has been associated with idolatry, it can not be said that it is much indebted to that misdirected feeling for its advance-

ment. The religion of Persia prohibited the representation of the human form, and in Egypt this art was very much shackled by a similar superstition. The same feeling prevails among the North American Indians. But in all rude nations, and in the earliest history of nations more polite, we find a strong disposition to carve out birds, beasts, monsters, and the figures of the gods they worship; yet almost uniformly coupled with a dread of representing the human face and figure. Notwithstanding these discouragements, however, the Egyptians attained some excellence in sculpture. They also labored under some other disadvantages. It appears that their personal figures and countenances were not the best models for sculpture; besides, by their laws, invention of every kind was prohibited. Such figures as they did produce were stiff and unnatural. All their works tended more to magnitude than excellence; they were more learned than artistic. The Phœnicians were more beautiful in person, and possessed a higher taste, but still they were apt to cover their statues with meretricious ornament. This partly grew out of their commercial character, by which they obtained gold and gems from other regions. The Etrurians cultivated this art to a high degree of excellence—so much so, indeed, that some of their works have been taken for Greek productions. They excel in the statues of their gods. But it was reserved for the Greeks to bring this art to perfection, as it was that of architecture. The climate of Greece was calculated to develop every thing that is noble in human nature. The sense of the beautiful was livelier in the Greeks than in any other people that ever lived. They had their ideal standard of

beauty, gathered from all that is beautiful in the human form in its best development. The age of Pericles, Phidias, Socrates, Plato, and Xenophon was an epoch of genius. Phidias ornamented the temple of Jupiter. Praxiteles lived later, and was not less excellent. He combined softness and force, voluptuousness and modesty, purity and passion, so sweetly that the most insensible were touched, and the most sensitive not alarmed. The form of the celebrated Venus was stolen from Praxiteles. The Elgin marbles—these were by Phidias, however,—taken from the temple of Minerva, now in the British Museum, are a group of figures representing every form and position of the human figure. They will form studies for all future time.

The Romans were too much engaged in war, and were too ambitious, to admire the repose of art. They did nothing in sculpture worthy of their fame. Finding the Greek works so beautiful, they contented themselves with collecting and copying them. Sculpture degenerated in their hands, as did also architecture. They, however, produced some good statues of their great men, but did not excel in ideal art. Modern Italy, however, revived sculpture, and it has now attained there a higher excellence than in any other nation. England, France, Germany, Spain, and America possess artists of great eminence, but no modern nation can be said to possess any sculpture of its own. Whatever the nation or the subject, if the sculpture be good, it will be Grecian. Powers' Greek Slave is as completely Grecian as though it had been the work of Phidias or Praxiteles; and although America has very little good sculpture, this specimen must be regarded as one of the very finest in art, an-

cient or modern. It is indeed a study. There she stands, the picture of innocence; her modesty outraged, the victim of wrong, clothed in her own purity, grieving in stone! Yet in that sweet but sad expression, we see a touching appeal to Justice and a firm reliance on Eternal right.

Painting, which represents the beautiful with color, will claim our attention next. No nation has ever been found that had not the rudiments of this art in its earliest period. Indeed, form, light, shade, and color exist every where, and to copy these is to paint. It is not surprising, therefore, that painting in some rude way, if it consisted in nothing more than marking out objects by lines, following the shadows they cast upon the plain, would exist very early in the history of man. There is a romantic story told of a young girl who traced the shadows of her lover's face upon the wall as he sat in silence contemplating their separation; and this, it has been said, was the origin of painting. The walls of Babylon were found covered with representations of natural objects, animals, hunting scenes, and combats. Painting existed in Egypt eighteen or nineteen hundred years before the Christian era, and, indeed, it had then attained nearly the highest point of Egyptian skill; but it afterward fell under the control of the priests, and degenerated, so that, in the time of the Ptolemies, the wisest period in Egypt, it was confined principally to hieroglyphics, and representations of their monstrous and absurd gods. The arts have ever followed the same track—from the East to Egypt, and into Greece; thence to Rome, and ultimately into Europe generally; thence to America. They have ever been found in the wake of science and civilization. Light first broke from

the East, flowed into Egypt, through Greece and Rome, and down to the present period. There were no families of nations then, giving light to one another, as we find them in modern times. One succeeded the other, and appeared to rise upon its ruins.

The Greeks were worshipers of the beautiful; it was a part of their religion. The artist imagined that in proportion as he succeeded in representing beauty, he received the blessings of the gods. Beauty bore off the prizes at their games. Beautiful children were blessed, and the Lacedamonian ladies ornamented their bedrooms with a view of obtaining the prize. Art could but prosper in such a climate as Greece, and with such a people so devoted to beauty. Their artists were philosophers, and their philosophers were artists. Socrates declared the artists to be the only wise men. Their pursuits, amusements, wisdom, and even wars, were devoted to the beautiful.

Painting run the same course in Rome as did sculpture. It was transplanted from Greece and degenerated at once. In the most learned and polite age of Rome, Augustus tried to retrieve the arts, but in vain. The spirit had gone from the earth for a time. The Romans had not only degraded arts, but they degraded artists, holding them as slaves. The walls of Herculaneum and Pompeii displayed scenes which put even Babylon to the blush. But if this art died in ancient Rome, it was reserved for modern Italy to revive it in all its splendor. Italy in painting has surpassed all nations, ancient and modern. All modern nations, indeed, have surpassed the ancients in this art, for it must be remembered that painting in oil—the only mode by which the highest excellence can be attained—was not known till after Greece and Rome



had passed away. I am aware that the use of oil in painting was not unknown to the Romans, Greeks, and even Egyptians, but oil painting was not practiced in art before the fifteenth century. The Florentine school, which was founded by Leonardo da Vinci, and followed by Michael Angelo, is one of the most celebrated. The characteristics of this school are grandeur, dignity, and spirit. The Venetian school is celebrated for its fascination in coloring. The Venetian artist will seize upon the most beautiful and brilliant scene in nature, and make it still more beautiful and brilliant with his pencil. Titian is the grand master of this department.

The modern Roman school has attained great excellence, particularly in accuracy of drawing, and general correctness; so much so, indeed, that critics have sometimes thought that it weakened the vigor and tamed the beauty of their efforts. Majesty and bold effect appear to be the object of this school, treating mere coloring as a secondary consideration. The Bolognese school was founded on the principles of eclecticism. This idea is generally captivating in all the arts and sciences—especially to the uninitiated—but it treads closely upon the empirical, and its unsettled practice is too apt to destroy all principle. Corregio and Guido may be mentioned as eminent in this department. The Dutch and Flemish schools are celebrated for representing nature in her common garb, and for not choosing the highest subjects of art, but often, indeed, portraying the lowest scenes. In this department, however, they have excelled, and produced some of the most life-like and surprising effects. But the English Hogarth has excelled even the masters of these schools in the striking force and intense



effect of his pictures. But Hogarth was not well received by contemporaneous artists. They thought him ill-bred and scantily educated, which was doubtless true, yet in his own department he has never been equaled. It is true that he never chose the highest subjects of art, but his mode of treatment made ample amends for this deficiency, and art could almost better spare her greatest master than her Hogarth. He also engraved his own pictures. His "Distressed Poet" and "Enraged Musician" are perfectly inimitable; and his "Rake's Progress" and "Marriage a la Mode" contain in themselves the history of human nature. A number of his most characteristic pictures, however, have ceased to be produced, on account of the more fastidious taste of later times.\* But England, France, and America can not be said to have schools of painting of their own, although they have produced eminent masters in all the departments; indeed, this may be the reason why they have not established any exclusive school, and perhaps it is as well, for any peculiar school can have no other effect than to narrow the field of art. Germany has founded a late school, having a great tenacity for the elementary principles of the art—characteristic of the German mind; but it is thought by some that this leads to too much stiffness,

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\*The celebrated Kit-Cat Club may be mentioned here. This club was composed not wholly of artists, but eminent men in various departments of learning, having for its ostensible object the encouragement of art and literature, but really for the secret purpose of opposing the arbitrary measures of James II. Sir Godfrey Kneller was one of its founders and leaders, and painted the portraits of all the members on canvas of particular dimensions, ever since known as the Kit-Cat size.

and excludes that easy flowing grace which is the very sweetness of a picture. In England, Sir Joshua Reynolds, notwithstanding his exploded theory that beauty consisted in mediocrity, attained great eminence as a painter. Although he painted many historical pieces, yet he particularly excelled in portraits. Sir Thomas Lawrence was also eminent in the same department, and perhaps scarcely inferior to Reynolds. But I can not stop to name even half of the eminent English artists. America has had her West, though appropriated by England—he was not unlike Reynolds—her Coply, Peale, Stuart, Trumbull, Dunlap, Melborne, Alston, Cole, second to none in their several departments; and now has many eminent living artists whom I may not name. But I have said that America, as France and England, has no peculiar school of painting. Rome is the Parnassus to which all modern artists make their pilgrimage; the Helicon, with its ever flowing Hippocrene, from which they derive their inspiration.

Music, which represents the beautiful in sound,—the next subject for our consideration as an art,—is extremely ancient, but the science upon which it rests is of modern date. The origin of this art, as we have seen, is attributed to many ingenious, but most likely fabulous sources. Throughout Jewish history, both sacred and profane, we find frequent mention of music, both vocal and instrumental. Music in a rude state must have been coeval with man. The first utterances of joy were doubtless musical. They were not arranged in a set piece, certainly, but they were in accordance with some of the intervals of the musical scale. Indeed, any one who is curious upon the sub-

ject will be able to detect musical intervals in the glad shouts of noisy boys in the street. Music is woven in man's nature, as are the elements of all the arts, and is discoverable in his earliest history. Plato tells us that music was taught to the youth of Egypt. He is corroborated by Strabo. The art of the musician was hereditary, and the songs were regulated by law. Amongst the musical instruments mentioned in Egyptian history are the lyre, the flute, and the drum. The Ptolemies encouraged music, and some of them were performers. The father of Cleopatra took the name of *Auletes*, which means a player on the flute. This art continued to be practiced throughout the period of Egypt, but, for want of some mode of writing it, no example has been preserved to modern times.

In treating of Grecian music, we must be careful not to misunderstand the meaning of the term as used by the Greeks. They included not only music proper, but poetry, eloquence, and even grammar—in fact, all the polite accomplishments—under the name of music. The word comes from the Muses, and embraces, in its Greek meaning, every thing that was taught by the patronage of the Muses. As much as the Greeks talked of music, it can not be said that they had any, in the sense in which we understand the term in modern art. This arose, doubtless, from the fact that they had not discovered the science on which it rests, and without which the art can never rise to any eminence. They had a variety of instruments but none of them were constructed on scientific principles; they were mere experiments, made without a guide. The Grecian harp was an improvement on the Jewish, but it had only seven strings, and its scale is not known at

this day. They had no mode of writing music, and we are therefore not able to form any idea of its style. Homer mentions several musical instruments in the *Iliad*, and the paintings of that period give us their forms, but, unfortunately, we can not discover upon what scale they were constructed. Plato describes a young musician turning the pegs of his instrument, which would indicate that they raised or lowered the tone by tightening or loosening the string, the mode practiced at the present day on all stringed instruments. Pericles patronized music, as it was thought to be a necessary part of education. Not to understand it, indeed, at that period, and not to play on some instrument, would have been regarded as a great lack in accomplishments. With the downfall of Greece, music also fell. Its echo found its way to Rome, but the Romans never brought the art to as high a cultivation as the Greeks. In the polite age of Augustus, even, music was not encouraged. Tiberius banished the musicians from the city; Caligula recalled them, and Nero fiddled while Rome burned. Music and the other arts fell with Rome; and, notwithstanding the high civilization which had preceded, mankind sank to degradation and slavery. The arts were lost, liberty was lost, all that ennobles man was lost; superstition, with her vicegerents, held her reign. During five hundred years the human race were denied the liberty of mind, of conscience, and of limb. With the revival of learning, hope broke again upon the world, and from that hour mankind have been gradually asserting and gaining their rights before God. With the revival of learning, Italy revived the arts, and to her we are indebted for the

highest culture in music. It is a singular fact that the tones of an instrument are better in Italy than they are from the same instrument, or from the human voice, in any other region. This is doubtless owing to the greater purity and weight of the atmospheric column in that country. The atmosphere is the medium of sound, and the higher the column and greater its weight, the more perfect will be the musical tone. To Guido, in the eleventh century, is generally attributed the invention of musical notes, and the stave upon which they are written, similar to those used at the present time. This was a great step in the advancement of music. It is now written in a universal language, understood alike by all nations. The world is thus indebted to Italy for its music. Germany, however, caught up the strain, and bids fair to equal her instructor, if, indeed, she has not already done so. In no country is music so generally cultivated as in Germany. It is taught to every pupil, even in her gratuitous schools. Her composers stand in the highest rank, and in Beethoven she has produced the greatest musical genius that ever lived. In France, music is highly appreciated, and has its professors of great eminence; but I am not aware that she has ever produced a composer of the first class. She copies from Italy, as the whole world has done. England is even behind France in original and native composers. Though music has been cultivated at every period of her history, she has not attained any remarkable excellence in the art. Henry VIII. was said to have been a composer, and the reign of Elizabeth was celebrated for the cultivation of music. It became almost extinct in the time of Cromwell.



After the restoration, however, it was again revived; but England, like France, has generally brought her music and professors from Italy and Germany. Although music, as an art, has not flourished so highly in England, yet, as a science, the musical scale has there received profound investigation; and England has furnished the best history of the art written by Chappell. America, as yet, has no music of her own. She has not produced a single composer of high rank, nor an artist of the first excellence. This is not surprising, however, considering her national youth, especially if we cast our eye to England and France. But, within the last forty years, music in this country has made rapid advances. Instrumental music throughout the world, within that time, has received wonderful aid by the invention and improvement of musical instruments. Seventy years ago there was not a perfect musical instrument in the world, except the violin and its kindred family; nor was there then a single master of this instrument. Paganini was the first, and, in some respects, the greatest. In purity of taste and thoroughly artistic performance, none have excelled Ole Bull. The theory by which these celebrated artists produced surprising effects was before known to scientific musicians, but its accomplishment in practice had been thought to be beyond reach; and, indeed, the theoretic musician still sees in the violin a perfection which has not yet been attained. It has taken three centuries to bring this wonderful instrument to its present practical excellence, and, as perfect as it is, after three centuries more shall have elapsed, there will still be room for further practical improvement—so wonderful is the capacity of this instrument! The



Saxons, Danes, Welsh, and Norwegians were very fond of music, and held the harp in high estimation. In Wales, a gentleman's harp was not liable to be seized for debt, because the want of it would degrade him from his rank. This beautiful instrument is the oldest on record, and figuratively stands for music itself.

The Chinese have a system of music peculiar to themselves. Their scale is supposed to resemble that of the early Greeks, or the more modern Scottish scale, but what the Greek scale was is left to conjecture. It is said that the intervals in the Chinese scale are arbitrary; so Dr. Burney thinks, and, as far as I know, it is so laid down by modern writers; but this is a mistake. The interval of the first, second, fourth, fifth, and sixth, in the Chinese scale, counting from the key-note, ascending, correspond with the same intervals in the true diatonic scale. It has a third, however, arbitrarily placed about half-way between the second and the fourth, and a seventh placed in a similar manner between the sixth and eighth. This third corresponds neither with the major nor minor third, nor does the seventh correspond with the flat or sharp seventh in the true scale. The North American Indians have a scale similar to that of the Chinese. Any one who understands the subject, and will listen to their rough groaning chants, or will examine their rude flutes will be convinced of the fact. But it is incorrect to talk of an arbitrary scale that will produce music. The musical scale is as fixed as the laws that govern the planets; and it were as absurd in science to talk of an arbitrary scale in music as of an arbitrary law in gravitation, or an arbitrary

law in mathematics. The Chinese, however, are poor musicians. They have no knowledge of harmony, and neither their music nor their instruments are worthy the least attention in art or science. It is a curious problem—music being so natural to man—that a nation as old as the Chinese has made no further advancement in this pleasing art. It must be accounted for by the fact that they have no knowledge of the science on which it is based.

But music, in its highest aims, is the most exclusive of all the arts. There are fewer master composers than masters in any other art. Indeed there never was but one Beethoven. And no artist ever has, or ever can, reach the full capacity of the art. It would be to exhaust infinity. It may sound strange to say that music exists in *mind*, and not in *sound*; but there is nothing in science or art more true. Many can enjoy music to the eye as well as to the ear, as we may read mentally without uttering a word. Beethoven, after he became deaf, composed and played admirably; and he would sometimes fairly go into ecstasies over the score without an instrument near him. And the science upon which music rests is more occult, and understood by a fewer number, than any other branch of learning. Many may tell you glibly that the steps in the musical scale obey certain laws, and are placed at certain intervals, and that the tones in the concords stand in the relation of 1 to 2, 2 to 3, 3 to 4, 4 to 5, and 5 to 6, and show their ratios of vibration; but this is not as much as the alphabet of the learning connected with the subject. It embraces mathematics in all its branches—numbers, quantities, relations; all the regular geometrical figures, and all aliquot ratios; indeed the law which governs the musical scale

pervades the universe as far as the finite mind can reach and grasp the knowledge. Yet, up to a certain degree, everybody understands and appreciates music; but this is only the sensuous effect of the sound, not the mental perception of the subject; and between such and those who have entered the *arcanum* there is no communication. It requires profound and patient study to understand the science of music, and patient, long, and loving practice to attain excellence in the art; yet these hard terms do not deny our common nature its enjoyment in simple melodies and harmonious sounds. They do not rob the milkmaid of her voice, the peasant of his pipes, nor the minstrel of his harp. We can enjoy the sky without being astronomers, love flowers and not understand botany, and praise God, though we are not sages.

Poetry will now claim our attention. It is the representation of the beautiful in thought. The elements of poetry are abroad throughout the universe, and are continually moving the soul. Every thing grand and terrible, every thing soft and pleasing, every thing true and pure, every thing sweet and delicate, every thing bright and beautiful, contains the spirit of poetry. Man, surrounded with the objects of creation, must have early felt the poetic influence. It is a favorite theory with critics, indeed, that poetry preceded prose; but if they mean to say that poems preceded prose compositions, it seems to me they must be mistaken. A poem presents to the mind a finished image, and it can not be that the first efforts of the human faculties resulted in such a production. Language, doubtless first broke forth in bold meta-

phor and striking similes, highly poetical, but any production worthy the name of a poem must have been of a later age. It may be that excessive refinement tames the spirit of poetry, but it needs something better than the untutored yearnings of the struggling soul to give it shape.

The poetry of the Hebrews is the oldest on record. Its characteristics are boldness and grandeur; its spirit is highly lyrical, though it has not the form of the classic ode. In fervent feeling and majestic thought, no poetry has equaled it. To the modern mind it seems abrupt and unconnected, and clothed in a profusion of imagery; but it must be admitted that if it has not the rounded form and polished finish of the classic models, it has more fervency and force. To the Hebrew, leading his pastoral life, the creation was new, and his images would naturally be bold. His poetry, therefore, would be like the gem fresh from the mine, which might be improved by art, but would necessarily lose in the process some of its weight and substance. The Hebrew mind was necessarily formed under the peculiar dispensation to which that favored people were subject, while the Greek mind was molded by mythology, which deified material beauty, and the effect of these causes are plainly seen in their poetry. Hebrew poetry is spiritual and subjective; Greek poetry is artistic and objective. The former is based on the internal emotions of the soul; the latter appeals to the soul through the external senses; and in this difference the Hebrew must have the preference even over the Greek. Homer is always given as the earliest exponent of Greek poetry, yet bards lived and sang before the days of Homer. His great poem, the

Iliad, has been so much noticed that I will pass it by with this single remark, that, like all epics, it is rather studied by the few than read by the many. Greek lyrical poetry possessed great fire and spirit, and attained a high excellence; but it must be admitted that it smacked too much of Venus and the vine. The fire of Sappho's love would never be acknowledged by a modern lady, nor would the bacchanalian spirit of Anacreon be excused in a modern gentleman. Pindar reached a purer excellence, but he was too artificial; and his devotion to splendor and power will forever deny him mastery over the universal heart.

The tragic drama was brought to perfection by Æschylus, soon after which Alexander conquered Greece, and poetry passed away. Pastoral poetry afterwards, however, attained to excellence under the hands of Theocritus, but the spirit of Greece had departed never to return. During the first five centuries of Rome she had no poetry. Indeed, Rome copied her poetry from Greece, as she did her architecture and sculpture. Virgil is the Homer of Rome, and Catullus the Anacreon. There never was but one Sappho. The torch of poetry was stricken down by the fall of the Roman empire, and smoldered in the ruins of the dark ages for many centuries. Its returning light was first seen in Dante. Then came Petrarch. The former represented the grand; the latter the amatory. Ariosto blended the two. Tasso copied Homer and Virgil. He was also as devoted a lover as Petrarch, but fixed his affections on a more legitimate object. Spanish poetry is a mixture of the Latin and the eastern. The romantic chronicle of the Cid is the great Spanish epic. In Spain, ballad poetry is rich and romantic.



Villegas was the Anacreon and Catullus of Spain, and the last poet of true spirit she has produced. French poetry began in chivalric romance. Besides her dramas, which are of the highest order, France has no poetry of the first excellence. She has nothing worthy to be called an epic, the *Henriade* having been denied that high position. Her lyric poetry is artificial and empty. Beranger, however, has brought that branch of the art to great excellence. His muse possesses fire and also finish—a rare combination; but I fear that it is too much colored by the times in which he wrote, and partakes too much of the political spirit, to ever become classical. The present French poets have shown fine genius. The early poetry of Germany was heroic. Then came the minne-singers, which were bands of minstrels similar to the troubadours. They sang of love. Then came the meistersingers, who sang less of love and more of morals. After the time of these wandering bards, there was a period of more than two hundred years, during which Germany produced not a single poet. Indeed, it was reserved for Klopstock, in the last century, to reawaken her Muse. He was a true German, and taught his countryman the powers of their own genius. Wieland possessed fine powers, but he was as much a Frenchman as he was a German. Göthe and Schiller were the greatest poets Germany ever produced. The latter was her great dramatist. He also attained high eminence in the lyric and ballad. Göthe was not only Germany's greatest poet, but the most eminent character in modern literature. His early productions are full of soul, but yet a little mixed with the blood. His riper age, however, atoned for the errors of his

youth. The "Truth and Poetry" of his life shows the development of a beautiful mind and a great soul. His Faust is the grandest of human productions. It is not a drama to be acted—for it would require the universe as a stage, God, Satan, and angels as actors—but an epic to be read and studied. It grapples with the profound mysteries of Creation, Divinity, Humanity, and embraces the All.

England had her early poetry, even before the Norman conquest, and although Gower first appeared above the horizon, yet Chaucer is considered her morning star. He flourished under Edward III. His Canterbury Tales, though doubtless suggested by the Decameron, display great originality and astonishing power. He possessed great invention, but his fancy—according to the definition of the term given in the beginning of our discourse—was not of the highest order. Spenser, who was the next great English poet in the order of time, possessed more fancy, still adhering to our definition, than any poet that ever lived. His imagination—that is, the constructive power—was not so good, for his fancy ran riot with the judgment. He produced more flowers than fruit. Dryden did much to establish the English language, but he can not stand in the highest poetical class; in him the critic was stronger than the poet. Pope was the most philosophical of poets, and yet the most artificial in his style. Butler and Swift may be mentioned together, as wits, not as poets; though Swift was far the greater man. Gray and Collins have furnished us the most finished models of English verse. But when shall we stop? I have not mentioned Shakespeare nor Milton. Why? I would not stop to talk of the sun's brightness, nor the beauty of the stars; these are seen by all.

But what shall I say of poor, rich, wise, foolish, good, bad, erring, Burns? Nothing, but that he was the rarest genius ever born—not the greatest. “O, rare Rob Burns,” were a more appropriate epitaph than “O, rare Ben Jonson.” Byron’s poetry was bred in the passions; there is too much blood in it; it is too full of “wine, women, and war,” instead of soul, love, and patriotism. Wordsworth is a very antipode of Byron; his poetry is as deep, placid, and passionless as his own lake, Winandermere. Alexander Smith and Gerald Massie were the meteors of the moment—spoiled by the favor of the critics. Whether the present laureate—Tennyson—is a comet or a fixed star, or, if a star, of what magnitude, is yet to be determined. Morris, with his *Earthly Paradise*, is little more than nebula. Swinburn is a great orb, still aberrant in the poetical sky, but which, if it finds, its true orbit, will become a great light. But we can not mention all the poets of England which deserve attention.

America has shown much poetic genius, and produced much good poetry with a great deal of bad. Neither Greece, Rome, England, France, or Spain, nor any other race, or people, or nation, on earth, at her national age, had a single poet. But Columbia leaped from the mother country, like Minerva from the brain of Jupiter, at once into the full panoply of power. We have but one fixed star in poetry—Bryant—who, though not of the greatest magnitude, nor of the very brightest ray, has risen high above the horizon. Willis wrote much, but never got above mere prettiness. Morris wrote some songs, fashionable in their day. Saxe is no poet at all, but a wit of the first water. Halleck has written most excellent

things. Whittier writes for the million; he is a good poet, but not a great one. Longfellow is a poet of the highest culture, but not of the greatest genius. The translation of Göthe's Faust, by Bayard Taylor, is the best in the English language; in his own poetry he gives us the true American relish. We have many poets worthy of notice, but we are discoursing of poetry rather than of poets, and must pass on. So little attention will the scope of my discourse allow me to pay to the different branches of my subject, that I feel like one who has been hastening through a beautiful garden so rapidly as not to be able even to look at the separate flowers.

We may now notice a few of the general principles which lie at the foundation of all art. Form and relation govern architecture—form of the whole and the relation of the parts. As we have remarked, there is no prototype in nature for architecture. The art consists in building from inorganic matter, structures beautiful in form, majestic in size, and grand in effect. Form and proportion are the objects to be obtained in sculpture; but this art is confined to organic prototypes in nature. No form is fit for sculpture unless it has once lived. Painting must represent form in superficies, and *apparent* form in solids. This is done by light and shade, or, in other words, by the *quantity* of light reflected from the different parts of the object, as the light and shade would appear in nature. Color is a great beautifier, but it is not indispensable to represent form. Light and shade are simply the various degrees of light which occur between black and white. Neither black nor white, philosophically speaking, is a color. White is the entire light, and black the entire absence of light.

If every thing in nature, above, below, and around us, were black, we could see nothing. We do not see black at all; it is defined negatively by what surrounds it. Light or shade therefore represents merely the *quantity* of light, while color represents its *quality*. It seems strange that form should be an essential in music—a thing which seems to have no more definitude than flowing water—yet nothing is more true. An unfinished piece of music is as defective as a broken statue. An artistic piece of music must have its beginning and ending, its parts and members, without which it would afford no more pleasure than a picture or a statue with the absence of some essential limb or feature. It is true that mere musical tone, without regard to any arrangement into a regular piece of music, is pleasing. So are random colors, flashing here and there; or curves, scrolls, and various figures; or separate thoughts, similes, or sentiments; but in neither instance do they represent works of art—they are merely the elements of art, out of which works of art are wrought. They touch emotions, but do not represent thought. Every tone in a piece of music must bear a certain relation to its key-note. To give the analysis of the musical scale would lead us too far from our subject. Suffice it to say that it has what is called its tonic, or key-note, to which every other note and chord must have a certain relation, which can not be departed from without introducing discord and confusion, and the musician's ear will trace this key-note throughout the most intricate and rapid piece of music, though it may have a score of different parts, and be performed by a hundred different instruments. This key-note may be changed to any other note in the scale by changing



this relation, which is done on instruments by means of flats and sharps, and in the human voice by its own natural adaptation. And every piece of music must conclude and repose on the key-note. If it did not, it would leave the ear in waiting for something more, and the soul in suspense and unsatisfied, which would be as unnatural to the sense of the beautiful as to represent a picture to the eye in a distorted shape, or a statue in a leaning or uneasy position.

Although poetry is unshackled by science, and its elements are every-where, yet a poem must have its form as well as any other work of art. The image represented must be finished. Every piece of poetry, whether epic, dramatic, lyric, pastoral, or elegiac, must have its leading thought—which should be grand, bright, passionate, emotional—to which every other thought in the piece is subordinate. Because poetry is purely ideal, and not material, it does not follow that it has no form; for an idea has its form, proportions, and symmetry, as well as a material substance. Indeed, every material thing is but an ideal expressed in matter. Every thing must exist in idea before it takes a material form, and the ideal world is no less real than the actual. We might suppose, without impiety, we hope, that the universe existed in the mind of Deity before He spoke it into being. Man can form nothing in the world of matter, until the object first has its prototype in his mind. Indeed, the ideal world is the true world; it is the material world that is stubborn and distorted. The imagination is not like the axe, chisel, or brush; it finds no such stubborn stuff as wood, marble, or canvas, to work upon—all is plastic, and every thing yields to its power. In every true poem all the

minor ideas and images should be subservient to the grand idea or image which completes its form, as all the parts of a picture or the members of a statue go to complete the image, and without which it would not please; nor would a poem please, however beautiful and bright its parts might be, unless they all went to complete the grand idea or image in the mind. It is not fine thoughts, nor beautiful images alone, that make a work of art. How many grand poems have rough and unpolished lines; and how many poems, worthless as productions, have beautiful and finished parts? How many noble statues are roughly sculptured—that of Praxiteles which won the prize, affords an example—and how many polished ones are worthless? How many grand designs in painting are poorly finished, while others, failing in this, though delicately handled, fail as works of art? And so in architecture—it were vain to bring the marble, hew the blocks, turn the columns, form the arches, curve the architraves, and mold the cornice, unless each was fitted to its place, and the edifice erected. Thus we see that form lies at the foundation of all the arts.

Taste is the faculty by which we estimate the fine arts. It is sometimes called a finer judgment, but, we think, incorrectly. Judgment is the faculty by which we ascertain the unknown by the known; while in taste there is nothing known or settled, yet, by taking the voice of the human race, a standard is approximated. Taste is not an elegant word as applied to art or belles-lettres, but our language affords no other which expresses the same meaning. It is derived figuratively from the organ of taste in the mouth, pop-

ularly, but erroneously, supposed to be the palate; and, of course, must be variable in its meaning to different persons, as individual tastes differ. The word, in its original meaning, is but little more refined than the word *appetite*, which has many, various, and uncertain meanings. The appetites of barbarians—it can scarcely be said that they have any tastes—are almost as uniform as those of the brute creation. In the lowest condition of the human race, man feeds on the uncooked food of nature, whether fruit or flesh; in the highest state of civilization, he has almost lost his original appetites by the artificial preparation of his food. So, in the rude, uncultivated mind, the natural tastes are all for physical action, force, daring, danger, bloodshed, and destruction; while in proportion as man becomes civilized and refined, his appetites are subdued by his tastes, and his passions are softened into emotions, and thus his mind and heart are gradually prepared for the appreciation of art; and it will be found, as a rule, that persons of the same degree of culture and refinement, whether it be high or low, will have essentially the same tastes. And thus it is that the relish of the mind and heart for the beautiful is called, not inappropriately, taste. As taste is ever variable, continually changing in nations from barbarism to civilization, and in individuals from the rude to the cultivated condition, and as criticism is founded on taste, it is not likely to ever become an established art—much less a science—in estimating works of art or belles-lettres. But criticism upon works referable to the understanding, instead of the imagination—to truth, instead of beauty—has solid ground to stand upon, and may become a

science as fixed as any other, except those which rest in the abstract. Critics of art and belles-lettres hold a high, delicate, and responsible office; yet "fools rush in where angels fear to tread." They are too apt to represent a school or a period—the great Ruskin was not wholly free from fractional defects—and sometimes nothing more than a faction, a clique, a person, or an occasion. They are seldom fully capable, and not always wholly honest; and much of their criticism is simply puerile. When Horace warned us not to put a horse's head on a man's body, he told us nothing but what children know. Art teaches criticism, not criticism art. If all the tastes of the human family were blended and refined by culture, the result would be the standard; and when we find a critic who in himself represents humanity, he will be able and worthy to judge of the beautiful.

The comparative merits of the fine arts may now properly claim our attention for a short time, though to give preference between sisters, when all are so beautiful, seems almost invidious. Architecture is capable of producing the grandest effects, but it is confined to place. Specimens of this noble art can not be transported to different countries and exhibited to the eyes of whole nations. But few, comparatively, can see them, and there are but few specimens in existence. The Pyramids, St. Peter's, St. Paul's, the Cathedral, must remain forever where they are. They cost millions upon millions, and required ages upon ages to erect them; and their duplicates can not be produced, save at the same cost in expense and time required for the originals. These reasons must forever confine architecture to narrow limits, but within

those limits no art is so grand. The effect of sculpture is more delicate and definite in its expression. When we gaze upon a work of architecture we scarcely know what it is that affects us; but if we look upon a statue, we see the beautiful at once. And the specimens of sculpture are far more numerous than those of architecture, and may be removed from place to place without serious inconvenience. Hundreds may see the Apollo, the Venus, the Psyche, and the Slave, to where one can view the Pyramids, the dome of St. Peter's, the steeple of St. Paul's, or the spires at Milan. If sculpture is less grand than architecture, its effects are far wider and more pleasing. Painting produces the most intense effects of any of the arts. To be unexpectedly ushered into a gallery of paintings would startle the soul at once. The most intense passion, even to agony, may be portrayed in painting. Sculpture may not do this—it would be mere distortion; yet sculpture expresses the gentle emotions with fine effect. We associate a piece of sculpture with the past—with something hallowed, something that reposes—while painting brings the past to the present, representing life and animation, as if they were capable of action. Painting may represent the form and color of every object in nature, while sculpture is confined to form alone, and to types of beings that have lived. The subjects proper for the pencil are far more numerous than those suitable for the chisel, and copies may be taken with far greater ease, and, if we include engraving, may be multiplied to any number. Painting is not only more intense in its effects, but it has a wider range and is properly entitled to a higher rank than sculpture.



Music is peculiar in its effects. It tells no story, and expresses no definite thought, but fills the soul with emotion. In this it is quite similar in its effects to architecture. It is also sometimes capable of arousing passion, particularly with the power of association. Architecture, sculpture, and painting address themselves to the sight: music appeals to another sense. It finds the heart by many avenues inaccessible to the other arts. Other arts are fixed in form; music is forever flowing like a beautiful thing in nature; and yet, too, it has its form in which it must ultimately repose. It has neither height, shape, size, nor material, and is the sweetest and purest of all the arts. It is molten sentiment and liquid poetry. No place is made worse for its presence; it can not be degraded. Bad associations may accompany it, but, of itself, it never leads to wrong. All the arts, except music and architecture, may be used for vicious ends; these may not. In this they have a superiority over all the others. Nothing is more fleeting than music; yet if it is ever going, it is ever coming, too, and thus may ever be present. It is the soul of art without its body. All the arts reach the soul, but music is the soul itself. It is the only art that we attribute to the angels.

Poetry possesses many advantages over all the other arts. While architecture is confined to place, sculpture and painting to single moments of time, and music to mere emotion, poetry has all places, all times, all emotions, all passions, all thoughts, all subjects, all things, which can be represented to the human mind. Its productions may be multiplied without limit; and they reach the college, palace, cottage, cabin, and the hut. The other arts address

the external senses; poetry addresses the mind alone. It reaches the senses through the mind, while the other arts reach the mind through the senses; and all, except poetry and music, are embodied in matter. Poetry includes all the powers of the other arts, and if it could not be degraded to improper purposes, would be all that the purest soul on earth could wish.

But the object of all the fine arts is the same—namely, to please the sense of the beautiful in our nature—although each effects the end by different means; and while we think their comparative merits stand in the order named, we should nevertheless love and cherish them all, for each has some peculiar excellence which the others never can supply.

As nature, in all its stupendous greatness and infinite variety, is composed of a very few elements, so art, in all its beauty and variety, is formed by a very few principles. Simply the line and curve will account for every shape in architecture or sculpture; and in painting every material object in the universe can be represented by only three colors and their combinations. Mankind has been singing on the musical scale, which contains but seven sounds, ever since the creation, and the variety is still exhaustless; and with a few letters, not exceeding eleven vowel sounds, perhaps, in all the languages—for the consonants are nothing but the vowels with a peculiar beginning or termination—every possible thought within the range of intellect, and every object or image in the ideal or material world, may be represented by poetry. How few the principles, how endless the variety, how vast the domain of art! And nature

herself, in all her works, is but the Art of God. The heavens are His architecture; His statuary is man, formed in His own image. His painting is on the earth and in the sky; the harmony of the rolling spheres is His music; and His poetry is universal and eternal praise.

The national importance of the arts is plainly seen throughout all the nations we have thus incidentally noticed. How much more we know of Greece and Rome than we do of the Eastern nations, or even of Egypt, whence they drew so much of their learning. This is attributable to the state of the arts in these two celebrated nations. They have governed the world during many centuries, not by their arms, nor so much by their laws, but by their arts. What would Greece and Rome have been at this day without their architecture, sculpture, and poetry? Nothing. In what, except in these and eloquence, were they superior to other ancient nations? Nothing. It is time for America to assume a higher rank than her present position in the most enduring of human things—the arts. Our hills and valleys teem with genius, and our country with subjects. Our land and its history invite the pencil, and our heroes, statesmen, philosophers, artists, and poets the chisel. The glorious deeds of our fathers are worthy of the American harp. We have a new continent, and we are a new people, making the last experiment of free government that ever will be tried—for there are no more continents to discover; and it becomes us not only to be free in arms, but free in thought, and free in art, and independent in all. We have asserted our national and personal liberty, but this alone does

not satisfy the soul. We are citizens of the Republic of America—that secures our rights; let us become citizens of the Republic of Letters—that will elevate our minds; and let us be lovers of art—that will ennoble our nature. These sacred privileges and high attainments aid one another; and without their mutual support, America can never fulfill her mission amongst the nations of the earth.

## THE DEFINITION OF POETRY.

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Poetry is older than civilization. It can be plainly traced to the earliest history of man. Although the world is very well agreed as to what is poetry and what is not, where specimens are given, yet during many ages philosophers and critics have been endeavoring to give us a definition of poetry without success. It is true that, throughout the philosophical and critical writings of the past, we find many definitions of poetry approximately correct, yet none that are complete. A definition of any subject should include every thing that belongs to the subject, and exclude every thing that does not. It should be sufficiently comprehensive to embrace every example or specimen of the thing defined, and yet so exact as to reject every example or specimen not belonging to the same class. It is not sufficient to give an example of the subject; some rule must be established by which every example of the same kind may be measured and known. Nor is it enough that every example will go into the definition—it must fill it. Every example must fill the rule, and the rule must embrace every example. Such a definition is perfectly attainable in the exact sciences, which are governed by principles every-where and forever the same. It is com-



paratively attainable in philosophy, which rests upon experience and observation, where the bases of induction are wide and general, although not founded on abstract principles. As we rise into the regions of taste, the laws of which are supposed to be less certain and settled, it becomes more and more difficult; yet taste has been called but a finer judgment. Our subject lies within the last domain, and is therefore one of acknowledged difficulty.

Before we attempt a definition of poetry, it may be well to ascertain what may, and what may not, be defined; and see whether our object falls within the latter or is included in the former. Man's mind being finite, the field of human knowledge is necessarily limited. Concerning the things which lie wholly beyond this limit, the mind can have no idea or conception. These, therefore, can not be defined. Whatever lies partly within this region we may understand more or less perfectly, in proportion to the degree of clearness in which it is manifested to us, and therefore it may be more or less perfectly defined, in the same degree. But whatsoever lies wholly within the compass of human knowledge, it would seem ought to be susceptible of a clear and distinct definition. For example: man well knows whence comes his body, for its elements are all around him. He sees it built up, he sees it stand, he sees it fall, he sees it crumble even to dissolution. The body, therefore, can be clearly defined, for it lies wholly within his knowledge. But the mind, during its earthly period, reaches in vain toward the source of its being; and the soul yearns in vain to know its destiny. It passes across our field of knowledge, but it comes from beyond and goes be-

yond. The soul, therefore, can be but imperfectly defined, because it can not all be known. Neither can the mind nor any of its separate faculties, as judgment, or imagination, be defined. Of the essence of the mind, we can form no conception. The subject is beyond our comprehension. It is the mind acting upon itself. Its beginning and ending lie far beyond our field of view. It comes within our knowledge mysteriously, operates before us mysteriously, and departs from us mysteriously. All is mystery concerning it. The effects and productions of the mind, however, are plain, and may be clearly defined. The most we can say of the judgment as a distinct faculty is, that it is the power by which we judge. The mode of judging, and the thing judged of, are apparent to us, and may be defined; but the faculty itself escapes our apprehension. Of the imagination, we can only say, that it is that faculty of the mind by which we select, arrange and combine, either in the ideal or real world, thus forming new images, pictures figures, and relations, not found in the order of things when nature is left to herself. No definition of either of the original senses can be given. No idea of light can be conveyed to one who never saw; and no idea of sound can be given to one who never heard. How idle the effort to make one understand the fragrance of a flower who never had the sense of smell. In these instances the things attempted to be defined have never been brought within the field of knowledge known to the persons to whom the definitions are addressed. Nor can we understand the powers of nature; her productions, however, are well understood and may be defined. How easy to classify

the trees and flowers, yet who can define the principle which produces them; or the operation by which they are produced? Instinct, also, is a principle which defies all examination. The bird builds its nest and the bee forms its cell, without ever having been taught, and their first effort is equal to their last. Can the bird or the bee tell us why? Can man in his prouder wisdom—and prouder only because it is blinder—proclaim it to us? No. The subject lies beyond his field of knowledge; yet how easy to define the nest; and the bee's cell, being a geometrical figure, is as uniform and fixed as science itself. All the causes which operate either in the mental or physical world transcend the human understanding, yet all the productions of these causes which fall within the scope of human knowledge may be defined. Poetry, then, although produced by faculties which can not be perfectly defined, yet being a production, which, as a production merely, lies wholly within the compass of human knowledge, would seem, if our views be correct, to be susceptible of a clear and complete definition.

Having ascertained what may, and what may not be defined, and finding poetry included in the former, we will next endeavor to trace the distinction which divides the fine arts from the useful. Art, in general terms, is the adaptation of the things in nature to the wants, comforts and pleasures of man. Such of the arts as simply supply our wants and comforts are called the useful arts. Such arts as administer to the pleasures of the soul, without reference to our ordinary wants and comforts, are termed the fine arts. The former refer exclusively to the conditions of the body, and are operated principally by manual labor;

the latter refer exclusively to the pleasures of the soul, and are mainly the productions of the mind. Art is sometimes regarded as the antithesis of science. This may not be improper, speaking generally, but it is not critically correct. Science supports art; there is nothing antagonistic between them. Science prescribes the rules of which art is but the example. Indeed, the words *art* and *science* are sometimes convertible terms. Art and philosophy are antitheses. Philosophy studies things as they are; art changes them with a view to their adaptation to the wants and pleasures of man. In the useful arts man adapts the common and useful things in nature to supply his wants and enhance his comforts, without reference to the beautiful; in the fine arts, he seizes upon the beautiful in nature, and adapts it to the pleasures of his soul, without reference to the useful. The immediate aim, then, in the ~~useful~~ arts is usefulness, while the immediate aim in the fine arts is beauty. But what is beauty? A definition of beauty, like that of poetry, has engaged the attention of the first-class of minds in all polite nations during the whole period of letters, and with no better success than in the case of poetry. For ourselves, we regard beauty as being classed with those objects of which we can give but imperfect definitions, because they do not lie wholly within the limit of human knowledge. Nature, it is true, is the common storehouse to which most writers refer us for the beautiful, but, unfortunately, when we resort to that great repository we find much there that is not beautiful. Our design requires us to use the word beauty only in its artistic sense. We might humbly conceive that before the mind of omniscience

the whole universe is beautiful; for there is no part in it, which man may choose to call deformity, but what is necessary to the beauty of the whole. Yet the world is full of beauty even to man. It is forever abroad, on the mountains, in the mine, on the sea, in the cave, over the earth, and in the sky; all see it, all feel it, all know it, all love it; yet none can tell what it is. While we do not believe, with a late philosophic writer, that "the lineaments of beauty, by which the eye is flattered and the ear regaled, are as determinate as any proposition in mathematics," and while we do not believe that beauty is susceptible of a complete definition, we yet by no means despair of pointing out its causes, and showing where the secret lies.

Among the vast multitude and diversity of things in nature, we find some that uniformly affect us with pleasure, a few that affect us with pain, but toward the great majority of the number we stand indifferent in these respects. Any of these things toward which we usually remain indifferent, are capable of affecting us either with pleasure or pain, as they may happen to be related to, or associated with, the things that intrinsically affect us with pleasure or pain.\* Every one is sensible that there is something within himself which leads him to prefer the statue to the block, the picture to the canvas, the edifice to the hovel, the harmony to the discord, the poem to the story. The same effect takes place if we descend into the mere elements of beauty. Who does not prefer to look upon a circle rather than an eccentric; a

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\*May it not have been this fact that misled Diderot in attributing beauty to *relation*? and deceived Jeffrey in placing it in *association*?



square, octagon, or polygon, rather than an irregular figure; a cube or sphere rather than a rough mass? In the scroll, curve, wave, and many other figures, unconnected with any thing else, there is an intrinsic power of beauty. Hogarth's celebrated line of beauty is an example. Certain colors affect us with a sensible pleasure, while others are repulsive; and certain combinations of colors are harmonious, while others are discordant. And who does not love the flower above the weed? Every one will notice, also, that the emotion awakened by beautiful objects is always the same in kind, whatever may be the difference between the objects that awaken it, or however much the emotion itself may differ in degree. What can be more unlike than a piece of music, a landscape, and a statue. Yet the pleasure which we derive from any one of these is the same in kind as that afforded by either of the others; there may be a difference in the degree of the pleasure. The beautiful in nature and the beautiful in art always affect us in the same way, for art is really but a transcript of the things in nature, only sometimes in different combinations. The peculiar pleasure which we derive from a thrill of harmony, a fine passage in a poem, a countenance that loves us, or a glimpse of the sky, is ever the same. The sense of the beautiful is as palpable and uniform in the soul, whatever may be the object that awakens it, as the sensation of heat is to the body, whether it be excited by a fire, the sun, or a fever. The emotion of the beautiful, then, always being the same, while the objects which awaken it are so diversified, is the quality of the beautiful inherent in the objects themselves, or is it some quality within us which the ob-

jects are capable of awakening? We do not hesitate to give our adherence to the theory that attributes beauty to the perceptions of the mind and the feelings of the soul, instead of that which refers it to the form, material, and qualities of the objects themselves. Beauty no more belongs to matter than color is inherent in the rose. It is the mind that perceives the object of beauty, and the soul that feels its effect. When we view a statue for a length of time, and take in its full effect, the mind perceives, and the soul feels that there is something beyond the marble. The beauty is not in the statue, it is something that shines through it. It was a beautiful remark of the sculptor when he said that he did not make his statues—he only rescued them from the quarry; that is, he only shaped the marble so that beauty, which is ever shining, could appear through it, and make us sensible of her presence. In viewing a painting in the same way, do we not see something above the mere canvas, color, light and shade? If we do not, then we have not learned the art of appreciating art. And there is a soul in music beyond and above the mere sound. The cultivated musician (I do not mean the mere performer, for one may understand and appreciate art without having the power to practice it), after long study, has taught his ear to give attention to a thousand tones at once, and learned his mind to grasp the various combinations of the harmony at one view, enjoys an intellectual delight and a soul-felt pleasure, infinitely superior to the mere sensuous effect of the sound itself. The works of art are but the body and features of beauty, through which we see her soul.

Sometimes the sublime is treated of as something different from the beautiful. We can not help but regard this division as unsound in philosophy. It appears to us that the sublime is merely a quality of the beautiful, as the picturesque, the delicate, the spirited, the forcible, the subdued; and is no more different from beauty itself than either of these qualities—just as the wonder we feel is the same, whether excited by the telescope in viewing a distant orb, or by the microscope in showing us an inhabited drop of water.

By the word useful we mean every thing the object of which is to supply a want of the body, or afford a good to that part of our nature which perishes. There is, undoubtedly, a beauty in usefulness, and a usefulness in beauty; but whatever usefulness there may be in “a thing of beauty,” we still class it with the beautiful; and whatever beauty there may be in a thing of usefulness, it still properly belongs to the useful. The usefulness of beauty, or the beauty of usefulness, is a mere incident; it is never necessary to the thing itself, and may be dispensed with, without essential injury to the purpose, design, or end, for which it is made. And although the useful and the beautiful are often thus found in conjunction, yet the distinction—that the one belongs to the soul and is immortal, while the other supplies the body and perishes—is still clearly maintained between them.

In our view, the fine arts being the representations of the beautiful unconnected with the useful, we will linger a moment and see whether our definition is applicable to those grand expressions which the

world has so long designated as the fine arts. We do so because we deem this course necessary for the purpose of laying a more permanent foundation for the definition which is the particular subject of our consideration. With regard to sculpture, painting, music, and poetry, there is no difficulty whatever. It is very apparent that our definition not only fits these, but that they fill the definition; namely, that they are the representations of the beautiful, without reference to the useful; but as to the latter clause of our definition being applicable to architecture, it is not quite so apparent, though equally true. We are apt to associate usefulness with architecture, more especially in the erection of edifices, either for permanent habitation or occasional occupancy. Certainly nothing is more useful, and even necessary, to man, than buildings to protect him, wherein he may reside, transact his business, enjoy his amusements, or perform his worship. But in the first place, architecture is by no means confined to the erection of edifices; it includes pyramids, monuments, pillars, obelisks, columns, and other structures, which are representations of the beautiful unconnected with usefulness. Secondly, it must be remembered that architecture, when applied to the erection of edifices, is not mere house-building. Architecture begins just where house-building leaves off. It is the form, design, grandeur, beauty, not the mere usefulness of the structure, that constitutes architecture as a fine art. A column for support merely, would be just as useful in many other shapes and proportions than those recognized in the regular orders. The cornice, the frieze, and architrave, and many other beautiful designs, could

be dispensed with entirely, if the object was only usefulness. The size, elevation, and proportion of the building could be changed at pleasure, not only without injury to its usefulness, but often in aid of it, if we did not consult the beautiful. From these, and many other suggestions that could be made, it is plain that architecture, though often found in connection with usefulness, is no part of it—not of its essence; nor is usefulness any part of architecture when considered as a fine art. Usefulness is the mere incident to architecture; they are not bound together in the relation of cause and effect, design and end; and, therefore, architecture, in the language of our definition, is the representation of the beautiful without reference to the useful.

Next we must see whether our definition will include any thing not belonging to the subject; for we have several times mentioned, what in all just criticism should never be forgotten, that a definition should not only admit every thing that belongs to it, but it must reject every thing that does not. Eloquence has sometimes been ranked with the fine arts. It is unquestionably an art, and represents the beautiful; it, therefore, has two essential requisites to a fine art; but it includes that which never can be admitted into the region of fine art, namely, *it always has a direct reference to the useful*. We can not conceive of eloquence as an art uncoupled with some useful purpose or end. The philipics of Demosthenes would have been puerile indeed, if there had been no Philip to oppose, and no Athens to be defended; the orations of Cicero would have been nonsense, if there had been no Catiline to thwart, and no Rome to save; the



great speech of Webster, in defence of the constitution, would have been no better than a sophomore exercise, if there had been no constitution to defend; and how idle would appear the most eloquent effort in protection of life when there was no life to be protected. In short, we can view eloquence in no light in which it is not directly connected with usefulness; it can not, therefore, however beautiful it may be in itself, be admitted as one of the fine arts. Dramatic acting, in its higher expressions, might appear, on first view, to lay some claim to being a fine art. It is an art, it represents the beautiful, it has no connection with the useful—indeed, the legitimate drama maintained at its true elevation, where we see the thoughts of the poet carried into effect by the actor, affords one of the grandest representations of the beautiful—but the poet is the artist, not the actor; the poetry is the art, not its representation. It is the conception of the author, carried through the medium of another, which brings us the pleasure. The actor stands in a relation to the poet similar to that of the musical performer to the composer, or the stone-cutter to the sculptor, or the mason to the architect. Now, the art consists in the poetry, in the music, in the sculpture, and in the architecture; not in the actor, the performer, the stone-cutter, nor the mason. No one would think then, I am sure, of robbing the poet of his laurels to place them on the actor's brow. Aristotle placed dancing in the same class, if not on the same level, with poetry, and other imitative arts, which he illustrated in his *Poetic*. Dancing, indeed, has some of the requisites of a fine art. In common with poetry it has rhythm—indeed, it has been happily

called "the poetry of motion," and in common with music it has both rhythm and time. It is clearly an art, and, quite as clearly, unconnected with any thing useful. Why then is it not a fine art? We answer, because it does not represent the beautiful in an artistic sense. Beauty, as we have endeavored to show, belongs to the soul; it is felt by an emotion, the body is moved by passion. It is necessary to carefully distinguish between an emotion and a passion. An emotion *has no desire beyond itself*; a passion *always drives to some purpose or end*. Under an emotion we desire to remain as we are; under the influence of passion we desire to commit some act. The former is attended with pleasure; the latter with pain, or at least with uneasiness. Passion belongs to the body; emotion to the soul. *No true work of art ever excited passion*. Dancing, then, belonging to the desires of the body—being, indeed, but the joy of the heels—finds no place among the fine arts. It is hardly necessary to formally shut out perfumery to keep it from creeping into the company of the fine arts; yet, perfumery, or the preparation of perfumes, is certainly an art; it represents the beautiful—of fragrance, and is unconnected with any usefulness; but it smells too strong of the body to ever give pleasure to that finer essence which we call soul. The eyes have three of the fine arts—sculpture, painting, and architecture; the ears have one—music; and the other, poetry—is more directly addressed to the mind; all arrive at the mind, however, only they reach it by different means. If we were to indulge the nose with a fine art, we much fear the tongue would be clamorous for a like distinction; yet the tongue, whatever we may say

about it, has furnished the word—taste, by which, used in a figurative sense, we test the fine arts, and prove their excellence; and the sense of feeling has also furnished a word that plays an important part in criticism.

Before we proceed directly to the definition which is the subject of our essay, we will examine some of the definitions heretofore given of poetry. The ancient Hebrews, although they produced the grandest poetry in all the past, never, as far as I am informed, attempted a critical definition of their own productions. Indeed criticism as an art was not practiced by the Jews—at least not in the sense in which the word is now understood. Among the Greeks the art of criticism arose to a very high degree of excellence, yet, if one might say so, many of their writings are loosely expressed and very incomplete. Surely much in the doctrines of Socrates, and in the writings of Plato, is still left to conjecture. (Aristotle defined poetry to be *imitation*, yet he did not apply this definition any more particularly to poetry than he did to some other imitative arts, which he treated of in his *Poetic*, and which he said differed from each other only in the *means*, the *objects*, and the *manner* of their imitation. Unfortunately this definition does not apply to poetry as accurately as it does to some other of the fine arts.) For instance, sculpture and painting imitate real forms and appearances in nature; architecture imitates ideal forms in matter; and music imitates natural sounds; but what does poetry imitate? It may be said to imitate every thing by description, or word-painting, but this is a far-fetched and improper use of the word imitation as we now

understand it. When we describe a thing it can not be said that we imitate it, at least not in the plain meaning of the word. ( It requires but little examination to discover the defects of Aristotle's definition when applied to poetry. In the first place, it does not give *all* the requisites of poetry, without which any definition must be defective.) For instance, poetry not only imitates whatever it may find worthy of imitation, but its main characteristic is that it changes the arrangement of things as they naturally are, and reconstructs them anew into beautiful images. Indeed, the true meaning of the word *poet* is that he is a *maker*. In this sense poetry means something quite the reverse of imitation. We thus see that to confine poetry to imitation would be to exclude the noblest efforts of the art. ( But the grossest defect in the definition of Aristotle is that it includes so much that has not even a resemblance to poetry; for it would clearly admit dancing, masquerade, burlesque, mimicry and buffoonery of every kind)—things, we scarcely need to remark, which have no claims to such a distinction. ( Thus, even if all poetry was imitation, it is very clear that all imitation is not poetry. A definition of poetry, therefore, which not only embraces all the other fine arts, but also includes so much that does not belong to art at all, can not be regarded as correct. Horace improved upon Aristotle in teaching the art of poetry, but never, to my knowledge, attempted a definition of poetry itself; neither has Virgil, the greatest of the Roman poets, ever ventured a definition of what he so ably practiced.) Bacon, in his writings, rather describes the effect of poetry than gives it a definition; for he says that it

(“doth raise and erect the mind, by submitting the show of things to the desire of the mind.”) This remark is profound and accurate, but it is scarcely a correct definition of poetry. Philosophy, as we have remarked, teaches us the real condition of things — the good, the bad, the false, the true, the useful, and the beautiful alike; while poetry seeks only the beautiful, and obtains it “by submitting the shows of things to the desire of the mind;” that is, philosophy submits the *actual* things in their real order to the *mind*; poetry, by selection, addition, subtraction, combination, and reconstruction, submits the *shows* of things to the *desire* of the mind. (We believe that poetry is always the representation of things arranged according to the desire of the mind, yet every thing arranged according to the desire of the mind is not poetry; for this would include not only all the other fine arts, but also every thing that is good; in this, therefore, the definition is imperfect. The mind desires nothing more ardently than the Good, which is the basis of morals, as the Beautiful is of art, or as the True is the basis of philosophy. The definition would embrace justice, mercy, benevolence, philanthropy, friendship, love, and all the moral virtues, most excellent, indeed! but they are not poetry, and do not necessarily belong to art. The definition of Aristotle falls below poetry, while that of Bacon rises above it; both, however, are thus rendered incomplete. Lord Jeffrey, in speaking of the definition of poetry, remarks, that “the end of poetry is to please, and the name, we think, is strictly applicable to every metrical composition from which we derive pleasure without any laborious exercise of the understanding.”



That "the end of poetry is to please," every one admits, but must a composition be metrical before it can be admitted as poetry? This may be true of classical composition, but is it true of English poetry? We think not. In the English language syllables can not be divided into regular quantities, as longs and shorts—two shorts making one long; they have every degree of length and quantity from the longest to the shortest. There is, perhaps, no short syllable in the English language which is not capable of becoming a long one by means of the accent; it might be more difficult always to compress a long into a short, though it can generally be done, but two syllables can often be put into the place that even one short may fill. The Psalms are always regarded as poetry, yet, in the English version they can not be scanned. The poems of Ossian, whoever wrote them, are certainly poetry; they can not possibly be scanned; and we think we could cite much of Shakspeare, and much of Milton,—that is not "metrical composition," which the world has long since embalmed as true poetry. On the other hand, can all "metrical composition from which we derive pleasure without any laborious exercise of the understanding" be classed as poetry? Surely not; for this might include wit, burlesque, humor, and many other "metrical compositions" which it would not be safe to pronounce poetry. A composition could be metrical, yet differ in no other respect from prose. Would the ridiculous adventures of the Don and Sancho, merely by arranging the language into metre, become poetry? It will scarcely be so contended; yet, the work would then be a "metrical composition," and certainly it would please "without

any laborious exercise of the understanding." Metre is, undoubtedly, a great aid to poetry, as many other things not necessarily belonging to it are, but it is the incident, and not of the essence of poetry itself. While we must place Lord Jeffrey in the first rank of critics, we are still not compelled to accept his definition of poetry as complete. Other definitions of poetry have been given, but I know of none more accurate or complete than those which we have thus examined.

Having established, as we think, the requisites of a definition; what may, and what may not be defined, and that poetry is included in the former; the distinction between the arts, namely, that the useful arts have for their object usefulness, without reference to the beautiful, while the object of the fine arts is the beautiful, without reference to usefulness; what it is we name the beautiful; what arts are properly called the fine arts, and what not, and the reasons; and having examined several definitions of poetry, heretofore given, and pointed out their defects; we are now prepared to offer our own definition, which we express in the following words: *Poetry is beautiful thought, expressed in appropriate language—having no reference to the useful.*

*Poetry is beautiful.* Beauty, as we have seen, is that quality of objects which pleases, without reference to any thing useful. What Beauty is in the abstract, apart from the objects which manifest it to us, can not be defined, yet the objects themselves are susceptible of a clear definition. Reason goes abroad into the universe and examines all things as they are—this is philosophy; imagination accompanies her,

selects the beautiful, and arranges them as the soul wishes them to be—this is art.] In poetry the imagination goes into the world of ideas, gathers the beautiful and arranges them into poems, as the artist selects his colors and applies them to produce his picture. The ideas must be beautiful, though the objects may be common; for common ideas about the most beautiful objects can not be poetical, while beautiful ideas about the most common objects are true poetry.\* Thus all see the beauties of creation alike, yet but few can express more than the common thoughts concerning them; and all see the common things of life in the same light, while only the poet can clothe them in new and beautiful ideas.

(3) *Thought.* All poetry is thought, or ideas. It is true we often speak of the spirit, sentiment, passion, or other qualities in poetry, but we only mean that the thoughts expressed in the poetry awaken these qualities within us. We can express spirit, sentiment, or passion, ourselves, in many ways besides expressing the thoughts which signify them—as by looks or actions; but in poetry, strictly speaking, the words which convey the thought are expressed, and the thought touches or moves the spirit, sentiment, or passion. Indeed, it is by thought only that the mind can be made to recognize any thing. Speaking critic-

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\*Will not this view of the subject explain the controversy so long kept up by the *Edinburgh Review* against what was called the Lake School of Poets? The *Review* insisting that nothing but elevated or beautiful subjects could be made poetical, while Wordsworth and Coleridge were drawing the most delightful poetry from the commonest objects in nature, and the most ordinary affairs of life.

ally, then, we say with propriety that all poetry is thought.

*Expressed.* While the thought remains in the poet's mind it can not be called poetry; it must be expressed before we can recognize it as art. We can well imagine how the brain of a Homer, a Shakspeare, or a Göthe teems with beautiful thoughts; what images they see, what beauties they feel, and what poems they compose in the mind, that never find expression. The universe is at their disposal, and tired of that, the imagination creates anew. So the sculptor sees beautiful statues, figures, and groups, still sleeping in the quarry, unawakened by the blast, unrescued by the chisel; and the painter sees a thousand pictures abroad in the landscape, or in the busy mart, and imagines more, which his pencil can never reach. The architect in his thoughts builds columns to the skies, adorning them with imaginary figures and beautiful forms, far above the actual; and the musician is listening to the endless variety of melodies bursting from nature, and the myriad combinations of harmony that fill the world, and lift him to the music of the spheres. Yet none of these infinite beauties belong to art until they are embodied and fixed in their respective forms.

*In appropriate language.* This branch of our definition raises the question whether time, number, feet, metre, rhythm, alliteration, rhyme, measure, cæsura, verse, strophe, antistrophe, stanzas, canto, or whatsoever the numerous externals of poetry may be called, are any part or element of poetry itself; and we dispose of them all by the single remark, that not one of them belong to the essentials of poetry. It would be difficult, perhaps, to find much poetry without some

of these incidents, but not at all difficult to find poetry from which many of them are absent; so that in turn, if you examine throughout poetry generally, you will find them all absent and all present in different given instances, which proves at once that none are essentials; for an essential to poetry is that without which it would not be poetry; and if all were essentials all would have to be present in all poetry, and if any one is an essential they could not all be absent from any poetry. I believe none of these mere fashions of poetical dress are now claimed as essential, except meter, and that only by Lord Jeffrey; and he was evidently driven to admit it for the purpose of excluding many admirable fictitious works, which otherwise would have been embraced within his definition.

Feet in poetry are what bars are in music. The composer is not bound to any uniform number of notes in a bar, nor is the poet obliged to give any particular number of syllables to the foot; the musician, however, must have equal time in each bar, and the poet should have equal quantity in each foot; and the one should be played, and the other read, in a given measure of time; varying, of course, where the thought or sentiment urges a more rapid movement, or requires slower and more emphatic expression. Meter divides the line into feet, and the feet in classical composition are divided into no less than twenty-eight different kinds, which I will not even name, for in English poetry their names are mere jargon, and their effect nothing but confusion. Every one who will attentively analyze them, will find that they will arrange themselves under two heads; namely, the



iambic, and the anapæstic; the former having a long and short syllable or their equivalent in the foot, the latter having a long and two short syllables or their equivalent in the foot; the one accented on the even, the other on the odd syllable, corresponding to the common and triple, or even and odd time in music. All the other kinds of feet have no effect upon the poetry different from these two kinds, but depend wholly upon the points in the line at which the divisions are made; so that in these the poor poet, whatever his genius may be, lies at the mercy of the printer's devil. Rhythm is the correspondence between the time and accent, and in poetry very much resembles the time and accent in music; rhyme is the consonance in sound between two syllables, and is analogous to musical harmony.\* These being the most important incidents to the dress of poetry, it will not be necessary to examine the remainder. But while we are expelling these mere attachments from the essential qualities of poetry, we are by no means condemning them; for each of them may be more or less proper, according to the character of the composition, as aids and ornaments to poetry; many of them, indeed, are frequently becoming in other forms of composition; and all, like other aids and ornaments, when

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\*But the rhyming syllables must begin with different consonants, or with a consonant and a vowel, otherwise they are unisons; and as unisons in sound—being in science the same thing—are not harmonies, so in poetry unisons are not authorized rhymes—that is, no syllable is a rhyme with itself. And though the rhyme is usually placed at the end of the line, yet it may be used at rhythmical distances in any part of the verse, with pleasing effect.

displayed with taste, add much to beauty; and although the Muse is a Beauty that delights in dress, yet we should do her great injustice, and be much disappointed in our joys, if we were to mistake her dress for her own sweet self. There can be no positive rule laid down by which to select poetical language, yet there is evidently a greater fitness in some words for poetry than in others. They should be carefully chosen for their elevated meaning, and musical sound, and harmoniously arranged in the sentence; so that no word could have been removed without loss, none added without redundancy, and none changed without injury. The question of style, however, must at last be left to the taste of the poet and the judgment of the reader to decide.

*Having no reference to the useful.* It can not be said, as we have shown, that there is no usefulness in beauty, nor that there is no beauty in usefulness. The world, during a long period of time, has hoped for an ultimate usefulness resulting from the beauty of art, in refining the heart and elevating the understanding of man; nor are we claiming that all the beauty in the world belongs to the fine arts. There is evidently a beauty in the fitness of things for useful purposes, and often in the productions of the useful arts; there is a beauty in science, in philosophy, in morals, and in religion; but these are all connected with the useful. Beauty in the fine arts is that beauty, and that beauty alone, which is unconnected with usefulness. When an artist is about to produce a work of art, he never takes into consideration its usefulness; that is an incident which may or may not happen; it, therefore, in the language of the definition, has no refer-

ence to the useful. We think this clause of our definition indispensably necessary to reject from poetry what would otherwise fall within its terms; and in our humble judgment it is the want of this negation that has caused so much confusion and uncertainty in the definitions which we have examined; for the definition of Aristotle, if it did not include the useful, and some things below art, would come much nearer being correct than it is; the definition of Bacon, if it negatived the useful, would be quite correct; and that of Jeffrey, if it did not include meter and rejected usefulness, would be complete.

It is plain that our definition is sufficiently comprehensive to include every thing that is poetry; let us now ascertain whether it will admit any thing that is not poetry. It is clear that it excludes all writings on philosophy, science, history, biography, morals, and theology, merely as such; because, in this view, however excellent they may be, they are always connected with what is useful; yet, as to imaginative works, such as fictions, novels, stories, allegories, fables, and the like—as we have refused to recognize the ordinary external forms of poetry as constituting any part of their essence—their exclusion is not quite so apparent. It will be noticed, however, that the latter class of works always has some practical end, or useful moral in view. A novel, indeed, is but history or biography in fiction, differing in nothing from real history or biography, except in not being true as to the particular facts stated; yet they must be such as might be true, for a novel that violates truth as a principle, or even probability, is at once condemned. The novel, therefore, can have no higher

claims to be called poetry than history or biography, of which it is supposed to be but a fictitious copy. The same remarks will likely apply to other writings of this class; they are not unconnected with the useful. Narrative poetry seldom ranks high in art; we have supposed the reason to be that it so strongly resembles the novel—having little else by which to distinguish between them except the dress of poetry. Scott's *Lays* may be cited as examples; and there are portions of Homer's *Iliad*, in the narrative part, that nothing but a blind reverence can possibly hold up to a level with poetry. Neither has didactic poetry ever risen to the first rank. Is it not because it is so nearly allied to the useful? How often does a little morality save a poem from condemnation as a work of art, when, in point of fact, morality is no part of art, as Göthe has abundantly shown. It is very difficult to regard Gay's fables as poetry; and Pope's *Essay on Man*, as splendid as the diction is, loses in poetry what it gains in philosophy. Let the palpable object of a work be to teach, and however beautiful it may be, it will be impossible to bring it up in art to a high standard of poetry. Subjective poetry, from its entire disconnection with the practical and material, will always afford the highest specimens of excellence.

Eloquence is beautiful thought expressed in proper language, but, as we have seen, it always aims at a useful end; and for this reason can not enter into our definition.

Will our definition include wit? Let us see. What is wit? This question is as difficult to answer as it is to define poetry. As the word is now understood—for it has undergone several changes—it may be de-

finer, a pleasant surprise arising from a sudden perception of some unexpected relation in the order of our ideas. But whatever wit may be, it is generally agreed that it must be unexpected, must be sudden, and must bring surprise; either of which qualities will exclude it from art; for the beauties of art are never suddenly perceived, and do not unexpectedly appear, nor do they give surprise; they are rather perceived by contemplation; they steal gradually upon us, and fill the soul with admiration. The effect of wit is sometimes so sudden that it almost amounts to a concussion, and most generally excites a disposition to laughter. What would we think of a work of art whose only quality was to make us laugh? It might please, but the pleasure would be very different from that derived from art. Nor can wit ever enter into the highest order of poetry. The *Hudibras* is a poem of "infinite wit," yet who would compare it with the *Iliad* or the *Paradise Lost*? For similar reasons satire can never rise to the first rank of art. It is difficult to tell what wit is, it is not hard to show that it is not poetry. Wit is but a flash, poetry is a beaming light; the one flits in a moment, the other is immortal. Humor, for the same reasons that reject wit, can not be admitted as poetry. There is no mere anecdote sufficiently elevated to give it that rank. It is true that anecdote is often expressed in poetical forms, but it is not the quality of the anecdote that can make it poetry. Humor takes its name and draws its nature from the flow of animal spirits, and like other streams, it can not rise above its source.

It seems, then, that our definition is sufficiently



comprehensive to include all that is poetry—and at the same time so exact as to exclude every thing that is not poetry. We have thus, following both modes of investigation, constructed and analyzed our definition, and we think that, under the severest scrutiny, it will be found that all poetry is beautiful thought, expressed in appropriate language—having no reference to the useful; and that all beautiful thought, expressed in appropriate language—having no reference to the useful, is poetry.\*

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\* It would appear also that a similar definition might be applied to each of the other fine arts: for instance, sculpture is the representation of the beautiful in the forms of organic beings, embodied in some suitable substance; architecture is the representation of the beautiful in the forms of inorganic matter, built of proper material; painting is the representation of the beautiful in the objects of nature, by means of color, light, and shade; and music is the expression of the beautiful in sound. In each instance, however, the art must be unconnected with the useful. It is clear, then, that the definition of each of the fine arts throws light upon that of the others, showing that beauty is the peculiar characteristic of all; and that they differ only in the objects they represent, in the means by which they are represented, and in the mode of representation.

6 Poetry is restricted in its means to language, but embraces all objects, all modes, all times, all places, all subjects, which proves that of all the fine arts poetry is the most excellent.

## THE ANALYSIS OF RHYME.

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Are there no rules for rhyme, except the ever-varying tastes of readers, the vagaries of critics, or the caprices of poets? In other words, is there no standard for rhyme, except the ear, be it long or short? It would appear not, if we follow any of these guides. And if we consult the rhyming dictionaries, we are no better off; for we shall find them so full of exceptions and contradictions that all rule is destroyed. They are nothing more than collections of examples from the older poets, and, of course, vary according to the peculiar genius, taste, or fancy of each one. We look through them in vain for principle, law, or rule to guide us. If we are to rely on the practice of poets to establish the canons of rhyme, we shall never have a rule; for some of the best poets have been the worst rhymers, and some of the worst poets the best rhymers. Indeed, a great poet seldom thinks of his rhymes, while a little poet is too apt to think of nothing else. Shakespeare rhymed *voice* with *juice*, *refresh* with *redress*, *dame* with *remain*, *fickle* with *brittle*, *doting* with *nothing*, *opened* with *betokened*, *remembered* with *tendered*, *replenish* with *blemish*, *chastity* with *scarcity*, *posterity* with *obscurity*. Byron rhymed *fresh* with *hush*, *man* with *sun*, *banns* with *once*, *must* with *blessed*, *of* with *enough*, *subject*

with *project*, *doting* with *both in*, *chronicle* with *miracle*, *damning us* with *magnanimous*. Burns rhymed *lass* with *breast*, *flows* with *closed*, *ripe* with *slight*, *glee* with *joy*, *hame* with *time*, *drops* with *steps*, *sins* with *once*, *kin* with *him*, *spin* with *sun*, *morning* with *storming*, *Peggy* with *leddie*, *pladdie* with *rainy*, *Wallace* with *bil-lies*, *blisses* with *wishes*, *strictly* with *quickly*, *early* with *Mary*, *ocean* with *bosom*, *quarter* with *halter*, *union* with *opinion*; he was the most careless rhymers that ever wrote. But, of course, when writing in a dialect, more latitude would be allowed than when writing in classical English. Byron was very negligent in his rhymes, and Shakespeare wrote more false rhymes than either; yet who would attack these great masters for their delinquencies in rhyme? As well might some fanatical moralist accuse Shakespeare of having stolen Sir Thomas Lucy's deer, blame Burns for having been drunk with Glencairn, or denounce Byron for having loved the Countess Guiccioli, with a view of destroying their fame as poets.

It is useless to go to the critics for a rule as to rhyme, for they do not agree. Indeed, as rhyme is not an essential element of poetry, a great critic seldom pays any attention to it, while a small one goes a-mousing at once for an imperfect rhyme; and should he find one, he tortures it much as a kitten would a mouse. Lions never prey upon small game. Such writers, not understanding their subjects, treat rhyme as the all-in-all of poetry, when it is not even an essential part. It is, at most, but an ornament.

As to the opinions of readers concerning rhyme, they are as various as the number of individuals,

and as multitudinous as the race, and, of course, afford no established guide for either poet or critic.

The Art of Poetry has been exhaustively taught by Horace and Pope (we need not mention others), yet the poet has learned nothing from them; for the rules are drawn from the poets to teach the critics, not from the critics to teach the poets. The poet is a law to himself. The question is not one of philosophy and science; it is one of imagination and taste. Without these, no one can be a poet; and with them, he will be a poet, in a greater or less degree, without teaching, and in spite of critics. All men with fair average ability can learn and teach philosophy and science, but no man can either learn or teach poetry. And none but a poet, or those having poetic faculties, can understand a poet. The faculty may exist in all degrees, but it is exclusive to those who have imagination and taste. Between these and those who have not the faculty in any degree, there is no road to connect them—nothing to bridge the chasm, and no power to leap it. The poet can come to them, but they can not go to him. Besides the world which holds us all, the poet lives in a world of his own—a new creation. This is as true, and as well established by evidence, as any great mind-fact, or soul-fact, in human nature.

In 1702, Edward Bysshe published "The Art of English Poetry," with a dictionary of rhymes. In 1775, John Walker published "A Rhyming, Spelling, and Pronouncing Dictionary," somewhat extending the rhyming portion of Bysshe's work, by admitting what are called *allowable* rhymes. Others have published rhyming dictionaries—among them, "rules of rhyme," by Tom Hood—but they were all based

mainly on Bysshe's and Walker's. Walker's work has been the standard—if such a thing as a standard can be established in rhymes—during a century. Let us examine it, and see how far it is a guide to the poet or critic.

Under A C K, *hack*, we find the allowable rhyme, *neck*; but under E C K, *neck*, we do not find the reciprocal allowable rhyme, *hack*. Under A F E, *safe*, we have the allowable rhyme, *chief*; but under I E F there is no *safe*. Under A G, *hag*, we find no allowable rhymes; but under E A G U E, *league*, we find *hag*. Under A L K, *talk*, we find *sock*; but under O C K there is no allowance for *talk*. Under A N, *man*, we find *gone*, *upon*; but under O N and O N E we have no *man*. Under A N C H, *branch*, we find *launch*; but under A U N C H no reciprocal *branch*. Under A N D, *hand*, we find *fond*; but under O N D no *hand*. Under A N G, *hang*, we discover the allowable *long*; but under O N G no *hang*. Under A N G E, *range*, allowable *revenge*; but under E N G E there is no *range*, and no allowable rhyme at all. Under A P, *cap*, we find the allowable *tape*; but under A P E no *cap*. Under A R C H, *march*, we have no allowable rhyme; but under E A R C H we have *march* as an allowable. Under A R D, *ward*, we have *Lord*; but under O R D no *ward* can be found. Under A R G E, *large*, we have the allowable *gorge*; but we find, under O R G E, no allowance for *large*. Under A R K, *bark*, we have the allowable *cork*; but under O R K no *bark*. Under A R N, *barn*, *corn* is allowable; but under O R N no *barn*. Under A R T, *dart*, *hurt* is an allowable; but under U R T there is no allowable *dart*. Under A S, *was*, we find the al-



allowable *cause*; but under A U S E there is no *was*. Under A S S, we have *brass*, with its allowable *loss*; but under O S S no *brass*. Under A T C H, *catch*, there is no allowable; but under E T C H, we find *catch* and *teach* as allowable rhymes. Under A Y, *bray*, we have the allowable *see*; but under S E E no *bray* is allowed.

Thus, under one letter, we have shown the incongruities which run throughout the alphabet. They are plain contradictions, and serve to mislead rather than guide. If, for instance, the poet desired to rhyme *man* with *gone*, he would probably look under A N for his authority, where he would find it; but if he wished to rhyme *gone* with *man*, and were to look under O N E, he would not find it. It would thus depend upon which rhyming word was first chosen, whether the desired allowable rhyme could be found or not.

Why *pie* and *see* should be allowed to rhyme, and not *pine* and *seen*; or *pent* and *saint*, and not *pence* and *saints*; or *man* and *pain*, and not *manse* and *paints*; or *ledge* and *badge*, and not *hence* and *chance*, and many similar words, it is difficult to see. And why *day* and *see* should be allowed to rhyme, and not *day* and *sky*, which are nearer together in sound, does not appear. It is said, however, that when Pope rhymed *day* and *tea* together, *tea* was pronounced *tay*—hence the license is perpetuated. And in *man* and *gone* the vowel sounds are as far apart as they can be placed, except it would be in *man* and *tune*.

Let us now more particularly examine the elements of rhyme. We have five vowels, arranged as follows: *a, e, i, o, u*. I do not mention *y*, because when it is a

vowel it has the same sound that *i* would have in the same place. The vowels are uttered without articulation. The first is naturally *a*, because it is uttered simply by passing vibrating air through the organs of speech in their natural position. It is the first syllable uttered by babes, and with a labial articulation forms *pa*, and repeated, *pa-pa*; and when uttered with a labial articulation and nasal tone, forms *ma*, and when repeated, *ma-ma*. The second, *e*, is uttered the same as *a*, except with a contraction of the organs of speech. The third, *i*, is uttered the same as *e*, but with somewhat less contraction. The fourth, *o*, is uttered the same as *a*, except with a slight expansion of the organs of speech beyond their natural position. The fifth, *u*, is uttered the same as *o*, only with a still greater expansion of the organs. The vowels, as they usually stand, are not arranged in consecutive order, according to the acuteness or gravity of their sounds. It is proper, however, that *a* should stand first, as it is the first one naturally uttered. In their consecutive order, ascending from the gravest to the most acute, they would stand *u*, *o*, *a*, *i*, *e*; descending, *e*, *i*, *a*, *o*, *u*. Besides the vowels proper, there are other vowel sounds—*a* having three sounds, and each of the others two; *e*, long, as in *scene*, and short, as in *men*; *i*, short, as in *tin*, and long, as in *pine*; *a*, long, as in *mane*, short, as in *can*, and broad, as in *wan*; *o*, long, as in *lone*, and short, as in *con*; *u*, short, as in *sun*, and long, as in *tune*. We have thus eleven distinct vowel sounds. There are also delicate changes in the sounds of the vowels in unaccented syllables, which we need not notice particularly. It seems to me that there are but the eleven sounds fairly distinguishable in accented

syllables. Indeed, in unaccented syllables, the vowel sounds seem to be almost the same. The word *hunter*, for example, in its unaccented syllable may be spelled *hunter*, *huntir*, *huntar*, *huntor*, *hundur*, without any sensible change in the pronunciation of the word; but if we change the vowels in the accented syllable, as *hunter*, *henter*, *hinter*, *hanter*, *honter*, the sound becomes changed entirely.. And so of many other words. In diphthongs, it is sometimes difficult to detect which of the vowels, or which most, or whether both, are sounded; as in *main*, *dean*, *sein*, *lean*, *coin*; or as in *tea*, *die*, *joy*, *thou*, *true*. The same in triphthongs, as in *beau*, *lieu*, *bureau*.

The consonants—to talk without technicalities—are nothing more than the vowels with a peculiar beginning or termination to the sound. Indeed, it is impossible to utter a consonant without carrying within it the sound of a vowel; for the sound of some vowel forms the body of each consonant. This will appear very plain if you attempt to dwell upon a consonant; you will find the prolonged sound to be that of some vowel which either precedes or follows it. If it precedes it, you will hear nothing of the consonant till the close; if it follows it, the sound of the consonant will be lost in that of the vowel: for example, *b* is *e*, with a labial concussion at the beginning; *c* is *e*, commencing with a hiss; *d* is *e*, with a lingual-dental concussion at the beginning; *f* is short *e*, ending with a labial-dental concussion; *g* is *e* long, beginning with a peculiar sound, difficult to describe, but very easy to make; *h* is long *a*, with a peculiar ending, easily shown by example, but quite difficult to explain; *j* is long *a*, with a peculiar lingual beginning; *l* is short *e*, with a pecu-

liar lingual termination; *m* is short *e*, with a peculiar labial-nasal conclusion; *n* is short *e*, with a peculiar labial-dental ending; *p* is long *e*, beginning with a peculiar labial concussion; *q* begins with a concussive *e*, sliding down to *u*; *r* is broad *a*, with a peculiar lingual termination; *s* is short *e*, ending with a hiss, as *c* begins; *t* is long *e*, beginning with a lingual concussion; *v* is long *e*, beginning with a peculiar labial-dental concussion; *w* is simply double *u*, and is a vowel at the end of a syllable; *x* is short *e*, closing with a concussion. We have thus disposed of all the letters. Of course, these examples could be much better given by the voice than described by words; but any one can see what is meant, and with a little practice may be convinced of its truth.

Rhymes may be defined generally as two or more accented syllables of the same vowel sound; as *ba*, *da*, *na*. When consonants occur in the syllable, those which precede the vowel must be different, and that which follows, the same; as *man*, *ran*, *can*. If the vowel and consonantal sounds were the same, of course the syllables would be the same, and would not form an authorized rhyme. The old English poets, however, often rhymed with the same syllables. In Gower's *Confessio Amantis* they are abundant, and are also found in Chaucer's *Canterbury's Tales*. Indeed, they may be discovered occasionally in our standard modern poetry, more especially when the rhyming word contains more than one syllable. Where the final consonant is followed by a vowel which does not form a syllable, the rule is not changed, nor is there any change when the rhyming vowel is doubled, except it may be in the vowel sound.

Rhymes may be divided into perfect, allowable, and false. Perfect rhymes have the same vowel sound, and when a consonant follows the vowel the same consonantal sounds; as *ha, da, na, man, ran, can*. Allowable rhymes have nearly the same vowel sound, as *man, rain, lean*—of course following the same consonantal rule. False rhymes have a different structure in the relation of the consonants to the vowels, from the true rhyme; as *worth, froth; truth, earth*; or as *man, dram; cane, maim; halt, what; after, faster*. It is sometimes claimed that unless a rhyme is perfect, it is not a rhyme at all; but this is too strict a rule. It were as well to say that a musical concord is not a concord unless it is perfect. Such a rule would destroy the art of music altogether, except in simple melodies. There are other divisions of rhymes, into doublets, as *written, smitten*; and triplets, as *creator, relator*; and quadruplets, as *Latinity, affinity*; and even quintuplets, as *manipulation, reciprocation*; but they are governed by the same rules which govern rhymes generally. There is also a sort of rhyme, sometimes used in burlesque poetry, which might be denominated grotesque, as Byron's *intellectual with hen pecked you all*. But these various kinds, for the most part, require no particular discussion. There is also a division of rhymes into *male* and *female*, which has no foundation in the nature of the subject, and need not be noticed.

As poetry is the only art that is not based on a science, the quality of rhymes must forever remain merely a question of taste, about which, as we were told nearly two thousand years ago, there is no disputing; or, rather, as we should have been told, there is no end of disputing. Architecture is based on



quantities and relations; sculpture, on quantities and proportions; painting, on perspective, light, and shade; while music, the most ethereal of all, is the most firmly fixed in science—being based on pure mathematics. The relations of parts in architecture are often varied to give the proper appearance to the whole; the proportions in sculpture are changed, sometimes, several meters, to give the desired effect to the figure; and the perspective in painting is seldom accurate upon measurement, even in the works of the great masters. But in music, the slightest variations from the exactions of science, of the intervals in melody, or the relations of the tones in harmony, destroys the artistic effect at once, and entirely. Science is the guide of art, except in poetry, which rests solely on the imagination. It is just as independent of science as mind is of matter, or the soul of the body. It is here, there, everywhere, now, then, always, forever. Rhyme is no essential part of poetry, but is a mere question of taste, and therefore never will be settled. Only such questions as are referable to the understanding can be put at rest. No one before Bysshe, and from Bysshe to Hood, and from Hood since, ever contended that all rhymes should be perfect. All the English-speaking poets, from Gower to Tennyson, and from George Sandys to Joaquin Miller, have used allowable rhymes, and sometimes, indeed, blundered into false ones. Shakespeare, Burns, and Byron were the greatest transgressors in this respect—one the very greatest, and the other two amongst the very greatest poets. Bysshe and Hood stand alone in insisting upon perfect rhymes. Bysshe was no poet, and Hood not a great one. Poets, critics,

and readers have accepted allowable rhymes, and probably will continue to do so while poetry is written. Indeed, sometimes an allowable rhyme, to many ears, is more pleasing, in certain positions, than a perfect one; especially when it precedes the closing line of a verse. It is like a thrill in music, on the second or seventh interval, resolving itself into the key-note.

My own theory is, that all the vowel sounds when in their proper relations to the consonants which precede and follow them, may be interchangeably used as rhymes with agreeable effect; as *scene, men, kin, pine, fane, ban, wan, lone, don, gun, tune*. *Tune* and *scene* are the extremes of the vowel sounds, and are surely not unpleasing—certainly more agreeable than no rhyme. Accented syllables ending with the same consonant, immediately following the vowel, whatever letters may precede them, are not inharmonious. It is not wholly the vowel sounds that make the rhyme, or give the pleasing effect. The vowels may be the same in sound, and yet the words extremely harsh, as, for example, *scratch* and *smash*. Here the sound of *a* is the same in both words, yet who could relish such endings to poetical lines? No one, surely, unless his ears were graters.

In music, the concords range from unisons, which are the most perfect, to the minor thirds, which are the least perfect; and while science exacts the precise relation between the tones of each concord, art by no means requires the sole use of the most perfect. Indeed, quite the reverse; for the consecutive use of the unisons would be but the movement of the two melodies; the consecutive use of the octaves would be but the movement of the two melodies an octave apart;

the consecutive use of the fifths and fourths, which are but reflexes of one another, would thrust the relations of the harmonies out of the key—indeed, this is never done—thus leaving the thirds and sixths, which may be used consecutively throughout the musical compass, and which, like the fifths and fourths, are but the reflexes of one another, to complete the harmony. Even the discords of the flat seventh and sharp fourth are frequently used, in the full harmonies of a composition, because for each of these discords two concords are obtained. In passages of consecutive thirds and sixths, the continual alternation between their majors and minors is extremely pleasing in music, and strikingly analogous to the perfect and allowable rhymes in poetry; and, as rhymes, *scene* and *lean*, or *tune* and *prune*, in poetry, than the thirds and sixths, as concords in music, stand to the octave and unison. Thus we see the beautiful analogy between poetry and music—and indeed between all the arts—yet the one most strictly bound by science is allowed the greatest latitude in art, while the one bound by no science is allowed the least. Yet it would seem, since the relations of melody and harmony in music are bound by the strictest exactions of science, and harmony and rhyme in poetry are mere questions of taste, that the latter art should have at least as liberal a latitude granted to it as is given to the former.

Yet whatever latitude may be allowed to rhyme in poetry generally, in a song every rhyme should be perfect. A perfect song is the rarest production in literature. There are fewer perfect songs than epic poems—just as there are fewer diamonds than bowl-

ders—and fewer perfect song-writers than masters of the epic. I venture the remark that there is not one good song to be found in all the range of literature written earlier than the seventeenth century. It was impossible to write a good song before the musical scale was settled, and the art of writing music understood and practiced; and there was no written music worthy of the name, anywhere, before the time of Handel. One hundred years ago such a being as Beethoven, Chopin, Ole Bull, Parepa Rosa, or Rubenstein, would have been as impossible on earth as an angel. There were then no superior musical instruments except those of the viol family, the flute and the clarionet. The organ was very imperfect, and the piano in a transition state, but little better than the old harpsichord. Fifty years ago there was not one instrument of the trumpet kind in existence, except the French horn, keyed bugle, and trombone. All the superior instruments of this class have been invented since.

Before the last century the art of music was in a very imperfect state, and no true song could be written until the music was ready to receive it; and no poet can be a true song-writer unless he is also a musician. I do not mean to say that he must be a scientific musician, or a practical artist, but he must have the soul of music in his nature. Byron, with all his genius, could not write a genuine song. He was not a musician. It is impossible to set his Hebrew melodies to music. They are fine poems, but not songs. Neither the composer, the performer, nor the singer, can manage them with any success; nor the hearer enjoy them as songs. Moore was undoubtedly the

best song-writer that ever wrote. He was a musician, and often sacrificed something of the poem to improve the song. His Melodies are perfect gems; not so much in the depth of their pathos and the fullness of their sentiment—for some of them are quite shallow and empty—but from their perfect finish and adaptability to the voice. They melt into the music that woos them. And Burns, it seems to me, must stand next to Moore as a song-writer. His songs are deeper, fuller, richer than Moore's, but not so polished, nor so ready to wed with sound. Burns, too, was a musician—not a theoretical or practical one, but a real and ideal one. I am well aware that Murdock, his teacher, said that “Robert's ear was dull for music;” but the truth is the music was dull for Robert's ear. It was the harshest, narrowest, and severest of Scottish church music, taught on a system of notation that had no fourth or seventh—and consequently no semi-tone—in its diatonic scale. No wonder, with such an ear as Burns had—turned to the harmonies of nature—that such music was repulsive to his soul. His genius was itself a musical instrument, played upon by the universal and eternal spirit. Shakespeare wrote no songs except the few fragments that are scattered throughout his dramas.

And not only should every rhyme in a song be perfect, but every syllable should be soft, round, full, and end with a vowel whenever practicable. The vowel sounds are the fullest, richest, and easiest to speak in tones; and in the order of their sweetness they stand as follows: *u, o, a, i, e*. It is impracticable to give a rich, full, sustained tone to *e*, and quite impossible if the syllable should end with *b, d, p, s, t, x*,



*z*, *ch*, *sh*, or *th*. Indeed, rhymes ending with these consonants, whatever vowel may precede them, are quite intractable in song. Next to the vowel sounds, rhymes ending in *l*, *m*, *n*, *r*, and *ng* are the most agreeable. And when *c*, *ch*, *s*, *sh*, and *th* precedes the rhyming vowel the sound is not pleasing. The richest and fullest vowel in its adaptation to tone is *u*; and *o*, the next, is also very soft and sweet. And the vowel sounds are the only ones on which the voice can dwell. The *fa-sol-law-ing* syllables follow these rules. There is also a peculiarity in the arrangement of syllables in a song. Much, in the ease and facility with which they may be uttered, depends upon what syllable immediately precedes or follows them. Sometimes, at the close of a syllable, the organs of speech are left in the exact position to begin the next, and sometimes the reverse. For example, *sol la* is much easier to sing than *la sol*, because, when we utter *sol* the organs of speech are left in the proper position for uttering *la*; while, if we utter *la* first, the organs must be changed before we can utter *sol*. This changing gives a kind of hitch in the song. A more palpable illustration may be taken from walking. When we have made a step with the right foot, we can not make the next step with the right foot; it would be a hop instead of a step.

Certain words are easily adapted to music, while it is found impracticable to mould others to sound. The syllables in *hal-le-lu-jah* and in *ju-bi-la-te* are perhaps the fullest and richest known in music. In *tranc-a-dil-lo*, and Uncle Toby's *lil-le-bu-le-ro*, and many of the meaningless (in words) choruses and chants found in catches and rondeaus, the syllables

are very sweet when joined to musical sounds. Pope's nonsense verses afford another happy example. Other words may be excellent in themselves, yet not at all adaptable to music. Take, as examples, *eloquent, redoubled, untrodden, inhabitants, witheringly, mockery, scorched, disquieted, unembittered, quenched, distinct, succeeding*—all from Byron's Hebrew Melodies. The composer would find them very unmanageable in music, and the singer would have great difficulty in giving them utterance in tones.

It is not likely that song-writers, composers, or singers think of these rules when they are writing, composing or singing; yet they nevertheless obey them whenever they produce a good song. The rules, indeed, do not form the song; the song forms the rules. No poet ever wrote a good song who was guided by any other rules, while writing it, than the spirit that was in him. Song-writing can neither be learned nor taught, save by the individual genius of the poet to himself. Genius does not draw its rules from art, but art from genius.

As some of the greatest poets have not been the best song-writers, so they have not been—unless they were also musicians—the best judges of rhymes; for rhyme has a strong affinity for song, and the vowel sounds a close analogy to melody. Besides, there is a harmony between thought and music, which, being merely psychycological, escapes the analysis of the understanding, and can be known only to those whose souls can receive and feel it.

But let us be thankful to our Bards who have enriched our poetry with rhyme, and thus united sense

and sound; to our composers who have inseparably married sentiment and song; and to our singers who have joined voice and verse as one.

## A REVIEW OF PROF. TYNDALL'S WORK ON SOUND.

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If the science of geology be true, there must have been a long period of time on the earth when there was no sound. While the surface of our globe was yet an igneous rock, without atmosphere, sound was impossible. And for a long time subsequent to this period, while the lower orders of vegetable life were forming, there was probably no uttered sound. These early productions grew, flourished, and decayed, in a noiseless world; and until animal life was so far developed as to have organs of utterance, sound was impossible, except from inanimate causes. No doubt the thunder, the storm, the volcano, the ocean, and the avalanche gave out their jarring clang to the earth—echoed from the mountains and whispered in the caves—long before there were ears to hear; but sound once established, silence became impossible. The air can not be silent. Nature has her murmurs even in her stillest moods.

Sound is the only medium by which animated nature can express itself. The utterances of the lower order of animals are not articulated; their language is merely intoned. The beasts of the field and the birds of the air have their various modes of expression. The elephant blows his nasal trumpet, and the mouse squeaks out its pain. The lion roars,

and the lamb bleats. The horse neighs, and even the hare has its little voice. The eagle screams his defiance, and the dove coos her affection. The owl hoots, the nightingale warbles, and the swan has her song of death. The woods and the plains are full of minstrelsy. Even the insect tribes give out their sounds by myriads of wings, and have their own peculiar songs. Reptiles hiss. Fishes make no noise by utterance, but they are not insensible to sound. Some of the lowest orders of animal life have no organs of utterance or hearing, and therefore make no noise, and hear none. To them the world is silent.

The speech of man is but articulated sound. Out of sound he has invented nearly four thousand different languages, having in all many millions of words, and each word a distinctly different sound. By these he can express the perceptions of his mind, the emotions of his heart, and the aspirations of his soul. He has thus been talking during six thousand years—and if recent discoveries be reliable, for a much longer period—yet how endless are the combination of his words. The literature of the world is but freed sound, to be silently understood and enjoyed, or fixed into words, at the pleasure of the reader. And music, almost celestial, with its enchanting melody and entrancing harmony, which, speaking without words, fills the mind with pure thoughts, the heart with sweet sentiments, and the soul with pleasing hopes—is nothing but moulded sound. Man has been singing ever since his creation—when the morning stars began their hymns—and yet how inexhaustible is the variety of his songs. It is not sur-



prising, then, that sound is an interesting subject of science. It attracted the attention of man early in his career, and has engaged minds of the first character ever since that time. It would be an interesting subject to trace the gradual development of knowledge on this subject till it took rank as a science, and the various ingenious discoveries made in it since that time, but as such a course is not necessary to our present purpose—or at least not within the range of our design—we must deny ourselves the pleasing task. But we propose to give some explanations of the subject we have chosen in a method which we hope will not be uninteresting to the general reader.

The latest work on sound, so far as we are aware, is that of Professor Tyndall. It is the American edition, but we understand it to be a reprint of the English edition from duplicate plates furnished to the publisher by the author himself; the two editions, therefore, are not in any respect different from one another. The volume contains the substance of eight lectures delivered by the author at the Royal Institution of Great Britain. The style is popular—being a happy medium between that algebraic brevity not easily understood by general readers, and the stately verbosity so apt to mislead undisciplined minds; yet it somewhat lacks that severe correctness which ought to characterize every scientific work. The character of its style, however, will not be objectionable to general readers, especially in America, where science is rapidly becoming popularized. The book is well illustrated, has a summary at the end of each lecture, and a general index.

Professor Tyndall opens his lectures with some physiological remarks on the brain and nervous system, explaining the mode by which the senses convey a knowledge of external objects to the understanding; and there are also references to the same subjects in other parts of the book; but we do not propose to discuss questions of physiology, as the understanding of that science—though as to sense of hearing it might be cognate—is not necessary to the discussion of the science of sound. Doubtless all the separate sciences are but so many parts of one grand science—the great system of Truth; yet it would be very embarrassing to discuss them all at once, or even several of them together. But this part of the book will probably not be deemed a redundancy. There is, however, as it seems to us, a conspicuous omission in the work, in its not treating of the structure of buildings and rooms for public speaking, according to the laws of acoustics. Surely the best mode of erecting our public edifices—churches, colleges, state-houses, theaters, lecture-rooms, and the many places of instruction and amusement, so as to obtain the best effects of voice—is a subject worthy of attention, and we think ought to have been investigated in a work of this kind. We are not sure, however, that there are any rules as to shape, proportion, size, and height of rooms, by which all parts within their walls can be made equally advantageous to both speaker and hearer. Perhaps not. To expect this might be as unreasonable as the notion of the man who refused to purchase a lithographic view of the city in which he lived, because it did not show all the front doors.

No doubt every room, whatever may be its shape, size, proportion, or height, has certain mouth-points most agreeable to the speaker, and certain ear-points most advantageous to the hearer; yet if these difficulties can not be entirely overcome by the plan of the rooms, they can certainly be favorably modified. And the best means of deadening walls so as to prevent the reflection of sound as much as possible, and of damping the echoes reflected from them—thus destroying, in part at least, those cross-cutting reverberations which are so annoying—are surely worthy of scientific attention. Professor Tyndall, with his means of experiment and illustration at hand, would doubtless have thrown much light on these interesting practical questions, if he had given the subject a more thorough investigation. Science instructs us how to make pleasing sounds more resonant and rich, and surely might teach us something about destroying or deadening sounds which are discordant or disagreeable.

The experiments given by Professor Tyndall on the velocity of sound passing through various media—air, water, the gases, several of the metals, and different kinds of wood—are full and satisfactory; establishing beyond doubt that the two conditions on which its velocity mainly depends are the elasticity and density of the mediums through which it passes. It is a well known fact that water from its point of greatest density expands by the increase of heat, and also expands from the same point by the decrease of heat. Doubtless, when it expands from a decrease of heat, its particles become more dense and less elastic, and when from the increase of heat, less dense and more elastic. We have thought that interesting experi-

ments might be founded on these facts, by passing sound through water at its point of greatest density, and at the various degrees down to freezing, and from the same point through the various degrees above. But we could not find sufficient data in Professor Tyndall's experiments to form correct conclusions on these questions.

Professor Robinson's experiment for the purpose of ascertaining the rapidity of musical vibrations, made with a stop-cock so constructed as to open an organ pipe at regular isochronous intervals, places the G in alt. at 720 vibrations per second. This would fix the lowest C at 30 vibrations per second. We have hitherto regarded this as correct; but the illustrations given by Professor Tyndall on the Syren put the lowest C at 33 vibrations per second, which would place G in alt. at 792. The Professor follows his own illustrations as to the lowest C, yet preserves G in alt. at 720, and does not seem to have noticed the discrepancy. It is difficult to see how the difference between him and Professor Robinson came, unless the experiments were carelessly made; for both means, as well as that of a toothed wheel, seem to be well adapted to settle the same fact. Measurement of the rapidity of musical vibrations being the only means by which a standard pitch can be positively preserved, there ought to be no confusion in the experiments. There is already some variation between the German, French, English, and American standards. It is to be regretted, too, that French philosophers count a full returned vibration two vibrations instead of one. By this means they would in France (following Professor Robinson's standard), in words, place the lowest C at

60 vibrations per second, while we (following the same standard) would place it at 30, when in fact both statements mean the same thing. Such confusion is calculated to embarrass the inquirer, and should be avoided, if possible.

In mentioning the analogy between light and sound, Professor Tyndall remarks :

“The quickest vibrations which strike the eye as light have only about twice the rapidity of the slowest; whereas, the quickest vibrations which strike the ear as a musical sound have more than two thousand times the rapidity of the slowest.”

This is true, but he might have added that the slowest vibration of light is many millions of times more rapid than the quickest vibration of sound. We suppose he used Dr. Young's tables of light, adopted by Sir John Herschell; if so, it should be remembered that they measure only one octave of *colored* light—running from red to violet inclusive. What is the vibration of the lowest degree of light which the eye can use? and what is it of the brightest light which the eye can bear? These are questions to be settled before we shall know the vibrations of the whole compass of light. The darkest light having the slowest vibration, and the brightest light the quickest; and there being colors many shades darker, and many shades brighter, than those shown on the spectrum, it may be that light repeats itself in octaves by colors from the darkest to the brightest, in the same manner that sound does in the musical scale from the lowest to the highest. There are many analogies between sound and light yet uninvestigated, and some which seem to point in this direction. The reflex rainbow,



which always accompanies the original, in having the colors reversed, is remarkably analogous to the reflex concords in an octave. The intervals of a fifth and fourth, a fourth and fifth, a third and sixth, and a sixth and third, always complete the octave, and are reflexes of one another; that is, each pair of these concords are but one concord and itself reversed. The same thing takes place in the tints of the two rainbows.

In speaking of what determines the *quality* of musical tones, Professor Tyndall says:

“Higher tones mingle with the fundamental one, and it is their intermixture which determines what, for want of a better term, we call *quality* of sound. The French call it *timbre*, and the Germans call it *klangfarbe*. It is the union of high and low tones that enables us to distinguish [the tones of] one musical instrument from [those of] another. A clarinet and a violin, for example, though tuned to the same fundamental note, are not confounded; the auxiliary tones of the one are different from those of the other, and these latter tones uniting themselves to the fundamental tones of the two instruments, destroy the identity of the sounds.”

The above extract contains both truth and error; unfortunately for the truth, however, it is so entangled with the error as to render the proposition incorrect. But, before we proceed to point out the error, let us settle our terminology. We are not willing to give up the plain English word *quality* for the German word *klangfarbe*, translated into *clang-tint*, and used by Professor Tyndall; and if we were, we think *tone-tint* a better translation, as applicable to music, than *clang tint*. *Clang* in English does not fairly mean

tone, most commonly the reverse indeed. It never means a concord of tones. Any sudden, short, sharp, harsh noise is a clang; a tone is always supported by regular isochronous vibrations. This indeed is the distinguishing difference between a mere noise and a tone. And *quality* has the advantage of being a single, direct and positive word, while *klang-tint* is merely figurative, besides being a cumbrous compound. And *quality* also has the advantage to readers of the English language of being well understood. Nor are we willing to abandon the word *harmonic*, which has a well settled meaning both in the science and art of music, for the German word *overtone*. *Overtone* may mean any tone above another, while *harmonic* means a peculiar tone in a certain relation to its fundamental. True, *overtone* in German may have the same meaning as *harmonic* in English, yet that fact, in our judgment, affords no good reason why we should exchange words. And we protest against the inaccurate use of the word *mingle*, so frequently made by Professor Tyndall. He uses it as the convertible equivalent of *co-exist*. Now these two words never mean the same thing. Musical tones never mingle. Whatever their combinations may be, each one persists in its individuality. If tones mingled—thereby losing their identity, and each becoming a component part of a common exponent of them all—harmony in music would be impossible. And Professor Tyndall uses the word *intermixture* in the same loose and unwarrantable sense. This practice is objectionable. Confusion in terminology is often confusion in science. Keeping ourselves, then, to words well understood, and to their true mean-

ing, we proceed. In the first place, Professor Tyndall confuses the effects of wind and stringed instruments together, as if the quality of their tones depended on similar conditions, when in fact the conditions are widely different; and the combination of their harmonics follow different laws. But we notice harmonics here only as they are connected with the quality of tones; in another place we propose to show the laws which govern them, both on stringed and in wind instruments. The combination of a harmonic in a wind instrument with its fundamental tone is impossible; nor can its harmonics co-exist except as unisons. *Any* harmonic on a string may co-exist with its fundamental tone, and its harmonics may co-exist in certain limited relations. What gives such purity and sweetness to the harmonics of a wind instrument is the fact that each harmonic is made up of a number of unisons; that is, counting the fundamental tone one, the second harmonic is made of two unisons, the third of three, the fourth of four, the fifth of five, and so on throughout the series. And the concord of their unisons is complete from necessity—so complete, indeed, that the ear confounds them as one—for the excess of one would be instantaneously imparted to the deficiency of another, until the harmony was perfect. Their nodes must exactly balance one another or they can not exist; therefore the slightest imaginary discord between harmonics produced together in the same degree becomes impossible. The same law, namely, the co-existence of unisons, gives that peculiar superiority to the harmonics of a string; but when they co-exist with other harmonics, or with their fundamental tone, they become, not a tone, but

several tones, either in concordant or discordant relations; consequently it is erroneous to say that this combination gives quality to a tone, but it may of course affect the aggregate quality of an assemblage of tones. Nor is it by harmonics that we distinguish between the tones of stringed and wind instruments; it is because their tones are produced by widely different—indeed, perfectly opposite—causes. A pipe registers the current of wind furnished to it by the bellows or the breath, into isochronous vibrations, and they impart the quality of the tone; a string furnishes the vibrations already formed to its sonorous body, and *it* imparts the quality of the tone. Besides this difference, strings are made of various materials—steel, catgut, silk—which must necessarily affect their tones. The truth is, the quality of tones depends on so many and such complicated conditions that science has not yet detected them all. A change of strings on a stringed instrument changes the quality of its tones, a change of conditions in a wind instrument changes the quality of its tones, *while their harmonic capacities remain the same*. We cannot, therefore, attribute these changes to harmonic differences. A pipe simply furnishes in its walls a solid basis from which the vibrations react; a string furnishes the vibration to a sonorous body, upon the character of which, and the kind of string, the quality of the tone mainly depends. Experiments prove that the area, dryness, hardness, elasticity, weight, thickness, density, and many other conditions of the sonorous body, decide the quality of tone on stringed instruments. It is therefore very easy for a musician to detect a difference between the same

tones on two stringed instruments of the same kind, while between the same tones on two wind instruments of the same kind, equally in good order, it is very difficult, if not indeed impossible. In the one case the quality depends on a few simple, plain conditions; in the other, on many and complex conditions, some of which are still hidden. While, therefore, it is difficult to show all the causes on which the quality of tones depends, it is easy to demonstrate that it does *not* depend on the co-existence of harmonics with their fundamental tone.

In the fourth lecture the experiments of Chladni, Wheatstone, Young, Faraday, Lichtenberg, Strehlke, Melde—some of which are improved by Professor Tyndall himself—on rods, square and circular plates, blocks of wood, bent wires, disks, glass—whereby we are made not only to hear sound but also to *see* it—are admirably set forth. The illustrations of the bell, so far as showing that its harmonics are always in even numbers, are very clear. This arises, doubtless, from the fact that in a bell, having no ultimate fixed nodes like a spring, each vibrating segment must find its support in a balancing segment, which of course could not take place in odd numbers. A steel or other metallic ring, when suspended and caused to vibrate, will divide in the same manner. Professor Tyndall gives the scale of a bell as follows: "Assuming its fourth division, which is always its fundamental tone, at 40 vibrations, its sixth will give 90; its eighth, 160; its tenth, 250; its twelfth, 360." In this we think Professor Tyndall is mistaken. We are aware of the anomalous law governing the scale of rods fastened at one end and free at the other, but the bell does not



appear to be subject to any such aberrations. The reason of the law which governs the vibrations of a fixed rod or tongue, is because its ultimate division has but one point of rest—the free end being at the middle point between the two nodes. The vibrations of plates and flat disks are also anomalous, and doubtless for the same reason—namely, that their ultimate divisions have but one node. The vibrating segments of a bell run around its circumference and pass into one another, having a node at each end of every segment, and are not, therefore, subject to this apparently exceptional law. Professor Tyndall's scale of the bell, expressed in notation, taking B flat as its fundamental tone, would be as follows:



Any musician can see at a glance, and everybody can hear when struck, that the above tones do not correspond with those of a bell. Any combination on a bell of tones according to the above scale, except alternate octaves, is impossible. Their simultaneous production, if forced on a bell, would simply break its walls, for its material would be demanded in different relations at the same instant of time. No one need hesitate to affirm a demonstrable proposition against Professor Tyndall, or any other author-

ity. Professor Huxley says that the highest merit in a man of science is to doubt and demand proof; that is, to accept nothing in science which science can not prove. Much less, then, should we accept, on mere authority, a proposition which science can disprove by demonstration.

The true scale of a bell is as follows: Counting its fourth division, and fundamental tone, at 40 vibrations, its sixth would be 60, its eighth 80, its tenth 100, its twelfth 120. This scale expressed in notation, still assuming B flat as the fundamental tone, would be written as follows:



Of course, the same relations to any other fundamental tone will produce the same concord. If a musician, while a large bell is ringing, will ascertain the unison of its fundamental note on the piano, and then strike the concord from it in the relation in which it is above written, he will find the instrument in full harmony with the bell. All the tones of a bell may be reduced to the relations of the common chord in the major diatonic scale, and are produced by the vibrations of its aliquoit parts, and, when in combination, by the aliquoit parts of the whole bell, with the aliquoit parts of its aliquoit parts, all vibrat-

ing at the same time. Any other law of co-existent vibrations would be, as before remarked, impossible without actually breaking the walls of the bell. And all the resultant tones of a bell—that is, those produced by the combination of other tones—fall within the harmony of the original tones, merely producing some one or more of them lower in the scale, and, therefore, though they add richness to the concords, do not vary the combinations. Any experienced ear, by listening attentively to the ringing of a large bell for a considerable length of time, may hear a faint murmuring tone far below the actual tone of the bell. This is the resultant tone produced by the fundamental tone combined with its fifth above, and may be represented in numbers as follows: Given B flat, 214, as the fundamental tone, its fifth above would be 321. Now, the difference between 214 and 321 is 107, which represents the resultant tone. The same thing may be demonstrated by quantities, seen by the eye on the rim of the bell in its lower divisions, and made palpable to the sense of the ear by playing the lower two tones in the last example, while holding down the key of the B flat an octave below, but without striking it, and then letting the sound die away on the lower string, still held undamped. Although this tone on the piano is a sympathetic tone, yet it is the same as the resultant tone on the bell. The tone of 214 is produced by the bell vibrating in four segments, each of which is divided into three smaller vibrating segments, thus making twelve segments, which vibrate simultaneously with the four. The number of the resultant tone, 107, will divide the fundamental tone, 214,

twice, and its fifth, 321, three times, all without remainder. If the whole rim of the bell could be thrown into one series of vibrations, they would be represented by 26.75, which number will divide any of the above numbers without remainder. Thus we demonstrate the scale of the bell, not only by abstract science, both in numbers and quantities, but also make it palpable to the senses of seeing and hearing. It seems to us that further evidence to prove our proposition is unnecessary.

In connection with bells, Prof. Tyndall might have mentioned the Chinese gong, if he had thought that annoying instrument worthy of attention. The disk of a gong, the rim around it, the unequal thickness and weight of its parts, make its vibrations irregular, both in rapidity and amplitude. None of its vibrations are isochronous; this is the cause of its disagreeable sound, which gives us a fine illustration of the scientific definition of a noise. The same difficulty of irregular vibrations attends the sound of a drum, or a cymbal, while they are struck rapidly; but when their vibrations are allowed to balance and settle, as they will partially while dying away, these instruments yield an isochronous tone which is not altogether unpleasant.

In the fifth lecture Prof. Tyndall gives us a full and accurate demonstration of longitudinal vibrations in rods and wires, and also of the relative velocity of sound through solids. We have also some explanations of the tones of pipes—both with and without reeds—which, in the main, are well considered. The anatomy of the organs of the human voice is given, and the manner in which they operate in producing

sounds. It seems that Hemholtz attributes the falsetto voice to anatomical changes. We had always thought that it was merely the harmonic octave, made precisely as it is made on the flute, or any other pipe. If the falsetto is not a harmonic octave we think the human voice incapable of producing one.

We do not agree with Prof. Tyndall when he says that: "Through the agency of the mouth we can mix together the fundamental tone and the overtones (harmonics) of the voice in different proportions, and the different vowel sounds are due to the different admixtures of this kind."

And for reasons which we have already stated, namely: That no such combination can be made to co-exist by the voice. The only co-existent tones possible in the human voice, or any other pipe—for the human organ of voice is but a reed pipe—are unisons. In our opinion, no single human voice ever yet uttered a combination of different tones at the same time. If two different tones depend on two different series of isochronous vibrations, the feat is impossible. In support of this theory, Prof. Tyndall adds: "We may blend in various ways the elementary tints of the solar spectrum, producing innumerable composite colors by their admixture. Out of violet and red, we produce purple, and out of yellow and blue we produce white. Thus also may elementary sounds be blended so as to produce all possible varieties of clang-tint."

Unfortunately for this theory, sounds will not "mix;" nor will they "blend." There is no such thing as composite sound; that is, a sound made of two other sounds, and differing from either and both. Sounds remain as separately marked as colors in mosaic. All



kinds of noises, sounds, and tones may co-exist if produced by independent causes; but each one maintains its identity whatever may be their combinations. There can, therefore, be no exponent of them all, or a compositive sound. The vowel sounds are simple utterances—the simplest in nature—the first uttered by babes—made by the natural positions of the organs of voice—maintained by a single series of vibrations, as any one may hear if he will dwell on one long enough to give it the character of a tone. The artificial utterances of the vowel sounds by inanimate instruments is no contradiction of this view, but rather a confirmation of the fact. The experiments of sounds on flames show conclusively that tones will not “mix” nor “blend.” Whenever two tones are blown upon a flame, it will show a marked difference between them. All the experiments on flame in lecture sixth, it seems to us, establish this conclusion. They are very interesting.

The principle by which sound silences sound is fully illustrated and proved. It is done simply by accommodating the swell of one vibration to the depression of another isochronous with it, and of the same amplitude. One can easily imagine two series of waves in water, wherein the swell of one would just fill the depression of the other, and thus leave the surface smooth. Precisely the same thing takes place in the air between two sounds when one silences the other. The demonstration is an admirable one, and finds a beautiful analogy, as well as support and confirmation, in Grimaldi's experiment, showing that light may extinguish light; thus giving additional evidence that light, like sound, is caused by vibrations, and that

colors, like tones, are simply differences in their velocities.

Prof. Tyndall states the theory of resultant tones correctly—that is, where two tones produce a third—and shows that the cause cannot arise from beats (beatings), but he fails, as do Young and Helmholtz, to give the true cause. We have supposed the cause to be the continual crossing of the two series of vibrations or tone-waves, whereby at each crossing a vacuum is produced and filled, which being thus produced and filled alternately, would create a third series of vibrations or tone-waves; such third series would of necessity correspond with the difference between the two producing tones, and this difference is always found to be the vibration of the resultant tone.

As to Prof. Tyndall's doctrine of "summation" tones—that is, where the sum of the vibrations of two tones creates a third—we are not convinced. There is no fact in science more fully demonstrated, and uniformly accepted, than that sound is caused by the vibration of the atmosphere. This vibration must be communicated to the atmosphere by a vibrating body—as a string, tongue, or voice; or caused by the reaction of the atmosphere from the surface of some substance or body—as a cavity, tube, or pipe. The resultant tone called by Prof. Tyndall a "difference" tone, is demonstrated to have a cause different from either of the producing tones. Now, if such a tone as that which is called by Prof. Tyndall a "summation" tone can exist, it must be produced by the very same cause which produces the "difference" tone, and the two tones would co-exist; that is, one vibrating cause must produce two rates of vibration at the same time

—a combination contradictory to abstract science, and impossible in fact. It is the same as saying that two can be four and four two, or that this and that can be here and there simultaneously. For example: The resultant tone of 240 and 400, (C and A), is 160, (F). The “summation” tone of those two would be 640. Now, to produce this “summation” and “difference” tone, the same cause would have to vibrate at the rate of 160, and 640, times per second, simultaneously—a result which, I respectfully repeat, is impossible. We must not be deceived or confused, by the co-existent harmonics often produced on a monochord. These are caused by the vibration of its aliquot parts at the same time, each of which acts as an independent string; these, therefore, are the same as so many different strings, and hence are, in fact, so many different and separate causes of tone. It is impossible, of course, for the same material in the string to vibrate, simultaneously, at two different rates of velocity. The same impossibility exists between “difference” and “summation” tones, otherwise harmony and discord would arise from the same cause. We are thus, as it seems to us, forced to the conclusion that Prof. Tyndall’s “summation” tones, have no existence in fact.

Prof. Tyndall’s experiments showing the cause of sympathetic tones, which may be noticed in this connection, are convincing as far as they go, but they might have been carried much farther than unisons; for not only will unisons communicate their vibrations through the air, or along a sonorous body, to unisons, but also to their concords; and concords thus awakened will communicate their concords in the various

combinations of the major diatonic scale; that is, unisons will move unisons, and their concords will move other concords of the same key note, and also sometimes their resultant tones.

Prof. Tyndall has well refuted Euler's theory as to *why* musical consonance is pleasing—namely, that the mind takes delight in order, and in the simplicity and complexity of relations—but he has given no better theory than the one he refutes; and simply, no doubt, because the problem can not be solved by science. The enquiry as to the cause which makes harmony *pleasing*, and the cause which *produces* harmony, presents very different and distinct questions. To ask *why* harmony is pleasing, is the same as to ask why pleasure is pleasing. The soul is pleased with many things unexplained by science. The question is purely a psychological one, and, as we declined in the beginning to discuss questions of physiology, we have now no intention of entering upon those which belong to psychology. But what is the *cause* of harmony, and what are the *conditions* upon which it depends, are questions that may well be asked, and science can give the answers. We do not accept, however, the elaborate theory of vanishing beats (beatings) advocated by Helmholtz, and adopted by Prof. Tyndall, because we do not think it the true one. Beatings arise between tones nearly in unison, when the vibrations are not quite isochronous, and also between concords when the harmony is not quite perfect. What Prof. Tyndall calls beats (beatings), that is, want of concurrence in the vibrations, can never be eliminated from harmony, because in all concords, except in unison, certain ratios of the vibrations are never concurrent. Even in the

octave but 1 in 2 vibrations are concurrent, in the fifth but 1 in 3, in the fourth but 1 in 4, in the major third but 1 in 5, in the minor third but 1 in 6, in the major sixth but 1 in 5, and in the minor sixth but 1 in 8. It is this regular alternate concurrence and concurrence (if the word be permissible), which give the peculiar characteristic to each concord, and make it pleasing to the ear.

The following is our resolution of harmony. Prof. Tyndall gives the correct ratios of the concords. In the unison the ratio is 1 to 1, in the octave 1 to 2, in the fifth 2 to 3, in the fourth 3 to 4, in the major third 4 to 5, in the minor third 5 to 6, in the major sixth 3 to 5, and in the minor sixth 5 to 8. The more frequent the concurrence of the vibrations the more perfect will be the harmony. But it is found that the same ratios in different parts of the musical compass do not produce the same degree of perfection in the harmony. There must be, then, some other condition than the frequency of the concurrences in the ratios on which harmony depends. That other condition is the frequency of the concurrences of the vibrations in the *duration of time*. To illustrate: Take the major third composed of C and E about the middle of the organ key-board, where their vibrations are 480 to 600, and we find it a pleasing concord, but slightly imperfect. Let us ascend three octaves and try the same concord where its vibrations are 3,840 to 4,800; here the union of the two tones to the ear is complete, and the harmony perfect. Then take the same concord three octaves below the middle one, where the vibrations are 60 to 75, and it will be found very rough and jarring to the ear. Now keep it in mind that the vibrations



of each of these major thirds occur in the same *duration of time*—that is, that it takes as long to accomplish the 60 and 75 vibrations, as it does the 3,840 and 4,800—and we shall find that in the first instance we have 120 concurrences in a second, in the second instance 880, while in the third we have but 15. It needs no argument to prove that 880 concurrences per second will fall more smoothly on the ear than 15. We may, therefore, safely rest on the following propositions:

1. Musical harmony between two or more tones depends on the frequency of their concurrent vibrations in *ratios*, and also on their frequency in the *duration of time*.

2. The greater the frequency in *ratios*—the *time* being equal—the more perfect the harmony.

3. The greater the frequency in *time*—the *ratios* being equal—the more perfect the harmony.

4. The greater the frequency, both in *ratios* and in *time*, the more perfect the harmony.

There is a peculiarity, however, in the harmony of octaves, which should be explained. In the interval of two octaves, for example, the concurrent vibrations are one in every four of the higher tone; and in the interval of a fourth the ratio of concurrences is the same; yet the ear, notwithstanding the duration of time may also be the same, never mistakes the one for the other, and always receives the interval of the two octaves as the more perfect harmony. The reasons are, first, that in the harmony of octaves the concurrences always fall on even numbers in both tones, while in all other concords they fall on even numbers in one tone and on odd numbers in the other; and, second, in the harmony of octaves, whether between

one, two, three, or any number, there is always a concurrence on every *half* vibration of the lower tone, which is not the case in any other concord. Thus, in point of fact, the concurrences in the interval of two octaves are *two* in every four of the higher tone, instead of one in every four. This fully explains the difference the ear detects in the harmony of two intervals; although, while we count the departure and return of the string, or of the tone-wave, as but one vibration, their ratios must remain the same. But whatever method we may adopt in counting the vibrations, it will not affect the truth of the above propositions.

As we are at variance with Prof. Tyndall on the following propositions, we prefer to state them at length in his own words:

“Now it is not possible to sound the string as a whole without at the same time causing, to a greater or less extent, its subdivisions; that is to say, superposed upon the vibrations of the whole string we have always, in a greater or less degree, the vibrations of its aliquot parts.

“And so it is with other sounding bodies; we have in all cases a co-existence of vibrations. All bodies and instruments, then, employed for producing musical sounds, emit, besides their fundamental tones, tones due to a higher order of vibrations.

“In the music of an orchestra, not only have we all the fundamental tones of every pipe, and of every string, but we have the overtones (harmonics) of each, sometimes audible to the sixteenth series. We have also resultant tones, both difference tones and summation tones, all trembling through the same air, all

knocking at the self-same tympanic membrane. We have fundamental tone interfering with fundamental tone; we have overtone interfering with overtone; and have resultant tone interfering with resultant tone. And besides this we have the members of each class interfering with the members of every other class. The imagination retires baffled from the attempt to realize the physical condition of the atmosphere through which these sounds are passing.

"The strings of a violin, for example, are rich in overtones (harmonics) whose interferences must be taken into account when judging of the combinations of the sounds of two strings."

Let us, before we begin our answer to the above propositions, clear away some verbal differences which might lead to confusion. In our illustrations by numbers we shall count the lowest C at 30 vibrations per second—according to Prof. Robison's experiments with the stop-cock, instead of those adopted by Prof. Tyndall on the syren, which placed the lowest C at 33 vibrations per second.\* We should also remark that in numbering harmonics we count the fundamental tone inclusive. It seems to us this mode is preferable to any other, not only because the fundamental tone belongs to the same system of tones, but because it brings the division of the chord, the unisons in the tone, and the harmonic, to the same number. That is, if we number the fundamental tone 1, then the harmonic number 2 will divide the string into 2 parts,

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\* By adding  $\frac{1}{10}$  to any number representing vibrations in this review, the sum will correspond to the number as given by Prof. Tyndall; or, by subtracting  $\frac{1}{11}$  from any number representing vibrations as given by Prof. Tyndall, the remainder will correspond to the number as given in this review.

and have 2 unisons; number 3 into 3 parts, and have 3 unisons; and so on indefinitely. Prof. Tyndall excludes the fundamental tone in his system of numbering, which, besides being wrong in itself, as we think, represents all the even harmonics by odd numbers, and all the odd ones by even numbers. With these explanations kept in mind, we proceed.

In the first place we take issue with Prof. Tyndall, on the facts stated in his propositions—that some of the aliquot parts of a string *always* vibrate with its whole length—that we have in *all* cases a co-existence of vibrations, and that the fundamental tones of *all* instruments employed for producing musical sounds are accompanied by their harmonics. It seems to us that Prof. Tyndall might have suspected the error of these statements in his own familiar experiments on the monochord, wherein, when he plucked the string in the middle, he had no harmonic, when he plucked it into two divisions he had two harmonics, and when he plucked it into three divisions the harmonics produced by two divisions disappeared, when into four, the harmonics of three divisions took leave; thus, continually finding the harmonics of the odd numbers chasing away those of the even numbers, and the even ones those of the odd numbers, throughout. And we think he might have been quite convinced by his experiments on the syren, whereby he shut out all possibility of vibrations except the single series he desired. We would also refer to the tone produced by a toothed wheel by striking a card held to its circumference, in which a complication of vibrations can not possibly exist. If these are not convincing, we think Prof. Robison's stop-cock, through which there is but a single vent, must be regarded as conclusive evidence. A tone is

produced and supported by a single series of isochronous vibrations. One series can never be two series, yet, until it can, one series can never produce two tones. The above experiments show conclusively that there can not possibly be but one series of vibrations in each instance, and therefore but one tone. The fact that a fundamental tone is *always* accompanied with some of its harmonics does not exist, but the truth is that under musical conditions they *never* so attend as a *necessary* accompaniment, and never come unbidden. They can neither be heard nor their existence demonstrated. If they were audible, music, as an art, would be impracticable. We venture to assert that in a whole orchestra there is not one harmonic which does not come and go by the volition of the performer. Bells produce harmonics at random, though always within the range of their concords; and on the monochord they are made very easily; sometimes, indeed, when the string is bowed, or struck in a peculiar manner, near its bridge, or a rest, they come as volunteers; but it must be remembered that a monochord is usually of an undue musical length, made so on purpose to beget harmonics, which are not, then, always readily produced, except by dampening the nodes. On a harp, which they would be more likely to trouble than any other musical instrument, on account of the great length of some of its strings, and the liberty to pluck them at any point, they never appear except at the pleasure of the performer. On the ordinary piano they can not be produced at all by the keys alone; indeed, the hammers and dampers are adjusted purposely so as to avoid them. Some pianos, however, have a harmonic attachment. The sweet, pure concords accompanying the performance of a superior



pianist, and not made by his touch, are sympathetic tones from other strings undamped—they are not the harmonics of the strings struck. By undamping the fundamental base tone, its major third, or its fifth, or all of them at once, and then striking their concords, or some of them, above, you will have a pleasing combination of additional harmony, not made by the strings you strike, but by those you hold undamped; or undamp the upper concords and strike the base tones and you will have a similar effect. Any ordinary player may prove the truth of these experiments in a great variety of combinations. It is true that a portion of the scale in most instruments is, or may be made, in harmonics, but they are not untamed—they are subjugated rigidly to their places, and do not appear, except at the desire of the player. The scale of a common horn is all in harmonics except its lowest note. A great portion of the scale of keyed trumpets is in harmonics. Whenever more than one note on a wind instrument is made in the same position, all except the lowest ones are harmonics. Every instrument of the viol kind has a complete chromatic scale of harmonics, throughout its compass, from an octave above its lowest note. If these come unbidden, and so abundant, Ole Bull would have a sad time with his violin. Hogarth's enraged musician would be but a faint picture of his distress. The truth is, harmonics on stringed instruments, instead of coming voluntarily, are very difficult to obtain, except the few whose nodes are aliquot parts of the open strings; and the power to obtain them with facility, and use them skillfully, are among the highest graces of execution.

Prof. Tyndall is quite in error, also, in the doctrine

of the co-existences of harmonics with their fundamental tones, and with one another. That they can and do co-exist to a limited extent, according to a certain law, is true; but he leads us to infer that all the even numbers may co-exist with one another, under all circumstances and in all relations; and all the odd numbers in the same way under like conditions—indeed, he says as much in several places in his book—at least he does not distinguish the law by which their co-existences are governed, and does not notice the law whereby they are produced at all.

We propose, now, to examine the subject of harmonics, and demonstrate the law of their production and of their co-existences; and we begin with the law of their production on the monochord.

Every harmonic is an aliquot part of its fundamental tone, both in the number and in the distances of its nodes, and also in the vibrating quantity of the string which produces it. Every fundamental tone is an aliquot part of its harmonic in the number of its vibrations. The vibration of the second harmonic is the sum of its fundamental tone added to itself; the vibration of the third is the sum of its fundamental tone added to the sum of the second; that of the fourth, its fundamental tone added to the third, and so on progressively to any extent—that is, the vibration of any harmonic is the sum of its fundamental tone added to that of all the harmonics which precede it. The fundamental tone of any harmonic is the quotient of the harmonic divided by the number of the fundamental tone; that is, if the vibration of harmonic number twelve, for example, be 360, then divide 360 by 12, and the quotient 30 is the fundamental tone; or multiply the vibration of the fundamental tone by the

number of the harmonic, and the product will be the vibration of the harmonic. The first octave of a monochord produces but one harmonic; the second, 2; the third, 4; the fourth, 8; and so on to infinity. Every succeeding octave has a number of harmonics equal to the number of all the octaves which precede it; for example, the first seven octaves have 228 harmonics, the eighth octave has an equal number, while out of the whole 256 but 5 belong to the musical scale. Harmonic intervals become less and less continually as they advance in the scale, according to the same principal in mathematics as that by which the space between two constantly approaching lines becomes less and less forever, yet the lines will never meet.

The following table, No. 1, will show the number of each harmonic, the number of its vibrations per second, and, when a musical interval, the letter which represents it; when not a musical interval, it will be marked with a dash, thus——. We assume C, at 30 vibrations, as the fundamental tone of the monochord, though of course, the principal is the same, whatever may be the length of the monochord, or the vibration of its fundamental tone:

TABLE 1.

Harmonics .....	1,	2,	3,	4,	5,	6,	7,	8.
Vibrations .....	30.	60,	90,	120,	150,	180,	210,	240.
Letters.....	C,	C,	G,	C,	E,	G,	—,	C.
Harmonics.....	9,	10,	11,	12,	13,	14,	15,	16.
Vibrations.....	270,	300,	330,	360,	390,	420,	450,	480.
Letters.....	D,	E,	—,	G,	—,	—,	B,	C.

The foregoing process may be extended indefinitely, but we can obtain no more musical intervals than those shown above. The same letters, however, may

be repeated again and again, but amidst an overwhelming and constantly increasing number of discords.

We next proceed to demonstrate the law according to which harmonics may co-exist on the monochord.

The fundamental tone may co-exist with any single number of its harmonics. Any single harmonic may co-exist with its fundamental tone, or with any other harmonic of which it is an aliquot part. All harmonics which are aliquot parts of their fundamental tone, and also aliquot parts of the aliquot part of their fundamental tone, may co-exist with one another, and with their fundamental tone.

The succeeding table, No. 2, will show what harmonics may co-exist on the monochord, the number of their vibrations per second, and the letters which represent them when they are musical intervals. The dash represents the wild harmonics which have no representation in letters, and are not musical intervals:

TABLE 2.

Harmonics.....	2,	4,	6,	8,	10,	12,	14,	16.
Vibrations.....	60,	120,	180,	240,	300,	360,	420,	480.
Letters.....	C,	C,	G,	C,	E,	G,	—,	C.
Harmonics.....	3,	6,	9,	12,	15,	18,	21,	24.
Vibrations.....	90,	180,	270,	360,	450,	540,	630,	720.
Letters.....	G,	G,	D,	G,	B,	D,	—,	G.
Harmonics.....	4,	8,	12,	16,	20,	24,	28,	32.
Vibrations.....	120,	240,	360,	480,	600,	720,	840,	960.
Letters.....	C,	C,	G,	C,	E,	G,	—,	C.
Harmonics.....	5,	10,	15,	20,	25,	30,	35,	40.
Vibrations.....	150,	300,	450,	600,	750,	900,	1050,	1200.
Letters.....	E,	E,	B,	E,	—,	B,	—,	E.
Harmonics.....	6,	12,	18,	24,	30,	36,	42,	48.
Vibrations.....	180,	360,	540,	720,	900,	1080,	1260,	1440.
Letters.....	G,	G,	D,	G,	B,	D,	—,	G.
Harmonics.....	7,	14,	21,	28,	35,	42,	49,	56.
Vibrations.....	210,	420,	630,	840,	1050,	1260,	1470,	1680.
Letters.....	—,	—,	—,	—,	—,	—,	—,	—.

It must not be supposed, however, that all the harmonics numbered in the same line of figures in the above table will co-exist, but the left hand number will co-exist with any other number in the same line; as, for example, 2 will co-exist with 4, 6, 8, and so on throughout the line; so will 8—16, 6—12, or 4—8, co-exist; but as to all other combinations in the same line of figures co-existence is impossible; that is, 4—6, 6—8, 8—10; and 6—9, 9—12, 12—15, and so on throughout all the sections of the table, cannot co-exist. The law that co-existence can take place only between the aliquot parts of the whole monochord, and the aliquot parts of its aliquot parts, is imperative. The only ratio in which all the harmonics made on the monochord can co-exist, is as follows:

TABLE 3.

Harmonics.....	1,	2,	4,	8,	16,	32,	64,	128.
Vibrations.....	30,	60,	120,	240,	480,	960,	1920,	3840.
Letters.....	C,	C,	C,	C,	C,	C,	C,	C:

But in such combinations they are all of the same letter, being but octaves and unisons of one another. Any letter, however, produced by this ratio may co-exist with its fundamental tone; as, if you take the numbers 3, 6, 12, 24, and thus throughout, you will produce all G's; or with 5, 10, 20, 40, and so on you will produce all E's. Besides the unisons and octaves, the only co-existent concordant intervals possible between harmonics are C—E, C—G, G—B, and G—D, while innumerable dissonances are continually flocking in; for example, in the section of the table beginning with 7, we produce not a single musical interval. In the division of the first and second octaves we have no discords—and it is this fact, no doubt, which led to the belief that the musical scale complied with the



harmonic series—in the third octave we have 1 wild harmonic, representing no musical interval; in the fourth, 3; in the fifth, 11; in the sixth, 27; in the seventh, 59; in the eighth, 123; and these, let it be remembered, all fall within the limits of the musical compass. Now, if these were audibly let loose, and “mixed” with the music of an orchestra (and if Prof. Tyndall’s theory of co-existences were true they might be), no wonder the imagination would retire baffled,” to say nothing of the fate of our ears! The plain and sufficient answer to all this is that they do not practically exist, and cannot possibly co-exist. They sleep on the strings as mere possibilities, to be awakened only by the volition of the performer; and even then, except some six or eight of the first, are aroused from their repose with great difficulty.

We will next endeavor to explain the system of harmonics on wind instruments of music, trumpets, flutes, clarionets, pipes; in short on all wind instruments, except those whose sounds are produced simply by reeds, or metallic tongues, unconnected with pipes or tubes; for on the latter class no harmonics can be made. It is impossible to divide a simple reed or tongue of the ordinary length, and under ordinary conditions for producing musical tones, unconnected with a pipe or tube, into aliquot vibrations; another strong proof that co-existence does not *always* take place in musical sounds.

Harmonics on wind instruments follow the same law of production as they do on strings, but their co-existences are confined simply to unisons. We have not only the evidence of the senses to support this proposition, but also the scientific deductions of

the mind, which, on investigation, will appear very plain. On a string the nodes, while they must be resting points for their own harmonics, may vibrate in the production of any other harmonic of which they are aliquot parts. This is impossible in a pipe, because the nodes, being merely re-actionary points, are as fixed as the walls of the instrument, and therefore can not vibrate; although they may change their places, as move up or down, or increase their number to accommodate themselves to any other harmonic, but they can not be nodes to one tone and vibrate for the purposes of another different tone at the same time, as they may on a string. A pipe does not cause the tone directly; it merely moulds the wind furnished to it into vibrations, which produce the tone. A string imparts the vibrations directly from itself to the air, and the sonorous or resonant body takes them up and gives back the tone. On the string it is action, in the pipe it is reaction. The nodes of a tone in a wind instrument are but reacting points from its walls, and therefore can not co-exist except in one system of aliquot parts at a time. As there can not be two different series of vibrations passing through a pipe at the same time, it can not therefore possibly produce two different tones at the same time—hence there can be no co-existences except between unisons.

Prof. Tyndall mentions no distinction between the co-existences of harmonics in a pipe or on the monochord, and makes no exception with regard to tones produced by reeds or tongues blown by wind unconnected with tubes, and none, indeed, in any case. If his theory, that *every* musical tone is *always* attended

with harmonics be true, their harmonics must have their harmonics *ad infinitum*; for there is no scientific difference between the causes which produce a fundamental tone, and those which produce a harmonic. Whenever a string is divided into harmonics it is the same as if each one was produced on a separate string; and in a pipe each harmonic is produced by a separate ventral segment, the same as if each one was a separate pipe. They are all alike produced and supported by a series of isochronous vibrations, and any harmonic within the musical compass may become a fundamental tone.

Having shown by demonstration, as we think, the law which governs the production of harmonics, and in what combinations on the various kinds of instruments they may co-exist, we now propose to show what effect Prof. Tyndall's system of musical sounds would have on the art of music. We will assume that harmonics audibly exist, and co-exist, as Prof. Tyndall claims they do, and give him the benefit of arranging the fundamental tones into concords. We propose to take his own tables, in which he thinks he chases dissonance to its vanishing point, analyze them, express their musical intervals by letters and the number of their vibrations, arrange them consecutively, and see what kind of harmony they will produce. We shall change them in no respect in principle, but will assume C at 240 vibrations per second, instead of 264, and count the fundamentals with their harmonics inclusive, so that we may have the whole system of tones before us in one view.

The following table, No. 4, will show the harmonics taken from C, E, G, as fundamental tones—the common chord, as musicians call it—and their concor-

dant and discordant relations to their own respective fundamental tones, and to the fundamental tones of one another, and between themselves. The column of figures on the left shows the numbers of the harmonics, and refers to all the columns in the table. Each column of letters refers to the column of figures next on its right, and each column of figures shows the number of the vibrations of its letters on the left:

TABLE 4.

1, C,	240, E,	300, G,	360, C,	480
2, C,	480, E,	600, G,	720, C,	960
3, G,	720, B,	900, D,	1080, G,	1440
4, C,	960, E,	1200, G,	1440, C,	1920
5, E,	1200, G sharp,	1500, B,	1800, E,	2400
6, G,	1440, B,	1800, D,	2160, G,	2880
7, A sharp,	1680, D flat,	2100, F,	2520, A sharp,	3360
8, C,	1920, E,	2400, G,	2880, C,	3840
9, D,	2160, F sharp,	2700, A,	3240, D,	4320
10, E,	2400, G sharp,	3000, B,	3600, E,	4800

The above tabular view represents the concords of but one octave in the musical compass, with their harmonics up to the 10th inclusive. Their tones may be written in musical notation, or they may be shown consecutively by the following letters with their flats and sharps:

C, D flat, D, E, F, F sharp, G, G sharp, A, A sharp,  
 B, C, D flat, D, E, F, F sharp, G, G sharp, A, A sharp,  
 B, C, D flat, D, E, F, F sharp, G, G sharp, A, A sharp,  
 B, C, D flat, D, E.

They represent the chromatic scale with the single exception of E flat—though the intervals are not all strictly correct—and are the tones which would co-exist according to Prof. Tyndall's theory. The musi-

cian sees at a glance that their co-existence is a solid mass of discord. A slash on all the keys of a piano—black and white—at a single blow, or an orchestra tortured into every discord within its compass, could not be worse. To simplify the principle: The common chord of C is C, E, G; the common chord of G is G, B, D; the common chord of E is E, G sharp, and B. Now bring these together consecutively, and we have C, D, E, G, G sharp, and B, an unendurable discord; yet this would be the first and simplest effect of Prof. Tyndall's theory. And this, it must be remembered, is the system of harmonics built upon the common chord of only *one* octave—three tones of the seven diatonic intervals. Of course the same system, if true, would belong to each of the other four intervals of the diatonic scale, and also to each of the semitones of the chromatic scale, and would be repeated in each octave throughout the musical compass. Such a complication of audible sounds to a musician would be inconceivably horrible! The theory, however, is so engaging, and finds such apparent support in fact, by producing the concords of the key note C, G, E, in the first five harmonies, that it is no wonder it occasionally finds an advocate. The ninth harmonic gives the second in the diatonic scale, and the fifteenth gives the seventh. After this we obtain no new musical relations, but get an innumerable brood of wild intervals, and tricky discords, which belong to no scale whatever, and in art are entirely unmanageable.

Prof. Tyndall, although discoursing much of consonances and dissonances, omits to fully explain what by many readers of a work on sound would be regarded as the most interesting part—the musical scale.



What he says about it, if not incorrect, is very incautiously stated. In reference to it he uses such phrases as these: "We choose sounds which are in harmony \* \* \*. In choosing a series of sounds . . . . The notes chosen are such as form chords," etc., and speaks of "interpolating" some of the intervals into the diatonic scale. Every uninstructed reader would naturally infer from such language that the musical scale was chosen arbitrarily. We can no more choose how musical intervals shall arrange themselves than we can choose how the original colors shall fall on the spectrum. And we are surprised to find Prof. Tyndall supported by a late high authority, which says: "In fact, there is no reason in the nature of things why we may not avoid dissonances with notes separated by other intervals than those of our European musical scale."\*

Prof. Tyndall is also supported in his views of co-existent harmonics by a still later authority,† which says: "A true note, or musical sound, contains in itself a third, a fifth, and an octave."

It seems to us that these writers never made their own experiments, nor solved the problems of the musical scale for themselves, or they would have been led to doubt the soundness of their own propositions. It seems to us, also, that no scientific proposition could be more inconsiderately stated. It has no foundation in fact. There is no other arrangement "in the nature of things" than the diatonic scale, by which we can avoid dissonances with the key note, and there is

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\* Edinburgh Review, January 1868.

† London Quarterly, July, 1871.

no other whereby we can obtain intervals concordant between themselves. The musical scale is a system of sounds built on a key note by a law as imperative as that which requires a tower to rest within its base, or a statue to stand within the perpendicular of its pedestal. True, we may build leaning towers, and we can erect distorted statues; but who will contend that in doing so we are obeying the laws of architecture or sculpture? No one, certainly. They are clear violations of these laws, which may exist, however, within certain restricted limits. So our tastes may be taught to endure discords, or even love them for the sake of the concords with which they may be associated, as the miller may, from association, learn to love the clack of his mill, or the operative the whiz and whir of his machinery; but the relations of concords and discords to a key note, and to one another, are not merely questions of taste—they are problems of pure mathematics, proved alike by the relations of quantities and ratios of numbers. Science settles the musical scale beyond doubt. There can no more be two musical scales in nature than there can be two kinds of mathematics in science. When we can change the ratios of numbers and the relations of quantities, then we can change the laws of harmony; but while the laws of harmony remain as they are, the intervals of the musical scale can never be arbitrary.

The musical scale of the various Oriental nations is referred to in support of the proposition that it is arbitrary, and a mere question of taste as to its intervals. It is true that the scales of the East differ from that of Europe, but by no means as widely as is generally supposed. Five of the intervals of the Chinese

scale correspond with the five leading intervals of the European diatonic scale—namely, the octave, fifth, fourth, second, and major sixth. The scale of the Japanese has the same intervals. The third in the Chinese scale is placed midway between the second and fourth, which, of course, is false, both as to the major and minor third; and the seventh is placed midway between the sixth and octave, which is neither the true flat nor full seventh. The old Scottish scale differs from these only in having a correct major third, and no fourth or seventh at all. It will be observed that these Eastern scales, as incomplete as they are, contain five leading concords—the octave, fifth, fourth, major sixth and minor third, all, indeed, but two, the major third and minor sixth—of the established European diatonic scale. Music of considerable excellence, even to European ears, could be written on the Eastern scales by avoiding the two false intervals. Dr. Burney thought that the eastern nations had no settled musical scale, which is probably true, with the exception of the main concords as stated above.

It is due to Prof. Tyndall, however, to say that he does not pretend to enter fully into the subject of the scale; but, in our judgment, a work on sound which fails to explain the musical scale is incomplete, whatever may be its merits in other respects. We propose, therefore, to supply this omission as well as our limited space will allow.

Having given the analysis of harmony, and shown the law which governs the production of harmonics, and also the rule that regulates their co-existence on the various instruments, we are now prepared to demonstrate that the law of harmony governs the

arrangement of the intervals in the musical scale; and our proposition is: The concords of the key note, and the concords of the concords of the key note—taking the most perfect first—constitute the musical scale.

In the first example, for the purpose of illustrating the subject clearly, we shall follow the process, step by step, in detail, even at the risk of some tediousness and repetition, begging the reader's pardon, as well as his attention, in advance. Keeping the proposition carefully in mind, then, we first assume a fundamental tone or key note, which may be any one within the range of the musical compass; but for convenience we adopt our standard C. We do not take the octaves, because they would simply repeat the same letter, and would of course produce no other interval. The most perfect concord of C, ascending, except its octave, is its fifth, which is G. We have now C and G. The next most perfect concord of C is its fourth, which is F. We now have C, F, G. Next we begin at G as a basis, because it is the most perfect concord of C, except its octave. The most perfect concord of G, except its octave, is its fifth, which is D. Now we have C, D, F and G. This D is produced in the next octave above, as several other intervals will be as we proceed, but, for convenience, we bring them into the same octave, and place them in consecutive order. We next begin at F as a basis, because, after G, it is the most perfect concord of C. The most perfect concord of F, except its octave, is its fifth, which merely repeats C, an octave higher than the C with which we began. We now have C, D, F, G, C. We will now return to G as a basis. The next most

perfect concord to G—having already used its fifth—is its fourth, which repeats the C again, and of course gives us no additional interval. We now begin again at F as a basis. The next most perfect concord of F—having used its fifth—is its fourth, which is B flat. Now we have C, D, F, G, B flat, C. In the order of our process we now return again to C, as our basis. The next most perfect concord of C—having used its fifth and fourth—is its major third, which is E. We have now C, D, E, F, G, B flat, C. Still pursuing the order, we must begin again at G. The next most perfect concord of G—having used its fifth and fourth—is its major third, which is B. Now we have C, D, E, F, G, B flat, B, C. Next in order as a basis is F, and the next most perfect concord of F—having used its fifth and fourth—is its major third, which is A. We now have C, D, E, F, G, A, B flat, B, C. Now returning to C again as a basis, its next most perfect concord—having used its fifth, fourth and major third—is its major sixth, which merely repeats A. Coming to G again as a basis, and having used its fifth, fourth and major third, its next most perfect concord is its major sixth, which is merely a repetition of E. Now we are at F again as a basis. The next most perfect concord of F—having used its fifth, fourth and major third—is its major sixth, which brings us D again. Now we are back to C again as a basis, and having exhausted its fifth, fourth, major third and major sixth, we must take its minor third, which is its next most perfect concord, and which gives us E flat. We have now C, D, E flat, E, F, G, A, B flat, B, C. The basis next in order is G, and the next most perfect concord of G—having used its fifth, fourth, major



third and major sixth—is its minor third, which only repeats B flat. Now F comes in as a basis again, and the next most perfect concord of F—having used its fifth, fourth, major third and major sixth—is its minor third, which repeats A flat. We now have C, D, E flat, E, F, G, A flat, A, B flat, B, C. The order pursued now returns us to C again as a basis. The next most perfect concord of C—having exhausted its fifth, fourth, major third, major sixth and minor third—is its minor sixth, which only repeats A flat. Our next basis is G, and its most perfect concord—having also exhausted its fifth, fourth, major third, major sixth and minor third—is its minor sixth, which only repeats B flat. The basis next in order is F. The next most perfect concord of F—having exhausted its fifth, fourth, major third, major sixth and minor third—is its minor sixth, which is C sharp. We have in our scale now C, C sharp, D, E flat, E, F, G, A flat, A, B flat, B, C. At this point we have exhausted all the leading concords of the key note, and therefore, according to our proposition, we must next resort to the concords of the concords of the key note. Now, as we have already said, the most perfect concord of the key note C, its octave excepted, is its fifth, which is G; and the most perfect concord of G, its octave excepted, is its fifth, which is D; therefore, D is our next basis. The most perfect concord of D, its octave excepted, is its fifth, which is A; its next most perfect concord is its fourth, which repeats G; and its next most perfect concord is its major third, which gives F sharp. This completes the musical scale, with twelve intervals in the octave, represented by C, C sharp, D, E flat, E, F, F sharp, G, A flat, A, B flat, B, C. The

next basis would be the fourth above G, which is C, an octave above the letter with which we began. Continued progress in the same order would, of course, but repeat the same scale again and again, ending each time an octave above the point at which we started. This at once fulfills and exhausts our proposition.

It will be observed that several of the letters are repeated from different points and by different concords. In some instances the interval, as repeated from a more remote or less perfect concord, does not precisely agree with itself as produced by a less remote or more perfect concord. In such cases the interval, as first produced by the concord nearest to the key note, and most perfect, is the true interval and should be retained instead of its repetition obtained by a less perfect concord, or one more remote from the key note. And an interval produced by a less perfect concord based on a concord of the key note—and therefore nearer to the key note—is to be preferred to its repetition by a more perfect concord based on a discord of the key note—and therefore, in the order of perfection, more remote from the key note. For example: The A is produced by the major third above F, and therefore is to be preferred to its repetition by a fifth above D, because F is a concord of the key note, and D is a discord to the key note, although the fifth, in itself, is a more perfect concord than the major third. So B flat is produced by a fourth above F, and is, therefore, to be preferred to its repetition by a minor third above G, because the fourth is a more perfect concord than the minor third; although the G as a basis is nearer the key note than

the F, both, however, being concords of the key note. But all the points at first produced, by taking the most perfect concords first, are perfect intervals.

We will next produce the same scale on the monochord, in vibrating lengths, and in stopping distances, by the same method; and we may be much briefer in this illustration than we were in the first one, because we need not so often repeat the degrees of the concords, which, however, should be carefully kept in mind while we proceed. We begin with a monochord which may be tuned to any tone, the whole vibrating length of which we count one. The vibrating length of its fifth, ascending, is two-thirds; of its fourth, three-fourths; of the fifth of its fifth, eight-ninths; of the fourth of its fifth, one-half; of the fifth of its fourth, one-half; of the fourth of its fourth, nine-sixteenths. The vibrating length of the major third of the whole chord, ascending, is four-fifths; of the major third of its fifth, eight-fifteenths; of the major third of its fourth, three-fifths. The vibrating length of the major sixth of the whole chord, ascending, is three-fifths; of the major sixth of its fifth, four-fifths; of the major sixth of its fourth, eight-ninths. The vibrating length of the minor third of the whole chord is five-sixths; of the minor third of its fifth, nine-sixteenths; of the minor third of its fourth, five-eighths. The vibrating length of the fifth of the fifth of the whole chord is eight-ninths; of the fourth of the fifth of its fifth, two-thirds; of the major third of the fifth of its fifth, seven-tenths; of the minor third of the fifth of its fifth, three-fourths. This completes the scale in vibrating lengths, the tones of which will exactly correspond with the letters, as we produced it in the first

instance. The stopping distances, or steps, in relation to the whole chord, are, of course, but the respective remainders after deducting the several vibrating lengths, and in that mode need not be stated; but we will state them in the relation of each interval to its vibrating part of the chord, for the purpose of showing their proportions to one another, and to the stopping points on the chord, which may be done as follows: One, one-sixteenth, one-nineteenth, one-sixteenth, one-twenty-fifth, one-sixteenth, one-nineteenth, one-sixteenth, one-sixteenth, one-twenty-fifth, one-sixteenth, one-nineteenth, one-sixteenth. This will bring us to the middle of the chord. We have thus shown the scale in vibrating lengths, in stopping distances, and the proportions the intervals bear to one another, the same as in the first instance we represented it by letters.

We will now state the same scale by the same process in numbers, placing the intervals in one octave, and in consecutive order. Assuming the standard C at 480, its fifth is 720, its fourth, 640; the fifth of its fifth, 540, the fourth of its fifth, 960; the fifth of its fourth, 960; the fourth of its fourth, 853. The major third of the 480 is 600, the major third of its fifth, 900; the major third of its fourth, 800. The major sixth of the 480 is 800, the major sixth of its fifth, 600; the major sixth of its fourth, 540. The minor third of the 480 is 576, the minor third of its fifth, 853; the minor third of its fourth, 768. The minor sixth of the 480 is 768, the minor sixth of its fifth, 576; the minor sixth of its fourth, 512. The fifth of the fifth of the 480 is 540, the fourth of the fifth of the fifth, 720; the major third of the fifth of the fifth, 675; the

minor third of the fifth of the fifth, 640. These intervals represent the following series: 480, 512, 540, 576, 600, 640, 675, 720, 768, 800, 853, 900, 960, which completes the scale in numbers, and represents the vibrations of the letters as produced in the first example. We have thus, by the same process, obtained the scale; first, in letters; second, in quantities, and third, in numbers—all exactly the same. It seems to us, the concurrence of these three modes fully establishes the truth of our proposition, namely: That the law of harmony governs the arrangement of the intervals of the musical scale.

It should be remembered, however, that the only strictly scientific method of solving the problem of the musical scale is by numbers. The letters which represent it, when flat or sharp, represent only approximate quantities. This is owing to the fact that what are called whole tones are unequal, and also to the excess of what is denominated a semi-tone over one-half of a whole tone. And it is impossible to make measurements on a monochord physically, even with the nicest instruments, as accurately as the divisions can be shown in numbers. For instance, there are infinitesimal errors in the distances on the monochord in the production of the scale by measurement which numbers may detect. We rely, therefore, on the solution of the problem by numbers for the elimination of all error. The method removes the question from the uncertainty of the senses, and brings it purely within the domain of the understanding, where the eye of the mind can see what the ear of flesh can never hear.

Geometry furnishes us with many interesting analogies of the musical scale, as all sciences do, indeed,



which deal in the proportions of quantities or numbers. On a monochord, the length of which is equal to all the sides of the following figures, the several sides will mark the concords as follows: One side of an equilateral triangle gives the internal of the fifth; one side of a square a fourth, two sides an octave; one side of a pentagon gives a major third, two sides a major sixth; one side of a hexagon gives the minor third, two sides a fifth, three sides an octave. The heptagon is the same as the seventh harmonic on the monochord, and will give no musical interval whatever. Two sides of an octagon will give a fourth, and four sides an octave. The radius of a circle upon a monochord, the length of which is equal to its circumference, gives the tempered minor third, its diameter a sharp fourth, or flat fifth. Thus the scale proves itself geometrically no less certainly than by numbers and quantities.

It must not be inferred, however, because we have produced a natural scale with twelve intervals in the octave—the same number now used in all fixed scales—that, therefore, every tone of the twelve may be used as a key note, as they may in the tempered scale. By no means. Nature gives us but one key note in octave. They could not all be used as key notes unless the intervals were all equal; and nature does not make all her musical intervals equal any more than she makes all her numbers even. It will be noticed that in each octave, as shown in distances on the monochord, according to the scale we have produced, there are three classes of intervals, namely, one-sixteenth, one-nineteenth, one-twenty-fifth; and it is the same, of course, whether the scale is represented

by letters or shown in numbers. In the octave there are seven intervals of one-sixteenth, three of one-nineteenth, and two of one-twenty-fifth. All these different intervals must be kept in their proper relations to the key note, or the scale would produce neither melody nor harmony. The whole arrangement, however, may of course be moved either up or down, and placed at any point within the musical compass, still preserving the same relations to the key note. This is done in the diatonic scale, on instruments of fixed tones—as organs or pianos—by inserting a semitone in the middle of each whole tone, and then equalizing all the semitones thus created, including the two natural semitones, which, in all, will make twelve—and is called *temperament*. But it should never be forgotten that *temperament* is no necessity of nature. Much confusion has been introduced, even among excellent musicians, by supposing that temperament in the musical scale is the correction of some apparent blunder in nature, in order to make it subservient to art. It is nothing of the kind. Nature never blunders in her laws. Temperament is merely an artificial contrivance of man, by which he obtains, at the expense of some slight imperfection, twelve key notes in the octave when nature has given him but one. It is, in fact, putting twelve instruments into one case. But this does not apply to instruments of the viol class. Upon these, temperament is no necessity, because—their intervals being changeable at the pleasure of the performer—a key note may be made of any degree of sound within their range. Counting the lowest C on the violin, for example, at four hundred and eighty vibrations, it has, within scientific possibility, four hundred and eighty key notes

in the first octave ; but of course in concert none but the twelve are used. It might, at first view, seem that intervals varying as much as they do in the diatonic scale—as one-ninth to one-tenth, and as one-sixteenth to one-eighteenth, or as they do in the scale we have produced, namely, as one-sixteenth, one-nineteenth and one-twenty-fifth, would resist all accommodation of equality so as to become interchangeable as key notes ; but the difference is not really as great as it at first appears to be. The one-sixteenth, one-nineteenth and one-twenty-fifth show the stopping distances on the monochord, the average of which, when all in the octave are used, is one-eighteenth ; \* the same as it is in the diatonic scale when the five semi-tones are inserted, and the whole octave equally tempered. The vibrating lengths on the monochord—which show their real differences—are fifteen-sixteenths, eighteen-nineteenths, and twenty-four-twenty-fifths, the average of which, when the twelve are used, is seventeen-eighteenths,\* the same also, as it is in the tempered chromatic scale. The ratios of differences are not in the stopping distances, but in the vibrating lengths. The same intervals stated in numbers have the following relations to each other—512, 507 and 500—the average of which, when all in the octave are used, is 508, not noticing decimals—and this is the average of the tempered semitone when expressed in numbers.

The following table, No. 5, will show the scale as

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\* In the one-eighteenth and seventeen-eighteenths there is an error of an inappreciable cast-off fraction, which need not be noticed in obtaining stopping distances or vibrating lengths on the monochord, but may be easily shown in numbers.

produced by each of the methods we have adopted, also the tempered scale, and the differences between the true and tempered intervals:

TABLE No. 5.

TRUE SCALE.				TEMPERED SCALE.		
C	960	1	1	960	1	1
		2	16		2	18
B	900	8	1	906	7,858	1
		15	19		15	18
B flat	853	9	1	855	8,979	1
		16	16		16	18
A	800	3	1	807	2,974	1
		5	25		5	18
G sharp	768	5	1	762	5,040	1
		8	16		8	18
G	720	2	1	719	2,004	1
		3	16		3	18
F sharp	675	7	1	678	6,940	1
		10	19		10	18
F	640	3	1	641	2,839	1
		4	16		4	18
E	600	4	1	604	3,974	1
		5	25		5	18
E flat	576	5	1	571	5,043	1
		6	16		6	18

TABLE No. 5—CONTINUED.

TRUE SCALE.				TEMPERED SCALE.		
D	540	8	1	539	8,015	1
		9	19		9	18
C sharp	512	15	1	508	17	1
		16	16		18	18
C	480	1	1	480	1	1
<i>h</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>

Column *h* shows the letters; column *k* shows the vibrations of each tone in the true scale; column *l* shows the vibrating lengths on the monochord in the true scale; and the column *m* shows the stopping distances of the true scale on the monochord. Column *n* shows the vibrations of each tone in the *tempered* scale; column *o* shows the vibrating lengths on the monochord in the tempered scale; and column *p* shows the stopping distances in the tempered scale on the monochord.

It will be perceived that the differences, as shown in numbers, between the major third and minor third, and the major sixth and the minor sixth, in the true scale, and the same intervals in the tempered scale, are but slight; and in those between the fourths and fifths of the two scales, almost nothing. Of course, as any concord and its reflex just fills the octave, where one is too flat the other will be too sharp in the same



proportion, and when one is too sharp the other will be too flat in like proportion. The greatest variance between the two scales in the major thirds and minor thirds, or in the major sixths and minor sixths, is not equal to one vibration in one hundred; and in the fourths and fifths not one in six hundred. It is extremely difficult to detect variations so slight by the sense of the ear, though to the mind it is demonstrable in numbers. The octaves in both scales of course are perfect.

There is another method of temperament sometimes tried, called the *unequal* temperament, whereby the attempt is made by tuning certain intervals unequal, so as to throw, as it is claimed, all the imperfections into the remote keys, as that of seven sharps or seven flats, thereby, as is supposed, leaving the other keys more perfect. But a little examination will show that this plan is perfectly fallacious, because the advantage gained by this means in one key returns a disadvantage in the next change: That is, if you tune in favor of the key obtained by using one sharp, for instance, you will have to restore the gain to the key obtained by using one flat; and in like manner throughout all the transpositions you will find similar changes.

TABLE No. 6.

SHOWING THE UNTEMPERED TRANSPOSITION SCALE.

	F flat.	C flat.	G flat.	D flat.	A flat.	E flat.	B flat.				F sharp.	C sharp.	G sharp.	D sharp.	A sharp.	E sharp.	B sharp.	
960	900	844						960	C	960								960
900								900	B	900					910			906
853						853									853			855
800						800		800	A	800			810					807
768	750			758									760		760			761
720				712		720		720	G	720	720							719
675	675	675								675			675		682	682		678
640		640		640		640	640	640	F	640					640			640
600	600					600	600	600	E	600	600		607	607	607			604
576	562	562		569	569	569								570	570	570		570
540				533	533	533	540	D	540	540	540	540	540					538
506	505	505	505	505						506	506	506	506	512	512	512		508
480			474	474	474	480	480	480	C	480	480							480
450	450	450				450	450	450	B	450	450	450	455	455	455	455		453
426		421	421	427	427	427	427									426	426	427
400						400	400	A	400	405	405	405	405	405				404
384		379	379	379	379									380		383	383	381
360					355		360	360	G	360	360	360						359
337		337	337								337			337		341	341	339
320			316		320		320	320	F	320							320	320
300							300	300	E	300		303		303				302
288			284		284												288	286
270							270	D	270		270							270
253			253														256	254
240							240	C	240									240
<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>	<i>t</i>

The above table, No. 6, will show the shifting of each note through the various transpositions of the twelve keys. The letter *k* marks the column which shows the letters of the diatonic scale throughout two octaves; columns *i* and *l* show the vibrations per second of each tone; column *a* shows the natural chromatic scale; column *t* shows the tempered chromatic scale; the top line of the table shows the letters in the order in which they are flatted and sharpened; columns *b, c, d, e, f, g, h* show the key notes, and the scales for one octave in each key as they are obtained by flats, and columns *m, n, o, p, q, r, s* show the same as obtained by sharps.

This table also shows the imperfections of the tempered scale as compared with the true or natural scale, and shows which tones are affected by temperament, and which are not so affected. Not to complicate the numbers impracticably, the decimals are sometimes cast off and sometimes added, but in no instance is there an error which will amount to one vibration, unless it has crept in by miscalculation. The result shows in one view the difference between music as an art, when expressed through instruments with fixed tones, and music as a science founded on fixed laws; and it will be seen that the difference is very slight, perhaps less than between any other art and the science upon which it rests; for no art fulfills the exactions of its science. Science belongs to mind; art deals with sense. In architecture, more especially in large and lofty structures, variations in lines and curves are purposely made to obtain the proper effect upon the senses; and in sculpture proportions are changed to heighten the effect of the art. Perhaps no celebrated painting in the world would prove to be perfect in its perspective on application of the meter, yet as a work of art it is not seriously injured by such slight defects. And no applied science fulfills the exactions of its abstract principles. If the astronomer made no allowances for disturbing causes, his conclusions would be practically incorrect; in other words, he varies the abstract to prove the truth of the concrete. A cube or a sphere are perfect figures to the mind, yet no art can produce either to the senses without some slight defect. In short, we may as well declare the circle an imperfect figure because we can not

square its area, as to complain of the musical scale because in constructing instruments with fixed tones, and in obtaining twelve key notes in the octave when there is really but one, we are compelled to resort to temperament. The imperfection is not in the scale, but in the instrument. On the viol, or in human voice, no temperament is necessary, because on the viol the performer commands every degree of sound within its compass, and the human voice in its intervals is perfect in all keys alike.

The history of the musical scale begins almost with the human race. Tubal Cain is supposed to have been its first discoverer or teacher. It can be plainly traced from the Eastern nations into Egypt, thence to Greece; and through Rome into modern Europe. It is also found among the nations of South America, and, in a rude state, among the North American Indians. In all places, and in all periods of its history, some of its intervals have been correct. The octave and fifth were early settled. At later periods the major third, the fourth and second, were ascertained; at length, the sharp seventh was discovered. The last and greatest difficulty has been to find the true points of the sixth and flat seventh, neither of which, strictly speaking, are beyond dispute to this day. The arrangement has undergone various changes in all except the leading concords. No doubt, during its history, in the empirical efforts to make it perfect, every one of the twelve intervals we now use have been produced, some at one time, some at another, but never all in the same scale, in their correct proportions to one another, and in their

true relations to the key note. And those in modern times who divided the whole tones of the diatonic scale into semitones for the purpose of transposing the key note, thus producing a scale with twelve intervals in the octave, seem to have "builded wiser than they knew;" for it does not appear that they ever supposed the true scale, when completed, had the same number of intervals. In our judgment, the scale we have produced, with twelve intervals in the octave, is the true musical scale. We think its division into major diatonic, minor diatonic, and chromatic scales is merely arbitrary—it is simply *the* musical scale. It seems to have been struggling to express itself ever since the earliest record of man. Every one of the scales which have been used have had some of the correct intervals; in many of them all the intervals used were correct—the scale being merely incomplete; as, for instance, the two tetrachords of Pythagoras, and the arrangement known as the Scottish scale, which has neither the fourth nor the seventh, but in all other respects is correct. And we think the process by which the scale is obtained resembles its history. In the first octave it produces but one interval, in the second two, in the third four, and so on till we have the major diatonic scale, with seven intervals; then it adds the minor to the major diatonic, with the same key note—including both keys together—thus giving us a scale with ten intervals; lastly, following the same law, it produces two more intervals, thus completing a scale with twelve intervals in the octave; after this the same process



will repeat itself forever without obtaining another musical interval.

It appears to us, then, clearly, that all the scales heretofore used with correct intervals, though incomplete in number, are but different degrees in the development of the true scale, evolving itself in obedience to an imperative law. And if science did not establish this proposition, and further evidence were needed to convince us, we might appeal with confidence to the compositions of the great masters in the art of music to confirm our views; for in most of their works you will find all of these modes used by means of accidental flats and sharps in different parts of the same piece; and when their more elaborate works are closely scanned throughout, it will be discovered that they have brought into requisition every semitone that can be produced within the compass of the piece. In music, as in many other things, the art preceded the science.

It may be added as curious, at least, if not as further evidence in support of our general proposition, that the methods of transposition by flats and sharps changes the key note in the same order the intervals are obtained by the process we have followed in producing the scale. Beginning with C as the key note, one sharp changes it to G—the fifth; one flat to F—the fourth; two sharps to D—the fifth of the fifth; two flats to B—the fourth of the fourth; and so on throughout. And this is the order of change, whether it be made by the signature at the beginning of the piece, or by accidentals in the course of the composition.

Having now established the principle, as we be-

lieve, by which the arrangement of the musical scale is determined, and pursued it to its ultimate results in three several modes, perhaps further illustration is unnecessary. Those who wish to test the principle more severely, however, may do so; and they will find their labors both profitable and pleasing—for the modes of illustration are by no means exhausted. For example: We may begin at the key note, as we have stated, and take the concords, descending, instead of ascending, as we have done, and the result will be the same; or, begin, in the first place, at either of the concords above or below the key note, and follow the order, either by ascending or descending, and the result will be the same; or, begin at either of these points—the key note, or its concords above or below—and pursue the process by ascending and descending alternately, and the result will be the same; or, begin at the key note, and first find all its concords, then begin at the fifth and find all its concords, then at the fourth and find all its concords, then at the fifth of the fifth and find all its concords, and the result will be the same; or, begin at any point within the limits named, and follow the order prescribed in any direction, and the result will be the same; in short, the whole process is nothing more than taking the concords of the key note, and the concords of the concords of the key note, *securing the points which are first found, and stand nearest to the key note*, and bringing the intervals thus obtained into the same octave consecutively. By all of these modes, in the fourth change we shall find ourselves at the same point relative to the octave at

which we began; and in this manner may repeat the process to infinity without changing the scale.

In thus reviewing Prof. Tyndall's work, we have confined our remarks mainly to Sound in its relations to musical tone; first, because it is by far the most interesting scientific view of the subject—being in that respect as fixed and unchangeable as the laws of numbers and quantities; while in other respects, as in language, its relations are arbitrary and conventional; and, second, because we thought in reference to the musical scale, the work contained some errors. These errors, or what we have deemed as such, we have endeavored to point out and correct, with whatever skill we could, and we hope with a becoming love for scientific truth; we know we have done so, distrusting our own ability, and with the highest esteem and most profound respect for the eminent character of Prof. Tyndall.

## MUSIC AND ITS INSTRUMENTS.

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Music! What is music? It is generally understood to be a composition of tones arranged into melody or harmony, and sung, or played on some instrument. And every body says they love music; so they do; so do animals—horses, cattle, cats, dogs, mice; even fishes and insects, and probably every creature having a nervous system, and birds delight in it; but this is merely the sensuous effect of tone. Nothing but the ears are necessary to hear it. It requires no more exercise of the intellect, emotions, affections, or soul, than it does to taste of something sweet, bitter, sour, or brackish, or to smell a flower, the new mown hay, incense, or any other odor. It is but the beginning of music, as the multiplication table is the tyros' first beginning to the higher mathematics. But there is a music which we write down on paper, along five parallel lines, with dots which we call notes, havings heads, some with tails, some heads full, some empty; some tails crossed—once, twice, thrice; and cliffs, bars, rests, flats, sharps, and divers signs. This kind of music we sing with our voices and play upon instruments, for which we must have eyes to see, ears to hear, and hearts to feel. There are many who can sing it and play it, but few who understand it, fewer who can arrange it, and fewest of all who can compose it—for great masters in music are rarer than great painters, great poets, great heroes,

or great sages. And there is a higher music than this: It is written in the sky, with suns, moons, stars, planets, comets, and meteors for its notes, and infinite signs for its language. The storms are its choruses, and the spheres mark its time. This music appeals to all the senses, and to the profoundest understanding of man. If the composer could take the solar system as his musical scale, make the sun his key, and arrange the stars as notes into one grand oratorio—now calling them from the impenterable deep, and now dismissing them into immeasurable space, resounding and reverberating through the infinite sky, tuning the spheres to eternal harmony—he would then present to the mind something of the infinite grandeur, exhaustless combinations, and heavenly concord which music presents to the soul of man. These several grand parts of music, with their various relations, and the order in which they move in time and space, constitute God's grand work—the infinite and eternal harmony of the universe, yet there is a higher music still, infinite, eternal, silent—for music is not all made of sound—it is the abstract and harmonious relation of numbers and quantities, transcending all our senses. Such music can be perceived by the mind alone and known alone to the soul. God alone is the Teacher and Master, and he who understands this music, is alone the true musician. A few of the masters reach this celestial height to stand alone amidst the Infinite and Eternal.

Although music, as an art, is the most airy and fleeting of all the arts, yet it is founded in the deepest and firmest science; indeed, the science of music pervades all other sciences which deal with numbers



and quantities. If a musical string equal in length to the three sides of a triangle be tuned to the letter C, the points of the angles will represent C, G, G, in tone; a string equal in length to the four sides of a square, will, in the same manner, represent C, F, C, C; a string equal in length to the five sides of a pentagon, will represent C, E, A, E, E; a string equal in length to the six sides of a hexagon will represent C, E flat, G, C, G, G. These figures and their multiples represent the same letters and their octaves; and they are all the harmonies known in music. A seven-sided figure represents, in this manner, nothing but discords in sound, and disproportion to the eye. The same relations in numbers represent the vibrations in musical harmony; the division of light into colors shows the same proportions; and even chemical affinities follow the same law. And not only is the science of music firmly fixed in the nature of things, but it is more exacting from its art than any other science in its application. Architecture may be disproportioned in its structures, sculpture may be false in the relation of its parts, painting may be out of perspective, and poetry may halt in its rhythm, jangle in its rhymes, or even blunder in its grammar; yet, notwithstanding these defects, each may rise into art; but with a slight error in the arrangement of the musical scale, or a slight departure from the relation of its tones in the practice of the art, music becomes impossible. Its efforts in such a case would produce neither melody nor harmony, but degenerate into the harshest succession of tones, and the most horrible discord.

Although the art of music, as it was known in

ancient Greece, contains nothing worthy of the study of modern nations, yet the Greeks gave to the word music a wider, fuller, and truer meaning—namely, all that was taught by the Muses, all that is beautiful and harmonious, including even dancing—than the the word now imports, when applied to the art of music, as we understand it.

Musical instruments may be conveniently divided into several kinds: 1, percussive instruments, as drums, tambourines, cymbals, gongs, castinets, etc. 2, wind instruments, which include all that are made of pipes, tubes, or vibrating reeds; and, 3, stringed instruments; which latter class may be divided into pulsatile and bowed instruments. We do not treat of percussive instruments, as their vibrations are not isochronous, and as they can not be properly used except with instruments of sustained tone; and then only in certain kinds of music, to mark time, or give spirit and dash to the general movement. Of themselves they are not properly musical instruments, as music consists of tones arranged according to a scale, and these instruments have neither tone nor scale. They simply produce sound—noise. The bell belongs to this class, but should be excepted from it in one respect: it has a fixed key note, and may produce at the same time with the key note, and frequently does, other tones to which the key note, in vibration, bears an aliquoit relation.

It seems likely that the first musical instrument was a Pandean pipe; for a piece of tube, with one end stopped and the other open, when the orifice is blown across, will produce a tone. But such an instrument, being made, most likely, of some perishable material—such as a

reed, or hollow weed, or something of the kind—would soon decay, and would not likely be the first relic of a musical instrument found. The earliest musical instrument that has yet been discovered, was made of a bone, from joint to joint, with a hole in the side, as the embouchure of a flute, which, when blown across, would produce a musical tone. Several relics of this kind have recently been exhumed in France, which, from their geological position—being co-eval with the cave-lion—must have been extremely ancient. A pipe made of a stag's horn, with three finger holes in its side, has also been discovered near Poitiers. This must have been of more recent date than the bone relics, yet probably belonged to the stone age. Such an instrument would produce four notes, which, if the finger-holes were properly arranged, would be the same as the Greek tetrachord. A wind-tone would very likely be discovered before a tone produced by a string; for nature herself would give a hint of it by blowing amidst the branches of trees, or across the holes and crannies of racks; indeed, it has been supposed that the first notions of music were derived from the sounds of the wind blowing amongst the reeds of the Nile. A string, to produce a tone proper, would have to be of some considerable length, of uniform size, weight, and elasticity, stretched with uniform tension across some sonorous body, and caused to vibrate. Such an arrangement would not likely take place in a chain of natural causes and effects; it would require some change by human action, or some artificial means to produce it. The story of the tendons of a tortoise drying across its shell, being blown upon by the wind, and producing music, is doubtless fabulous. It is told

too many ways, has too many dates, and localities, and is too unlikely to carry credence with it. Musical instruments have been made of various kinds of material: of earth—in the form of pottery—of stone, glass, the different kinds of metals, wood; of bones, horns, tusks, hides—indeed they are sometimes even found in the shape of animals. And the strings of musical instruments have been made of many different materials, as the skins, entrails, and hair of animals, and of wire, silk, flax, etc.

The Chinese have a very ancient instrument called the *King*, the invention of which they attribute to their Orpheus whom they name *Kouci*. (He ante-dates the Grecian Orpheus more than two thousand years, and is supposed to have possessed the same marvelous powers of moving the trees and charming wild beasts.) The tones of this instrument are produced by flat pieces of a peculiar, sonorous stone, generally made into a triangular shape, but often in the form of birds, and also into various fantastic shapes, which are strung on a cord so as to be conveniently struck by a hammer. There are different classes of the king—as the *soung-king*, *pien-king*—not differing essentially in structure, but having different ranges of musical compass. The Chinese have also a very ancient wind instrument called the *hiuen*, made of baked clay, of a conical shape, having five finger-holes; and another one called the *cheng*, made of a bundle of tubes, or pipes set in a piece of pottery shaped like a bowl—taking the place of a wind-chest in the organ—into which they blew their breath. It is believed that the Chinese had no very ancient stringed instruments; but in modern times they use an instrument resembling

the Spanish guitar, and a kind of narrow fiddle, resembling a single tube with strings stretched upon it; but the tone is very harsh. [The Chinese musical scale is the same as the European scale would be with the F and B left out of the octave, and the same as the ancient Scottish scale; and, it may be remarked, the same as the scale is always found in a ruder condition of the art of music. The Chinese, however, sometimes use a wild, unsettled tone between the E and G, and between the A and C, but they do not always correspond with one F and B.]

The first musical instruments of Persia, or at least as far as any relics have yet been found, seem to have been of the harp kind; but we know not much of them before the Christian era. Their scale, it is said, divided the octave into seventeen equal intervals; if so, no instrument could be made, adapted to it, which would produce either melody or harmony. Such a scale does not contain a single concord within the octave. There is probably some error in our knowledge upon this subject, for the natural divisions of the tones, however produced, will arrange themselves in the main intervals according to the present European scale.

The most ancient known musical instrument of the the Hindoos—the *vina*—is a string instrument, and quite curious. It consists of a pipe, closed at each end, about three feet long, and as many inches in diameter, upon one side of which, near each end, is fixed a gourd by its neck; to serve as a sounding box; on the other side of the tube, four strings are stretched, beneath which, between the bridge and the nut, movable frets are inserted, by which the performer can adjust his scale to any arrangement he chooses. The



Hindoos had other kinds of stringed instruments, and claim to have invented the bow; but there is nothing on their monuments, or amongst their relics, or in any authentic history, which will fairly sustain their claim. If they, in ancient times, used the violin and bow, they must have been in a very rude state.

The ancient musical instruments of Egypt, from their sculpture and drawings, are much better known to us than those of any other nation. The Egyptians possessed the harp and the *nofre*—an instrument resembling a guitar—perhaps earlier than any other people. They also had instruments in the shape of pipes and flutes, though limited in compass. But the Egyptians were evidently farther advanced in the science and art of music than any of the Eastern nations.

The Assyrians used both wind and stringed instruments. They had the harp, the lyre, and the dulcimer; and a kind of instrument held horizontally upon the lap, or before the player, and played upon by a long plectrum, not unlike a bow, but without the hair, with a hook on the end, by which the string was both bowed and twanged. This is thought to be the origin or first hint of the violin bow. They also used the trumpet with effect, and had other smaller wind instruments.

The Arabs possessed a great number of musical instruments, some of which were introduced into Spain by the Saracens and Moors; and thence found their way into Europe. The Arabian *kuitra* became in English *gittern* or *cittern*, and, through Spain, finally the guitar; the *e-loud* was softened, in English, into *lute*, and the *rebab* became the *rebec*, which ultimately.

became a sort of fiddle, having at first but two strings, and afterward three, and was played on by a bow. This fiddle had no neck, and the bow resembled a boy's bow to shoot arrows with, far more than it did the present violin bow. The strings were fingered by the hand held above them, and the bow used under the arm of the hand which fingered the strings. It was also held and played in other positions, much as the performer preferred. By whom, or when, or where the bow was invented can not be ascertained. The Arabian bow used on the *rebab* was the first one authentically known in its present form and mode of use. The Arabs admit, however, that it was not original with them, but was obtained from the Persians. It was probably the *rebab* and its bow, which Al-faribi, the Arabian musician, used in playing at Bagdad, before the Caliph and his court, as the story goes, and by which he first set his audience a-laughing immoderately, in spite of the official presence; then, by changing the mode, made them weep; next, by changing again, he got them so angry that they were about to fight promiscuously, to prevent which he changed his mode a third time, and played them to sleep, and during their nap made good his escape. The same story is also told, stating that it was a lute which he used instead of the *rebab*, which is doubtless as authentic in favor of one instrument as the other. But the "jolly rebec," once used in England, and spoken of somewhere by Milton, was undoubtedly the successor of the Arabian *rebab*.

The "harp and organ" are mentioned in Gen. iv: 21; but what the character of the instruments was then is not now known; but it is well known that the

Hebrews possessed the harp and the lyre—which is near akin to it—the dulcimer, the trumpet, and pipes of various kinds; but upon what scale they were constructed is not known. Much is said in the scriptures about their musical instruments, and their music, their songs and their chaunts, but as far as we can now ascertain, music as a science or an art was not well understood by the ancient Hebrews.

Greece derived her musical instruments and her music, as she did much of her learning and art, from Egypt, as Egypt had before derived much of her knowledge from the Eastern nations. Greece had the harp, the lyre, trumpets, horns, and pipes, constructed in various ways, but their scale is unknown to us. [The meaning of the word music in Greece, as we have shown, was not confined merely to the art as we now understand it, hence much confusion has arisen as to what Grecian music was.] There was no intelligible method of writing music before the time of Guido in the eleventh century.

The Romans copied their musical instruments—as they did almost everything else they had in the way of art—from the Greeks; or, rather, more directly from the Etruscans, who derived them from the Greeks. The Etruscans excelled all the people of Italy in manufacturing musical instruments, and in many other things indeed. They were a very ingenious people. They made flutes of ivory and box-wood, and of bronze and silver, some of which were very highly ornamented. They also made a long curved horn, or trumpet, almost completing a circle, which, by a bar across it near the ends, was hung upon the shoulder, thus bringing the mouthpiece

conveniently in front, and the bell part behind and above the head; but it had no scale except its natural harmonics. Their straight horns were very long and slim. It is plain, from many concurring accounts, that the musical instruments of Greece and Rome came originally from the Eastern nations, and through Greece and Rome into modern Europe.

Amongst the North American Indians, the Aztecs of Mexico, the tribes of South America, and in the West Indies, ancient rude musical instruments have been found, resembling those already described, and first discovered on the other hemisphere. They are made of bones, horns, pottery; and, the more modern ones, of joints of reed, and tubes made by splitting smooth straight limbs of young trees, and hollowing out the wood, then binding the halves together with bark, and perforating them with holes; but without any system or scale. Amongst these races, we believe, no stringed instrument was ever found.

During the first ten centuries of the Christian era there was no improvement, either in music or musical instruments; indeed, during that dreary period the arts and sciences came very nearly being lost to the western nations and to the human race, except as they might have been revived again from the east, or discovered anew. Early in the eleventh century Guido, as we have remarked, improved, or rather invented, the method of writing music, by adopting the staff, and giving monosyllabic names to the notes; but there was no improvement in musical instruments. The history of music and musical instruments up to this time may be a curious and entertaining study, but for the purpose of instructions upon these sub-

jects, it is wholly a useless one. It only shows the longings and gropings of the human race, for some method of expressing something in the soul that can find utterance in no other way than in music. Neither music nor musical instruments, in any fair scientific or artistic sense, had any existence before the fourteenth century. No instrument is known, made before that date, which could be used in concert in a modern orchestra. It is not yet five hundred years since the musical scale was understood and adopted. Some of the intervals, of course, were known to the earliest and most ignorant nations, for the rudest trumpet, or the clumsiest string, might, by the natural divisions of their tones, teach them the octave, fifth, fourth, and possibly the major third; but the intervals between these, and the consecutive scale, and the relation to the key note, were not known. The Greeks understood the abstract laws of harmony, but that the intervals in the diatonic and chromatic scales were governed by these laws was not generally known, nor is it fully received to the present day. Some yet regard the intervals in the musical scale as an arbitrary arrangement which may be changed at pleasure—a theory as absurd as to say that you may adopt an arbitrary system of mathematics. Of course before the scale was settled there could be no scientific instrument made, nor artistic music written. It was all empirical.

The trumpet is the simplest of wind instruments, as the monochord is the simplest of stringed instruments; and their harmonic scales are the same. The invention of the trumpet has been attributed to the Syrians and to the Egyptians, but there is no certain evidence



in support of the claims of either. The Hebrews derived it from the Egyptians. The trumpet is emphatically a war instrument, to sound to the charge, or other evolutions of an army. It fell into disuse by the Greeks after the Trojan war, then became a favorite with the Romans, and in some shape has been in use ever since. [The scale of the trumpet, ascending, assuming C as its key note, is C, C, G, C, E, G; and it is possible to obtain the B and C above the last G, but quite impracticable—all of which are produced without keys or valves. It is not possible to obtain the F or A on the trumpet, in any part of its compass. By means of keys or valves which will produce the lower D, E, and F, it will give the diatonic scale; add to these keys, or valves, one for C sharp, and one for E flat, and the trumpet will produce the entire chromatic scale. This is the principle upon which all the varieties of modern trumpets and horns are constructed, including all the sets of our magnificent brass and silver instruments. As simple as this seems it was never discovered until about the year 1835. We believe the invention is due to Sax, of Paris. Each position—that is, of C, C sharp, D, E flat, and F—will produce its letter, its octave, fifth, and third, throughout the compass of the instrument, which, when all are brought together consecutively, make the chromatic scale.

Wind instruments of music are so numerous, and of so many varieties, from the tiny whistle to the ophicleide, that it is impracticable to notice them separately. The principal wind instruments, except the simple trumpet, trombone, keyed-bugle, and French horn, are of modern invention, as stated, and greatly

superior in the scale to any of the ancient trumpets or horns. Arranged in sets, they include the entire musical compass, except the highest octave, which can be supplied by the pipe or piccolo. For field music, they can not be rivaled.

The organ is the grandest musical instrument in the world. It is the sum of all wind instruments placed under the hands, and within the power of a single performer. In its simplest elements, as a whistle, or pipe, it is the oldest instrument; but when, by whom, or where it was invented, in its present combined powers, can not be ascertained. Century after century it can be traced in some form or other. It did not spring into existence Minerva-like, from the brain of any one inventor—it is the work of many brains and many hands. The first boy that made the first whistle, commenced an organ; the last man that made the last organ, did not complete the instrument. Its combinations are as endless as science, and its powers unlimited, except by natural laws. But we do not propose to write the history of the organ—that may be studied by any one; nor explain its construction—that belongs to the organ-builder; but rather to examine certain alleged defects which are supposed to exist in the science of its scale, and in its adaptability to art. The chromatic scale of equal temperament, as every musician knows, is not perfect on the organ, in all its intervals, as it is not on any other instrument having fixed tones; but the imperfection is much less than it is supposed to be by those who have never thoroughly investigated the subject, and carefully examined the particular question. The following table will show the variations of the chromatic scale of equal temper-

ament from the true scale, as it exists in abstract science:

Untempered Scale.		Tempered Scale.	
C.....	480.	C.....	480.
C-sharp.....	506.250	C-sharp.....	508.542
D-flat.....	505.678	D-flat.....	508.542
D.....	540.	D.....	538.781
D-sharp.....	562.500	D-sharp.....	570.819
E-flat.....	568.888	E-flat.....	570.819
E.....	600.	E.....	604.761
E-sharp.....	632.812	E-sharp.....	640.724
F-flat.....	599.321	F-flat.....	604.761
F.....	640.	F.....	640.724
F-sharp.....	675.	F-sharp.....	678.882
G-flat.....	674.237	G-flat.....	678.882
G.....	720.	G.....	719.186
G-sharp.....	750.	G-sharp.....	761.951
A-flat.....	758.518	A-flat.....	761.951
A.....	800.	A.....	807.270
A-sharp.....	843.750	A-sharp.....	855.263
B flat.....	853.333	B-flat.....	855.263
B.....	900.	B.....	906.120
C.....	960.	C.....	960.

By this table it will be seen that the imperfection of the chromatic scale of equal temperament, no where is equal to one vibration in one hundred—a much less per cent. of variation from the exactness of abstract science than will be found, upon the application of the meter, in architecture, sculpture, or painting. Indeed, no art ever fulfills the exactions of its science—it is a practicable impossibility. The concords of the octaves are perfect; the fifths stand, perfect 720, tempered 719.186; the fourths, perfect 640, tempered 640.724; the major thirds, perfect 600, tempered 604.761, which last shows the greatest imperfection in the tempered scale. Any concord, and its reflex concord, will fill the octave; and, if either one of them, in the tempered scale, is too flat, the other will be too sharp, exactly in the same proportion; and if either is too sharp, the

other will be too flat, in the same proportion, of course. But the imperfections of the instrument lie oftener in defective tuning than they do in the intrinsic imperfections of the tempered scale. The variations, practically, in architecture, sculpture, or painting, from the abstract sciences upon which they rest, do not offend the eye, unless they are unnecessarily glaring; nor will the tempered scale in music offend the ear, when the temperament and the tuning are perfect. There is no ear so nice, and no sense so acute as to be able to detect the difference between 600 and 604 musical vibrations in a second of time—a difference in the ratio of 1 to 151.

Unequal temperament of the scale is an attempt to throw all the imperfections into the remoter keys, which are seldom used, and thereby, as is supposed, to make the nearer keys, which are oftener used, more perfect; but nothing can be more fallacious, as is easily demonstrated. Unequal temperament, when the key note is changed the first time from the C, either by a flat or a sharp, is an advantage; but it will be found that when the key note is changed the second time, by two flats or two sharps, the advantage gained in the first change will return a disadvantage, just doubled, in the second change. For example, change the key note from C to D, by sharpening F and C, and you will find the D represents 540 vibrations, and the E, next above it, represents 600, when, in fact, E, to be the true interval from D as a key note, should represent 608 vibrations. Now, in the scale of equal temperament, the E represents 604, whatever may be the key note. The same ratio will take place

in any part of the scale in transposing the key note, either by flats or sharps, whenever it is changed the second time from any key in which the instrument is tuned to the true scale. Besides, grand and elaborate compositions in music use each of the tones in the chromatic octave as a key note in the course of the piece, and hence require one key to be as perfect as another.

It is sometimes thought, from the necessity of temperament for the purpose of obtaining a transposition scale, that the musical scale itself is imperfect. The student might as well suppose that the science of mathematics is imperfect, because he can not solve his problem. The musical scale, in abstract science, is as perfect as mathematics itself. Any instrument can be tuned perfectly to one key note in the octave, but the difficulty lies in getting twelve key notes in the octave, when there is really but one, and having each of their keys perfect. This is the problem which neither the musician nor the mathematician can solve, simply because it is insoluble; therefore, temperament makes a slight sacrifice of the science, to make the instrument more practicable in the art. Various methods, for hundreds of years, have been tried to avoid the necessity of temperament, but soon abandoned in succession. A transposition of the key on an instrument with fixed tones, without temperament, is an impossibility.

As the organ, in some rude way, if only a single pipe, is doubtless the oldest musical instrument in the world, so the harp, if only a single string, is the oldest stringed instrument; but it is impossible now to ascertain when, or by what people, it was invented. It is not



probable that it was invented by any nation solely, or at any given time, but most likely by many nations, and at various times, and perhaps contemporaneously, and improved through centuries; at least it is certain that the modern harp is a far more perfect instrument than its ancient prototype. It is perhaps the most ancient of all instruments having a regular scale of tones. The first person who stretched a cord tightly across something that sustained its vibrations, had the beginning of a harp, and if he happened to strike the string suddenly he had commenced playing upon the harp. The story of Apollo and the tortoise-shell does good service in accounting for the origin of the harp, but the song of Tom Moore, attributing its origin to the graceful form of a siren, or sea-maiden, whose loose hair, falling over her white arms, was changed to chords, to which her voice gave tones, is amongst the most beautiful legends of the harp, and perhaps quite as authentic as most of the stories of its origin. The harp, in a highly perfected condition, can be traced to Thebes in Egypt, more than two thousand years before the Christian era, more than nine hundred years before David wrote his psalms and played them, and about one thousand years before Solomon sang his celebrated love-song. Lord Elgin obtained a harp from a tomb in Athens, which must have rested in silence nearly three thousand years. When found it was in many pieces, but they could be put together so as to plainly show its shape, and the method by which the strings were tightened. It was, however, a very clumsy instrument. Notwithstanding we hear so much of the Grecian harp, the instrument does not appear to have

been as well known to the Greeks as it was to the Egyptians, who brought it to a higher degree of perfection than it attained during the Grecian era. The Hebrews were well acquainted with the harp, and very fond of its music, but the lyre, so well known to the Hebrews—about which a similar tortoise-shell story is told, only in this instance the god who discovered it was Mercury instead of Apollo—was often confounded with the harp; and, indeed, they resembled each other so much that the mistake is not surprising. The lyre also figured prominently in Grecian music, during the time of Pindar, Sappho, and Anacreon. The harp was well known to the Romans, but not so much used nor so highly prized by them as it was by the Egyptians, Hebrews, and Greeks.

The Northern nations also claim the invention of the harp, but it was not found amongst them in any fair degree of perfection before the fifth century of our era. Some writers concede this claim to the North, but we find no convincing evidence in its support—nothing, indeed, except the traditions amongst the Northmen themselves—while the claim for the Egyptian harp is well established, both historically and by drawings representing it, found upon the spot. The Theban harp was crescent-shaped, and highly ornamented, without the supporting pillar which gives it the general form of a triangle. It varied in the number of its strings from four to twenty-one, but according to what scale they were tuned is not known. But no race of people ever loved the harp as devotedly as the rude nations of the North. The history and laws of the ancient Britons, Picts, Scots, Irish, Welsh,

Saxons, and Danes, show their affection for their favorite instrument. A harp, by the laws of Wales, could not be seized for debt, because, without it a gentleman was degraded to the condition of a slave. Slaves were forbidden by law to own harps, or to be taught to play upon them. None were allowed to have them except the king's musicians, and those who ranked as gentlemen; and whoever could play upon the harp was declared to be a gentleman by law; and such were received into the highest circles of society, treated with distinguished respect, secured by law against all penalties, and their persons held inviolable. The nations of the South, even in the days of chivalry and the Troubadours, were not as devoted to the harp as the Welsh and Irish. The Irish ever loved the harp, as the songs of Tom Moore, gathered from the legends and ballads of the nation, most affectionately testify. There is a harp in the museum of Trinity college, Dublin, which is said to have been carried to Rome by Donagh, or McDonagh, with the crown of his father, who had been deposed in 1004, and both laid, with other regalia of the Irish king, at the feet of the pope, in full submission of Ireland to the church of Rome.

The ancient harp was a very imperfect instrument. At present, such an instrument could not take rank either in the science or the art of music. During the eighteenth century it was greatly improved by the Germans. They added bass strings to its compass, and obtained upon it a partial transposition scale. It began to be introduced into choirs and concerts, but was seldom admitted to the orchestra. About the first decade of the present century, Sebastian Erard, of

Paris, by the addition of pedals and the double action, placed the harp at once in the first rank of musical instruments.

It is now the most perfect in its chromatic scale of all that class of instruments having fixed tones. By means of the double action, each string can be made to produce its natural tone, its flat, and its sharp. On other instruments of fixed tone the flat of the tone above, and the sharp of the tone below, are the same. The same key or fret is used to produce both; this renders both slightly imperfect. A tone is flatted only when the interval next above it is a semitone; a tone is sharped only when the interval next below it is a semitone. The true flat of a tone is at a point below it in pitch, which leaves the interval of a natural semitone between the flat so made and the tone below it; the true sharp of a tone is at a point above it in pitch, which leaves the interval of a natural semitone between the sharp so made and the tone above it. Now, as the interval of a natural semitone is greater than one-half of a natural whole tone, it is plain that the flat of a tone above it, and the sharp of the tone below it, can not be exactly the same. On a harp, the true flat and the true sharp may be exactly obtained, which can not be done on the organ or piano, because the same key is used to produce both. The harp, in all the keys, corrects these differences, which on the piano or organ, and other instruments of fixed tone, are evenly distributed by temperament throughout the compass of the instrument, so as to reduce them to their minimum degree of imperfection. In tuning the harp properly the intervals of the whole tones are tempered—that is, equalized—and the intervals of the

semitones retained as in the true scale. The difference between the interval of the natural and tempered semitone, mathematically stated, is as 8 to 9; the mathematical difference between the natural and tempered interval of the whole tones which occur between the first and second, fourth and fifth, and sixth and seventh—counting from any key-note you choose—is as 270 to 269; such differences in the intervals between the second and third, and fifth and sixth, counting as above, are 150 to 151; and this represents precisely the amount of imperfection in the chromatic tempered scale on all instruments; but this imperfection, as we have stated, is more apparent to the mind in science than to the ear in sense; indeed, it is demonstrated in science, while, if the instrument is perfect and the tuning by equal temperament accurate, it becomes impalpable to sense.

Yet the harp, notwithstanding all its mechanical improvements, the perfection of its chromatic scale, and the sweetness of its tone, can never lead in the orchestra, or concert; it lacks both power of tone and facility of execution, but in the drawing-room, or family circle, it is the queen of instruments, and to the poor wandering minstrel his sweetest solace.

The harpsichord, which has now fallen into disuse, was the transition step between the harp and the piano-forte, or piano, as it is now generally called. Indeed the piano is merely an improvement on the harpsichord. It was invented about a century and a half ago by I. C. Shroder, a German, but has been greatly improved since. The harpsichord was merely a harp laid down in a box—the strings struck by a plectrum; the piano is the same—the strings struck



by a hammer, instead of being touched by the fingers. It may be constructed to express the entire range of musical sounds, from the highest to the lowest, and generally runs six or seven octaves. It is the sum of all stringed pulsatile instruments, and contains from 128 to 284 strings, according to its range and mode of stringing. About one octave of the lower tones are produced by single strings, some three or more octaves in the middle are strung double, and sometimes two or three octaves of the upper notes are triply strung. Practical sense has settled the length, weight, and material of the strings. They are now generally made of steel wire; some two octaves of the lower ones are wrapped with a smaller wire to give them weight, and yet preserve their elasticity. The lowest tones of a piano, beginning with A, is produced by fifty vibrations per second, the highest one—the C above the seventh octave—by 7,680 per second. This calculation is made upon the basis of thirty vibrations per second for the lowest audible C, which has generally been regarded as the English standard. Prof. Tyndall, however, places it at thirty-three. The question, being only relative, is an immaterial one; yet a standard ought to be established. There is already some variation between the German, French, English, and American standards. Such confusion is calculated to embarrass the student and should be avoided. The only standard for a musical pitch is the law of gravitation—as remote from the subject as it may seem at first view. The pitch can not be carried around the world, without variation, by a tuning-fork, pitch-pipe, or any other instrument. It must be taken from a given number of vibrations in a

given time, these must be taken from a pendulum, and the vibrations of a pendulum are regulated by the power of gravitation. A siren is an instrument which registers musical vibrations, and a stop-cock may be so attached to a pipe as to accomplish the same purpose; but a simpler method still is to hold a piece of card board to a ratchet-wheel, regulated to a known velocity in its revolutions. The card board, when the velocity is sufficiently rapid, will give out a tone, and, whatever it may be, the calculation is very easy from any known basis. It would be well if instruments all over the world could be made to the same pitch, as, by the commerce of nations, they are constantly being interchanged.

The scale of the piano labors under the same imperfections of temperament as that of the organ; indeed, where we desire twelve key notes in the octave, temperament becomes inevitable.

The piano is capable of expressing the most brilliant melodies with the richest combinations of harmony. Other instruments may exceed it for particular purposes, or within certain limits, but as a whole it has no rival. It is the best guide for training the musician, and the instrument generally used in composing. On the piano one performer commands the compass of an orchestra—the instrument is, indeed, a stringed orchestra. As a stringed instrument, subservient to art, it stands pre-eminent; and, practically, its solidity, permanence, power of remaining in tune, and freedom from injury by the accidents and vicissitudes of the school, concert, and family, will probably keep it in the lead. Its use has become so general

that it may be regarded as one of the popular educators and social reformers of the time.

Yet with all their advantages, pulsatile stringed instruments labor under some disadvantages. Their notes are loudest as soon as they are struck. Each one passes out of the power of the performer the instant it is touched. It can not afterwards be swelled, diminished, or in any way modified by the player, except to suddenly stop its sound; if not so stopped it gradually dies away. On a given note it is impossible to execute a crescendo, and impossible to avoid a diminuendo. These graces may be executed, of course, in passages, but not upon a single note. If musical notes on this class of musical instruments could be seen as well as heard, they would appear in the shape of cones, assailing the ear base foremost, and disappearing at their vertices, unless cut off.

Another disadvantage attends all musical instruments of fixed tones. The notes are set in the scale like mosaic. They have no tone-tints. No degree or shade of tone can be expressed between the semi-tones. The pitch comes hard and square to the point of tuning, without the least flexibility. No expression can be given to the tone after it has been touched. All the power the player has over it, except to stop it, lies in the original impulse; while, upon bowed instruments, the player has full command over the tone—to swell, diminish, modify, or change it as he chooses, from its first sound until it ceases.

Of all the musical instruments ever invented by man, those of the viol class must be placed at the head, on account of their complete adaptation to the chromatic scale, as well as for their powerful and soft,

tender and sweet, touching and expressive tones under the bow, which is the wand of the musician. And the violin is the genius of the family. It is the most interesting musical instrument known. It at once fulfills the fullest exactions of science, and the completest adaptation to art. The philosopher approves it, the artist adores it, the "fiddler" ignorantly worships it. It is the hope of the amateur—because he knows not its capacities—and the despair of the master—because he does. In its finest qualities it is the most exclusive of instruments, in its rudest powers the most widely popular; capable of producing the most exquisite tones, or the most torturing noises—the prince and plebian of instruments. This beautiful and brilliant wonder has retained its present shape, with very slight changes in its size and proportions, during about two hundred years; its strings have remained the same for at least three hundred years, and its mode of tuning unchanged for more than two hundred years. The music of the violin is the most sprightly, brilliant, and genial, as well as the saddest, most touching and mournful. There is no sentiment in the human breast that it can not awaken. It finds places in the heart which nothing else can touch, and lifts the soul higher above material things than the most eloquent language. It carries us beyond the palpable into the regions of the ideal, and above the senses into the spiritual. It is the instrument of the mind and soul; simple, profound, sublime. All the various and complicated powers are expressed by the plainest and most direct means, without the guide or obstruction of any mechanical perplexities. What condemned it to obscurity, in its ruder condition,

during a thousand years—namely, its want of fixed tones—proved ultimately to be its most transcendent excellence. Its scale—or rather want of a scale, for it has none except the four notes of its strings; its scale being in the soul of the performer—is absolutely perfect, and its facility for execution limited only by the skill of the artist.

The lowest letter of the violin, G, is produced by 360 vibrations per second; from this point ascending its scale, theoretically, is unlimited; its practical compass however is about four octaves, up to G, produced by 5,760 vibrations per second; yet some of its most eminent masters may occasionally snatch a tone above this—even up to E—produced by 9,600 vibrations per second. The instrument in its whole practical range is capable of expressing of 9,240 gradations of tone. If we were to calculate by the theory of fluxions we should have no steps or degrees of tone upon it whatever, but an inclined plane of sound. Inasmuch, however, as the musical scale is a series of irregular intervals, it is impossible to represent it in any other mode than by steps, or degrees; and a single vibration is the lowest unit by which we can make it intelligible. And let it not be supposed that this system is merely a fanciful array of figures; it is as demonstrable as the simplest problem in Euclid. Nor let it be imagined that it is merely theoretical, for it is within the range of actual practice, but, in its fullest extent, most rare and difficult of attainment. In theory the scale of the instrument ascends until it is lost in the infinite; and thus we can follow it through the material into the mental, until it passes into the ideal; just as we can trace the soul through the senses into



the spiritual, until it rises to the infinite and eternal. And all these beauties are perceived by the mind and felt by the soul of the true artist—as plainly as he can see the rays of the sun, or feel their warmth—inviting him on from excellence to excellence, still showing him a higher excellence, with a fascination utterly incomprehensible to those who have never entered into this unbounded field and heavenly arcanum of art. There is a music for the mind as well as for the ear. He who can find nothing but sound in music, is not thoroughly instructed in the science nor the art. Silent music is no solicism. The sound is not the music any more than the word is the thought—they are but the signs—and as we can understand thoughts without speaking, so we can understand music without hearing. Music can be seen with far greater accuracy than it can be heard. Many a musician enjoys a sight of the score almost as much as hearing its performance, the same as we can mentally read without expressing the words. Poor Beethoven composed, performed, and enjoyed music for years after he was as deaf as the insensate clod. Besides the world we all live in, the musician has a world of his own creation. It is this fact which makes great composers and artists so different from other men in the ordinary affairs of life. Mozart, Beethoven, Chopin, were all their lives mere children in the world's ways. Paglini had not the capacity to manage his own business; and although Ole Bull, in his physical, mental, and moral development, was one of the finest specimens of man that ever lived—brave, generous, noble, enduring—yet his heart and his soul were as delicate and tender as if he were a child. We could

see his fine presence, his genial countenance, and his graceful manners, but that was all—all could not follow him into *his* world. He sometimes lifted us up and showed it to us for an instant, but we soon sank back into the hard reality; yet such moments, and such glimpses, make us better, by elevating the soul and showing it something above what we find in this lower world.

The violin has a long history. It can be traced from an early period, through the middle ages to the present time; but it never had an inventor. It is not the product of one man, but the result of the skill and labor, mistakes and experiments, of many generations of men. Stradiuarius is sometimes accredited with its invention, but upon no different or better evidence than that which would give it to the Brothers Amati, or, indeed, to many others. Stradiuarius had something to do with settling the shape of the violin, which has remained the same ever since. If races of men, when they have no historic origin, may claim their descent from the gods, it would be quite excusable to attribute the invention of the violin to some spirit or angel. It required six centuries to bring the violin to its present perfection as an instrument, and two more centuries to ascertain the correct practice upon it, and will require many more centuries to exhaust its capacity—nay, its capacity is infinite, and therefore never can be exhausted.

Each violin, though all may be made alike, and out of the same kind of material, as near as it is possible to be done by human skill, has its peculiar individuality, as distinct from others as the faces and voices of our friends are distinct from one another. They

have their temperaments, tones of voice, capacities, and particular genius, as well as human beings. The handling, position of the sound post, its tightness or easiness, weight and height of the bridge, mode of stringing, and treatment under the bow, must all be managed with reference to each instrument, just as a careful physician would study the temperament, condition, and ailment of each patient. There is no successful mode of treating them as a class, any more than there is for treating all persons for all diseases in the same manner. And as a genius may be born in any rank of society, so occasionally a violin from amongst the ordinary cheap kind will turn out to be remarkably superior. By cheap violins, of course we do not mean "shingles;" and, of course, well-made violins, out of good material, will average much higher than ordinary cheaper ones—as well-learned, well-bred, well-educated, and well-fed people will be superior to those who have not the means of health and improvement; nevertheless, the unfathomable secret of superiority lies hidden in the violin, as it does in the human being.

But, with all the superiority, completeness, and perfection of the violin, and all the love we bear it, we are constrained to say, and we feel as if it were a kind of sacrilege to utter the thought, that there is an imperfection in the instrument in the want of complete uniformity between the *quality* of the tones produced on the G, or wrapped-string, and those produced on the other strings which are unwrapped. It is impossible to obtain the same quality of tone from a wrapped and an unwrapped string, or from any two different causes; and no attainable skill in the performer can disguise

the difference. It is not that the tones on either class of strings are defective—they are the best that can be produced on any mechanical instrument—but that they are not completely uniform in their quality. A want of uniformity in the quality of tone is a defect on any instrument, and it must be admitted that it runs throughout the viol family.

Another imperfection of the violin: The E string is too small for its length, and requires undue tension to give it the proper pitch. The tones made on this string are characterized rather by a keenness and shrillness than a roundness and fullness. In quality they are inferior to those made on the other unwrapped strings. The gradation from one string to another is not perfect. The tone of A, made on the D string, is different in quality from the same tone on the A string; so the tone of E, made on the A string, is different in quality from the tone of the E string. All the strings are too long and too light for their lower tones, and too short and too heavy for their upper tones, to be in due proportion of length, weight, and tension to the tone. There is a certain proportion in the length, weight, and tension of the string to obtain the best quality of tone, which can not be materially departed from without injury to the effect. Indeed, the method of stringing viols is a compromise between these conflicting difficulties.

As we have stated, the organ is the sum of wind instrument, and the piano the sum of pulsatile stringed instruments. If a system of viols, from the double-bass to the kit, inclusive, could be combined into a single instrument, and placed under the power and command of a single performer, we should have the

sum of bowed stringed instruments, and the most perfect inanimate instrument of music that could be fairly conceived in our present state of knowledge; but it would require an Argus and a Briarius combined for a performer. Such an instrument is "a consummation devoutly to be wished," rather than hoped for or expected.

But the most complete musical instrument known to man is the human throat. It was constructed by a Maker whose works are all perfect. The purest and sweetest tone ever heard by human ears is the voice of woman. The vital instrument is, and must forever be, more perfect than any thing contrived by human ingenuity. The difference is as that between the automaton and the living man. But it is not wholly in the superiority of the tones of the human voice over the tones of any other instrument in which its excellence consists; it lies in its complete adaptability to the musical scale in every key. Let a voice sing a strain in the key of C, then give it the pitch of F as a key-note, and it will flat the B perfectly, and so throughout all the changes by the flats; then give it the pitch of G as a key-note, and it will restore the B to its natural tone and sharp the F, and so throughout all the changes by sharps. Whatever pitch may be given to the human voice as a key-note, it instantly adjusts itself to all the intervals in that relation; and its modulations in the chromatic scale are perfect. The harmony of trained voices is more perfect than any that can be produced by instruments, and the melody of a single voice adjusts itself precisely to the true intervals. It needs no temperament to correct its tones when the key is changed. All keys are alike natural to the hu-



man voice, whatever the pitch may be. How the human throat can so delicately express all of these changes must forever remain an anatomical and a psychological wonder. Dr. Mandl, in his elaborate work on the *Larynx*, has only pushed the mystery a little farther from us—he has not solved it. And besides all of these advantages in favor of the human voice, the instrument itself is sentient. Unlike inanimate instruments, it is coupled with a brain which understands the thought, and with a soul which feels the sentiment it expresses, and is in full sympathy with all that is good and grand, beautiful and true, pure and holy.

## A REVIEW OF A REVIEW.

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The publishers of "The Musical Scale" have forwarded to me a review of that work, with a desire that it may be answered. Such of the propositions contained in the review as are capable of proof or disproof by demonstration, and with which I do not agree, I will answer; but questions of composition, or matters of taste, whether I agree with the writer of the review or not, I shall not notice, because none such are in the controversy.

I will state the propositions of the reviewer in his own words; the first is as follows:

1. "When A, the sixth of C, and a third to F, is sounded with F and C, it is a sixth to C, and a third to F; but when it is a fifth to D it is quite another thing—a full eighth of a tone sharper—as it must be or it can not be a fifth."

It is true that a fifth above D is sharper than a third above F, but it is not true that it is "a full eighth of a tone sharper." It is exactly one-eightieth of a tone sharper, instead of one-eighth. The difference between the vibrations of the two tones being as 800 is to 810, when the vibration of C is 480, and in the same ratio upon any other key. The reviewer certainly never made his own demonstrations, or he would not have fallen into such an error.

2. "The distances of the vibrations of a long string *do* have an effect on the gravity of acuteness of the tone. The longer  
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the vibrations the flatter the pitch, and the shorter the vibrations the sharper the pitch."

This proposition is not only untrue in science, but the reverse of it is true in fact. The tone of a slack string, when the distances of its vibrations are greater, will be more acute than it will when they are less; not because the distances are greater, but because, being greater, they increase the tension of the string by carrying it farther from its right line. The same law also governs a tight string; but on a tight string the increase of tension by the greater distances of its vibrations, is so slight in proportion to the amount necessary to sharpen its tone, that it is not perceptible to the ear. These experiments must be pushed to the extreme distance of vibration that the string will bear, otherwise the change in the tone of the string can not be perceived. In the ordinary tension of a string for musical purposes, and under the severest and most intense playing, the tone will maintain its correct pitch.

The proposition in the book that the reviewer attacks, namely: "The distance of the vibrations has no effect on the gravity or acuteness of the tone," therefore remains established. If the propositions of the reviewer were true, a sustained musical tone produced by a string would be impossible; and as the same law that governs the vibrations of a string also governs the beats of a pendulum—namely, that all the vibrations are isochronous, whether they be greater or less—gravitation acting upon the pendulum as tension upon the string—if the reviewer was right the measurement of time by a clock would also be

impossible. Increasing the length of a pendulum increases the time of its beats in inverse proportion, the same as increasing the tension of a string increases its vibration in time in inverse proportion; thus, the time of the pendulum is increased, and the tone of the string is raised. But the same law as to the *weight* of the pendulum and the string does not apply. Increasing the weight of a string sinks the tone, and decreasing the weight of a string raises the tone, both in direct proportion—the tension remaining the same; while increasing or decreasing the weight of a pendulum has no effect whatever on the time of its beats. Hence, the pendulum is the only means by which the pitch of musical tone can be ascertained and established. As the force of gravitation is always the same at the same level above the sea, and as the weight of the pendulum has no effect on the time of its beats, they must inevitably be isochronous.

3. "The musical scale *does* comply with the natural scale of harmonics. It is not the harmonics of one note, but of three notes."

The musical scale neither complies with the natural scale of harmonics, nor can either the fourth or the sixth above the key note be found in an infinite series of harmonics based upon the same key note. In Table No. 1, section 35 of "The Musical Scale," will be found a series of harmonics running through the number of 256, based on a key note of 480 vibrations to the second of time, beginning at 30, four octaves below, wherein search will be made in vain for either 640, which is the fourth, or 800, which is the sixth of the scale; and should the series be pushed to

256,000 the result would be the same. This not only shows that neither the fourth nor the sixth are there, but it proves that neither of them can possibly be there, because any number that can not be divided by 30, without remainder, can not be a harmonic to that key. The number of vibrations of any key note will divide the number of vibrations of any of its harmonics, without remainder; and every addition of the number of vibrations of the key note to one of its harmonics, produces the next harmonic above it. Nor is it true in science that the harmonic series of three notes, or any other number, will comply with the musical scale. Each note of any number will produce precisely the same scale of harmonics, differing only in the pitch. Each tone has its own system of harmonics. It is true that by taking the key note, and assuming its fourth and sixth above—the two latter being the very tones that the harmonics of the key will not produce—you may pick out the major diatonic scale from the three series of harmonics; so we may assume the seven tones and have the musical scale at once. But this is not the proposition in the book. It is that the harmonic series of the key note does not comply with the musical scale.

4. "Musical temperament means a mixture; and in order to have temperament we must have C and B sharp together, G flat and F sharp together, C sharp and D flat together, both sounding at the same time, and not a sound between them, which is neither."

If this proposition means, as we suppose it does, that C and B-sharp should be the same tone, that G flat and F sharp should be the same tone, and that C sharp and D flat should be the same tone, then, as to these



letters, it is the same as the chromatic tempered scale—which is so repugnant to the writer of the review—for there is no scale in which the flat of one tone is the same as the sharp of the tone below it, except the chromatic scale of equal temperament. But this is not the true scale. In flattening a tone to accord with a perfect scale, it is sunk to within a natural semitone of the tone below it; in sharpening a tone, it is raised to within a natural semitone of the tone above it. The flat is not thus sunk to the middle of the whole tone below it, nor is the sharp thus raised to the middle of the whole tone above it. The whole tone is thus divided in the ratio (within an extremely small fraction) of 16 to 24, instead of the middle, as 20 to 20 would be. Now, temperament divides the octave into 12 equal steps, or degrees, each of which is called a semitone, and any two of which is called a tone. These semitones stand as 18, while 16 represents the true or natural semitone. Temperament thus makes each semitone a key note, and gives the performer 12 key notes on his instrument instead of one.

5. "Every harmonic of the key note is in harmony with any other harmonic of the same key note."

This proposition is true as to the first six harmonics of the key note, all of which are also in harmony with the key note; but as to all others in the same series, it is utterly without foundation in science or in fact. Of the 256 harmonics, as shown by table No. 1 in "The Musical Scale," six are in harmony with one another, and with the key note, while the other 250 are not only discords amongst themselves, but also with the other six, and with the key note. The last

two harmonics are represented by 7,650 and 7,680 vibrations—having only one concurrent vibration in every 256. This not only proves the proposition in the book, but it also proves the negation of the proposition of the reviewer.

But let us demonstrate it by another method.

The ratios of the vibrations in the harmonic series progress as follows: namely, 1 to 1, 1 to 2, 2 to 3, 3 to 4, 4 to 5, 5 to 6, 6 to 7, 7 to 8, 8 to 9, and so on, up to 7,650 to 7,680, as shown by the table above referred to, and just as much farther in the same ratio as the student may desire to go. In the first concord they are unisons; in the second, octaves; in the third, fifths; in the fourth, fourths; in the fifth, a major third with its reflex, the minor sixth; in the sixth, the minor third with its reflex, the major sixth. This completes all the concords, any one of which, with its reflex, falls within and fills the octave. If we take 6 to 7 or 7 to 8, both are discords; and if we follow the series to infinity we shall never obtain another concord. Indeed, the farther we go the worse the discord. Thus we have shown that the harmonic series exhausts its harmony in six concords, just as we shall show, in discussing the next proposition, that the musical scale exhausts its intervals in twelve divisions, which we call semitones.

6. "How the author of 'The Musical Scale' ever arrived at the conclusion that 'if we take the concords of concords we can produce but twelve sounds to the octave,' is more than the writer of this can understand."

The author of "The Musical Scale" never arrived at any such conclusion. That is not the proposition

in the book. It is this: "If we take the concords of the key note, and the concords of the concords of the key note—*always adhering to the place where the interval first falls as the true point*, we can produce but twelve intervals in the octave." This is a very different proposition from the one first assumed and then attacked by the reviewer; and we now add to the proposition that these twelve intervals constitute the true, natural, untempered musical scale. The words in italics, which the reviewer, besides misstating the other portion of the proposition, entirely ignored, are indispensable to the truth of the proposition; otherwise we should wander in error, not only to 53 sounds in the octave, as the reviewer has done, but to 53 billions of sounds, or any other immense number that figures can express—for we should never again return to the key note. He has followed a succession of fifths, and thereby incorporated into his process in obtaining the A, the very error pointed out in the first proposition in his review, and the same which the italicised words in the present proposition correct. On returning to the C by the method of the reviewer, we find it too sharp by 6.547 vibrations in every 480—though the reviewer did not take the trouble to work out the problem and make the statement. Now, as 6.547 vibrations will never divide 480 vibrations without a remainder, we may safely assert that we should never return to the key note.

There are several methods of working out the problem contained in the proposition—for it is no matter at what interval we begin, so it belongs to the key note or some of its concords, nor which concord we

take first. If we follow the law laid down in the proposition, the result will be the same by either method. I will endeavor to prove it in the plainest manner, though I despair of ever stating it any clearer than I have done in the book. Instead of the numbers of the intervals I will use the letters, as they are more familiar to musicians.

Begin with C, the key note; take its common chord, and we have C, E, G; then take G and its common chord, and we add B and D to the scale. Next take F and its common chord, this gives us A, and repeats C, which completes the major diatonic scale. Now we will take the minor third above C, and we have E flat, the minor third above G, and we have B flat, and the minor third above F, which gives us A flat. Having thus made use of the key note and its concords, both in the major and minor modes, we next resort to the concords of the concords of the key note, beginning at D, which is the fifth above G. Take the common chord of D, and it will give us F sharp and repeat A; but this repeated A is too sharp; we therefore adhere to the *first* A produced from F. Following the process in its order, we take A as the next basis. The common chord taken from A gives us C sharp and repeats E. Bring these tones together consecutively, and we have the natural chromatic scale of twelve intervals in the octave, which may be repeated to infinity, by adhering to each point as it is first produced, and we will not be able to obtain another interval. This is the scale shown upon the monochord, and by numbers in Plate VI in "The Musical Scale."

7. "Flatting or sharpening a tone is really moving it up or down, not inserting a new interval to obtain the semitone."

Nothing can be more true than this proposition, as shown by Plate X in the book, yet the reviewer does not seem to understand it. The words were spoken of the diatonic scale—not the chromatic. It is precisely the method by which the transposition of the key note is obtained on the double-action harp. An ideally perfect musical instrument would have no fixed tones at all, but the power of expressing easy gradation of tone from the the lowest to the highest. The fingers of the violinist are simply four movable keys, and allowing his instrument a compass of four octaves, command 2,700 gradations of tone, which are the equivalent of the same number of fixed keys. The human voice within the compass of three octaves expresses 1,800 gradations of tone with its single pipe, as if the whole compass was but one movable tone. This matchless instrument would be poorly represented by thirty-six immovable keys. No proposition is plainer or clearer than that to sharp a note you raise it, and to flat it you sink it; but on instruments of fixed tones, represented by keys, as the organ or piano, of course an additional key must be inserted to either sharp or flat a note.

But I agree with the reviewer in the remark which he quotes, that "Few persons are aware how great is the difference between the true intonations of a fine voice, or a violin, and the false intonations of such instruments of fixed tone as the organ or piano-forte, etc."

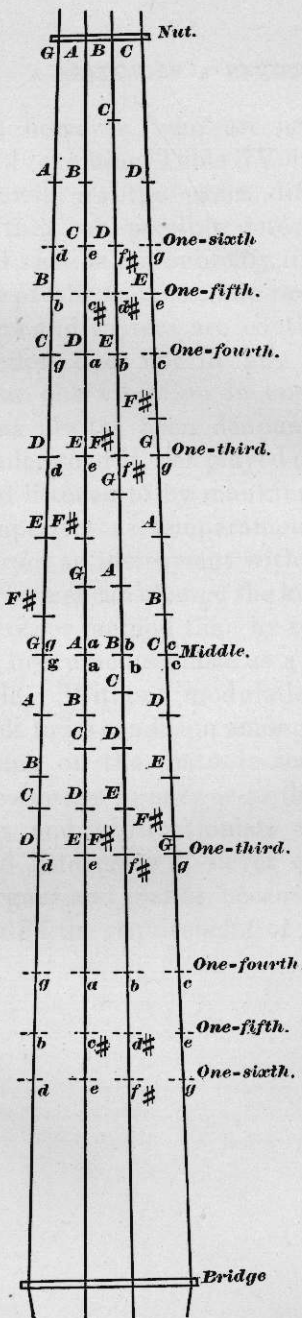


If persons, however, who are not aware of this difference will examine Table IV in "The Musical Scale," they will see the exact difference, and far plainer than they can possibly detect it by the ear. The tempered scale is undoubtedly imperfect in all its intervals except the octaves, but not so much so as careless talkers and writers are continually asserting. The imperfection does not in any interval amount to as much as one vibration in one hundred. The truth is, it has always been denounced by theorists who never understood it, yet played on, and sung with by artists, and listened to by mankind for hundreds of years. As imperfect as temperament is, it is impossible to construct an instrument with fixed tones upon which the performer can change the key-note by modulation by any other method than by temperament, and without such instruments music as a high art is simply impossible. Without modulation, music would soon sink back to its condition amongst the mountains where it is sung on the diatonic scale by the swains and their sweethearts in answer to the echoes. Whatever theorists and abstractionists may say, artists, amateurs, and listeners will never consent to throw away their organs and pianos because their scales do not strictly fulfill the requirement of abstract science.



# SCALE OF THE G TETRACHORD.

(HALF SIZE.)



The capital letters at the left of the string (with the bridge toward you) represent the stop-notes, and the small italic letters at the right the harmonics. The small roman letters represent double harmonics. The scale of open harmonics is the same from the middle of the string, either toward the nut or the bridge, but in practice it is generally taken toward the nut.

## THE TETRACHORD: A NEW MUSICAL INSTRUMENT.

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The tetrachord is a new musical instrument of the viol kind. In external shape and proportions it resembles generally the family to which it belongs, as the violin or violoncello. It may be made of any size, from that of the double-bass or violono to the kit or smallest fiddle; but from the mode of stringing, and the scale of tuning, it is a distinct instrument, in quality of tone, and method of obtaining the scale, and in practice, from any of the viols as now used. The strings of each instrument are all of the same kind, as all wrapped, or all unwrapped catgut, or silk, properly graduated in size and tension; and, including the set, may be tuned to any pitch from the ophicleide to the piccolo.

The G tetrachord, which is herein described, is of the size of the violin, and is strung with four wrapped strings, resembling the G string of the violin; only graduated in size and weight, so that with the proper tension each one will produce the tone desired. The lowest string is tuned the same as the violin G; the others are tuned to A, B, C, ascending, consecutively.\*

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\* When it is not convenient to get strings properly graduated, the experiment may be tried by using the ordinary sized violin G string for the G, and a lighter G (there is generally sufficient difference between their size and weight) for an A, and two guitar D strings—selected in the same manner, as to size and

This open scale of tuning is the same as the Greek tetrachord—hence the name of the instrument. The tetrachord divides the octave into two equal parts, leaving the space between the fourth and fifth between them; that is, the intervals from the first to the fourth, or from C to F inclusive, in the ascending scale, are the same in their relation to one another as the intervals from the fifth to the returning octave, or from G to C inclusive.

The first octave of the scale is produced by the open strings and stop-notes, or all except the lowest tone, G, by stop-notes, as the performer chooses; all the tones above the first octave, in the diatonic scale, are open harmonics—that is, tones produced by lightly touching the string instead of stopping it firmly. The point of touch to produce a harmonic is always at some aliquot division of the string; and when a stopped harmonic is made, it is by stopping the string with the first finger, and touching the aliquot point of the remaining or vibrating part of the string with some other finger. Double harmonics are made by touching the string at two aliquot points at the same time. Thus a complete chromatic scale, with all its shades of tone, is within the power of the performer. The practical compass of the instrument is three octaves and a half, which may be commanded by a single position of the hand. All the stop-notes, except the lowest G and G sharp, may be doubled in power—that is, made on two strings in unison; and

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weight—for the B and C strings. Strings for tetrachords, tuned to other letters, either below or above G, may be selected from the various viol strings as they are now made, so as to answer a very good purpose.



within the range of the stop-notes above the lowest F inclusive, four unisons may be commanded, either of which the performer may choose, as best suits the passage he is playing, and all of which could be used at once if the bow could be made to touch more than two strings at the same time; and indeed may be used by a dexterous sweep of the bow across them all. Each harmonic tone is composed of two or more unisons, produced by the vibration of each aliquot part of the string. The tone, when the string is touched in the middle, or divided into two parts, is made up of two unisons; if thus divided into three parts, of three unisons; and so to any number of divisions; but above the sixth division the harmonics do not belong to the scale of which the string is the key note, and therefore can not be used in music at all.

The harmonic produced by dividing the string into two parts, is an octave above the pitch of the string; the one produced by dividing the string into three parts, is the fifth in the second octave; that by dividing the string into four parts, is two octaves above the string; a division of the string into five parts produces the major third in the third octave, and a division into six parts produces the fifth in the third octave, being an octave above that produced by a division of the string into three parts. In the middle of the string the stop-notes and harmonics are the same in letter. All the harmonics, notwithstanding the wide intervals between them on a given string, are so arranged by the method of tuning as to be brought into consecutive order in the scale. The harmonics produced by the division of the string in two, three, four, five, or six aliquot parts, and their

multiples, four, six, eight, ten, and twelve, and so on, are all that properly belong to the musical scale.

By stopping the strings in the middle, the scale obtained between the nut and the middle may be repeated between the middle and the bridge, in both the stop-notes and harmonics, and in exactly the same manner, but it is an octave higher. This gives the instrument a scale of more than four octaves, which, on tetrachords of the lower pitch, is quite practicable; but in the highest portions of the scale on those of the higher pitch, it exceeds the musical compass, except in theory, and becomes impracticable. The bow would have to be moved so swiftly to outstrip the vibrations of the string, and thus produce a clear note, as to render its motion by the hand impossible. It would require the sweep of the entire length of the bow to produce an instantaneous tone.

By spreading the diagram of the finger-board before the student, with the bridge toward him, he will see at once that the same letter runs diagonally across the finger-board, from left to right toward the nut, and from right to left toward the bridge—either of which the performer may take separately, or combine them, as he chooses. It will be seen, also, that the scale may be made from the lowest tone of the first string, by ascending the string, stopping at the proper intervals, or by one step to the second string and ascending that, or two steps to the third string and ascending that, or three steps to the fourth string and ascending that; or by alternately taking one step across and one up, or by one, two, or three across or up, as may be most convenient. Of course

descending the scale is just the reverse of this. Indeed, arithmetically, any octave on the instrument may be played in many different ways. Only the diatonic scale is marked on the diagram, as every musician—and this little work presupposes a fair knowledge of the science and art of music in the reader—knows that a flat of any tone is made by stopping the string a little lower than its natural, and its sharp by stopping it a little higher. A flat or sharp in the harmonics is made by holding the stop-note from which it proceeds a little lower or higher than the place of its natural tone, and making the harmonic a little higher or lower, as either its flat or sharp is desired. A close examination of the diagram will also show the student that all the concords of any tone—the minor third, major third, fourth, fifth, minor sixth, major sixth, or octave, may be commanded, upon one of the other strings, from any point. This gives the tetrachord great power when playing in concert, and adds wonderfully to its capacity when played separately. A little familiarity with the scale of the instrument, and the fingering, will enable any musician to play it without difficulty. Of course to the beginner, like all musical instruments, it will be difficult to understand, and far more difficult to play it with excellence.

But it is impracticable, by a description in words, to give a hundredth part of the passages of melody, or the combinations of harmony, which can be expressed on the tetrachord. The different modes and combinations are endless, all of which may be understood and obtained by study; yet the musician must love the science and the practice of the art, or he is not likely,

to attain to excellence in either. Nothing, indeed, but love and labor will make a musician on any instrument.

A full set of tetrachords requires twelve instruments:

1. The lower C double-bass tetrachord—the size of the double-bass viol—is strung with four heavy wrapped cat-gut strings, properly graduated in size and weight to answer to the tones required, and is tuned double C, D, E, and F, consecutively. This arrangement brings the finger-board so under the hand as to avoid all danger of false stopping, either in the stop-notes or harmonics. It affords peculiar facility in execution, and the tones are very rich and powerful.

2. The lower or double-bass D tetrachord is the same size as the C, strung with large, heavy cat-gut strings, graduated and tuned D, E, F sharp, and G, consecutively. It takes a higher part in the bass than the double C tetrachord. Its tones are peculiar and soft, yet powerful; but different in quality from those of the C tetrachord.

3. The second C or bass tetrachord is strung with wrapped cat-gut strings, and tuned to C, D, E, F, the same as the double C tetrachord, but an octave higher. Its size is the same as that of the violoncello. The tone is remarkably soft and strong, and the instrument is an admirable support to the bass voice.

4. The second D or tenor tetrachord is strung with unwrapped cat-gut strings, and tuned D, E, F sharp, and G, an octave above the double D tetrachord. Its size is also the same as that of the violoncello. As a support to the tenor voice it can not be surpassed by any other instrument.

5. The E tetrachord is of the size of the violin, or

it is better to be a little larger. It is strung with wrapped cat-gut strings. Its lowest note is E, below the violin G; and it is tuned E, F sharp, G sharp, and A, consecutively. It takes the part of the second violin with fine effect. The tone is exceedingly soft and creamy. The lowest string should be a size heavier than the violin G; the others graduated accordingly.

6. The G tetrachord is the one we have particularly described in the diagram. It takes the part of the leading violin, but may also be used for the part of second violin. By the description of one, the musician will easily understand those of any other pitch.

7. The B flat tetrachord is strung with wrapped cat-gut strings, a little smaller than those used for the G tetrachord. The best size for the instrument is that of the three-quarter violin. The full size of a violin requires the strings to be rather attenuated to make them stand, and renders the tone less perfect. They are tuned B flat, C, D, and E flat. The tone is fine and very pleasing.

8. The D tetrachord is of the size of the violin, and stands next to the G as a leading instrument. It is strung with unwrapped cat-gut strings, the lowest one corresponding to the violin D. They are tuned D, E, F sharp, and G. It corresponds to the flute in its scale, and also resembles it in tone. Flute duets may be played upon it throughout. It sustains the female voice admirably.

9. The F tetrachord is strung with unwrapped cat-gut strings, properly graduated in size; and is tuned F, G, A, and B flat. Its tones resemble those of a flute, and are very soft and sweet. The size of the instrument is the same as that of the violin.



10. The A flat tetrachord is of the size of the violin, strung with unwrapped cat-gut strings, and tuned A flat, B flat, C, and D flat. Its tone is keen, yet soft and pleasing.

11. The B instrument is also of the violin size, strung with unwrapped cat-gut strings, of a size smaller than those used on the A flat tetrachord. They are tuned B, C sharp, D sharp, and E. The tone of this instrument is very brilliant, but it is only calculated for the higher parts.

12. The upper D tetrachord should not be larger than a half sized violin. It is more curious and interesting than valuable, as the lower instruments reach to the top of the scale. It is tuned D (piccolo), E, F sharp, and G. The upper string in size corresponds to the violin E. Its scale goes up to the D above the highest piano C; but the upper half of the highest octave is very difficult to execute, it requires so swift a bow. As the extreme upper notes on the piano must be struck quickly or the hammer will damp the tone before it leaves the string, so the upper tones on this instrument must be bowed swiftly, even with a jerk, or they will be destroyed by the bow itself, the same as when the bow is dragged too slowly across the string to accommodate its vibration. The upper D tetrachord takes the highest part with the piccolo.

Each instrument in the set is named from the letter of its lowest tone.

The tetrachord, as remarked, may be constructed, strung, and tuned to any pitch—just as the maker, composer, arranger, or performer may choose; but it is thought that the above modes are the best, relative to one another. And the semitone may be placed

between any of the two strings, and thus change the key-note of the instrument. For example, on the G tetrachord, flat the B string, and the key-note will be transposed to F; or flat the A string and the B string, then the key-note will be E flat; and so on through the various changes. Every instrument of the viol kind—indeed of every other kind except the piano and organ—is intrinsically better, owing to its pitch and peculiar construction, in certain keys than in others, and gives the performer a more ready command over certain positions than others. To meet this difficulty the tetrachord may be made for, and strung and tuned to any key, so as to be most readily adapted to the position required. The more open harmonics obtained in the given key, the greater and easier will be the facility of execution.

Viols, as now made, may be used as tetrachords merely by changing the mode of stringing and tuning, but it is thought that they should be slightly changed in their structure when made especially for tetrachords; that for all the instruments strung with wrapped strings there should be a bass-rod under each foot of the bridge, and the sound post placed a little back and between them; and in those strung with unwrapped strings there should be no bass-rod at all. But these modes of constructing the instruments must be tested by experiments before they can be declared to be the best. In tetrachords of the violin size or smaller, the strings should be notched a little wider on the nut than usual on violins. This affords the fingers greater facilities in combining the harmonies.

It is thought that the tetrachord has some advantages over the viols as they are now used:

1. In the great superiority of harmonics—of which the scale except the lower octave is composed—over stop-notes. The harmonic is the purest tone that can be obtained by mechanical means. It always consists of two or more unisons, so blended that the ear can not detect them separately; and it is impossible to make them falsely if the string is in tune. They can not be produced at all unless they are perfect in their relation to the tone of the string upon which they are made.

2. In the complete uniformity in the quality of the tones throughout the compass of the instrument. This arises from the uniformity in the quality of the strings used upon each instrument. It is impossible to obtain uniformity in the quality of tones which are produced by different means. Every one knows at once the difference between the A on the flute and the A on the violin, yet the tones in science are the same; and every musician instantly detects the difference between a tone produced on a wrapped string and the same tone produced on an unwrapped string. And the difference runs through all the viol family as now used; not even the violin, which is the most perfect of all instruments, is free from this defect—if it is not sacrilege to say so—and the performer, though he may be the greatest of artists, can not disguise it.

3. Another advantage in favor of the tetrachord is the command it gives over a consecutive scale of open harmonics, which, as we have shown, are the purest tones produced on any mechanical instrument; and

a scale of harmonics which can be managed with facility is a desideratum.

4. The fingering on the tetrachord in producing harmonics, will be found far easier than on the viol.

5. There is a much wider scope for delicacy and expression in the management of the bow, in harmonics, on the tetrachord than on the viol.

6. There is an incompatibility in stringing a viol with two kinds of strings. As a general rule, viols which are the best on wrapped strings are not the best on the unwrapped strings. The tones on the wrapped strings are sometimes better than those upon the unwrapped, but frequently the tones on the unwrapped strings are the best on the instrument. These discrepancies are always to be reconciled on each instrument if possible. Whoever has lovingly handled viols knows this fact very well. And, as a general rule, instruments should be thinner and lighter for wrapped strings than those for unwrapped; but there are hidden secrets in viols which no one can discover by their appearance, as we can not tell a man's genius from his looks. Of course, there are external indications by which we may judge approximately, but nothing short of careful and repeated experiments can settle the question as to the qualities of a viol, just as we can not know a man of genius until he has given us some evidence of the fact. Now, this peculiarity in viols may be turned to advantage in tetrachords. Each one may be chosen, by experiment, for the letter to which it is best adapted.

But the tetrachord does not dispute the place of the viol, which belongs to the highest class of instru-

ments, and has been used for more than four hundred years, nor claim to be its superior, nor its equal, indeed, in all respects; it only hopes for an introduction into the family, and a fair recognition according to its merits.

In conclusion, let us add that this little book is not all theory. It is the result of many years' careful study of the subject, and of repeated experiments by every imaginable method. What disadvantages may be developed by use in the tetrachord, or whether it has any advantages over the viol as now used, must be left to time and experience to determine.



## RUSSIAN LITERATURE.

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Since the Crimean war, in 1855, the power of Russia, although it suffered in that contest, has been much more noticed by other nations than it had been before; and since the abolition of serfdom in her dominion, in 1861, her government has become a study for other statesmen besides her own; but no nation yet has given her literature more than a passing notice. The reason may be plain. Her great military power is felt by the world, and her policy, in reference to the law of nations, has its influence, but her literature, which will ultimately represent the best results of all her powers, is not yet established. Perhaps her banner may yet wave, her policy rule, and her language be heard, from the chilling snows of Siberia to the burning rays of Good Hope—for she is rapidly availing herself of the science, art, and skill of other nations—if so, then her literature will be known to the world; for the school and college, in the range of time, are more powerful than the cabinet and the field.

Literature is as enduring as human nature, and had its beginning almost coeval with the origin of mankind. The traditions, observations, and tales of love and battle, form the basis of the first rude essays of the historian, the philosopher, and the poet.

Poetry precedes civilization—not, indeed, in the shape of regular poems, but in bold expressions and striking metaphor; tradition is ever the precursor of authentic history, and observation is the only true basis of philosophy. The arts began early in the history of man. Necessity invents the useful arts, and the love of the beautiful, implanted in our nature, suggests the fine arts. After myths have passed away like the clouds of the sky, or the fogs of the sea; after traditions have been winnowed of their fictions, and furnished their grains of truth; after philosophy has studied the universe and its laws, then comes science, which is what we know; and all of these together constitute a nation's literature. Whenever a nation begins, it begins a history, a philosophy, the arts and sciences, and a literature. But amongst a people, where man has to struggle with the elements and his enemies for mere animal existence, although he necessarily acquires knowledge, there are but few joys for the mind and heart; yet in more polished nations literature gradually becomes a want of the soul almost as much as bread is a want of the body. Literature, indeed, may be defined to be the recorded culture of the mind and the soul; and the best literature is the best thoughts, upon the best subjects, expressed in the best words. The orator and the poet precede the scholar and the author. The scholar learns from the poet, the author reads, invents, and imagines; the critic comes last. He draws his rules from those who spoke, wrote, and sung, without rules, save the great rule of nature; and the bold oratory and artless song of the savage sometimes have a beauty which no learning or criticism can improve. Kings, princes, heroes, warriors,

statesmen, and rulers, however useful to their times, however wise, brilliant, or accomplished, pass away with their periods; while the man of letters represents pure thought, which remains like the fixed stars; and he is often remembered for a single sentence, a line, a verse, a principle, a sentiment, simply expressed in words, long after kings, princes, heroes, warriors, statesmen, and rulers are buried beneath the dust of ages, and forgotten forever.

The earliest authentic history of the Slavonic nations, of which Russia is the great modern exponent, fades away amidst the traditions, legends, and tales which have just been noticed. Herodotus mentions a people which are supposed to have been a tribe of the Slavi; and some allusions to their country and race are made by Strabo, Pliny, and Tacitus. From the resemblance of the Slavonic language to the Sanscrit it has been supposed that these people came from India, but when they passed over into the regions they now occupy, can not be ascertained; probably it was before the Christian era, but the first authentic intelligence with regard to them does not reach back farther than the sixth century. Doubtless the whole Slavonic race originally spoke the same language, but it was soon broken-up into dialects, as a language spread over a vast region of country will be—especially while it remains unwritten. The Slavonic language has become varied and enriched by the Greek, Latin, German, French, and even English, and has now ripened into the modern Russian; but the earliest manuscripts in the Slavonic language are not older than the time of the eleventh century. There are some inscriptions and devices upon the crosses and monuments perhaps

older than that date. The earliest records by native writers were written about the middle of the eleventh century. A code of laws was enacted as early as 1280, and recorded in the native language. And Russia, like Greece, and indeed like most other nations, has its epic poem. It is called "Igor's Expedition," and is supposed to have been written in the twelfth century. It is said to possess a refinement and delicacy remarkable for so rude a people as they were at that time, and also has much power and gracefulness; but the critics do not place it very high as a literary production. In the fifteenth century Russian literature received an important influence from the liberality of some of the native princes, who invited the learned from Germany, Italy and France into their dominions. About the same time public schools were founded; and the Russian youth were sometimes sent to foreign universities to be educated. The language and literature of Poland, also, about this period commenced having an important effect upon the minds of the Russian people; and subsequently Russia obtained the greater part of her public libraries from the spoliation of Poland, and very much enriched her literature from the language and works of that intelligent and brave, but unfortunate people. History began to be regularly recorded, and thus assume an authentic and permanent shape; but Russian literature can not be said to have had a beginning before the reign of Peter the Great, at the close of the seventeenth century. He adopted the Russian language in his courts of justice, and in diplomacy, and made it the polite language of the nation. He had type cast, and established presses, and caused many books to be translated into the Rus-

sian from other languages—particularly from the German and the French; indeed, Peter the Great was to Russia very much what Alfred the Great was to England; still, up to this time even, the Russian language has no systematic grammar, and of course but little attention has been paid to style. But if Peter the Great laid the foundation of Russian literature, Lomonosof must be regarded as its architect. As most great benefactors are, he was humbly born; his father was a fisherman. He first learned to read from the servants of the church, and so ardent was his desire for knowledge, that he left the shelter of his father's roof clandestinely, and went to Moscow, where, he had been told, they taught the languages; thence to St. Petersburg, where he obtained a liberal education. Afterwards he traveled through Germany and Holland, where he studied philosophy and the sciences. His Russian grammar brought his native language from chaos into order, and he was the first one who cultivated style. He sketched the history of his country, and wrote several works on chemistry and mineralogy. He also composed a long epic poem, as well as several odes and tragedies, but they do not rank high; he was rather a philosopher than a poet. His works are blemished, however, by the too common fault of all who write under tyranny, namely, an undue tendency to panegyric, and a stooping to despotic power. These are weaknesses in a great mind, but the age and country in which he lived must be the excuse of Lomonosof. Contemporaneous with Lomonosof were Kheraskof and Sumarakof, who were very prolific writers, but not of remarkable genius; although Kheraskof, having written an immense and cumbrous



epic poem, was called the Russian Homer. About the same time also lived and flourished Dershavin, a poet of true genius. Although his works were bedazzled with the glory of Catharine, yet the true metal could be discovered beneath the tinsel. He wrote an "Ode to God" of uncommon beauty; it was translated into most of the European languages, and attained the distinguished honor of being printed in letters of gold and hung in the palace of the Chinese Emperor and the Temple of Jeddo. But devotion to power, from which not even Dershavin was exempt, is the weakness of all the literati of Russia. Patriotism is a becoming sentiment, but a literature expressive of that which is not just to all men, can have no abiding place in the Republic of Letters. Catharine was a great patron of learning, but a literature indebted to any other influence than that of truth and nature, can never be pure or permanent.

During the reign of Alexander, who succeeded Catharine, many new schools and several universities were founded, also a number of museums. This prince affected to be a great patron of letters, but his influence rather made learning fashionable than afforded it any substantial advantage. Writers became extremely numerous; authorship seemed to be a rage with the nobility. Russia, at this time, possessed about fourteen thousand volumes in the Slavonic language, more than seven thousand of which were said to be the product of a single year. We shall be able to mention but few authors of this period—they are very numerous—among whom Karamzin must stand at the head, for, unquestionably, next to Lomonosof, he was the great benefactor of Russian literature.

After fighting awhile in the army with credit, he turned his attention to letters, and established the *Moscow Journal*, a periodical through which he first became known to the world in his new character. He won nobler laurels with his pen than he had done with his sword. At length he enlarged his field by founding another periodical called the *European Messenger*, in which he took a larger and higher range of subjects; but his more permanent fame rests on his history of the Russian Empire. This great work, however, having been written under the patronage of the government, is not free from the blemishes we have before mentioned. If not false in fact, yet the romantic coloring is too apt to gild the deed which truth and justice must condemn. The great advantage which Russian literature gained from Karamzin, was the improvement of its language and the cultivation of a vigorous and idiomatic style.

A remarkable poet of this period, both for genius and misfortune, was Ivan Koslof. Early in life he had been a gay and fashionable man, and pursued his career of dissipation until sickness deprived him of the use of his limbs, soon after which misfortune he lost his sight. Adversity seemed to touch and awaken his true genius. He found a balm for his afflictions in literature. Heine, of Germany, affords a similar and more recent example of the soothing effect of culture under misfortune. Being a lover of the intense and passionate, Koslof imitated and translated Byron, and like that great poet, and like Heine also, "he learned in suffering what he taught in song." Another poet, of a similar name—Ivan Krylof—was celebrated for the composition of many stories and fables, and

his sweet appeals to child-like nature. Count Orloff as well as several of the literati of Paris, did him the honor to translate his works into the French language. He was a pure, harmless, kind-hearted man, and, notwithstanding the ruggedness of the Russian character, became a great favorite of the nation. Whoever, indeed, obtains a hearing from the youth of a nation secures perpetual fame. At this period, Russia had produced but little in the drama; nothing, indeed, in the department of tragedy of any greatness or power. Ozerof is the leading dramatic poet, and his most popular, and perhaps his best play, is entitled the "Miseries of Intellect"—surely a most admirable theme. The novel has been cultivated in Russia, both in prose and rhyme, to a considerable extent. The one best known among the older ones, as far as I am informed, is entitled "*Bursak*," and is said to abound in that pleasing, quiet humor, so characteristic of Don Quixote, but it narrates the adventures of a scholar with his pen, instead of a knight-errant with his sword. Recently, Russia has produced a novelist of great power—Ivan S. Turgenef—still living. His first venture—"Notes of a Sportsman"—a series of sketches of country life, contains vigorous attacks upon the villeinage of the serfs, and had much to do, it is thought, in abolishing that odious system of slavery. These sketches were followed by more elaborate works—"Fathers and Children," "Smoke," "A Nest of Nobles," "The Unfortunate One," etc.—all upon Russian subjects, and written with great vigor.

Translations have even abounded in Russia. Homer, Ossian, Ariosto, Tasso, Pope, Byron, in poetry; Newton, Locke, and Bacon, in philosophy; and a

great number of ecclesiastical and educational works have received the Slavonic dress.

The reign of the late Emperor Nicholas commenced in a storm—indeed, in blood, and ended in storm and blood. The most of his rule, however, was calm, but it was the calm of force, not of consent. Many of the young literati were concerned in the bloody tragedy which ushered the emperor into power, and lost their lives in the contest. His death, during the terrible war in the Crimea, will be long remembered. The conflict was really between free thought and despotic power. The Russian Pegasus had become restive under the curb and rein of tyranny. He longed to range at liberty in fresh pastures, and drink from a pure Hippocrene, or dash his daring hoof on Parnassus Mount; but, alas! he was subjugated to the Emperor's will, and compelled to drudge in his iron service, just as Napoleon III geared him to the car of tyranny in France.

Research and criticism began to assume a more prominent part in literature during the late reign than it had previously done. A periodical work, entitled "The Telegraph," was established by Polevoi, who was a self-made man—not having been bred to letters, nor was he a man of much genius—but he possessed a clear judgment and great energy of thought, the very qualities which constitute the critic. History and biography assumed more importance, but no work of philosophy or science, or at least none of a high order, had yet appeared written by a Russian, or in the Slavonic language. Religious controversies arose, and skepticism and infidelity made their appearance during this reign, probably transplanted

from Germany and France. *Panslavism*—a political doctrine, according to which Russia, being at the head, claimed the right to absorb all the Slavonic nations into her own empire—was much discussed at this period, and was indeed the principle which gave the final blow to the liberty of Poland. Books of travel and studies of antiquities now appeared, but they formed no very considerable branch of Russian literature. Novels were very numerous and began to portray Russian home-life, but no remarkable author appeared in this line. Their works were all ephemeral, corresponding to the multitude of tales which we now find in our own nation. Pushkin, the greatest poet that Russia has yet produced, flourished during this time. He had been banished by Alexander for his too daring sentiments of liberty, but on account of his great genius was recalled by Nicholas. During his exile he wrote much and well, but on his return he seemed to have lost the spirit of his genius, so baleful is the influence of a despotic court upon this noble principle. His writings possess the true Byronic fire, and, like those of Koslof, evidently share the influence of the great English bard. Pushkin, indeed, may be called the Russian Byron. He had the daring of an eagle, and behind the bars of despotism, like the caged eagle, could only gaze upon the sky of liberty. The court of Nicholas was also adorned by a number of minor poets, amongst whom two ladies of some genius appeared—the Princess Volkanski, and Miss Teplef. Mrs. Helena Han was also an author of celebrity, whose writings resemble those of the late Madame George Sand. A collection of the popular poetry of the Slavonic tribes has been made by Bielowski, a



Polander, by which it appears that Russia, though the largest, is not the oldest nor the most poetical branch of this extensive family. But Russian poetry, comparing it in quality to that of this prolific age in our own country, is very limited in its production. The Russians can not be said to be a poetical people. Pushkin is their only great poet when compared with the poets of other nations. The drama, during the reign of Nicholas, lay at the feet of the Emperor. The very titles of the plays are abject, and sometimes even sacrilegious; for instance, one is called "Our Lives Belong to the Czar," another "The Hand of God Defends the Czar."

Polish literature, although now embraced in the general name of Russian, of which, however, it is the greater and better part, still deserves a separate notice. The language of Poland, like that of Russia, arose out of the Slavonic dialects, but has been modified, of course, by the surrounding languages. No living language can remain permanent; even the written language of the Chinese, the most peculiar of all languages, is now changing under the pressure of surrounding influences. Like the Egyptian hieroglyphics, the key to its meaning has been discovered, and it no longer remains a mystery. The Polish tongue is still spoken by ten millions of people. The earliest production in this language is a war song—which is still sung, or at least was before the Partition of Poland amongst the conquering powers—supposed to have been written about the close of the tenth century. It should be remembered that Poland had no existence as a nation, separate from the Slavonic tribes, earlier than the tenth century, nor, indeed, had

Russia earlier than the ninth. This song, which rather resembles a prayer, has no poetical value, and, notwithstanding so early a specimen, the beginning of Polish literature does not date before the fifteenth century. There are a few slight traces of recorded thought throughout this dreary period, but nothing that remains permanent. Indeed, all the nations of the earth, except some in the East, during these five centuries, and the five immediately preceding them, were robbed of their rights, ensnared in ecclesiastical meshes, enchained by political tyranny, and trodden down to the deepest degradation. The sun of literature, during one thousand years, was obscured by the clouds of superstition; philosophy was denied, science condemned, the arts—except where they subserved the interests of the church—were ignored, and liberty destroyed. From the tenth to the fifteenth century, Polish thought and Polish letters were wholly governed by church dignitaries, who were all foreigners, the nation not being allowed to exercise even the humblest clerical privileges. While a nation is thus robbed and ridden, it is very easy to see why it produces no literature. The mind must be free, or its thoughts are worthless.

Casimir was the first wise Polish prince; he improved the laws, established courts of justice, and laid the foundation of a national education. He was the Peter the Great of Poland. The first printing press was erected at Cracow, in 1488, from which period the Polish language may be said to date. There has been found, however, a work called "The Memoirs of a Janissary," written at an earlier period, but its language is so imperfect that a modern Pole can not read

it without explanation. It is the journal of a Polish nobleman, who joined the Turkish army, and fought at the siege of Constantinople, in 1453; and, of course, the true date of the work could not have been long after that event. Some religious works, that bear date about the same time, are still extant, but their language is also so imperfect that they afford conclusive proof of the true commencement of Polish letters. The annals of Poland, however, seem to be correctly written at this time, and for a long period before, but they are found in the Latin language, and written by foreign scholars.

Kochanowski was the founder of Polish literature. He was a man of genius, a scholar, and a poet. His translations of Homer, Anacreon, and Horace, are distinguished for force of language and purity of style; and his original pieces possess uncommon vigor and beauty. He was a dramatic as well as a lyrical poet. Rybinski and Klonowitz were also distinguished as poets; the former wrote in the Latin as well as in the Polish language, and was created a poet-laureate. Karpinski was the poet of the people, and may justly be called the Burns of Poland. From this period, Poland has had a continued succession of poets—too numerous to even name—of a high order in all the departments of the art, down to the time she lost her nationality; and there is one noble trait of character, which, during all of this time, must forever distinguish them from the Russian poets of the same period—their muse was devoted to freedom; but, alas, for the sad effect of despotic power in chaining genius—a recent volume of poetry, published at Warsaw, celebrates the praises of all the tyrants of Russia,

from Rurik to Alexander. And eloquence, before the downfall of Poland, was also highly cultivated, and very much esteemed, as it always is in a free nation, and as it never can be under a despotism. Russia has never produced a single orator of eminence, whilst Poland has had her hundreds; but, alas, for Polish eloquence, that, too, has been hushed forever.

The novel has been cultivated, perhaps, in Poland, less than any other department of literature, yet Scott has been happily imitated. Sharbeck is the principal, or, at least, one of the leading Polish novelists; but the novel which is said to be the most read was written by a woman, the Princess of Wirtemberg, and is called, "The Intimations of the Heart"—a very pleasing title, and a subject which a woman could most happily treat. Historians and analysts have abounded in Poland—none of the highest order, however; but the true history of Poland can never be written. Her nationality is lost, her libraries are plundered, and her archives destroyed. Russia seems determined, under the fatal doctrine of Panslavism, not only to destroy her from amongst the nations of the earth, but also to efface every mark that might seem to indicate her former existence. She was too learned, too eloquent, too brave, and too free, to suit the designs of Russia; and the remains of her noble qualities but ill comport with despotic power.

In philosophy, mathematics, astronomy, and the practical sciences, Poland, for three hundred years before her downfall, stood equal to any of the contemporaneous nations; while Russia, proper, in these departments, fell below mediocrity. The universities, seats of learning, down to the common schools of Po-

land, were broken up, their funds taken from them, and every vestige worth removing, transferred to the halls of the Czar. Since the downfall of Poland, the more spirited of her people have been wanderers, too proud to wear the chains of slavery on their native soil. A great many of her literati fled to Paris, where they or their descendants still live. From that city, during the last forty years, they have published to the world many interesting productions concerning Poland. "Evening Hours of a Pilgrim," the very title of which touches the heart, is a work of peculiar interest. It gives much information concerning the former condition of Poland, especially in the time of Poniatowski. I do not know the author of this work; it was published without his name. The lectures of Mickiewicz on Slavonic literature, delivered at Paris, in the French language, and afterward published in German, at Leipsic, are full of thought, and glow with enthusiasm. Their author was a bold orator and a true poet. He fondly believed in the revolution of the world, which would restore his wronged country to her legitimate rights, and unite all the Slavonic nations under a free government. He made use of this beautiful metaphor; "There will yet be a torch that shall illumine the world, of which I am but a spark now falling to the ground." But it is in purely poetical creation that Mickiewicz shows his full power. His "Sir Thadeus" is a work of great beauty: and he is also the author of some smaller poems of a very high order. But in poetry he is not a prolific writer; indeed, it might almost be stated as a rule, that the best poets produce the least poetry; at least, good poetry, compared with such as is "hated by gods and



men," bears but a small proportion to it. Pebbles are plenty, diamonds are rare. Count Krazinski, however, is considered by many their greatest poet. He has the ethereal mystical power of Shelley, combined with the passionate fire of Byron; indeed, by some he is considered not inferior to these master spirits. There are a number of other poets still living, too many, indeed, to notice separately, some of whom have a highly cultivated genius. Their songs are wild and daring, or sweet and subdued, as alternately they sing of their once happy, but now unfortunate country. But the echo of their strains will soon die away, and Polish poetry cease to have a living voice.

Finland, as being a considerable portion of the Russian Empire, may claim our attention a moment. The Finns are not of Slavonic blood; they are supposed, by many, to be the same as the *Phinni* mentioned by Ptolemy, or the *Fenni* noticed by Tacitus. They are a brave and hospitable people, but grave and unsocial. Their popular education is in a low state, yet almost every one studies music and poetry. Their poets wear the mythic robes of Ossian, and their music resembles the ancient Gaelic, or that of the early Welsh; but they can scarcely be said to have a recorded literature. Their greatest poem, or collection of poems—it is difficult to say which—is an epic, entitled *Kallawalla*. It has been translated into English, French, and German, and I believe into the Swedish language. It is from this poem, as some have thought, that Longfellow caught the idea of his *Hiawatha*. *Kallawalla* sings the legends of the Finnish race, and *Hiawatha* the traditions of the North American Indians. That the legends and traditions of a rude people, though inhab-

iting different countries, when their circumstances are alike, might resemble, is highly probable; yet there are but few coincidences between the Finns and our Indians. From the strong resemblance between the two poems, not only in form and spirit, but in many of the incidents, and the frequent similarity of thought and sentiment, it seems highly probable that Professor Longfellow took a lively hint from the Finnish epic. Though Longfellow worthily wears the poetic wreath, yet he is too much of a scholar and too devoted to books to be a thoroughly original poet. Not that a man can be too learned to be a poet, yet his genius must bear a due proportion to his learning, else he will take thought at second hand and unconsciously become a copyist. This is precisely the case with the author of *Hiawatha*; his genius is covered up in his learning; he has not sufficient force to assimilate it, and thus make it his own, or to shake its influence from his mind. The author of *Kallawalla* is unknown. It has been sung during many generations at the fire-side of the Finn, and chanted in the field to lighten his labor. Indeed, it has floated in tradition for ages, until it was gathered up by European scholars, or some modern Pissistratus perhaps, and put in its present shape. This renders its authenticity certain, but leaves the name of its author a mystery forever.

We will now notice some of the characteristics of Slavonic popular poetry, and also give a few specimens. The monuments of a nation's muse generally exist in their epics, dramas, histories; these are read by students, scholars, and critics; but the living and flowing poetry of a nation is found in its songs and ballads; these are read, repeated, recited, and sung

by the people. The Slavi are a singing race. The faculty called a musical ear is almost universal with them, and their cultivation of a musical taste is remarkable; and, when not at war, singing and playing on an instrument of the lyre kind, similar to a Spanish guitar—in Latin called a *cithara*, in old English a *cittera*, and in Spanish *guitarra*, whence comes the modern name, *guitar*—constitutes quite an occupation, and consumes much of their time. In their poetry they make frequent use of epithets, and the application of some of them, though somewhat monotonous, is indeed beautiful. To give an example—the word *white* is not only applicable to things, but to actions also. Not only is it used to express the *color*, but also every quality that is pure, or beautiful, or good. They would say of a noble action, “it is a *white* deed;” or if they speak of the Czar, they call him the *white* Czar; and indeed they extend the application of the epithet to the Almighty, calling Him the *white* God, as we would say the Immaculate. Slavonic poetry is extremely ancient. We are indebted to German scholars for bringing it to light, as we are indebted to them for light upon many other subjects. Its morality, for a rude people, is extremely high and just, and its tones remarkably pure and chaste, as is more likely to be the case in northern than in southern races. In these respects politer nations might have learned justice and purity from the ancient Slavi. It is also comparatively free from superstition and those monstrous conceptions which are so apt to disfigure the poetry of rude nations. Such supernatural expressions as we find in it generally relate to the attributes of the Supreme

Being, or to the missions of angels, which are pleasing to the most enlightened minds. The belief, however, in the foreboding of dreams prevails to some extent. Indeed, but few persons arise entirely above such influences; the reason condemns them, but a doubt will still linger in the sentiments. There is a prevailing cast of melancholy in the Russian songs, and in the tone of their national music. The origin of their popular tunes is as deeply hidden in the past as the sources of their poetry. They are rich and varied, and are much admired by cultivated musicians. The pensiveness which pervades his songs appears in singular contrast with the generally cheerful disposition and rugged character of the hardy Russ. And as warlike as the Russians are, we yet find but few war songs in their poetry; nor are they remarkable for their fire or force when they do occur. The following "Song of the Haidamack" is a fair specimen. It is expressive of the Russian's hatred for the Pole. Haidamack is a name given to the Russian peasant:

#### SONG OF THE HAIDAMACK.

Gladly would I to the war—  
To the war so full of prey;  
Pleasure of the Haidamack,  
But the steward bids me stay!

Gladly to the merry dance,  
Would I to the gusli play,  
Pleasure of the rosy maid;  
But the steward bids me stay!

Gladly would I hunting go  
 With my hounding dog away,  
 Pleasure of the noble youth,  
 But the steward bids me stay!

But, farewell, thou rosy maid,  
 Quickly, sabre, to thy goal,  
 Mount thy charger Haidamack,  
 Perish may the haughty Pole!

Neither are elegiac pieces common in Slavonic poetry. The following elegy, however, on a murdered youth, is supposed to date as early as the sixteenth century:

#### ELEGY ON A MURDERED YOUTH.

Oh, thou field, thou green and level field,  
 Oh, thou plain, so far and wide around,  
 Pleasing field, dressed up with everything—  
 Everything—with sky-blue flowers so small;  
 Fresh thy verdure, and thy blushes fledged,  
 But defaced by one thing—only one!

In thy very middle stands a tree;  
 On that tree a young grey eagle sits;  
 He sucks the raven's heart-blood glowing hot,  
 Drenches with it, too, the moistened earth.  
 Ah, black raven, youth so good and brave,  
 Thy destroyer is the eagle grey!

Not a swallow can more fondly cling—  
 Hovering cling, unto her soft, warm nest,  
 Than the mother to her murdered son.  
 And her tears flow like the rushing stream,  
 And his sister's like the murmuring rill;  
 Thus, in showers, the tears of love fall down!



The following touching little piece, entitled "The Dove," may also rank under the present division :

## THE DOVE.

On an oak tree sat,  
Sat a pair of doves;  
And they heart to heart  
Tenderly embraced.

On them suddenly  
Darted down a hawk ;  
One he seized and tore,  
Tore the little dove ;  
With his feathered feet,  
Soft blue little dove ;  
And he poured his blood  
Streaming down the tree ;  
Feathers too he strewed  
Wide around the lea ;  
High away the down  
Floated on the air.

Ah, how wept and wept,  
Ah, how sobbed and sobbed,  
The tender doveling then  
For her little dove !

Spake the light young hawk  
To the little dove :  
" Weep not, weep not so,  
Tender little bird !  
O'er the sea away—  
O'er the far blue sea,  
Flocks of other doves  
I will drive to thee ;

From them choose thee one,  
Choose one soft and blue,  
With his feathered feet,  
Little dove for you ! ”

Said the doveling then,  
To the light young hawk :  
“ Villian, fly thou not  
O'er the far blue sea,  
Flocks of other doves  
Drive not here to me ;  
Of all the flocks of doves,  
Of all beyond the sea,  
The father of my little ones  
Alone can comfort me ! ”

The song of the Post Boy is highly characteristic of the rugged Russian and the cheerless climate. Imagine him in the depths of a Russian winter, scaling the snow-clad mountain ; in the wild forest ; through the keen air ; while a few stray sunbeams glitter on the snow they can not melt, chanting the following strain :

#### SONG OF THE POST BOY.

Ah, thou bright sunlight—  
Bright and red sunlight,  
O'er the mountain high,  
Shining through the oak,  
Warm the post boy's heart,  
Warm, oh, warm me, sun,  
And not me alone,  
But my maiden, too !

Ah ! thou maiden dear,  
Fairest, dearest child ;  
Thou my lovely maid,  
Mild and sweet to me !

Black those brows of thine,  
Black thy winning eyes,  
And thy lovely face,  
All so round and bright,  
Without painting red,  
Without painting white!

To thy girdle rolls  
Many a flowing lock;  
And thy voice is sweet,  
Full of gentle talk!

In the collections of Slavonic poetry to which I have had access, I do not find a single drinking song.

Some of them, however, allude to the vine in rather merry terms. The Russians are known to be a sober, hardy people; yet, as every poetic literature of which I have any knowledge has something inspired by the wine-cup, it would seem highly probable that the Russian did not stand as an exception so remarkable. Bacchanalian songs really disfigure Greek and Roman poetry; and the German, French, and English are not without serious faults in this respect. It is a subject well enough when delicately managed, but in the poet's hands very liable to be abused.

The love of the dead appears to be a strong trait in the Slavonic character. The following piece, although it sounds very Germanlike, is characteristic of the melancholy Slavi. It is difficult, in these specimens, to always employ rhyme and exactly preserve the sense, yet it will be attempted in some of the following pieces:

## THE DEAD LOVE.

I sought the dark wood where the oat-grass was growing;  
The maidens were there and the oat-grass were mowing;  
And I called to those maidens: "Now, say, if there be  
The maiden I love 'midst the maidens I see!"

And they sighed as they answered: "No, no; alas, no;  
She was laid in the tomb just one week ago."

"Then show me the way my footsteps must tread  
To reach the dark chamber where slumbers the dead!"

"The path is before thee, her grave will be known  
By the rosemary wreathes her companions have thrown."

"And where is the church-yard, whose newly-made heaps  
Will point out the bed where the blessed one sleeps!"

I turned, and with heart-chilling terror I froze,  
As a newly-made grave in my pathway arose;  
And I heard a low voice, but it audibly said:  
"Disturb not, disturb not, the peace of the dead!"

"Who treads on my grave? what footsteps have swept  
The dew from the bed where the weary one slept?"

"Oh, maiden, my maiden, speak not thus to me,  
My presents were once not unwelcome to thee!"

"Thy presents were welcome, but none could I save,  
Not one could I bring with me into the grave;  
Go, then, to my mother, and bid her restore  
To thy hands every gift which I valued before!"

"Then cast the gold ring in the depths of the sea,  
That eternity's peace may be given to me;  
And sink the white 'kerchief, deep, deep in the wave,  
That my head may repose undisturbed in the grave!"

The next is a little piece bearing the same title,  
which, I think, must be regarded as beautiful. The

reader should remember what was said about the word *white*—that it meant not only the color, but also every thing that is good, pure, and beautiful:

## THE DEAD LOVE.

White art thou, my maiden,  
Naught so white as thee;  
Warm my love is, maiden,  
Can not warmer be!

But when dead, my maiden,  
Whiter than before;  
Maiden, now I love thee  
Warmer than before!

The accumulated superlatives in this piece are faults in a strictly critical view. Of course, nothing can be whiter than the whitest, nor warmer than the warmest. But the same extravagances have been alleged against Sappho and Shakespeare, and indeed can be pointed out in most of our standard poets. The head may detect such errors, but the heart forgives them.

Love is the great element in Slavonic poetry, as it is, indeed, in the poetry of all the nations of the earth. Love—nothing so laughed at, yet nothing so wept over; nothing so ridiculed, yet nothing so obeyed; nothing so gentle, yet nothing so terrible; why wonder, then, since it can move every other passion, that love is the master key to poetry. Strong men and proud women may say what they will—he conquers them, and they obey him. The Russian, with all his ruggedness, is delicate in love. In literature their love-songs are less offensive with gross-



ness of passion than perhaps those of almost any other nation. Greece, the politest of ancient nations, and France of modern, fall far below Russia in this respect. There is less ideality in the Russian's love than in the Grecian or German, but his affection is more self-sacrificing to the object beloved. The following verse expresses a pure and noble sentiment. It should be mentioned, first, however, that the Asiatic custom, by which the parents dispose absolutely of their children in marriage, prevails throughout the Slavonic nations. A Russian daughter, wherever her love might be placed, would not presume to marry against her parents' discretion. This verse expresses the lover's advice to his beloved after she is betrothed to another, in accordance with parental authority:

Weep not, weep not, oh, sweet maid;  
 Choose, oh, choose another love.  
 Is he better? Thou l't forget me;  
 Is he worse? Then think of me—  
 Think of me, sweet one, and weep!

The following, which describes a parting under similar circumstances, it appears to me, must be regarded as a beautiful poem. It is impossible to adapt rhyme, in this piece, without too great a sacrifice of the thought:

#### THE FAREWELL.

Brightly shining sank the waning moon,  
 And the sun all beautiful arose,  
 Not a falcon floated through the air—  
 Strayed a youth along the river's brim;  
 Slowly strayed he on, and dreamingly,

Sighing, walked he to the garden green,  
Heart all filled with sorrow, thus he mused :  
"All the little birds are now awake,  
Greeting, all have sung their morning songs.  
But, alas ! that sweetest doveling mine,  
She was my youth's first dawning love,  
In her chamber slumbers fast and deep.  
Ah, not even her friend is in her dreams,  
Ah, no thought of me bedims her soul,  
While my heart is torn with wildest grief  
That she comes to meet me here no more !"

Stepped the maiden from the chamber then,  
Wet, oh, wet with tears her lovely face ;  
All with sadness dimmed her eyes so clear,  
Feebly drooping hung her snowy arms.  
'T was no arrow that had pierced her heart,  
'T was no adder that had stung her breast :  
Weeping, thus the lovely maid began :  
"Fare thee well, beloved, fare thee well,  
Dearest soul, thy Father's noblest son ;  
I have been betrothed since yesterday,  
Come, to-morrow, troops of wedding guests ;  
To the altar I am forced to go ;  
I shall be another's then, yet thine,  
Forever thine, thine only until death !"

Having thus shown the complaint of a despairing lover for the loss of his mistress, we will present the following little piece, which expresses the grief of the maiden for the loss of her lover. The sentiment is lighter than that of the preceding pieces. Perchance some inveterate bachelor—unwillingly so, no doubt—will exclaim : "And well it may be, for the maiden's love is lighter than the man's." But be that as it may, here is the piece :

## THE FORSAKEN MAIDEN.

Little star, with gloomy ray,  
 If thou could'st but cry,  
 If thou had'st a heart, my star,  
 Sparks, I'm sure, would from thee fly,  
 Just as tears fall from mine eye.

All the night with golden sparks  
 Thou for me would'st cry,  
 Since my love intends to wed,  
 Only cause another maid  
 Richer is than I!

Nor can this piece rank very high as a composition. It is too much elaborated. The heart utters its grief in the most simple and direct language. It never runs after comparisons. The tone of the piece sounds far more like the song of a lover in his closet than the deep murmur of an injured maiden's heart.

The following poem is very plaintive, and fondly expresses the uneasy longing of the love-stricken one:

## ABSENT LOVE.

Winds are blowing, howling,  
 Trees are bending low;  
 Oh, my heart is aching,  
 Tears in streamlets flow!

Days I count with sorrow,  
 And no end appears,  
 But my heart is lightened  
 When I'm shedding tears!

Tears the heart can lighten,  
 Happy make it not,  
 But one blissful moment  
 Ne'er can be forgot!

On the lea so sandy—  
Dry, dew-thirsty lea,  
Oh, without my lover  
Life is dark to me!

Where, dark-browed, beloved one,  
Where, oh, mays't thou be!  
Come, oh, see, and wonder  
How I weep for thee!

I would fly to thee, love,  
But no wings have I;  
Withered, parched, without thee  
Every hour I die!

But I find that I am quoting quite too freely from this branch of my subject; I can not leave it, however, without showing the humorous side of the universal passion. The following playful banter is quite pleasing:

#### THE LIBERAL OFFER.

Flowing waters meet each other,  
And the winds they blow and blow;  
Sweetheart, with the bright blue eyes,  
Looking from the window now.

Do not stand so at the window,  
Rather come before the door;  
If thou givest me two kisses,  
I will give thee ten—or more!

This piece is from Bohemia, and the succeeding one from the Vendee, neither of which provinces belong

to Russia, but both are of Slavonic origin. The following verses will show lovers

### HOW TO CHOOSE A WIFE.

Let him who would married be,  
Look about him and take care  
How he choose to take a wife—  
Take a wife,  
Lest he rue it all his life!

If thou should's't make up thy mind,  
And should take too young a wife,  
Youthful wife has boiling blood—  
Boiling blood;  
No one thinks she is too good!

If thou should's't make up thy mind,  
And should's't take too old a wife,  
In the house she'll creep about—  
Creep about,  
And will frighten people out!

If thou should's't make up thy mind,  
And should's't take a handsome wife,  
She will naught but trouble give—  
Trouble give;  
Others' visits she'll receive!

As for poor ones, let them be,  
Nothing they will bring to thee,  
Every thing will wanting be—  
Wanting be;  
Not a soul will come to thee!

If thou should's't make up thy mind,  
And should's't take a wealthy wife,



Then with patience thou must bear—  
Thou must bear,  
For the breeches she will wear !

Pretty, modest, smart, and neat,  
Good and pious she must be ;  
If thou weddest such a wife—  
Such a wife,  
Thou'lt not rue it all thy life !

But with all the devotion of the Slavonic races to the grand passion, it does not seem that the “course of true love” runs any smoother with them than it does with other people, as the following Servian song will show. It should be introduced, however, with the explanation already made—that in all the Slavonic nations the authority of the parents over their children in the affair of marriage is absolute ; and the additional remark that their authority does not cease with marriage. It seems, indeed, that the parents, during their lives, exercise an important influence over the families of their children. The knowledge of this custom is necessary to the full understanding of the following little piece, entitled

#### THE QUARREL.

Come, my neighbors, let us hurry,  
That we may not stay out late ;  
My mother-in-law is in a fury—  
She says I broke my husband's pate.

Well, he wouldn't mind my wishes,  
Heeding not a word I said ;  
He refused to wash the dishes—  
I threw a pitcher at his head !

Both were broken—head severely,  
For the head I could not laugh;  
But I loved my pitcher dearly—  
It cost an apple and a half !

Those who are familiar with old English poetry, written before the age of Spenser, will notice many resemblances between that and the poetry of the Russians. Indeed—human nature being ever the same—wherever nations have attained to a similar degree of civilization and intelligence, they will be found to resemble one another in their literature and manners. And persons of the same degree of culture generally have similar opinions and tastes. The upper castes of India, although we are in the habit of thinking of that nation as sunk in idolatry, which indeed is quite true as to the general masses, entertain opinions on most matters of thought and taste corresponding with the educated classes of Germany, France, or England, or indeed any other cultivated nation. External manners may vary according to local customs, and fashions may change, chameleon-like, but modes of thought and matters of feeling and taste, amongst the cultivated, have an affinity throughout the world.

It is quite unsatisfactory to give extracts from prose works without extending them impracticably. From works of philosophy they would be unmeaning without the argument; from essays unfair, unless the premises were stated; and from stories scarcely intelligible, unconnected with the plot; indeed, any thing torn from its context must necessarily suffer much injury thereby. We must therefore be contented with the following passages, taken from Turgenief's "*Nest*

of *Nobles*," which give certain marked characteristics of each sex :

"In her youth, Maria Demitrievna had enjoyed the reputation of being a pretty blonde, and even in her fiftieth year her features were not unattractive, though they had lost somewhat of their fineness and delicacy. She was naturally sensitive and impressionable, rather than actually good-hearted, and even in her years of maturity she continued to behave in the manner peculiar to 'institute girls.' She denied herself no indulgence, she was easily put out of temper, and she would even burst into tears if her habits were interfered with. On the other hand, she was gracious and affable when all her wishes were fulfilled, and when nobody opposed her in any thing. Her house was the pleasantest in the town, and she had a handsome income, the greater part of which was derived from her late husband's earnings, and the rest from her own property. Her two daughters lived with her; her son was being educated in one of the best crown establishments at St. Petersburgh.

"The old lady, who was sitting at the window with Maria Demitrievna, was her father's sister, the aunt with whom she had formerly spent so many lonely years at Poknovskoe. Her name was Marfa Timofeevna Pestof. She was looked upon as an original, being a woman of an independent character, who bluntly told the truth to every one, and who, although her means were very small, behaved in society just as she would have done had she been rolling in wealth. She never could abide the late Kalitine, and as soon as her niece married him, she retired to her own modest little property, where she spent ten whole years in

a peasant's smoky hut. Maria Demitrievna was rather afraid of her. Small in stature, with black hair, a sharp nose, and eyes which even in old age were still keen, Marfa Timofeevna walked briskly, held herself bolt upright, and spoke quickly but distinctly, and with a loud, high-pitched voice. She always wore a white cap, and a white busk always formed a part of her dress." . . .

"Panshine really was very adroit—not less so than his father had been. And, besides this, he was endowed with no small talent; nothing was too difficult for him. He sang pleasantly, could draw confidently, and write poetry, and acted remarkably well.

"He was now only in his twenty-eighth year, but he was already a chamberlain, and he had arrived at a highly respectable rank in the service. He had thorough confidence in himself, in his intellect, and in his sagacity. He went onward under full sail, boldly and cheerfully; the stream of his life flowed smoothly along. He was accustomed to please every one, old and young alike; and he imagined that he thoroughly understood his fellow creatures, especially women—that he was intimately acquainted with all their ordinary weaknesses.

"As one who was no stranger to art, he felt within himself a certain enthusiasm, a glow, a rapture, in consequence of which he claimed for himself various exceptions from ordinary rules. He led a somewhat irregular life; he made acquaintances with people who were not received into society, and in general he behaved in an unconventional and uncereemonious manner. But in his heart of hearts he was cold and astute; and even in the midst of his most extrava-

gant rioting, his keen hazel eye watched and took note of every thing. It was impossible for this daring and unconventional youth ever quite to forget himself, or to be thoroughly carried away. It should be mentioned to his credit, by the way, that he never boasted of his victories. To Maria Demitrievna's house he had obtained access, as soon as he arrived in O., and he soon made himself thoroughly at home in it. As to Maria Demitrievna herself, she thought there was nobody in the world to be compared with him." . . .

The current-literature of Russia was checked and changed by the Crimean war; indeed, during that period, not a single book of the first class appeared, either in Germany, France, England, or Russia. There were many books written at that time, but they nearly all relate in some way to the war, and of course are of an ephemeral character. The same may be said of that spawn of books produced by our late civil war. They are but little better than daily newspaper matter, and, having served their temporary purpose, are now quite worthless except as material for the future historian. It is impossible to write of current events with full information, if it, indeed, could be done with entire fairness. Even Thucydides did but little more than collect material for the Peloponnesian war, as much as his works are admired. Man is unable to rise above the events which press upon him, and view them entirely free from interest, prejudice, or passion, as he may look upon those which affected a preceding century or generation. The history of the present must be written in the future. Literature never flourishes when the world



is disturbed by wars; this fact is fully established by the history of the past, but it generally receives an impetus soon after war, or any great national disturbance. Ideas become shaken up during war, danger, or any intense excitement, and, after the events are past, fall into order again, and seek expression in literature. Nothing could have been more favorable to awaken the genius of a people than the alternate storm and calm of the Grecian States. After the Crimean war, which shook the entire Eastern hemisphere, and indeed disturbed the relations of the whole world, a new vigor was infused into the literature of the nations, more especially of those so deeply affected by that terrible conflict, so singularly are the events of the world connected together in affecting the destiny of man. Within six years after the peace of Paris, which settled the Crimean war, schools were established in Russia which taught the liberal and advanced philosophy of the time, and did much to spread knowledge throughout the empire. The works of Tyndall, Huxley, Darwin, Buckle, Faraday, Mill, Hemholtz, Virchow, and of other liberal writers, were translated into the Russian language, passed through several editions, and were circulated widely. Among the present novelists of Russia—besides Turgenief, already noticed—may be mentioned Avdeyef, Gontchasof, Krestovski, and Panayef; among the present poets, Palouski and Nekrasof; and dramatists, Ostrovski and Count Tolstoi. Their present great philosopher, and indeed it might be said their first, is Lavrof; and their historians, Pypin, Kovalevski, and Solovief. Their great statesman, during the Crimean and Austro-French wars was

Prince Gortschakof—the rival if not the equal of Bismarck. Daily and weekly newspapers, monthly and quarterly periodicals, have been established in several places in Russia, especially in St. Petersburg and Moscow. Amongst their distinguished editors may be named Korsh, Krayefski, Katkof, and Aksakof. Besides these, there are many young authors rising in Russia in the various departments of literature, which, at this distance from them, seem rather as *nebulæ* than as fixed stars. It is not likely that this advancement of learning in Russia—at least not for a long time—would have occurred, but for the stirring events connected with the Crimean war. Events affect men more than men affect events. Had there been no Trojan war, there never had been a Homer; had there been no civil war in Rome, there never had been a Cæsar; had France, Spain, Italy, and Germany been at peace, there never had been a Charlemagne; had Russia, Poland, and Denmark treated Sweden fairly, there never had been a Charles the Twelfth; if the nations of Europe had remained at peace, no Napoleon could have arisen; and but for our revolution Washington would probably have remained a private citizen. Indeed, it is impossible to be great in any thing unless the circumstances necessary to greatness exist. When there is nothing to do, nothing can be done. The architect can not erect his edifice without material, nor can the sculptor produce his work without his marble. Men of genius affect one another; and they seem to grow in clusters. Aristotle, Socrates, and Plato flourished together; Cicero, Cæsar, and Sallust; Corneille, Mo-

liere, and Racine; Goethe, Schiller, and Herder; Addison, Pope, and Johnson; the world has yet produced but one Shakespeare. Russia has not yet offered her cluster of geniuses, but if she continues to progress in enlightenment as she has recently progressed, the world may expect from her something far better than any thing she has yet produced. But she has already afforded much that is good, some that is excellent, though with some defects; yet it must be remembered that her literature is in a transition state. It has not yet passed the first poetic condition; its mass of polite prose literature is yet to be written, after which a more profound, philosophic period may be expected. It is a curious fact in the history of literature that poetry precedes prose, and prose philosophy; but poetry also seems to be the last gift of a nation to the world, as well as the first, and many believe the best. We have already remarked that poetical expression precedes even civilization. The poetical period begins before the language is perfected; as it becomes polished and full it passes into prose; at length, after it has become settled, clear, and certain, it is then suitable to express the various philosophical formulæ and the exact sciences. We do not mean to say that poetry and prose may not exist together, and with philosophy and science; they undoubtedly may, and do, after the philosophic period has arrived, and that of poetry, which is first and last of all. In English literature, Addison, Goldsmith, and Byron lived after Bacon, Locke, and Newton; yet Gower, Chaucer, and Spenser preceded all. Examples of this order of succession may be cited from almost any nation. Not only Homer,

but also Sophocles and Æschylus preceded Herodotus in Greece, and all of them lived before Socrates, Plato, and Aristotle. Ennius, Plautus, and Terence preceded Cicero, Pliny, and Sallust, and flourished before the philosophic period of Rome. Dante preceded Petrarch, and Petrarch ushered in Boccaccio and other accomplished prose writers of Italy. Corneille, Moliere, and Racine introduced the period of prose composition in France; and Gower and Spenser flourished in England before any established prose writers, and prior to Bacon, Locke, and Newton. America is yet too young to afford an illustration of so grand a law; besides, when she became a distinct nation there was a literature in her language already formed. Indeed, America never can have an entirely new literature; her literature was begun for her before she had a beginning as a nation—before she was separated from the mother country. Yet there is enough room for originality in America, with her vast continent, free institutions, and new conditions; but whatever she may produce, English and American literature, being created by the same race, and expressed in the same language, must forever remain but separate parts of a grand whole. Russia, as we have seen, has produced her poets—some of distinction—and prose writers, not without merit. She has her philosophers, and may be said to be entering upon her scientific period. Her language is becoming more and more perfect as she progresses, and when war ceases to be her ruling passion she will take full rank in the peaceful pursuit of letters. What is to be the ultimate destiny of the Russian government, of Russian literature, it is impossible to know, and, of course, idle to conjecture, but I

can not help but think that she will carry her banner in the course of time to the Cape of Good Hope. The Slavi bear a relation to the nations south of their territory similar to that which the hardy Northmen, in the earlier centuries of the Christian era, bore to the Roman Empire. They overran Rome and spread into the forests of Germany and Gaul, passed into France and England, and across to America. We derive our blood from their veins. They were a rude people, as rude as the Slavi ever were; yet out of this blood have sprung the best governments, the purest literature, and the politest nations of the earth. If the Slavonic race should run the same course they will but do what the Teutonic and Gallic have done. Russia must ultimately and inevitably be the great power of that hemisphere, as the United States must be of this. In her present position Russia has the finest opportunity to present a new literature to the world of any nation on earth. There never really has been a wholly new literature since the days of Greece; perhaps there never can be; but Russia is influenced less by the past than any other nation. Literature originally sprang up in the East, no one can tell exactly where or when. It ran through Assyria, Persia, Arabia, and all the eastern nations, into Egypt. Greece copied Egypt, Rome copied Greece, and the world has copied all. These two last mentioned and most celebrated nations have shot their influence in letters through Germany, France, Spain (less in Spain), England, and America, down to the present time. They must inevitably affect every portion of the world that comes in contact with their literature; indeed, there remained a slavish obedience to classic models till Shakespeare, Cervantes,



and a few other geniuses taught the world that it might be pleased without obeying the arbitrary rules of Greece and Rome—that we still have the common fountains of nature to draw from, and that, as these fountains are inexhaustible, we might still hope to taste of something fresh from their sources.

But whatever may be the fate of the Russian government, her learned belong to the Great Republic of Letters; and whatever may be the fate of all the political governments of the earth, the Republic of Letters will endure with the existence of the human mind. It has no limit in boundary save the earth itself. It began with the earliest history of man, and can end only with humanity. It commenced in the far East, and in the deep past, spread into Egypt, and continued on through Greece, Rome, Germany, France, Italy, Spain, England, Russia, to America; and although wars have continued, and still continue between the nations of the earth, and revolution has succeeded revolution within the separate governments, yet the Republic of Letters has marched onward in its peaceful career, binding together all the races of the world in one harmonious and indissoluble union. How temporary, and even trifling, appear the political revolutions of nations, when compared with the illustrious progress of letters. And it can have no retrograde movement; its march must ever be onward. The learned of all periods, and of all nations, and of all time, are members of this renowned Republic. Still may we go to the temple and sit at the banquet with Manu, Confucius, Hafiz, and Zoroaster of the East; with Soter and Philadel-

phus, of Egypt; with Homer, Socrates, Xenophon, Pindar, Plato, Aristotle, and Demosthenes, of Greece; with Virgil, Horace, Tacitus, Seneca, Sallust, and Cicero, of Rome; with Goethe, Schiller, Klopstock, Lessing, Herder, and Richter, of Germany; with Corneille, Moliere, Racine, Voltaire, Beranger, Lamartine, and Guizot, of France; with Garcillasso, Herera, and Cervantes, of Spain; with Dante, Petrarch, Boccacio, and Tasso, of Italy; with Chaucer, Spenser, Shakespeare, Milton, Locke, Newton, Addison, Johnson, Goldsmith, and Buckle, of England; with Burns and Scott, of Scotland; with Lomanosof, Karamzin, Pushkin, Dershavin, and Zagorkin, of Russia; and with our own Franklin, Bancroft, Bryant, Webster, and Irving, of America; nor can we name a thousandth part of the worthy guests, nor have we mentioned even all the nations; while the feast is made richer and richer by the fruits of mind through all the ages; more beautiful and more beautiful with the sweetest blossoms of the heart from every clime; and purer and purer by the aspirations of the soul of all mankind. A seat at this board offers a nobler ambition, and affords a more rational honor than all the venal thrones and high places of the earth; yea, to be the humblest citizen in this world-wide and time-enduring Republic, is a prouder title than all that kings, and crowns, and the powers of the earth can bestow.