(For the Scientific American.)

Music and the Pianoforte.

Music is a natural, inherent gift of man, yet not to man alone has the power to make melody been given, but also to many of the lower order of beings in the animal kingdom. Music is not only a natural faculty produced by the animal organs, but it is also artificially produced by human invention.

In all civilized nations has music been cultivated as one of the fine arts, and even among savages has it received some attention. Any country may well be judged of its advancement in civilization by the musical progress and education of its people. Inspired by the love of melody, man has made and used various instruments for the production of music, from the eighth generation to the present time.

The harp may be truly called the father of musical instruments. It is the most prominent and often spoken of in sacred history, and though of ancient origin, it is also an instrument of modern and present use, unequalled for purity and sweetness of tone by any others, but limited in its power and compass. The harp (like many an ancient father unsurpassed by intrinsic worth) has been outdone and rivalled by the improvements of its offsprings, and their wider and greater range of usefulness.

Among such instruments of more modern date is the Pianoforte, not inappropriately styled "the prince of instruments" of the present day. The pianoforte cannot in truth be called the invention of any one man, but a series of improvements upon improvements for the last century and a half. It was unquestionably derived from the harp, and is a mechanical device for producing and checking the vibration of its strings, which are based upon the same natural and fundamental law of geometrical progression (in their vibrations) as its predecessor.

The first instrument with horizontal strings was always called a psalterion or tympanum, and more recently a dulcimer. These instruments consisted either of metallic strings, or like those of the harp, made from the ligaments of animal intestines, drawn across a wooden box, and tuned like the harp to the various notes of the scale—but instead of being snapped with the fingers they were struck with small hammers covered with cloth or leather, and held in the hand of the performer.

The first improvement upon this was the addition of keys, or what is usually termed the key-board, with pieces of upright wire set in the back part of them, to strike the strings when the front part of the key was pressed down. This instrument was called a clavichord.

The second improvement consisted of the addition of a quill to the jack (or upright piece now made of wood) which caught the string in its upward motion, snapped off, and left the string free to vibrate whilst the key was held down. This instrument was called a spinet.

The third improvement was the addition of another string to each note, which history reports to have been an Italian production, in the year 1711, and was named the harpsichord or horizontal harp.

The instruments already described were rude and unscientific works, but, nevertheless, they were the germ of the present pianoforte—thus far the improvements had been almost wholly upon the action, or the mechanism which forms the connection between the key and the vibration of the strings.

The next, and one of the greatest improvements, was the introduction of the lever hammer into the action; this, together with the addition of the dampers, so far advanced the instrument that the performer could play soft or loud at pleasure; it then received the very appropriate name of pianoforte, a compound of two Italian words. The author of this last improvement is supposed to have been a German, by the name of Gottfried Silberman, of Freyburg, who manufactured instruments of this kind in the year 1747. It is, however, claimed by the French and English as well as the Germans.

The next important improvement is credited to Christopher Gottleib Schræter, of Hohenstein, on the borders of Bohemia, in the year 1768. By this improvement the action was so far perfected that the performer could execute much more rapid and difficult music than could be played upon any of the previous made instruments.

The earliest record of the production of pianofortes in England was in the year 1767, by Messrs. Broadwood & Sons, then the principal makers of harpsichords in London, and afterwards the best pianoforte makers in that great metropolis. The name of that firm has descended from father to son, grandson, and greatgrandson, and with it the fame and reputation so well earned by the sires, is justly credited to the Messrs. Broadwood & Sons of the present day, as being the best makers of that instrument in England.

Sebastian Erard, of Paris, made many valuable improvements in the pianoforte. He was the founder of two very large establishments for the manufacture of musical instruments of various kinds; one in Paris and the other in London. Pierre Erard, the present proprietor, was his nephew, heir, and successor, and is now making upwards of one hundred pianos per week, besides harps, guitars, and other instruments in proportion.

The French pianos are the neatest and best finished internally (and some of them externally) of any in the world, but their tone is not generally liked in the United States as well as those that are made here, and their touch, like all foreign pianos, is very heavy, which prevents their general use in this country. The Germans, Swiss, and Italians have also made great progress in the manufacture and use of the pianoforte. Being so many nations of musicians, they have not been slow to learn what instrument was best adapted to their wants.

Improvement after improvement has followed in succession, until the once rude dulcimer has been transformed into the most perfect instrument in existence. Under the hand of an experienced pianist it is capable of yielding the greatest variety, as well as the most difficult music ever written. Upon it the performer can mechanically express the very soul of music, the thoughts and feelings of its author; it is in fact an artificial mode of producing the most brilliant and beautiful pieces ever composed.

At the time of the great Exhibition in London, in 1851, it was estimated that there were made in that city some 450 pianos per week, or upwards of 23,000 per annum—and in all other parts of Great Britain 54,740, making a total of 77,740 pianofortes in one year—classed and valued as follows;

Grands,	1,300, at £110 each,		143,000
Squares,	1,040, "	60 "	62,400
Uprights,	75,400, "	35 "	2,639,000
Whole No.	77,740, valued at		£2,844,400

The number made in France is estimated at one-third of that of Great Britain, and all others in Europe at two-thirds—making in all 155,480 pianofortes manufactured in Europe in one year, furnishing employment for not less than 25,000 workmen.

There were exhibited in 1851, by the Messrs. Collards, good pianos in plain cases as low as £30, and from that sum upwards as high as 500 guineas, and others by the Messrs. Broadwood & Sons at a still higher price.

The manufacture of pianofortes in the United States has increased very rapidly within the last twenty years. Previous to that time the most of the pianos used in this country were imported from Europe, but there are now made upwards of 400 pianos per week, or a total of about 21,000 per annum, furnishing employment (on the whole work from the rough materials to the completion) for at least 3500 worknen. The business has caused the establishment of several machine shops with very expensive machinery for the manufacture of what is termed pianoforte trimmings, or those parts of the instrument that are made of iron, brass, and steel; there being in each (of the Boston made pianos) about 100 lbs. of those metals.

The other parts of the work are divdedi into many separate trades, such as the bottom, skeleton, leg, top, desk, pedal, sounding-board, harp and action makers; carver, varnisher, stringer, finisher, trimmer, regulator, and tuner, besides much that is done by machinery, such as sawing, turning, jig and fret sawing.

The materials for the manufacture of pianos have decreased in supply, and increased in value, some of them to near double their former cost a few years since. The principal woods used are ash, oak, maple, spruce, pine, chestnut, cherry, walnut, rosewood, and mahogany, all of which require a long time of natural and artificial seasoning before they are fit for use; averaging some two or three years after they are sawed. The average time for the making of a piano, from its commencement to completion, in the large manufactories, is about four months.

To improve in workmanship, tone, and quality of the instrument, should be the constant desire of every manufacturer, and has been of all those who had ambition and perseverance enough for success. The tone of a vibrating string takes its pitch from its number or speed of the vibrations; the greater the velocity with which it cuts the air the higher in the scale will be the note. The number of vibrations are governed by the length and size of the string, the larger and longer the string the lower or deeper will be its tone; the longer the string the further apart are its nodal and vibrating points—consequently its vibrations will be less in number.

The quality of the tone is principally dependent upon two causes, entirely independent of each others. First, the application of the power which produces the vibrations (which is the blow given by the hammer.) If that blow be not given with sufficient force, or the hammer properly covered, the tone will be faulty. The second, and perhaps that which is the greatest cause, and most inseparably connected with the good or bad tone of the instrument, is the sounding-board; its stock, formation, and connection with the strings are its ruling powers of the tone.

The successful manufacturing of pianofortes is perhaps the most difficult and uncertain business to establish of any in this country. It requires not only a thorough practical knowledge of mechanics, but years of patience and perseverance with a large capital and good reputation. The largest establishment in this country is now making from 25 to 30 pianos per week, but it has taken upwards of thirty years of constant toil to reach that number, and the progress of the other manufacturers has been in about the same proportion, with one exception, where upwards of twenty pianos per week has been reached in less than nine years.

Such has been the progress of musical taste in this country, that the parlor is now only half furnished without a pianoforte, and though a luxury, and sometimes a costly one, yet it has a moral and a social influence that is beyond all comparison with dollars and cents. It is the center around which many a family nightly gather to enjoy their fourth and most luxurious meal of the day. A musical festival satiating to repletion their appetites for amusement, thereby restraining the wayward from seeking elsewhere pernicious and injurious enjoyment. B.

Boston.

Attraction—Gravitation.

MESSRS. EDITORS—Your correspondent, J. B. Conger, says "the idea of subverting the force of gravity is manifestly absurd. The least change in the action of gravity would throw the whole system into confusion. The regulation of the world is not based on so precarious a foundation." Unfortunately, however, he forgot that that "least change" must be universal before it can "throw the whole system into confusion," and I must confess myself so obtuse as to be unable to discern how the counteraction of 500 lbs. force of gravity on the earth would in the slightest manner discommode the Saturnites or Neptuneites, or even the man in the moon.

Let us now look at the subject of this suspension of gravitation for a moment. Attraction seems to be divided into the following classes: gravitation, cohesive attraction, affinity, magnetism, and capilliary attraction. Now, the second quality may be suspended by heat, in metals, or destroyed, in combustibles. Affinity is regulated by heat, in forming compounds. Magnetism may be suspended, destroyed, or reversed, by heat. Capillary attraction may be reversed by heat. And will Mr. G. inform me why we should not reason from analogy and conclude that gravitation is subject to the same influence? I believe it will be done. ALFRED PARKES.

[We have received so many communications on this subject, that we deem it prudent to publish no more on it, for the present at least. J. B. Conger is perfectly correct in his conclusion, respecting the simple suspension of gravity, in the manner referred to by Septimus Piesse, our London contributor; he has laid down facts as the basis of his arguments which cannot be overthrown by inferences.

Alcohol.

Alcohol is that combustible fluid which rises by the distillation of the juices of sweet fruits; from the infusion of malted barley or other grain; the solutions of sugar, honey and other substances that are capable of being converted into sugar after they have undergone that spontaneous change which is commonly known as fermentation—the vinous fermentation. The word alcohol is of Arabic or Hebrew origin, and signifies subtle or attenuated; but although it has for many ages been used to designate the material in question, it does not appear to have become popular; "spirits of wine," or "spirits," being the general interpretation of alcohol. As alcohol is well known to be derived from sugar, malt, and grapes, it is generally though erroneously believed that these substances contain it. By the hand of Power "a Greek Slave" can be produced from a solid mass of marble chained to a pedestal. No one will believe that the beautiful form pre-existed in the marble, and that Power merely removed the stone veil that enclosed it! In like manner, when a chemist manipulates sugar, barley, or grapes for the purpose of making alcohol, he does not separate it as a material pre-existing in the substances operated on, but merely uses the ingredients contained therein to create alcohol. It is an ascertained fact that alcohol can only be made from sugar, although at first sight it appears to be made from a variety of things, such as potatoes, treacle, &c. When it is known that any materials that contain starch can be converted into sugar, the mystery of making alcohol from potatoes becomes solved. Moreover, when starch is manipulated in another way, chemists can produce from it vinegar, sugar, alcohol, water, carbonic acid, oxalicacid, carbonic oxyd gas, lactic acid, and many other substances; but it must not be supposed that these materials have any pre-existence in starch—no, they have been created from the elements composing starch, but not from that substance itself. The starch is broken up, and its elements are re-arranged into new forms. When alcohol is made from barley we merely complete a change which nature had begun. Barley contains starch. When barley is malted the starch becomes sugar: this we extract by the use of water, and call it wort. Fermentation is now set up, and the sugar is changed into "spirit." How quickly this can be turned into acetic acid—that is, vinegar—is well known to all beer drinkers.

SEPTIMUS PIESSE.

Foot Rot in Sheep.

The *Country Gentleman* states that the following remedy for the foot rot in sheep, has been used with great success by H. Howland, of Aurora, Cayuga Co., for the last thirty years:—

"Mix flour of sulphur with the salt given to the sheep, in a proportion just sufficient to discolor perceptibly the salt, or about one-eighth part. Sulphur may be had at a wholesale price at a cost of not over two cents. Where local applications are necessary, we should much prefer a solution of chloride of lime, to any other application.