

met with some such story, and thought it interesting enough to be treasured up in that curious depot of fact and fancy—his “Natural History.” I simply use it as an illustrative introduction to some examples of accidental discovery in Science and the Arts, which I have thought it might not be inappropriate to enumerate to you this evening.

That glass was in some manner discovered at an early period of the world's history, is certain. Articles of this material, very skillfully constructed, have been found in the palaces of Nineveh, and the ancient tombs of Egypt and Italy. The number of glass vessels to be seen in the great Museum at Naples, collected from the buried cities of Herculaneum and Pompeii, is truly astonishing. In that Museum are also preserved numerous fragments of *flat* glass from the latter place, together with bronze lattice-work with panes of glass actually inserted, proving that glazed windows were by no means unknown eighteen centuries ago.

Could we be admitted to the secret history of discoveries and inventions in general, I dare say we should find that many more have originated in what was apparently an accident, than we are now aware of. We know that the devotees of the so-called Occult Sciences in the Mediæval period—the Alchemists—the transmuters of metals and searchers after the elixir of life—lighted on facts that tended largely to the development of the real science of Chemistry.

We have dim traditions from the mythological times of the accidental invention of musical instruments. The wind whistles over the sheaf of broken reeds in the arms of the shepherd-god, and gives him the idea of the syrinx—the pipes of Pan—the embryo that grows at length into the noblest perhaps of all musical instruments—the Church Organ. Again, Hermes strikes his foot against the shell of the sun-dried tortoise, and the tightly-strained tendons give out musical tones. He thus literally stumbles on the lyre—the germ of our harp and piano-forte. The colossal statue of Memnon (Amenophis) in Egypt, emits music from its head—cavities in the sculpture producing vibrations in the air. The fact is converted into a miracle, and gives birth to a series of adroit uses of the simple laws of nature for the creation of surprise in the minds of the ignorant.

Were we living in an age of infantile simplicity, to what myths might we not expect those mystic chords to give rise which in these days are so rapidly encircling the earth as with a zone! Listen to the excellent music which they discourse over your heads as you walk abroad! We overlook the phenomenon as a mere trifle—the principle of which, however, might lead us at least to the *Æolian Harp*—were we not long forestalled in that; and are absorbed—and justly so—in the sublimer contemplation of a system of artificial nerves, gradually throwing themselves out over the globe, along which may rush impulses from the will and soul of man.

Of chance discoveries hinted at in very ancient history, I find one or two cases more. The gracefully-curling leaves of an *Acanthus* plant, surrounding a basket left by accident upon it, catch the eye of a sculptor who has a quick sense of the beautiful. A new style of ornament for the column is instantly conceived. The Corinthian capital thenceforward in all after ages gives pleasure to the frequenters of Temple and Forum. Again, the hand of affection, on one occasion, is prompted to delineate on a wall the shadow of a head, to be a memento, during an anticipated absence, of the beloved reality. The art of portrait-painting takes its rise from the circumstance.

The popular tradition is that the falling of an apple first suggested to Newton the idea of universal gravitation. Sir David Brewster, very reasonably, gives no credence to the story. Still,

we can well imagine the philosopher in his orchard at Woolstrop, using such a casual occurrence by way of illustration to a friend:—“If this earth be a globe, and what is “up” to us is “down” to our antipodes, why does yonder apple, for example, descend to the surface in preference to rising outwards into space?” And may we not ask, in connection with Newton, is it not exceedingly likely that the resolution of white light into its component parts by the prism, may have been suggested to him by the beautiful colours which he must often have seen projected on the walls and ceiling of a room from the crystal drops of a chandelier? But questions like this it is easy to put, in the case of almost every invention, after it has taken place. We are so fortunate as to be put at once in possession of the result, without being obliged so much as to think of the steps which led to it. Still, it is interesting sometimes to conjecture what those steps were.

The bold stroke of Columbus, by which he caused the egg to stand alone, has become a proverb. Any person visiting now the heights behind Genoa, and remembering that the great navigator was once familiar with that scene, can imagine it to be exceedingly natural that he should have discovered America. “If Africa lies yonder, though invisible to the eye, what reason is there, why I should not believe, when I look out on the Atlantic from behind Lisbon, for example, that there is as certainly land to be arrived at, by persevering to the West?”

By a pleasant train of association, the mention of Genoa and Columbus suggests to me the memory of Pisa and Galileo—with another example of happy accidental discovery. It was in the magnificent cathedral at Pisa that the gentle oscillations of a chandelier gave Galileo (1642) the idea of the application of the pendulum, as a regulator in an apparatus for the measurement of time—a combination that ripened at last into that exquisite piece of mechanism—the Astronomical Clock.

The recent ingenious experiment of M. Foucault, to demonstrate to the eye the motion of the earth, was the result of a chance observation. While engaged about a turning-lathe, he took notice that a certain slip of metal, when set in motion, vibrated in a plane of its own, independently of the movement of the part of the lathe on which it was carried round. Hence, he thought he could by a certain contrivance exhibit to the eye the revolution of the earth on its axis. He obtains permission to suspend from the dome of the Pantheon at Paris, a pendulum of some 280 feet in length, and demonstrates the accuracy of the idea which he had conceived. However difficult of brief explanation the phenomenon may be, it is nevertheless a fact—and it is with a degree of awe that one witnesses it—that the pavement of the Church seems very sensibly to rotate, the pendulum at every oscillation returning to a different point on the graduated circle placed below the dome.

The inventor of spectacles was a great benefactor—but having found no chronicler, his name is lost. He was, probably, some one who himself suffered from defective vision—the necessity of an individual often leading to contrivances which benefit a class. Friar Bacon has been mentioned as the inventor, but not with certainty. Spectacles, however, became generally known in Europe about his time (1214—1292). I have often thought that a person afflicted with short sight, would be very apt to hit upon a remedy. I remember, as a boy, discovering that many of the little blisters in common window glass would partially correct short-sight; also, that the polished bottom of a common tumbler would occasionally do the same—facts that might lead any one to the construction of concave lenses.

(To be continued.)