

AN HOUR WITH THE ELECTRICITY

ELECTRICITY

Professor Trowbridge closes his work suggesting as the answer, "ignoramus, ignoramus" (We do not know, we shall not know). We know how electricity acts, but we do not know its nature any better than men of science did in 1750, when Professor Winthrop of Harvard wrote: "The electricity which has been made considerable noise in the world, upon which it is supposed that several of the most important hidden phenomena of nature depend. There seems to be evidence that electricity, heat and light are manifestations of the same force, and that this force has its effect in the sun, being conveyed to the earth, and there appears to be a probability that it is the source of the phenomena of life; but what this force is essentially, and if it originates in the sun, how it is caused there, we are yet without even a plausible theory."

The workings of science after fundamental facts have been extraordinary. For example, in order to account for heat and combustion, it was assumed that there was an element called phlogiston, which combined with matter and thereby raised its temperature. Later it was suggested that an element known as caloric was contained in all substances and given off by them under certain conditions. Even nowadays we hear people say of articles of food, that one contains more caloric than another. But as heat neither adds to nor takes from the weight of a body, it seems evident that there are two substances together, they will become warmer, and though we continue the rubbing indefinitely they will become neither lighter nor heavier, except as particles may be rubbed off. Caloric and phlogiston are no longer regarded as among scientific probabilities. Count Rumford, writing one hundred and ten years ago, suggested that there was no more reason for calling heat a substance than there was for so regarding sound, and in a general way he may be said to have been the first person to suggest the identity of heat, light and electricity, and the possibility of their being transmutable. Since his time, though great progress has been made in ascertaining the properties of electricity, it has been turned to many valuable practical uses, we really have advanced a single hair's breadth towards the ascertainment of what it is. In this respect we are as ignorant as to electricity as we are as to the force of gravity.

The first historic mention of electricity, although not by any distinct name, is in the writings of Thales, who lived six hundred years before Christ. He noted that amber, if rubbed, would attract light bodies. At this stage all knowledge of the subject halted, so far as is known, for more than two thousand years, but in A. D. 1600, Gilbert of Colchester, starting with the observation of Thales about amber, ascertained that some other substances were affected similarly by rubbing, and he applied the Greek name for amber, electron, to the process, so that the name and the science may be said to have been born simultaneously. About one hundred and twenty-five years later, simple electric experiments became very common, and in 1747 Franklin in America and Romas in France, by experiments carried on quite independently of each other, identified lightning with electricity. Although the use of this force for lighting purposes is of very recent origin, one of the first discoveries in electrical science was that it could be used to generate light. This was one of the achievements of Otto von Guericke, who lived in the last quarter of the 17th and the first quarter of the 18th century.

As long ago as 1747 Sir William Watson demonstrated that electricity could be used to ignite gunpowder, but nearly a hundred years elapsed before any practical use was made of the knowledge. One of the earliest efforts made to turn it to advantage was that of Dr. James Robb, Professor of Natural Science in the New Brunswick University. A heavy ice jam formed in the St. John river at Fredericton, and fears were entertained that the city would be flooded. Dr. Robb endeavored to break the jam by exploding a barrel of gunpowder by electricity. He caused the explosion, but its effect upon the ice was very limited.

The names which are now most frequently used in connection with electricity are those of Galvani, Volta, Ohm and Ampere. Perhaps not many people are aware that when they speak of galvanism and terms from the same origin, they are commemorating Galvani's discovery about 1790, that electricity could be produced by the contact of certain metals under certain circumstances. The simplest way to demonstrate this is to take a silver and a copper coin, place one on the other under the tongue and bring their edges to rub a bitter taste will appear in the mouth at the instant of contact. This is due to electrical action. Volta developed the plan of producing electricity by batteries consisting of such metals as are now used in telegraphs and telephones, although his

method was very different from that which is now employed. Ampere was one of the first to deduce from the action of electricity the laws which govern it. Ohm was one of the most distinguished experimenters at a time when science was in its infancy. For a long time it was supposed that there was an element which constituted this force, and it was referred to as "the electric fluid." Popularly the idea is yet held, and it is colloquially referred to by electric railway employees as the "juice." Sir David Brewster was the first scientist of great repute to reject the theory of a fluid, and he was followed by Sir William Thomson, the remarkable precision of whose experiments placed our knowledge of this wonderful force upon a new plane.

We shall not attempt to give even a brief outline of what has been accomplished by contemporary masters of applied electricity. Their achievements have been great, but they are chiefly due to their ingenuity in utilizing the discoveries of the earlier students. Marconi sends wireless messages across the Atlantic, but this is only an application, on a stupendous scale indeed, of the discovery made two hundred years ago, that if a glass tube were rubbed with the hand it would communicate electricity to a pith ball hung upon a very light thread a short distance away. It is more than two hundred years ago since von Guericke found he could produce light by the rapid revolution of a sulphur globe. The great inventors of today are only amplifying the discoveries of their predecessors, and with all their knowledge they cannot tell us any more as to what electricity is than Thales could when he toyed with his piece of amber twenty-five hundred years ago. They have established the existence of such corpuscles. They are exceedingly minute, the estimate being that 30,000,000,000 would only measure an inch across. These are supposed to be matter in its latest analysis. If they are also electricity, then electricity is the primal and irreducible element of what matter is formed. We are not aware that there is any scientific authority for this last hypothesis.

Since the above was in type, we have seen a suggestion that corpuscles, which are given off by radium are not simply electrified, but are electricity itself. Sir Oliver Lodge, Sir William Crookes and others of the most recent school of investigators "thing they have established the existence of such corpuscles. They are exceedingly minute, the estimate being that 30,000,000,000 would only measure an inch across. These are supposed to be matter in its latest analysis. If they are also electricity, then electricity is the primal and irreducible element of what matter is formed. We are not aware that there is any scientific authority for this last hypothesis.

"ELEANOR OF AQUITAINE"
"Cherchez la femme!" say the French, and so it seemed very naturally the right thing to do, when trying to find out why for hundreds of years France and England were almost constantly involved in war, to seek out the woman, who was at the bottom of it. There was little difficulty in finding her, and we present her to Colonial readers in the person of Eleanor of Aquitaine, the jolly daughter of the Duke of Guienne. Indeed it was three hundred years, less one, before the troubles that this lively and energetic young woman managed to stir up were satisfactorily adjusted. Guienne is another name for Aquitaine, and Aquitaine was a fine tract of country between France and the Bay of Biscay, extending almost all the way to the present eastern boundary of France, and down as far south as the Pyrenees. When her father died, Eleanor was his only heir, and she was not only the most vivacious princess of her time, but by much the best loved. Raymond of Poitiers was living with her in her fifteenth year. She accepted the proposal and the two were wed, and very shortly after Louis VII. was gathered to his fathers, and his son came to the throne. The lovely married years of the young queen seems to have been not materially different from other royal lives, and Louis set out on a Crusade with high resolve and boundless ambitions. Eleanor accompanied him, and all went well until they reached Antioch, where Raymond of Poitiers was living with all the splendor of an Eastern potentate. The contrast between life in Antioch and the austerity of the French court inflamed the imagination of the queen, and her desire for pleasure meeting with no response from her husband, she sought it in other directions. Contemporary historians say that he was austere in manner, intensely religious and excessively jealous, but as one of them says "he loved Eleanor perhaps too much." If she ever had any affection for him, it vanished, and she declared her intention to marry Raymond, who was a man of reason that there was a tie of blood between them, which was within the prohibited degrees. She refused to leave Antioch with him, and proceeded to the siege of Damascus, and undoubtedly the breach between the ill-assorted pair had much to do with the failure of the Crusade. They returned to France together, and in 1182, after a

married life of fourteen years, a divorce was granted. Six months later Eleanor married Henry of Navarre and Normandy, who shortly afterwards became King of England and Henry II. By the marriage the position of England on the Continent was tremendously strengthened. Aquitaine passed from France to England, and Henry became virtually king of the whole region from the Tyne to the Pyrenees, except the small area over which the French sovereign reigned. During the life of Henry, Eleanor was very active in public affairs. He was a man of coarse appearance and coarser habits, but he was full of energy and all might have gone well between him and his wife, if he had paid some regard to his marriage vows. Eleanor was not a person to submit quietly to such wrongs, and she incited her son, Richard, to rebel. She even made overtures to her former husband to secure his aid, in the formation of a league against Henry, but the English king, with his customary promptitude, threw her into prison, where she remained until his death in 1189, a period of sixteen years. Released from confinement, she declared herself regent of the Kingdom until her son Richard could return home, and during his absence on the Crusade, she was virtual ruler of England as well as of Aquitaine. She had a great regard for her position. She inspired the confidence of the nobles, and it was not until death claimed her in her eighty-first year that the hold of England upon her was broken. She was even able to withstand the ruinous policy of King John, but she was unable to inspire him with her own dauntless courage.

History has not dealt as kindly with the moral reputation of Eleanor as she possibly deserved. There are no direct statements, but William of Tyre scolded her for her conduct. He tells of her life at Antioch, and of the reverse of moral, but he does not pretend to relate anything upon his own authority, trusting wholly to hearsay. When we reflect upon the manners of those times, and of how difficult it was to learn the truth about princes, we may, by the absence of specific statements, suspend judgment of such moral qualities of this great woman. No one has questioned her vivacity, her ready wit, her contempt for the false dignity of sovereigns. Her intolerance of her husband's infidelity seems to discredit the suggestion that she was herself unfaithful. Her influence upon the history of England and France was profound, and as these nations were at that time in the forefront of European activity, she certainly deserves a place among the world's great women.

We have nearly completed this series of articles upon women in history, but if there are any other, about whom Colonial readers would like such information as may be at our disposal, we shall be glad to meet any requests as far as we deem it expedient. It has been suggested that we should tell something of Madame de Barry, de Pompadour and other of that class, but we think it inadvisable. There are doubtless some women, whose influence upon history has been great, and whose names we have overlooked. Famous are those of whom we have written: Victoria, Elizabeth, Margaret of Norway, Catherine II. of Russia, Semiramis, Margaret of Anjou, Queen Sand, Lucretia, Borgia, Catherine de Medici, Isabelle of Castile, Dido, Helen of Troy, Zenobia, Boadicea, Cleopatra, Joan d'Arc, Maria Theresa, Marie Antoinette, Mary Queen of Scots, Madame de Maintenon, Esther, Madame de La Tour, Harriet Beecher Stowe, Hypatia, Josephine, Eleanor of Aquitaine.

After this series is ended we propose to deal with Women in Literature.

Ancient Teachers of Religion and Philosophy

By N. de Bertrand Lugin.

ARISTOTLE

From time to time a star goes out in the sky, and yet, though the source of the light is itself in darkness, the radiance still comes down to us, through millions of miles of space, for many hundreds of years. The light we see brightens the firmament, just as it did when the star itself was ablaze. So it is, when the lives of great men end; their thoughts, which are the vital part of them, cannot die with the frail body, but must live on and on, and like the light of the long-dead stars, will illumine the intellectual world for centuries after the thinker, himself, has ceased to be. Today, as we have grown, with the wisdom and philosophy, our greatest savants draw much of their inspiration, much of their logic and science, and a vast amount if not all, of their religion and philosophy from the works of the great teachers, who have gone before.

Such a one was Aristotle, rhetorician, logician, scientist, politician and philosopher. Historians agree that among the many wise men of ancient Greece, Aristotle stands alone, not only distinguished by virtue of his sublime intellect, but also by the lofty purity of his character. We read of him as a little boy, wise beyond his years, dutiful and virtuous; as a youth,

the conscientious student, and pupil of Plato; as a man, the never-failing friend, the brave and inspired philosopher and orator. While at Athens he was so remarkable, for his quick perception and keen insight into matters scientific and philosophical, so jealous in his pursuit of knowledge, and in his courage and patient, that Plato appointed him one of his staff of teachers, and Aristotle remained with his master for twenty years. "Aristotle more than Plato," wrote Valartotie, and it was because he valued the truth of his own investigations, that he gave up all idea of succeeding Plato, as he was so remarkable, for his quick perception and keen insight into matters scientific and philosophical, so jealous in his pursuit of knowledge, and in his courage and patient, that Plato appointed him one of his staff of teachers, and Aristotle remained with his master for twenty years. 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