Encyclopædia Britannica;

OR, A

DICTIONARY

OF

ARTS and SCIENCES,

COMPILED UPON A NEW PLAN.

IN WHICH

The different SCIENCES and ARTS are digeſted into diſtinct Treatiſes or Syſtems;

AND

The various TECHNICAL TERMS, *&c.* are explained as they occur in the order of the Alphabet.

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M.DCC.LXXI.

ELECTRICITY.

THE word ELECTRICITY ſignifies, in general, the effects of a very ſubtile fluid matter, different in its properties from every other fluid we are acquainted with. This fluid is capable of uniting with almoſt every body, but unites more readily with ſome particular bodies than with others: its motion is amazingly quick, is regulated by peculiar laws, and produces a vaſt variety of ſingular phenomena, the principal of which ſhall be enumerated in this article.

As we are entirely ignorant of the nature of the electrical fluid, it is impoſſible to define it but by its principal properties: that of repelling and attracting light bodies, is one of the moſt remarkable. The ancients were only acquainted with this property in amber. William Gilbert, a native of Colcheſter, and phyſician at London, in his treatiſe *De Magnete*, in the year 1600, was the firſt perſon who diſcovered, that ſulphur, wax, reſinous ſubſtances, glaſs, and precious ſtones, when dried and rubbed a little, were endowed with the ſame property of attracting and repelling ſtraws and other light ſubſtances. Sir Francis Bacon, in his phyſiological remains, gives a catalogue of electrical bodies; but it differs in nothing worth mentioning from that of Gilbert. Mr Boyle, about the year 1670, made ſome addition to the catalogue of electric ſubſtances; but all his experiments on this ſubject relate only to a few circumſtances attending the ſimple property of electric attraction: he had never ſeen the electric light, and little imagined what aſtoniſhing effects would be afterwards produced by this wonderful power.

Cotemporary with Mr Boyle was Otto Guericke, burgomaſter of Magdeburg, and inventor of the air-pump, who was likewiſe one of the firſt improvers of electricity. He made his experiments with a globe of ſulphur, which he mounted on an axis, and whirled it in a wooden frame, rubbing it at the ſame time with his hand. He firſt diſcovered, that a body once attracted by an excited electric was repelled by it, and not attracted again till it had been touched by ſome other body: that bodies immerged in electric atmoſpheres are themſelves electrified: that threads ſuſpended within a ſmall diſtance of his excited globe, were often repelled by his finger brought near them: that a feather, repelled by the globe, always turned the ſame face towards it, like the moon with reſpect to the earth; and that the excitation of his globe produced both light and ſound, though in a very inconſiderable degree. A much finer electric light was afterwards obſerved by Dr Wall, and an account of it was publiſhed in the Philoſophical Tranſactions: Dr Wall likewiſe compares the light and the crackling of his excited amber to thunder and lightening.

Sir Iſaac Newton, in 1675, was the firſt who diſcovered that excited glaſs attracted light bodies on the ſide oppoſite to that on which it was rubbed.

After Gilbert, Boyle, and Otto Guericke, Mr Hawkesbee, in his Phyſico-mechanical Experiments, publiſhed in the year 1709, diſtinguiſhed himſelf by his experiments and diſcoveries in electricity. He firſt diſcovered the electric power of glaſs, the light proceeding from it, and the noiſe occaſioned by it, together with a variety of phænomena relating to electric attraction and repulſion: Indeed little was added to his obſervations, till the diſcovery of a plus and minus electricity by Dr Watſon and Dr Franklin about the year 1746, and the farther illuſtration of that doctrine by Mr Canton.

From the year 1730 to the 1746, the writers on electricity are ſo numerous, and their experiments ſo many and various, that a volume would be inſufficient for their hiſtory. We ſhall therefore endeavour, in the *firſt* place, To give a ſhort and connected view of the nature and principles of electricity, ſo far as they have hitherto been unfolded, without mentioning the perſons to whom we are indebted for any particular diſcovery: And, in the *ſecond* place, Give a deſcription of electrical machines; with a ſelection of a few of the moſt curious and uſeful experiments, which the reader may eaſily underſtand after having made himſelf acquainted with the general principles.

IT has been aſſerted, that all bodies, provided they be heated to a certain degree, and rubbed for a long time, will diſcover themſelves to be poſſeſſed of the property of attracting and repelling light ſubſtances. However, metals of all kinds, although ever ſo much heated, or rubbed, or poliſhed, never diſcover the leaſt ſigns of electrical attraction; and conſequently are excepted from the general rule, as well as water and other fluids, which cannot be ſubjected to the neceſſary treatment. Although moſt bodies, by being heated and rubbed, diſcover more or leſs of electrical attraction; yet, as ſome of them poſſeſs this property in a more eminent degree, and with leſs labour, this circumſtance has ſuggeſted a diviſion of bodies into two claſſes, according as they are more or leſs ſuſceptible of electricity.

The firſt claſs comprehends thoſe bodies which receive and collect the electrical matter moſt eaſily, and in greateſt quantity, after being a little rubbed and heated: theſe bodies are called *electrics*, or *non conductors*; ſuch as,

1. Diamonds of all kinds; the ruby, the ſapphire, the emerald, the opal, the amethyſt, the topaz, the beryl, the granat, rock cryſtal, *&c.*

2. Glaſs, and all vitrified bodies, enamels of all colours. porcelain, glaſs of antimony, of lead, *&c.*

3. Balſams, reſins of all kinds, wax, *&c.*

4. Bituminous bodies, ſulphur, amber, aſphaltum, *&c.*

5. Certain animal productions; as ſilk, feathers, wool, hairs, and briſtles, *&c.*

The ſecond claſs comprehends thoſe bodies which either do not at all collect the electrical matter by friction, or