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bours. It was also equally convinced, that ultimately, they would be introduced on board vessels without inconvenience, and thus have the effect of establishing a sort of equilibrium between vessels of different dimensions. *Proceedings of the Academy of Sciences.*—*Ann. de Chim.* xxvi. 438.

5. *Preservation of Fish during Carriage.*—For ensuring the sweetness of fish conveyed by land carriage, it is proposed, that the belly of the fish should be opened, and the internal parts sprinkled with powdered charcoal.—*N. M. Mag.*

6. *Artificial Puzzolana.*—M. Bruyere finds that an excellent artificial puzzolana may be obtained by heating a mixture of three parts clay and one part slacked lime, by measure, for some hours to redness. M. de St. Leger also finds these proportions to be the best, and prepares the substance for sale.—*Ann. de Mines,* ix. 550.

II. Chemical Science.

1. *On the nature of the Electric Current.* By M. Ampere.—M. Becquerel having constructed an electrometer of excessive sensibility, M. Ampere was desirous of making an experiment with it, illustrative of the nature of the current of electricity produced by contact, and that produced by an electrical machine.

It is well known that when a plate of zinc and a plate of silver are soldered together, and one of them insulated, except by the other metal, a constant difference of electric tension is established between them. The object of the experiment was to verify the supposition that this difference existed even when the two plates were in communication, by being plunged into a liquid conductor; and M. Becquerel found that the tension did not sensibly diminish even when the liquid was acidulated water, and an intense electrical current was produced. This experiment proves that the two electricities developed by contact in the zinc and copper, are produced with a rapidity infinite, as it were, in comparison with the rapidity with which they can traverse acidulated water. It shews also, why no sensible electro-dynamic (electro-magnetic) effect can be produced with a current excited by friction, as for instance, by connecting the conductors of an electrical machine with the wires of the galvanometer. Friction can only excite a certain quantity of electricity in a given time; but the contact of two different metals supplies it *indefinitely* as fast as it is carried off by the fluid conductors: for as fast as they diminish the tension by the removal of the electricity, it is renewed at the point where the two metals are in contact.

It is evident, that, to produce by a machine a current of electricity equal to that produced by a pair of plates, the machine must be competent to produce the same difference of electric tension between two metallic plates, in communication with each other by a stratum of acidulated water, not thicker than that interposed between the two plates which form the voltaic point; but far from observing an effect to this extent, no application of electrical machines has been able to produce an appreciable difference.

"I may observe," says M. Ampere, "that for the observation of a difference of electric tension between two bodies, by the electrometer, it is necessary that the cause which makes the electricities of different kinds pass into the different bodies, should be able also to maintain those bodies in the electric states produced; and prevent the reunion of the electricities, at least for the time requisite to put the electrometer leaf in motion. This circumstance takes place in contact, but not in the union of two bodies; in accordance with the explanation contained in my memoir of Dec. 3, 1823. The combination of two particles can only produce an instantaneous current; and the effects on the galvanometer are observed, because, successive particles combining produce a succession of effects. But in this case no sensible tension should be produced capable of being exhibited by the electrometer, because nothing opposes the union of the two electricities in the liquid where they have been produced; and it is only a portion of these two electric fluids, which, uniting by means of the wire of the galvanometer, produce the effect on the magnetic needle. In accordance with this view, M. Becquerel has observed that the electricity produced by the combination of an acid and an alkali, does not act on the electrometer when the metallic wire which unites these two substances is interrupted, though the current is found by the galvanometer to exist when the wire is continuous.—*Ann. de Chim.* xxvii. 29.

2. *Electromotive Action of Water on Metals.*—M. Becquerel has endeavoured to ascertain experimentally the electrical effects produced by the contact of water and metals. The effect is so small as to be easily mistaken for, or confounded with, those due to electricity produced accidentally during the performance of the experiments, by contact of various parts of the apparatus, or in other ways: but taking every possible precaution, and testing his results in all ways, he arrived at the conclusion that zinc, iron, lead, tin, copper, &c. communicated positive electricity to water; whilst platina, gold, silver, &c. gave it negative electricity. Water is therefore positive with the metals which are most positive, and negative with those which are least positive. It behaves, therefore, with oxidable metals as alkalies do in their contact with acids, when there is no chemical action. The same phenomena take place even when a