

this indeed appears but a feeble tribute of respect to the services which he has rendered to the science of mineralogy.

Since the crystallization of certain mineral substances, in which nothing but earths has been discovered, has appeared problematical to many persons, and has led to the supposition of the existence of unknown acids in their composition, Mr. Smithson endeavours to explain this difficulty, by suggesting that quartz itself may be considered as an acid, to which class of bodies it has analogous qualities: we shall then have a numerous class of silicates, both simple and compound; and zeolite will belong to the latter, and may be regarded as a hydrated silicate of alumina.

Experiments and Observations on the different Modes in which Death is produced by certain vegetable Poisons. By B. C. Brodie, Esq. F.R.S. Communicated by the Society for promoting the Knowledge of Animal Chemistry. Read February 21, 1811. [*Phil. Trans.* 1811, p. 178.]

The substances selected for these experiments are vegetable poisons only; and they were chosen of the most active kind, that the exact nature of their effects might be more readily discerned. The principal object of the experiments is to determine on which of the vital organs the influence of each poison is exerted, and through what medium the organ becomes affected. The first series of experiments relates to the effects of *internal* application to the tongue and alimentary canal, and the second to the consequences of application to external wounds.

When proof spirit was given to a rabbit in sufficient quantity to kill it, the heart was observed to continue in action after apparent death.

The same observation was made respecting the heart of a cat, killed by injecting the root of aconite into the rectum.

When the oil distilled from bitter almonds was employed, although no more than a single drop had been given to a cat, she died in five minutes. Two drops of the same oil injected into the rectum of another cat, killed it also in five minutes. And the heart, in each instance, continued acting after apparent death.

Distilled oil of tobacco exerted nearly the same energy as the distilled oil of bitter almonds, and apparently in the same way, as the heart was observed to contract after apparent death.

From this circumstance, Mr. Brodie inferred that these poisons exert their primary influence on the brain, and that death ensues in consequence of the suspension of respiration, which is dependent on the brain.

When an *infusion* of tobacco was made use of instead of the *empyreumatic oil*, and injected into the rectum, the effects were different from any of the preceding, as the heart continued to contract, and was uniformly found in a state of extreme distension. Mr. Brodie is, however, of opinion, that the heart was not directly affected, but through the medium of the nervous system. For when the same

infusion was injected into the rectum of a dog whose head had been cut off, and whose respiration was kept up by artificial means, the heart continued to act in the same manner as in the experiments which Mr. Brodie lately communicated to the Society, without being sensibly affected by the infusion.

The author's trials of the *external* application of poisons were confined to the essential oil of bitter almonds, the juice of aconite, and the South American poison called Woorara. They all produced the same effects as the two former had done when applied *internally*, for the heart was observed to contract, as before, long after other symptoms of life had ceased; so that the circulation could be kept up by means of artificial respiration.

With respect to the medium through which poisons affect the brain when they are applied to external wounds, the author's experiments were confined to the woorara. And he endeavoured to determine whether the influence was conveyed by the nerves, or whether the poison itself entered the circulation, either by the absorbents, or through the divided veins. By dividing the nerves of a part, the efficacy of the woorara did not appear diminished, neither did tying up the thoracic duct in any degree interfere with its action. But when a ligature was applied round the leg of a rabbit, so as not to include the sciatic nerve, the rabbit was not in the least affected by the woorara.

The author consequently infers that the woorara acts upon the brain by passing into its substance through the divided vessels of the part to which it is applied.

Since the circulation of an animal could be kept up by an artificial respiration, after the brain had been even completely removed, Mr. Brodie conceived it possible that the functions of the brain might be found to recover from temporary suspension if the circulation were continued for a time by artificial respiration, and that thus the life of the animal might be preserved.

After two experiments, which were not attended with complete success, a third was made upon a rabbit, by applying distilled oil of almonds to a wound in the side. In five minutes it ceased to breathe, and was apparently dead; but by means of artificial respiration continued for sixteen minutes, it was completely restored to life; and on the following day appeared not to have suffered from the experiment.

On the Causes which influence the Direction of the Growth of Roots.
By Thomas Andrew Knight, Esq. F.R.S. In a Letter to the Right
Hon. Sir Joseph Banks, Bart. K.B. P.R.S. Read March 7, 1811.
[Phil. Trans. 1811, p. 209.]

In a former paper Mr. Knight showed the influence of gravitation on the plumule and radicle of germinating seeds; in the present he considers the fibrous roots, which, with little comparative regard to gravity, extend themselves in whatever direction the greatest nutriment or moisture is to be found, with an appearance of predilection,