## 254 Naumann on Primitive Formations.

pounds, which is lifted in six hours. This is equivalent to lifting a weight of 412,335,000 foot-pounds in one hour; and since one horse-power is considered equivalent to raising 1,800,000 footpounds per hour, we have locked up in every 100 yards square of sea surface, a power equal to a 236 horse-power steam-engine, acting, be it remembered, day and night to the end of time, requiring no supervision, and costing nothing, after the first outlay, but the wear and tear of machinery.

By means of appropriate machinery connected with this tidal movement, any kind of work could be readily performed. Water could be hoisted, or air compressed to any desired extent, so as to accumulate power for future use, or for transport to distant stations. Light of surpassing splendor could be generated by means of magneto-electric machines : and with a very little exercise of ingenuity, every lighthouse on the coast could be illuminated with sun-like brilliancy, and with absolutely no expenditure of fuel; the very same mechanical power of the ocean, which in its brute force would dash the helpless vessel to pieces against the rocks, being bound and coerced like the genii in Eastern tales, and transformed by man's intellect into a luminous beacon to warn the mariner against the approach of danger.

ARTICLE XXIV.—On the various theoretical views regarding the origin of the Primitive Formations. Translated from the German of Carl Freidrich Naumann, (Lehrbuch der Geognosie II. 160), by THOMAS MACFARLANE.

The parallel structure, and the stratification of gneiss, micaschist, etc., have, from the earliest dates of geological history, given rise to the opinion that water must, in some way or other, have had a part in the formation of these rocks. Werner and other geologists believed it to be even possible that they had been deposited from the waters of the ancient ocean, as crystalline sediments. But seeing that the mineralogical composition of the gneiss does not appear to be compatible with this view, geologists sought to explain the sedimentary origin of these rocks in a somewhat different manner. Thus, Von Beroldingen declared gneiss to be but a regenerated granite, that is to say, a rock resulting from granitic sand, washed together, in which the mica laminæ came to be deposited parallel with each other, among the grains of feldspar and quartz. The same view was later enunciated by Boué (Essai géologique sur l'Ecosse, p. 445), but afterwards