animal or vegetable matter appears to be almost entirely replaced by mineral matter, so as to form a genuine *petrifaction.*

Sometimes after the rock had become hardened, the animal or plant decayed and escaped through the pores of the stone, so as to leave nothing but a perfect *mould.*

After this mould had been formed, foreign matter has sometimes been infiltrated through the pores of the rock, so as to form a *cast* of the animal or plant when the rock is broken open. Or the cast might have been formed before the decay of the animal or plant.

Frequently the animal or plant, especially the latter, is so flattened down that a mere film of mineral matter alone remains to mark out its form.

All that remains of an animal sometimes is its track impressed upon the rock.

The mineralizer is most frequently carbonate of lime; frequently silica, or clay, or oxide or sulphuret of iron, and sometimes the ores of copper, lead, etc.

2. *Nature and Process of Petrifaction.*

Petrifaction consists in the substitution, more or less complete, by chemical means, of mineral for animal or vegetable matter.

The process of petrifaction goes on at the present day to some extent, whenever an animal or vegetable substance is buried for a long time in a deposit containing a soluble mineral substance that may become a mineralizer.

EXAMPLE 1. Clay containing sulphate of iron, will in a few years, or even months, produce a very perceptible change toward petrifaction in a bone buried in it. Some springs also hold iron in solution; and vegetable matters are in the process of time thoroughly changed into oxide of iron. This is seen often where bog iron ore is yearly depositing.

EXAMPLE 2. M. Goppert placed fern leaves carefully in clay, and exposed the clay for some time to a red heat, when the leaves were made to resemble petrified plants found in the rocks.

Theory of Petrifaction.—In all cases of petrifaction, chemistry acts a part. In many instances galvanism and electro-magnetism are concerned; especially where the organic substance is converted into crystalline matter. The juxtaposition of mineral matters forms galvanic combinations, that produce the requisite currents.

3. *Means of determining the Nature of Organic Remains.*

The first requisite for determining the character of organic