

and still higher, as stated above, they will doubtless diminish upon more careful examination.

*Second Law.*—*With the exception above named, the fossil species have all perished.*

This is merely an inference from the first law; but it is so common to suppose recent species identical with the fossil, that we make the inference a distinct law.

*Third Law.*—*“The duration of types and species as a general rule, is usually proportioned to rank and intelligence. The most highly organized fossils have the smallest range.”*—(Owen.)

The great lizards of the Jurassic series, the mammals of the tertiary, and especially man, are examples of this law.

By a type we mean a set of characters by which a genus, or family, or group is distinguished from all others. It is the model or pattern on which such groups are formed. Thus the horse family, the cat family, the ostrich family, the pigeon family, have certain characteristics by which we know them, though sometimes difficult to describe; and it is found that many of these types have gradually changed. This law declares that these types have the shortest duration among the higher tribes.

*Fourth Law.*—*Each type of organism has had but one term of uninterrupted existence, and sometimes has extended only through part of a formation.*

There are some seeming exceptions to this law; as for instance the appearance of the marsupial animals in the trias and oolite, and then their failure in the chalk and tertiary, and reappearance in the alluvial. But the probability is that they existed during these intermediate periods, since they are found in the pleistocene, of Australia.

Among the animals extending through a part of a formation, we may mention such as the Mastodon, Elephant, Dinotherium, Zeugloden, and Man, which are found only in parts of the tertiary and alluvial.

*Fifth Law.*—*Most of the great Sub-Kingdoms of animals and plants, two thirds of the classes and nearly half the orders, and a few of the genera extend through all the formations.*

The only exception in respect to the sub-kingdoms, is, that vertebrate animals are not found in the Lower Silurian, and no deeper in the Upper Silurian than the lower Ludlow Rock; and flowering plants are not found lower than the Devonian, where Hugh Miller has detected coniferous trees in the lower Old Red Sandstone of Scotland. But perhaps in considering this subject we ought to have reference to a palæontological classification, rather than one founded partly on lithological characters, and this would bring all the sub-kingdoms into the lowest life period, which reaches as high as the top of the Permian.

It will be seen by referring to the Table of Organic Remains, which we have presented at the end of the last Section, that while many of the classes and orders of the less perfect animals and plants extend through all the formations, those of the higher vertebrate type rarely reach through the whole