(4) The Vegetable Kingdom is a provision for the storing away or magazining of force for the Animal Kingdom. This force is acquired through the sun's influence or forces acting on the plant, and so promoting growth; mineral matter is thereby carried up to a higher grade of composition, that of starch, gluten, vegetable fiber and other products, and in this there is a concentration or accumulation of force. To this stored force animals go for growth and development; and, moreover, the grade of composition is thus carried yet higher, to muscle and nerve; and this is a magazining of force in a still more concentrated or condensed state.

(5) Plants, of some minute kinds, and the spores of some larger species (some Algæ) have locomotion, or a degree of contractility in certain parts that corresponds to an infinitesimal amount of mechanical power; but the locomotive spores, as they develop, become fixed, like the plants from ordinary seeds, and no increase of mechanical power accompanies vegetable development. In animal development from the germ, on the contrary, there is always an increase of power — an increase, in all, of muscular (mechanical) power, and, in the case of species above the lower grade, of psychical and intellectual power, — until an ant, for example, becomes a one-ant power, a horse a one-horse power. Whence, an animal is a self-propagating piece of enginery, of various power according to the species.

(6) In the plant, the root grows downward (or *dark*-ward) and the stem upward (or *light*-ward), and there is thus the *up-and-down* polarity of growth — the higher developments, those connected with the fruit, taking place above, or in the light. In the animal, there is an *antero-posterior* polarity of power as well as growth — the head, which is the seat of the chief nervous mass and of the senses, and the locus of the mouth, making the *anterior extremity*. *Consequently, there is in animals a connection between grade and* the greater or less dominance and perfection of the head extremity. An animal, as its ordinary movements manifest, is preëminently a *go-ahead* thing. Even the inferior stationary species, like the Polyp, show it in the superior power that belongs to the *mouth extremity*.

(7) Plants have no consciousness of self, or of other existences; animals are conscious of an outer world, and even the lowest show it by avoiding obstacles.

From the above diverse characteristics of plants and animals, it follows that, however *alike chemically* are the germs of the two, they must *still* be, *in their chemical nature*, fundamentally different.

ANIMAL KINGDOM.

The most prominent subdivisions of the Animal Kingdom are: —

I. VERTEBRATES; II. INVERTEBRATES.

These subdivisions are based on the presence in the former alone of a vertebral column, with a bone-sheathed cavity along the *dorsal* side of the column for the great nervous cord. This vertebral column in the embryo-stage and in many adult fishes is a cartilaginous cord, called the notochord (from the Greek for *back* and a *gut chord* of a stringed instrument), situated below and parallel with the spinal cord or nerve; out of it, as development and ossification proceed, the vertebral column is produced. In the sheath of the spinal nervous cord, the dorsal spinous processes of the vertebræ are produced, which more or less inclose the cord. The Invertebrates, besides having no vertebral column within, have the chief nervous cord *ventral* in position and below the intestinal canal instead of *dorsal*.

The Vertebrates include, beginning with the highest: —

MAMMALS	REPTILES	FISHES
BIRDS	AMPHIBIANS	LEPTOCARDIANS

All other species are Invertebrates.