The trachea is generally rather short, divided near the base of the neck into two large bronchi, one of which is often so curved as to form a large arch. The lungs are very voluminous; more so in land than in water Turtles. This difference alone, in the size of this organ, accounts almost entirely, both for the high arched body of the true land Turtles which never go into water, and for the flat trunk of the Trionychidæ and sea Turtles, which hardly ever leave the water, except to lay their eggs. But even in the aquatic Turtles, the capacity of expansion of the lungs is great enough to allow them to remain for half an hour or more under the water, as I have had ample opportunities of observing in Trionyx, though it must not be forgotten, that in the family of Trionychidæ, the skin being soft and thus more permeable to water, a kind of respiration of the blood may take place through the skin also,[1] as is the case so extensively in Frogs.

The following table shows the capacity of the lungs in those families, of which I was able to obtain fresh specimens at the time. The experiments were made upon the living animal by pumping out the air of the lungs, then pumping in water, then pumping out the water again and measuring its amount in cubic inches. This table shows that aquatic Turtles require much less air in their lungs, in proportion to the weight of the body, than land Turtles.[2] It shows especially, that in mud and soft-shelled Turtles, the lungs being much reduced in size and importance, by far the greater part of the respiration must be performed by the skin of the whole body, which is much thinner in these families than in other Turtles; while, on the contrary, in the true land Turtles and that land Emydian,

backwards. Again, we find in Frogs, at least in some, for instance in the genus Rana, a movable valve, by which it can close or open the nostrils at will; there is nothing of this kind to be found in Turtles.

[1] The beautifully ramified vessels, which are seen through the epidermis upon the entire lower surface of the body of Trionyx, add great weight to this supposition. See below, p. 284.

[2] It is moreover evident that the capacity of the lungs is not a family character, for while the Testudinina (land Turtles) are generally provided with much larger lungs than the Emydoidæ, our table furnishes the unexpected evidence, that in a member of the latter family they are larger still. The capacity of the lungs in Cistudo, for instance, shows clearly its influence upon the form of the body, and it would thus seem that here, at least, form cannot characterize the family. But this very instance proves, on the contrary, the truth of the principle adopted for the limitation of families, as by a thorough examination we find still in the Cistudo the real character of the form of Emyds, in its sharp contradistinction from the Testudo family. See below, The Family Characters of Emydoidæ. Hence it follows, that the mode of life, and, what depends upon it in the organization of the animal, the capacity of the lungs, the length and proportions of the intestine, etc., are generally, though by no means always, common to a family; and that such definite complications of forms as characterize families may be modified according to the different modes of life, without interfering with or changing the ideal combination. This ideal is the conception of the Divine Mind. The conception however is not changed, in the act of being expressed in living realities, but only specified; and this is done in the various members of a family, according to their mode of life, etc.