

work undoubtedly still contains, I feel the more the responsibility I have assumed, in undertaking to write anew the Embryology of that order of Reptiles. But, if I cannot expect to exhaust the subject, I may at least hope to show how instructive this field may become for the American student, and how important it is for science in general. Every European embryologist must envy the opportunities our naturalists have in this respect; and it is the duty of those who possess such advantages to supply fully and freely any additional information which a thorough comparison of the structure and embryology of the different genera and families of our Turtles may afford, and which is not already included in the following pages.

The age at which Turtles begin to lay has been ascertained, with sufficient precision, only for one species, our common *Chrysemys picta*. By the help of a series of specimens, from those just born up to adult ones, it was possible to trace the progress of growth of the ovarian eggs till they were ready to drop into the oviduct; and thus the fact was elicited, that the eggs do not begin to differ in size among each other by any readily appreciable amount until the seventh year, and that the process of reproduction by laying is not commenced before the eleventh year. Several other genera of this and other families were examined in reference to this point, but for want of materials the investigation was not carried on so extensively nor with so much precision as with *Chrysemys picta*; yet enough has been seen to warrant the assumption, that from the eleventh to the fourteenth year<sup>1</sup> is about the age at which most, if not all, our native fresh-water Turtles lay their eggs for the first time.

Again: the time of the year at which they lay is the same for both the northern and the southern species, without reference to physical differences, such as temperature, moisture, etc., or climate in general. *Graptemys LeSueurii*, which lays as early as the first of June, gives the earliest instance of incubation in the year, and this is a western and south-western species. *Chelydra serpentina*, the species most widely distributed in the United States, at the North lays as early as the tenth of June, and continues to do so till the twenty-fifth: some individuals disposing of their burden as early as the first date, and others as late as the latter.

<sup>1</sup> A careful comparison of the relative distance of the successive lines of growth of the scales may satisfy any one that the Turtles grow more rapidly during the first ten or twelve years of their life; and that after the twelfth or fourteenth year the rate of increase is considerably diminished. From the facts observed in our little *Chrysemys picta* it is certain that this is also the period at which they begin to lay.

There exists, no doubt, some difference between different families; but, judging from the change in the rate of increase after the twelfth or fourteenth year in different species, there can be no doubt that this is a critical period in the life of all the scaly fresh-water and land Testudinata, and *Chrysemys picta* shows that this is connected with the period of their first reproduction.