Skeletal System

Identify the following

A. Skull

Premaxilla, maxilla, nasal, prefrontal (lacrimal), frontal, parietal, squamosal, palatine, parasphenoid, sphenoid, pterygoid, quadrate, occipital, occipital condyle, foramen magnum, quadratojugal, jugal, articular, angular, dentary. Since there is considerable fusion in the avian skeleton, distinct sutures between many of the bones will not be apparent. (see attached figures)

B. Hyoid apparatus

The hyoid supports the tongue. It is formed embryonically from part of the visceral arch II and all of arch III. Observe the various hyoid bones on display (also see figures).

C. Use the articulated skeletons to identify all the bones indicated in the figure of the articulated chicken.

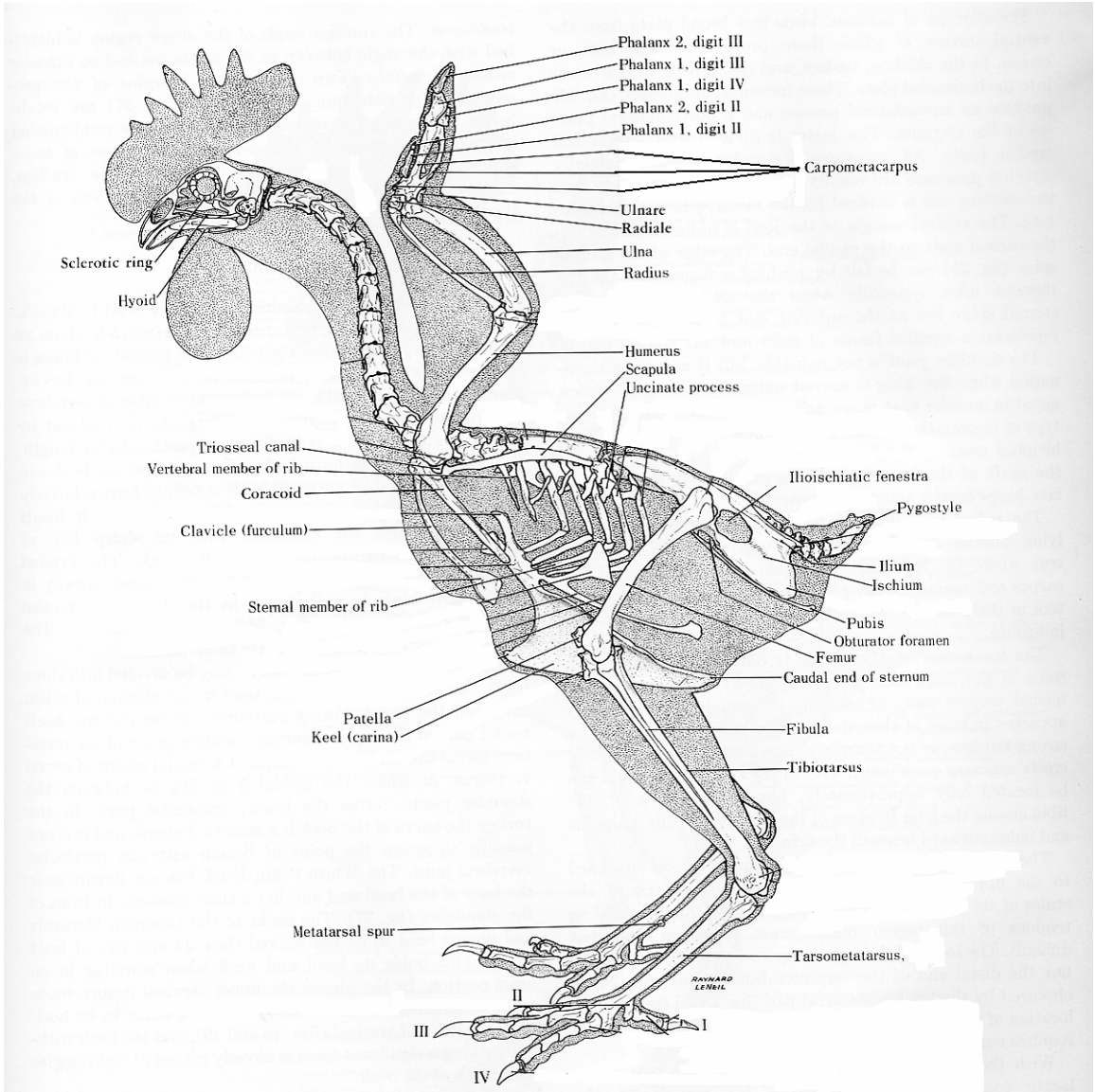
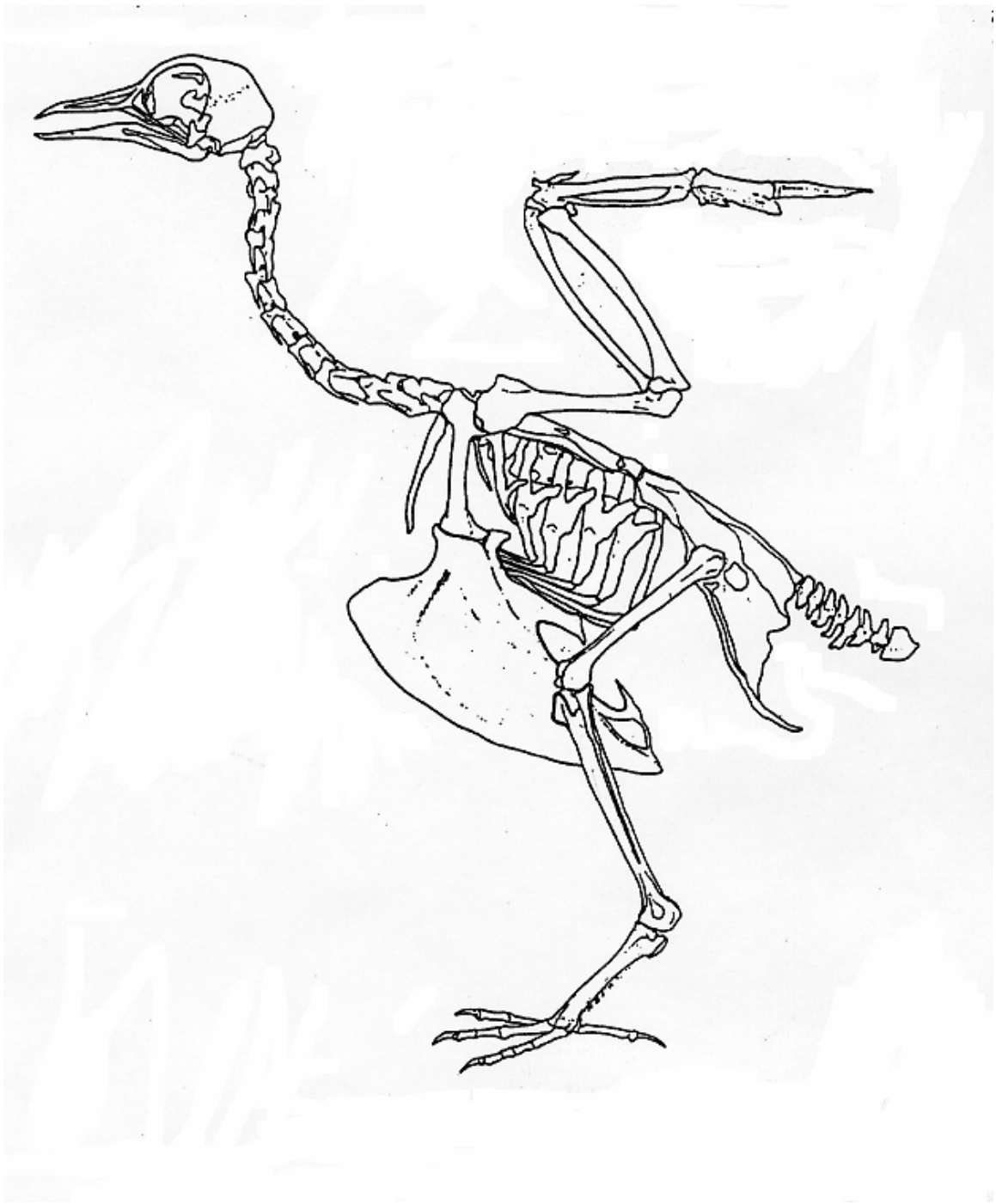
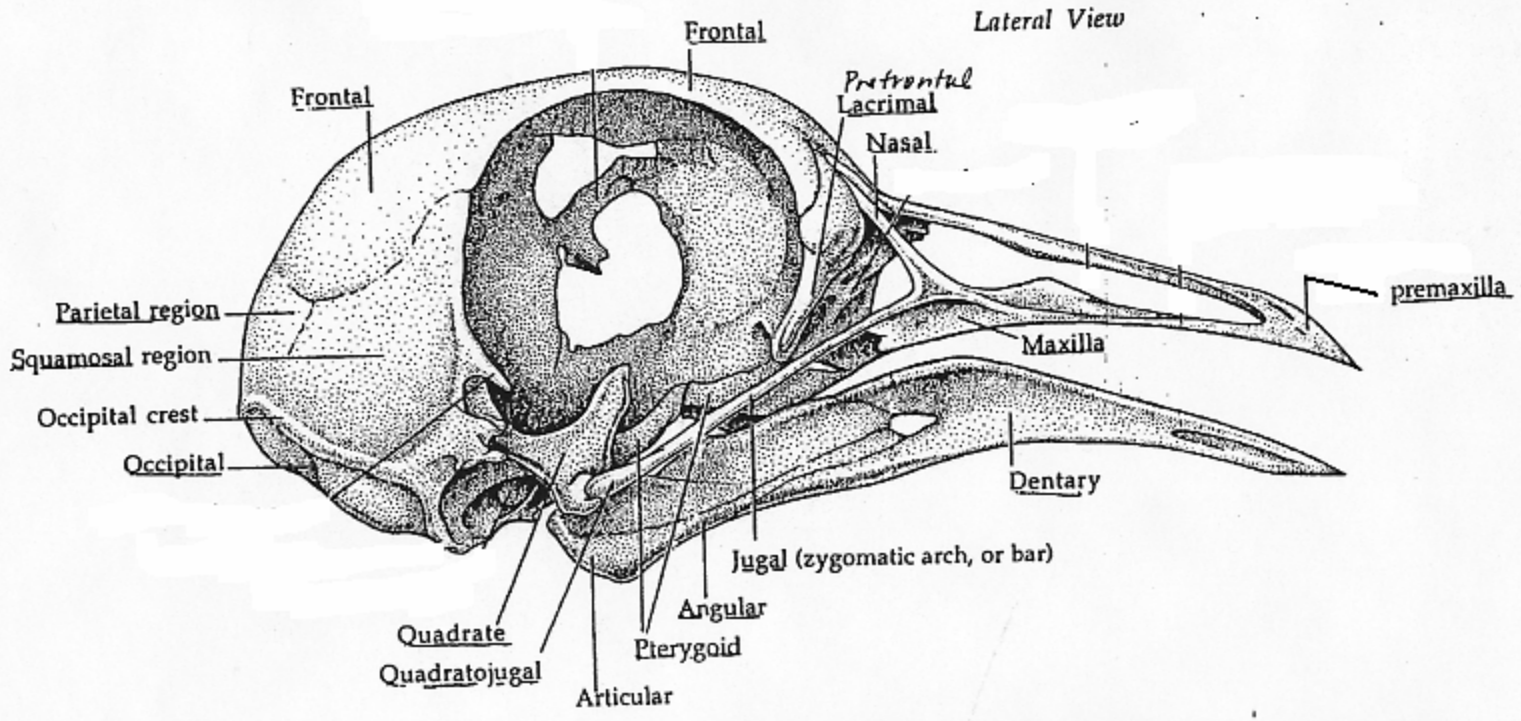


FIGURE 25.—Lateral view of the skeleton of the Single Comb White Leghorn Chicken. Abbreviations: C., cervical vertebra; Coc., coccygeal vertebra; L., lumbar vertebra; T., thoracic vertebra.

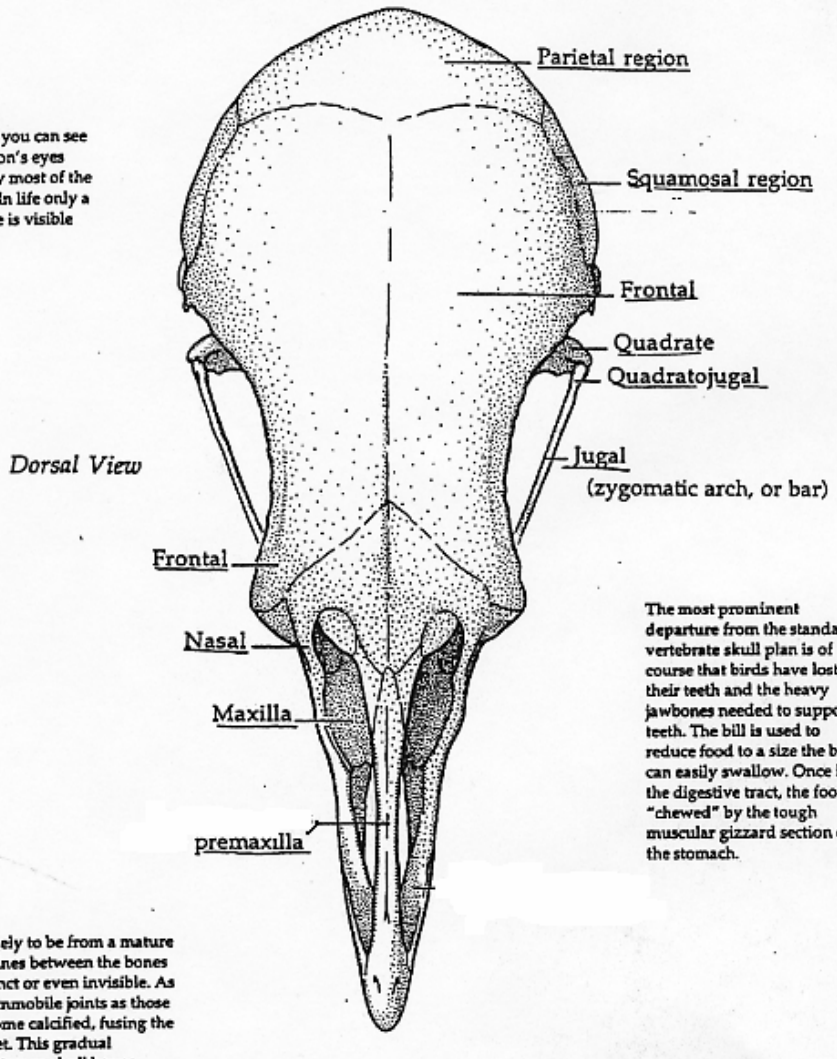


Lateral View of the Skull
Rock Dove (*Columba livia*)



From the side, the skull of a pigeon shows how much the eyes dominate the avian head. To accommodate the large orbits the brain has been forced down and back into the occipital region and now tilts in the skull at an almost 45° angle. Note how open the bird's skull is. Composed largely of tiny struts and paper-thin sheets of bone, the structure is remarkably strong.

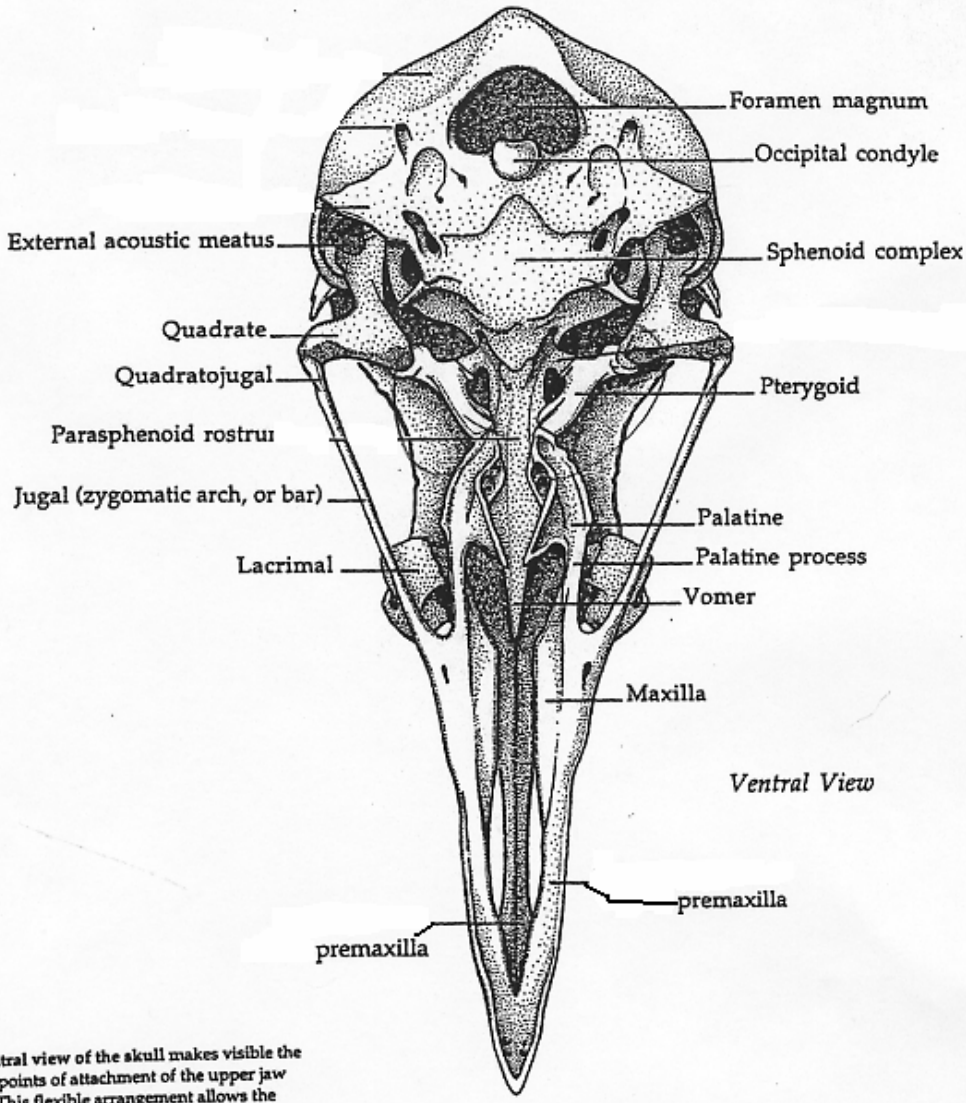
In looking at the skull you can see just how large the pigeon's eyes really are—they occupy most of the room within the skull. In life only a small portion of the eye is visible between the eyelids.



The most prominent departure from the standard vertebrate skull plan is of course that birds have lost their teeth and the heavy jawbones needed to support teeth. The bill is used to reduce food to a size the bird can easily swallow. Once in the digestive tract, the food is "chewed" by the tough muscular gizzard section of the stomach.

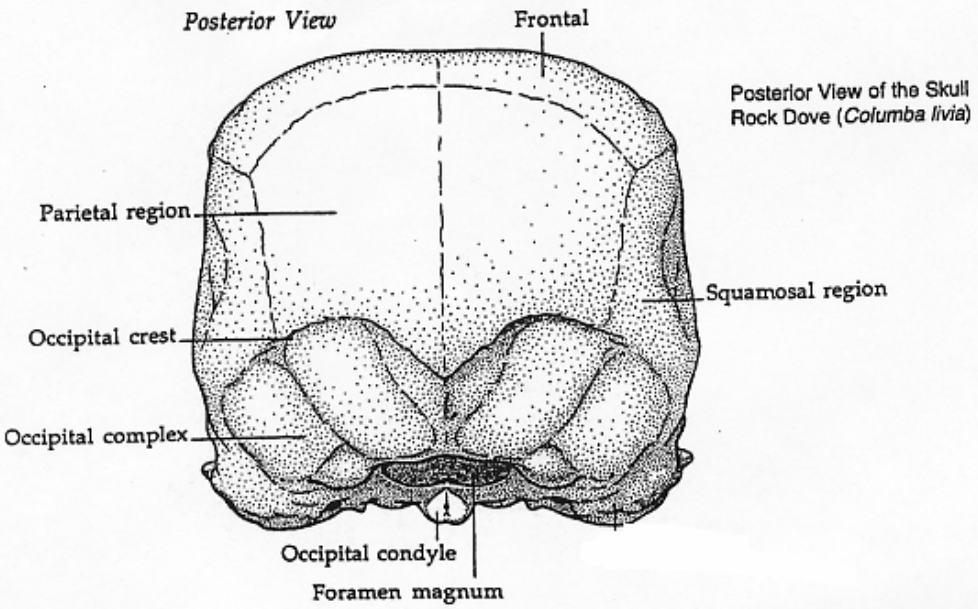
Your skull specimen is likely to be from a mature bird, and thus the suture lines between the bones of the skull may be indistinct or even invisible. As birds age, such normally immobile joints as those in the skull gradually become calcified, fusing the bones in a continuous sheet. This gradual ossification of the joints between skull bones occurs in most vertebrates (including humans) and is often used as a means of determining the approximate age of animals. In birds the rate of ossification of the frontal bones is used to separate birds only several months old from older birds wearing similar plumage colors (see Skulling in chapter 12, Field Techniques).

References: Bellairs and Jenkin 1960; Carroll 1988; Chamberlain 1943; Howard 1929.



A ventral view of the skull makes visible the three points of attachment of the upper jaw area. This flexible arrangement allows the mouth to open wider than would be possible with a fixed upper jaw. The zygomatic arch and the pterygoid-palatine complex of bones articulate with the quadrate bone. The jaw muscles can pull this flexible complex of bones upward to swallow large food items whole.

References: Bellairs and Jenkin 1960; Carroll 1988; Chamberlain 1943.



Posterior View of the Skull
Rock Dove (*Columba livia*)

References: Bellairs and Jenkin 1960; Carroll 1988; Chamberlain 1943.