

Even-Toed Ungulates: Age 1.

White-tailed Deer: Antlers, Teeth, Pelvis

Mule and Black-tailed Deer: Antlers, Teeth, Pelvis

Elk: Body size, Antlers, Teeth

Moose: Body Size, Length of Bell (shorter with age), Antlers,
Phenology of Antler cycle (earlier with age)



Caribou: Antler size, Antler cycle, Teeth

Even-Toed Ungulates: Age 2.

Muskox: Body size, Horns

Bison: Horns



Wild Sheep: Body size, Horn annuli, Teeth

Mountain Goat: Body Size, Horn Shape, Horn Annulli, Dominance

Pronghorn: Body Size, Cementum Annulli

Selected Mammals: Age

Rabbits and Hares

Muskrat

Gray, Fox and Red Squirrels

Woodchuck

Opposum

Small Mammals



= > Body Size, Hind Foot, Teeth, Genitalia, Eye lens weight,
skull size, baculum weight, nipples

Even-Toed Ungulates: Gender 1

Sex Determination DIMORPHIC

Moose: Antlers, males >40% heavier than females, females have white vulval patch

Caribou usually: Males 10-15% larger, 10-50% heavier and larger antlers than females; antler cycle, mandible length

Pronghorn: Incisor tooth, Horn length, Body length, Horn Sheath Shed, Face mask

Bison: Males weigh app. 5% more than females, Horns

Elk: Antlers, males have upper canines

Even-Toed Ungulates: Gender 2

Sex Determination DIMORPHIC

Muskox: Males >40% heavier than females

Mountain Sheep: Males heavier than females, Horn Shape

White-tailed Deer: Antlers, pelvis

Black-tailed Deer: Antlers, pelvis



Even-Toed Ungulates: Gender

Sex Determination MONOMORPHIC

Mountain Goat -usually females dominate though
-urination posture
-horns of males are thicker at base



Birds: Gender

Sex Determination MONOMORPHIC

- Loons
- Grebes
- Gannets
- Cormorants
- Swan
- many Shorebirds



=> DNA, behavior

Birds: Gender

Sex Determination DIMORPHIC

-waterfowl

-many warblers

-House Sparrow

=>plumage, behavior

Birds: Gender

Shape of Cloaca

- bursa depth
- size and color
- shape



Gender and Age

Subcellular sex determination

Birds: Chromosome analysis of cells from blood, feathers

Mammals: Chromosome analysis of cells for many species

=> e.g. useful when only parts of the animals are available

Terrestrial Carnivores

Wolf

Coyote

Red Fox and Gray Fox

Black Bear, Brown Bear and Polar Bear

Raccoon

Mink

Pine Marten

River Otter

Wolverine

Fisher

American Badger

Skunk

Felids



See Bookhout (1996)

General appearance: Sheep Example

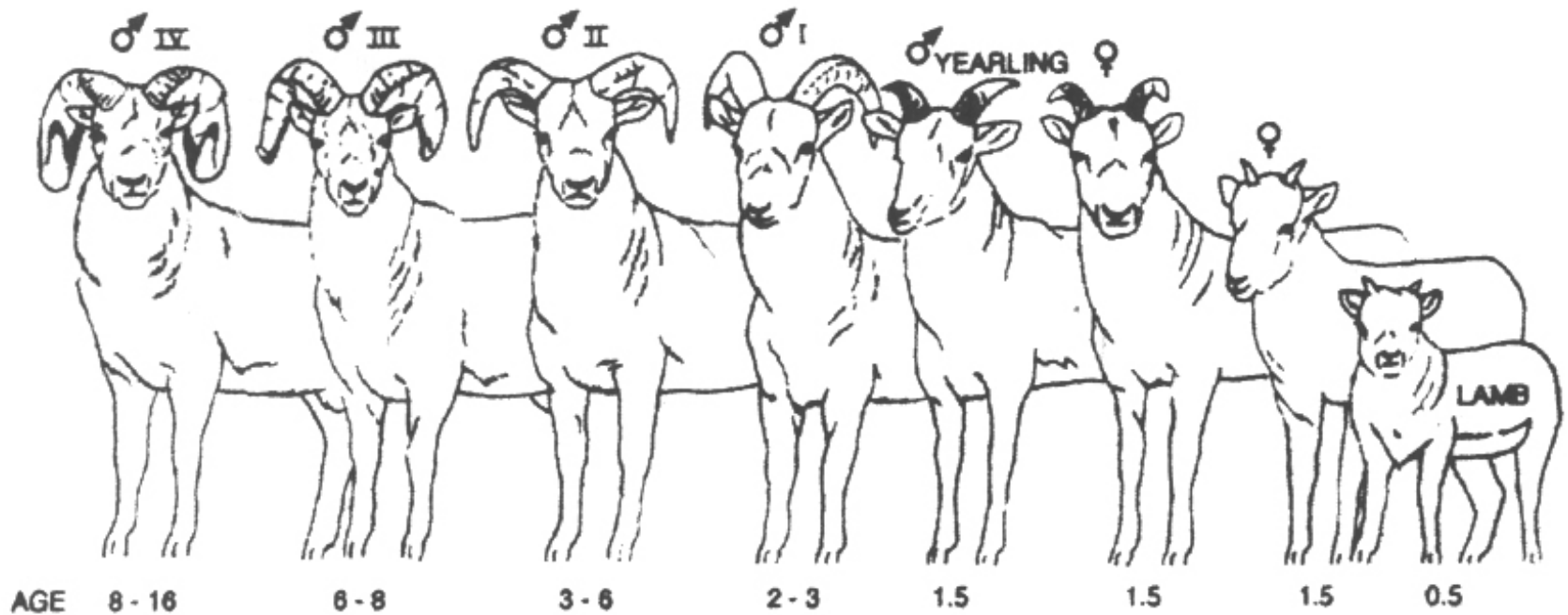
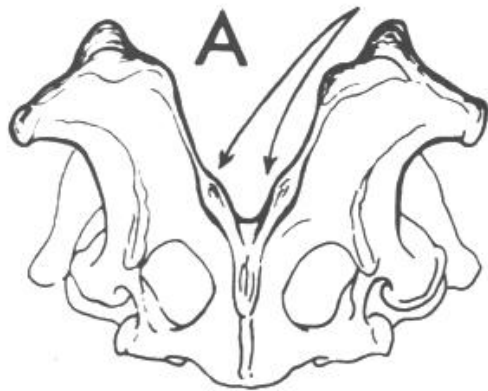


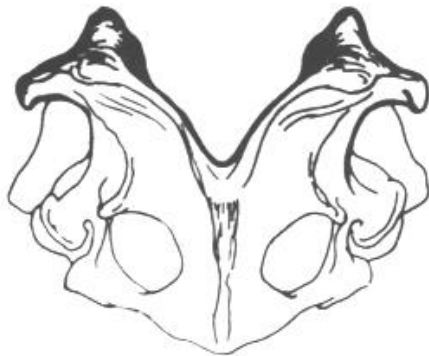
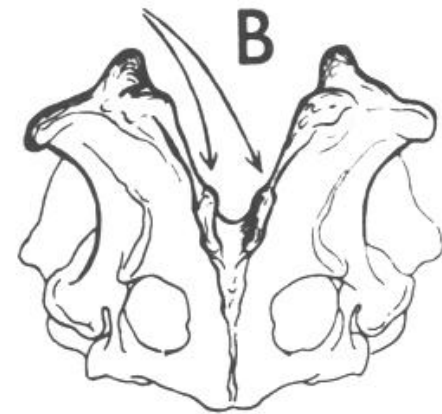
FIGURE 51.7. Age classes of bighorn sheep. Note that the classes form a cline in body and horn size. SOURCE: Redrawn from Geist (1968).

Example Deer



SUSPENSORY
TUBEROSITIES

MALE



FEMALE

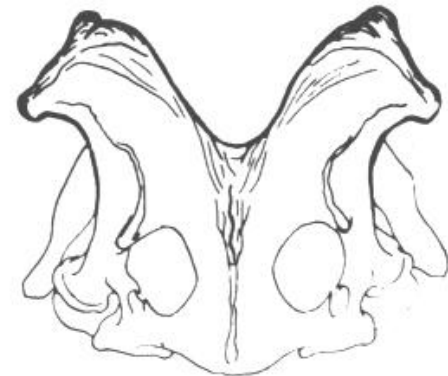


Fig. 22. Pelvic girdle of the white-tailed (A) and black-tailed (B) deer, viewed from the rear, showing the suspensory tuberosities for the attachment of the penis ligaments in the male and their absence in the female (after Taber 1956).

Example Woodcock

sex: -bill length
 -outer primary width

age: -inner secondary feathers

BILL LENGTH (mm) AND PROBABILITY OF CORRESPONDING SEX

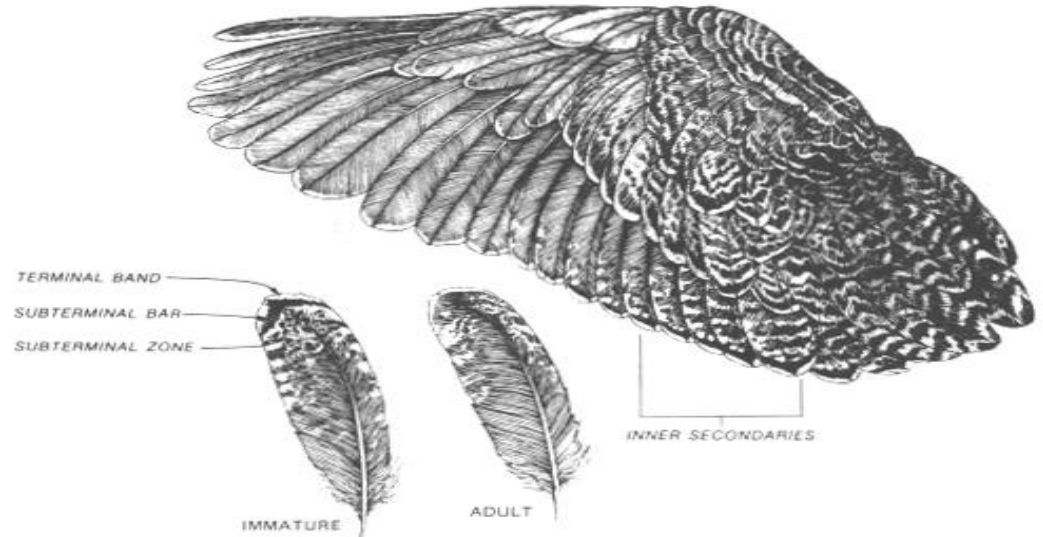
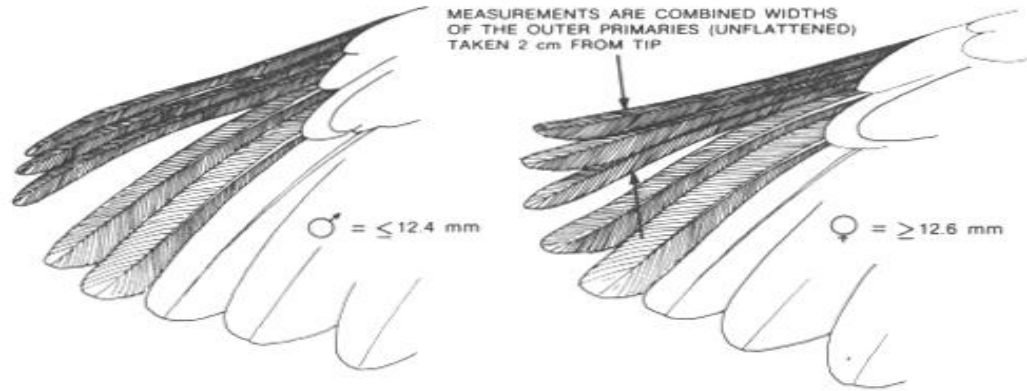
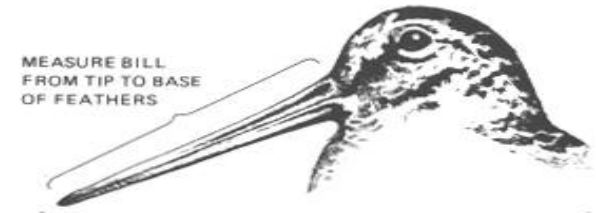
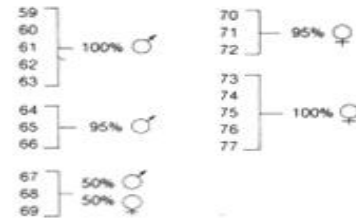


Fig. 16. Ascertaining sex and age in American woodcock. Bill lengths (top) and outer primary widths (center) distinguish sex. Bottom: patterns of inner secondary feathers distinguish age classes. Based on Roberts (1988), adapted from Liscinsky (n.d.) and Martin (1964).

Example Gray Partridge

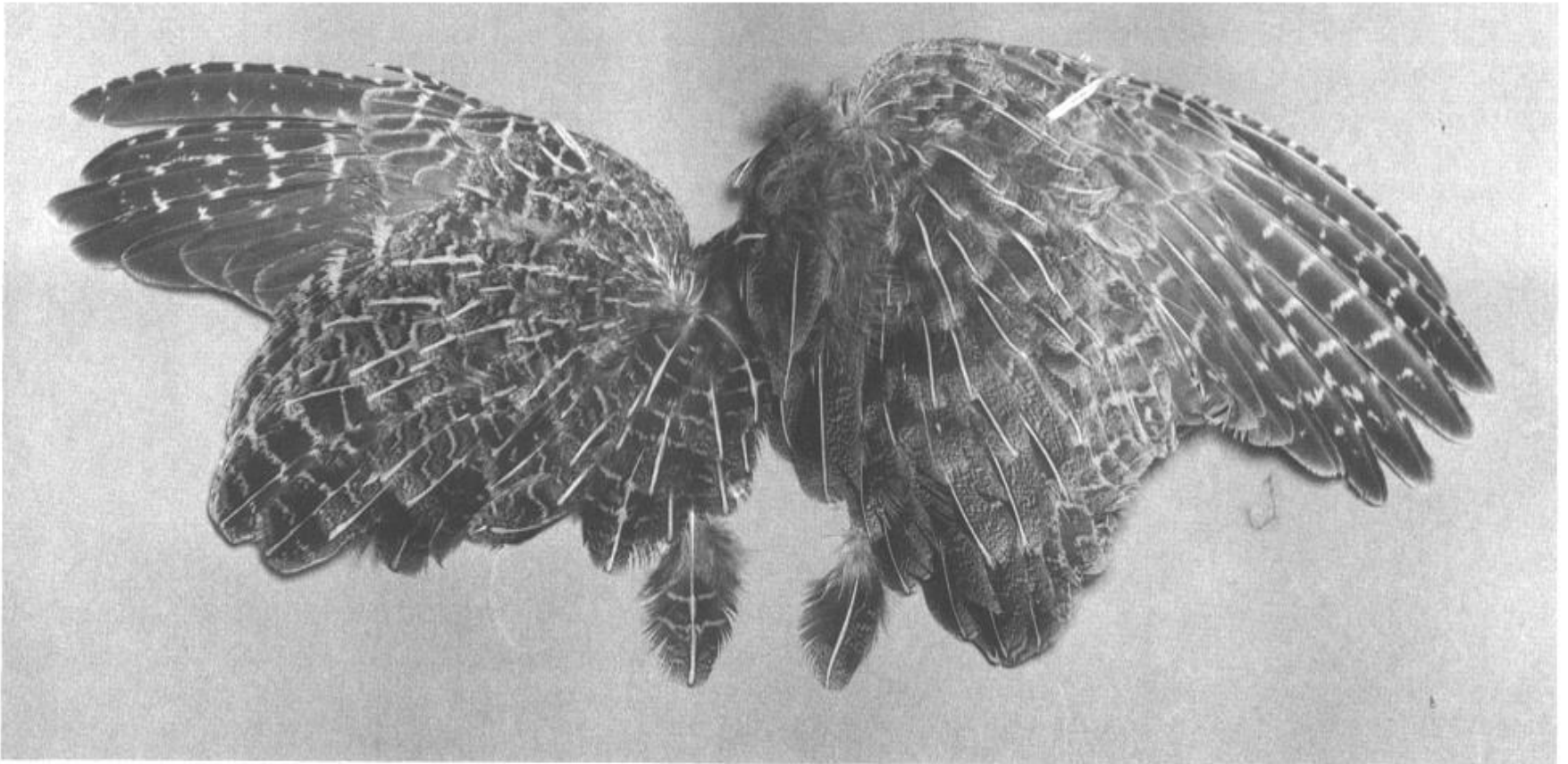


Fig. 10. Scapular feathers and wings from gray partridge. Note central stripe in feather from male on right and barring on feather from female (after McCabe and Hawkins 1946).

Example Gray Partridge

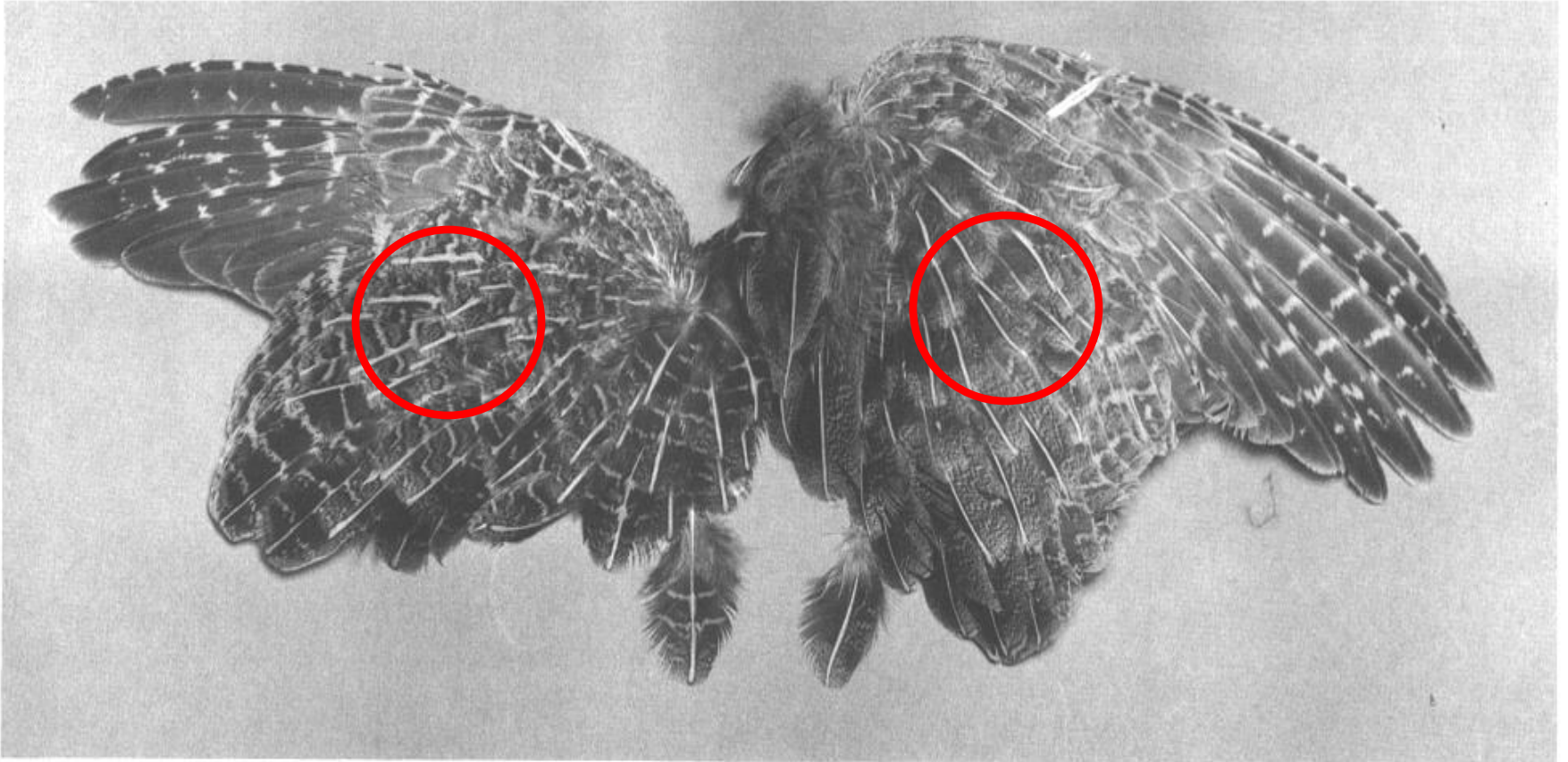


Fig. 10. Scapular feathers and wings from gray partridge. Note central stripe in feather from male on right and barring on feather from female (after McCabe and Hawkins 1946).

Example Pheasant chicks

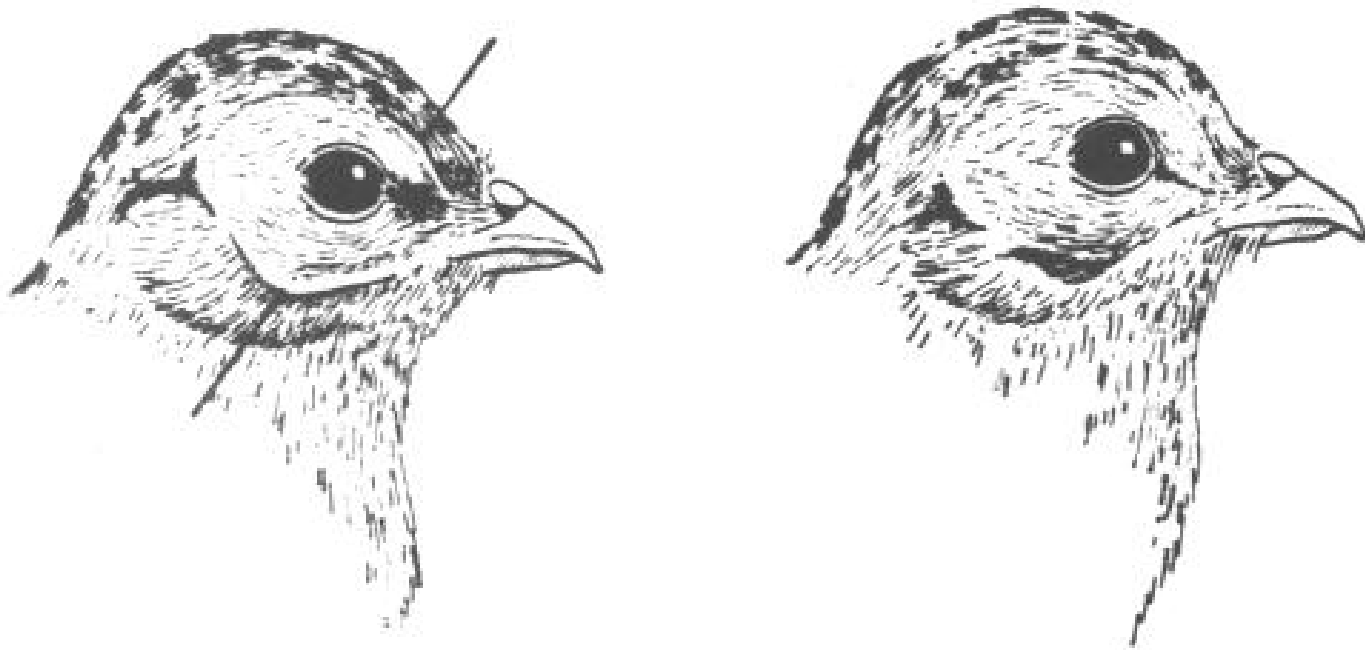


Fig. 9. Heads of day-old pheasant chicks showing regions of maximum wattle development. Male chick on left, female on right (from Woehler and Gates 1970).

End of Session

Any Questions ?

